DRAFT BASIC ASSESSMENT REPORT

for

BLOEMSMOND GRID CONNECTION INFRASTRUCTURE

On

Portion 5 of Farm Bloemsmond 455, Portion 14 of Farm Bloemsmond 455, Remainder of Farm Dyasonsklip 454, Remainder of Farm Rooipunt 617, Remainder 638 Tungsten Lodge and Olyvenhouts Drift Settlement Agricultural Holding 1080.

In terms of the

National Environmental Management Act (Act No. 107 of 1998, as amended) & 2014 Environmental Impact Regulations

Prepared for Applicant: Bloemsmond Grid (Pty) Ltd.

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Report Reference: KAI582/07

Department Reference: to be allocated

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Cape EAPrac Environmental Assessment Practitioners PO Box 2070 George 6530 Tel: 044-874 0365 Fax: 044-874 0432 **Report written & compiled by:** Dale Holder (Ndip Nature Conservation), who has over 15 years' experience as an environmental practitioner. **Registrations:** Director, Louise-Mari van Zyl (MA Geography & Environmental Science [US]; Registered Environmental Assessment Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa, EAPSA). Ms van Zyl has over fifteen years' experience as an environmental practitioner.

PURPOSE OF THIS REPORT:
I&AP Review and Comment

APPLICANT:
Bloemsmond Grid (Pty) Ltd

CAPE EAPRAC REFERENCE NO:
KAI582/07

DEPARTMENT REFERENCE:
To be allocated

Draft Basic Assessment Report

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended) & Environmental Impact Regulations2014 (as amended)

Bloemsmond Grid Connection Infrastructure

Portion 5 of Farm Bloemsmond 455, Portion 14 of Farm Bloemsmond 455, Remainder of Farm Dyasonsklip 454, Remainder of Farm Rooipunt 617, Remainder 638 Tungsten Lodge and Olyvenhouts Drift Settlement Agricultural Holding 1080**.**

Submitted for:

Stakeholder Review & Comment

Report Issued by:

Cape Environmental Assessment Practitioners

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REPORT DETAILS

Title:	Draft Basic Assessment Report for Bloemsmond Grid Connection Infrastructure
Purpose of this report:	This Draft Basic Assessment Report is made available to all registered and potential Interested and Affected Parties (I&APs) for review and comment and all comments received will be incorporated into the Final Basic Assessment Report that will be submitted to the competent authority for decision making. This BAR forms part of a series of reports and information sources that are being provided during the Basic Assessment Process for the proposed Bloemsmond Grid Connection Infrastructure near Keimoes in the Northern Cape Province. Registered I&APs will be given an opportunity to comment on the following reports as part of this environmental process: - Draft Basic Assessment Report, - All Specialist Studies, and - Draft Environmental Management Programme. In accordance with the regulations, the objectives of an environmental process are to, through a consultative process: (a)identify the relevant policies and legislation relevant to the activity; (b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location; (c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process; (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment; (e) identify the key issues to be addressed in the assessment phase; (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and (g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.
Prepared for:	Bloemsmond Grid (Pty) Ltd
Published by:	Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)
Authors:	Mr Dale Holder
Reviewed by:	Ms Melissa Mackay
Cape EAPrac Ref:	KAI582/07
DEA Case officer & Ref. No:	To be allocated – Application and Draft Basic Assessment Report submitted simultaneously.
To be cited as:	*Cape EAPrac,* 2020. Draft Basic Assessment Report for Bloemsmond Grid Connection Infrastructure. Report Reference: KAI582.07. George.

TECHNICAL CHECKLIST

The following technical checklist is included as a quick reference roadmap for the proposed project.

Applicant Details	Applicant Name:	Bloemsmond Grid (Pty) Ltd
	Company Registration Number:	2014/142363/07
	BBBEE Status:	n/a
	Project Name:	Bloemsmond Grid Connection Infrastructure
Size of the study area	Size in ha of study area.	A grid connection corridor (from the on-site substations to the Bloemsmond Collector Substation and from the Bloemsmond Collector Substation to the Upington MTS) have been assessed. This corridor is approximately 300m wide and increases to ~1.3 km at the Upington MTS. The total surface area of the asssed corridor is 1512ha.

Development Footprint	Inclusive of substations and powerline.	The proposed development constitutes, both linear and non linear components. **Non Linear components:** • Bloemsmond 3 - Eskom Portion of on-site substation: 5000m^2 (50m x 100m). • Bloemsmond 4 - Eskom Portion of on-site substation: 5000m^2 (50m x 100m). • Bloemsmond 5 - Eskom Portion of on-site substation: 5000m^2 (50m x 100m). • Bloemsmond Collector Substation: 11250m^2 (150m x 75m). The non linear aspects of this development will therefore have a development footprint of approximately 26350m^2 **Linear components** • 33kV or 132kV overhead powerline from Bloemsmond 3 to Collector substation: 4480m • 33kV or 132kV overhead powerline from Bloemsmond 4 to Collector substation: 4400m • 33kV or 132kV overhead powerline from Bloemsmond 5 to Collector substation: 9270m • DCt or 2 x SCt 132kV overhead powerlines from Bloemsmond collector to Upington MTS: 12500m The linear aspects of this development will thus be approximately 30650m
Capacity of the facilities / infrastructure	Capacity of facilities and infrastructure in kV)	33kV – 132kV
Grid connection components	Conductor	Kingbird / Twin Kingbird / Tern / Twin Tern
	Structure height	• Pylon Structures: Approximately 30.5m; • Substation buildings: Approximately 8m; • Lightning conductors at substation: Approximately 21m.
	Laydown area dimensions	Approximately 1ha of laydown area will be required per substation. Total laydown area for the project will not exceed 4ha.

Bloemsmond Grid (Pty) Ltd proposes the construction and operation of grid connection infrastructure for the five proposed Bloemsmond solar PV facilities near Upington in the Northern Cape Province. This grid connection infrastructure will connect the following Renewable Energy Iinfrastructure to the National Grid via the Eskom Upington Main Transmission Substation (MTS):

- AEP Bloemsmond Solar 1 (Authorised - 14/12/16/3/3/2/814);
- AEP Bloemsmond Solar 2 (Authorised - 14/12/16/3/3/2/816);
- Bloemsmond 3 (Decision Pending - 14/12/16/3/3/1/2042);
- Bloemsmond 4 (Decision Pending - 14/12/16/3/3/1/2044); and
- Bloemsmond 5 (Decision Pending - 14/12/16/3/3/1/2043).

LOCATION OF PREFFERED ALTERNATIVE

The table below reflects the positions of the preferred alternatives. It must be noted that alternative substation and powerline alignment positions were considered as part of this environmental process (see section 2.10 of this Draft BAR for details of the alternatives considered.

Component	Latitude	Longitude
Substation centre positions (Preferred)		
Bloemsmond 3 on-site substation	28°33'32.10"S	21°1'57.88"E
Bloemsmond 4 on-site substation	28°34'39.80"S	21°1'40.33"E
Bloemsmond 5 on-site substation	28°31'47.69"S	21°0'5.52"E
Bloemsmond Collector Substation	28°35'16.12"S	21°2'34.75"E
Powerline positions (preferred)		
Bloemsmond 3 to Bloemsmond Collector Substation		
Start	28°33'32.10"S	21°1'57.88"E
Middle	28°34'24.63"S	21°02'41.75"E
End	28°35'16.12"S	21° 2'34.75"E
Bloemsmond 4 to Bloemsmond Collector Substation		
Start	28°34'39.80"S	21°1'40.33"E
Middle	28°34'29.66"S	21°02'44.66"E
End	28°35'16.12"S	21° 2'34.75"E
Bloemsmond 5 to Bloemsmond Collector Substation		
Start	28°31'47.69"S	21°0'5.52"E
Middle	28°34'24.63"S	21°02'41.75"E
End	28°35'16.12"S	21° 2'34.75"E
Bloemsmond Collector Substation to Eskom Upington MTS		
Start	28°35'16.12"S	21°2'34.75"E
Middle	28°34'09.38"S	21°05'38.33E
End	28°32'46.05"S	21°08'19.07"E

CONTENTS OF A BASIC ASSESSMENT REPORT.

Appendix 1 of Regulation 326 of the 2014 EIA Regulations (as amended) contains the required contents of a Basic Assessment Report. The checklist below serves as a summary of how these requirements were incorporated into this Basic Assessment Report.

Requirement	Details
(1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include -	
(a) Details of - The EAP who prepared the report; and The expertise of the EAP, including, a curriculum vitae.	The report was compiled by Dale Holder of Cape EAPrac. The author has thirteen years' experience as an EAP and holds a ND Nature Conservation qualification. The CV of the EAP and Company Profile is included as Annexure J4 of this report.
(b) The location of the activity, including – The 21 digit Surveyor General code of each cadastral land parcel; Where available, the physical address and farm name; Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	**21 Digit SG Code** C02800000000045500014 C02800000000045500005 C02800000000045400000 C02800000000061700000 C02800000000063800000[1]

[1] Agricultural Holding 1080 (cadastral unit containing the Upington MTS) does not have a registered S21 digit code.

Requirement	Details
	±25km West of Upington in the Northern Cape **Co-ordinates:** Substation centre positions (Preferred) Bloemsmond 3 on-site substation 28°33'32.10"S ; 21°1'57.88"E Bloemsmond 4 on-site substation 28°34'39.80"S ; 21°1'40.33"E Bloemsmond 5 on-site substation 28°31'47.69"S ; 21°0'5.52"E Bloemsmond Collector Substation 28°35'16.12"S ; 21°2'34.75"E Powerline positions (preferred) Bloemsmond 3 to Bloemsmond Collector Substation Start 28°33'32.10"S 21°1'57.88"E Middle 28°34'24.63"S 21°02'41.75"E End 28°35'16.12"S 21° 2'34.75"E Bloemsmond 4 to Bloemsmond Collector Substation Start 28°34'39.80"S 21°1'40.33"E Middle 28°34'29.66"S 21°02'44.66"E End 28°35'16.12"S 21° 2'34.75"E Bloemsmond 5 to Bloemsmond Collector Substation Start 28°31'47.69"S 21°0'5.52"E Middle 28°34'24.63"S 21°02'41.75"E End 28°35'16.12"S 21° 2'34.75"E Bloemsmond Collector Substation to Eskom Upington MTS Start 28°35'16.12"S 21°2'34.75"E Middle 28°34'09.38"S 21°05'38.33E End 28°32'46.05"S 21°08'19.07"E
(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	As a linear activity, the powerlines are being assessed as 300m wide corridors. Both the co-ordinates as well as the property details of all properties are detailed in the table above. The cartographic representation of all affected properties are included in Appendix A and B of this report.
(d) a description of the scope of the proposed activity, including - All listed and specified activities triggered and being applied for; and A description of the activities to be undertaken including associated structures and infrastructure.	The relevant listed activities are captured in Section 3.1.2 The description of the activity is provided in Section 2 of this report with graphic representation provided in Appendix B.
(e) A description of the policy and legislative context within which the development is proposed, including – An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and .How the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks and instruments.	Please refer to Section 3 of this document.
(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.	Please refer to Section 2.2 of this document.
(g) A motivation for the preferred site, activity and technology alternative.	The preferred alternative has been identified as the best practicable option and is discussed in detail in section 2.4 of this report.
(h) A full description of the process followed to reach the proposed preferred alternative within the site, including - • Details of all alternatives considered;	Section 2.4 addresses feasible and reasonable alternatives which were identified for the grid connection infrastructure. Alignment and technological alternatives were considered. Details of Public Participation are included in section 8 of the report.

Requirement	Details
• Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; • A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; • The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; • The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated. • The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; • Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; • The possible mitigation measures that could be applied and level of residual risk; • The outcome of the site selection matrix; • If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and • A concluding statement indicating the preferred alternatives, including preferred location of the activity.	A summary of all issues raised by I&APs as well as the responses thereto are included in Appendix F. The environmental attributres of the study site are included in section 5 of the report. The identification and assessment of Impacts are included in section 6 of the report. The summary of proposed mitigation measures are included in section 7 of the report. The outcome of the site selection matrix is attached in Annexure E7 and is summarised in section 2.3 of the report. The concluding statement is contained in section 6.14 of the report.
(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, including - A description of all environmental issues and risks that were identified during the basic assessment process; and An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Please see Summary and Section 6 of the report and Appendix E for the specialist reports.
(j) An assessment of each identified potentially significant impact and risk, including - Cumulative impacts; The nature, significance and consequences of the impact and risk; The extent and duration of the impact and risk; The probability of the impact and risk occurring; The degree to which the impact and risk can be reversed; The degree to which the impact and risk may cause irreplaceable loss of resources; and The degree to which the impact and risk can be mitigated.	Please see Section F of the report and Appendix E for the specialist reports.
(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 assessment report.	Please see Section 6 of the report and Appendix E for the specialist reports.
(l) An environmental impact statement which contains – • A summary of the key findings of the environmental impact assessment;	Section 6.23 and 6.14 of this report.

Requirement	Details
• A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and • A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	See Appendix D Section 6.13 of this report.
(m) Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.	See section 7 report.
(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.	See section 7 of this report.
(o) A description of assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	See 3.4 of this report.
(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.	See section 9 of this report.
(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 concluded and the post construction monitoring requirements finalised.	The proposed activity does include operational aspects.
(r) An undertaking under oath or affirmation by the EAP in relation to: The correctness of the information provided in the reports; The inclusion of comments and inputs rom stakeholders and I&APs; The inclusion of inputs and recommendations from the specialist reports where relevant; and Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	The declaration of the EAP is attached in Appendix G.
(s) Where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts.	This environmental assessment does not include application for decomissioning and closure of activities
(t) Any specific information that may be required by the competent authority.	Currently not applicable but will be included if such a request is made.
(u) Any other matters required in terms of section 24(4)(a) and (b) of the Act.	This section will be updated on reciept of the mandatory comment from the competant authority.

DEA COMMENT ON DRAFT BASIC ASSESSMENT REPORT

This section will be updated once a comment is received from the competent authority.

ORDER OF REPORT

Report Summary

Draft Basic Assessment Report – Main Report

Appendix A	:	Location, Topographical Plans
Appendix B	:	Biodiversity Overlays
Appendix C	:	Site Photographs
Appendix D	:	Grid Connection Infrastructure Alignment Plan
Appendix E	:	Supplementary Reports (Specialist Reports and Technical Reports)
Annexure E1	:	Ecological Impact Assessment Report (Terrestrial and Avifaunal) (Confluent, 2019)
Annexure E2	:	Freshwater Ecological Impact Assessment (Confluent, 2019)
Annexure E3	:	Agricultural Impact Assessment Report (Lubbe, 2019)
Annexure E4	:	Archaeology Impact Assessment Report (van der Walt, 2019)
Annexure E5	:	Palaeontology Desktop Study (Almond, 2019)
Annexure E6	:	Visual Impact Assessment (Stead, 2019)
Annexure E7	:	Social Impact Assessment (Barbour, 2019)
Annexure E8	:	Technical Design Report
Appendix F	:	Public Participation Process
Annexure F1	:	I&AP Register
Annexure F2	:	Comments and Response Report
Annexure F3	:	Adverts & Site Notices
Annexure F4	:	Draft BAR Notifications
Annexure F5	:	Draft BAR Comments and Responses (to be included in final Basic Assessment Report)
Appendix G	:	Other Information
Annexure G1	:	Correspondence with Authorities
Annexure G2	:	Landowner Notification
Annexure G3	:	EAP Declaration & CV
Annexure G4	:	Specialist Declarations and CVs
Annexure G5	:	Title Deed / Windeed Report
Annexure G6	:	Proof of Availability of Services (for PV Facilities)
Annexure G7	:	Proof of Submission of WULA
Annexure G8	:	Proof of SAHRA upload

Appendix H : Environmental Management Programme

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EXECUTIVE SUMMARY

I. INTRODUCTION

Cape EAPrac has been appointed by Bloemsmond Grid (Pty) Ltd, hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner (EAP), to facilitate the Basic Assessment process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the Bloemsmond Grid Connection Infrastructure near Upington and Keimoes in the Northern Cape Province of South Africa.

The applicant proposes the construction and operation of grid connection infrastructure for the five proposed Bloemsmond solar PV facilities near Upington in the Northern Cape Province. This grid connection infrastructure will connect the following renewable energy infrastructure to the National Grid via the Eskom Upington Main Transmission Substation (MTS):

- AEP Bloemsmond Solar 1 (Authorised - 14/12/16/3/3/2/814)[2];
- AEP Bloemsmond Solar 2 (Authorised - 14/12/16/3/3/2/816);
- Bloemsmond 3 (Decision Pending - 14/12/16/3/3/1/2042);
- Bloemsmond 4 (Decision Pending - 14/12/16/3/3/1/2044); and
- Bloemsmond 5 (Decision Pending - 14/12/16/3/3/1/2043).

NOTE: The AEP Bloemsmond Solar 1 and AEP Bloemsmond Solar 2 have separate powerlines and on-site substations Authorised as part of their respective EA's. Bloemsmond 3, Bloemsmond 4 and Bloemsmond 5 have the IPP portion of the respective on-site sub-station considered and assessed as part of their applications for EA (decisions pending). This report should therefore be considered in conjunction with the Final Environmental Impact Assessment Reports for AEP Bloemsmond Solar 1 and 2 as well as the Final Basic Assessment Reports for Bloemsmond 3, 4 and 5.

The purpose of this **Draft Basic Assessment Report** (BAR) is to describe the environment to be affected, the proposed project, consider all comments received, to present the site constraints identified by the various specialist during their site assessments, and identify and assess the impacts of this development on the receiving environment.

RECOMMENDATION OF THIS EIA

The proposal by the Applicant is to develop joint grid connection infrastructure to connect five[3] renewable energy facilities to the National Grid via the Upington MTS. The intent of this project is to reduce the potential duplication of infrastructure and impacts by developing a single grid connection solution, rather than for each project to have a standalone connection.

NOTE: The proposed powerline alignment alternatives and substation positions were assessed in this environmental process as corridors (300m wide) to allow for minor adjustments / flexibility during the final design / micro-siting phase post environmental decision, and to avoid protracted administrative amendment processes because of these potential minor adjustments.

It is Cape EAPrac's reasoned opinion that the following alternatives be considered for approval:

- **the eastern on-site substation alternatives;**

[2] It must be noted that AEP Bloemsmond Solar 1 and AEP Bloemsmond Solar 2 have approved grid connections to the Upington MTS. Should this BAR for the Bloemsmond Grid Connection Infrastructure be authorised, an application to amend the two facilities' EAs will be lodged to exclude all infrastructure associated with the grid connection.

[3] Two of these five facilities have been authorised, while three are awaiting decisions.

- **the eastern grid connection corridor alternatives from the eastern on-site substations to the Bloemsmond Collector Substation; and**
- **the northern grid connection corridor (Alternative A) from the Bloemsmond Collector Substation to the Upington MTS.**

NEED AND DESIRABILITY

Need and desirability for this project has been considered in detail in this environmental process. The overall need and desirability in terms of developing generation facilities and associated infrastructure in South Africa and globally is considered in section 1, while the project specific need and desirability is considered in section 5.

ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998). This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the National Department of Environment, Forestry and Fisheries, DEFF) based on the findings of an Environmental Assessment.

The proposed development entails several listed activities, which require a Basic Assessment Process, which must be conducted by an independent EAP. Cape EAPrac has been appointed to undertake this process.

Table 1: NEMA 2014 (As amended in April 2017) listed activities applicable to the Bloemsmond Grid Connection Infrastructure.

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Description
11	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;	Construction of the on-site substations and Bloemsmond Collector Substation with a maximum capacity of 132 kilovolts and the construction of overhead powerlines with a maximum capacity of 132 kilovolts.
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; (c) if no development setback line exists, within 32m of a watercourse measured from the edge of a watercourse	Construction of powerline infrastructure straddeling the ephemeral washes and watercourses.
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;	Construction of powerline infrastructure straddeling the ephemeral washes and watercourses.
27	The clearance of an area of 1 hectares or more , but less than 20 hectares.	The construction of the substation (on-site and collector substation) and the temporary laydown areas will require the clearance of more than 1ha.
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 hectare;	The substations are considered to be industrial use and the development footprint of these substations will exceed 1ha.
Activity No(s):	**Basic Assessment Activity(ies) as set out in Listing Notice 3 (GN R985)**	**Description**
4	The development of a road wider than 4 metres with a reserve less than 13 metres. g. Northern Cape iii. Outside urban areas:	At the pylon positions, the construction access road will exceed 4m in width. These will however be rehabilitated to a single jeep track on completion of construction.

	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	
12	The clearance of an area of 300 square metres or more of indigenous vegetation. g. Northern Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	Portions of the powerline corridor (particularly the section between the Bloemsmond Collector substation and the Upington MTS) fall within a Critical Biodiversity Area and clearance of vegetation for the establishment of this powerline will exceed 300 square metres.
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more. g. Northern 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;	Portions of the powerline corridor (particularly the section between the Bloemsmond Collector Substation and the Upington MTS) fall within a Critical Biodiversity Area and the infrastructure in these CBAs will exceed 300 square metres.

NOTE: Only activities in Listing Notice 1 and Listing Notice 3 are applicable to the development of the Bloemsmond Grid Connection Infrastructure and as such, a Basic Assessment process is to be followed.

Before any of the above-mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the DEFF Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who has a legal mandate in respect of the activity.

II. DEVELOPMENT PROPOSAL & ALTERNATIVES

Bloemsmond Grid (Pty) Ltd, a Special Purpose Vehicle (SPV), proposes the construction and operation of grid connection infrastructure for the five proposed Bloemsmond solar PV facilities near Upington in the Northern Cape Province. The Basic Assessment Report (BAR) considers and assesses a joint grid solution required to evacuate power from the following Renewable Energy Projects:

- AEP Bloemsmond Solar 1 (Authorised - 14/12/16/3/3/2/814)
- AEP Bloemsmond Solar 2 (Authorised - 14/12/16/3/3/2/816)
- Bloemsmond 3 (Decision Pending - 14/12/16/3/3/1/2042)
- Bloemsmond 4 (Decision Pending - 14/12/16/3/3/1/2044)
- Bloemsmond 5 (Decision Pending - 14/12/16/3/3/1/2043)

Each of the above projects include authorisation for the IPP portions of the respective on-site substations, and this BAR assesses the remainder of the joint grid solution as described below.

- Infrastructure between the individual on-site substations and the Bloemsmond Collector Substation;
- The Bloemsmond Collector Substation;
- Infrastructure between the Bloemsmond Collector Substation and the Upington MTS; and
- Works within the Upington MTS.

III. PROFFESIONAL INPUT

The following professionals[4] have provided input into this environmental process:

1.	Ecology	-	Enviro Insight & Confluent Environmental
2.	Avifaunal	-	Enviro Insight & Confluent Environmental
3.	Archaeology	-	Heritage Contracts and Archaeological Consulting (HCAC)
4.	Palaeontology	-	Natura Viva
5.	Heritage	-	Heritage Contracts and Archaeological Consulting (HCAC)
6.	Agricultural Potential	-	Mr Christo Lubbe
7.	Visual	-	Visual Resource Management Africa (VRMA)
8.	Freshwater	-	Confluent Environmental
9.	Social	-	Tony Barbour
10.	Engineering aspects	-	Atlantic Energy Partners
11.	Water Consumption	-	Atlantic Energy Partners
12.	Planning	-	Macroplan.

IV. PLANNING CONTEXT

The proposed Bloemsmond Grid Connection Infrastructure is situated within a Gazetted Strategic Powerline Corridor and the establishment of this infrastructure is thus compliant with national strategic planning objectives.

V. ASSESSMENT OF IMPACTS

The potential key impacts identified and assessed by the various specialists (more details on the significance and ratings of these impacts are provided in section 6 below and in the attached specialist reports).

Ecological impacts assessed

Construction Phase

- Vegetation clearing for construction could impact indigenous species. Vegetation clearing will also lead to **habitat loss** for fauna and potentially the loss of sensitive faunal species, habitats and ecosystems within the remaining natural areas.
- Presence and operation of construction machinery on-site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site. Disturbance could affect faunal species.
- Increased human presence can lead to faunal conflict.

Operational Phase

- The presence of the development could disrupt the connectivity of the landscape.
- Human-animal conflict can occur.
- Alien clearing will improve the ecology and habitat of the area.

Cumulative Impacts

- Transformation of intact habitat could disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

Freshwater impacts assessed

- Disturbance to riparian habitat;
- Disturbance to watercourse bed and banks;
- Sedimentation of downstream watercourses;

[4] Note that not all these professionals are considered specialists as contemplated in chapter 3 of Regulation 326. Studies such as Engineering, Stormwater, Traffic, water consumption and planning constitute "technical" studies, rather than specialist studies and as such, the requirements in appendix 6 of R326 do not apply to all these professionals

- Water Quality Impacts; and
- Alien plant introduction

Heritage Impacts Assessed

Construction Phase

- Impact on scenic routes during construction

Operational Phase

- Impacts on the heritage resources.
- Impact on scenic routes.
- Impact of new structures on cultural landscape and character.

Cumulative impacts

- Change to the rural character.

Archaeological Impacts Assessed

Construction Phase

- Disturbance to surface and sub-surface sediments

Operational Phase

- None

Cumulative Impacts

- No cumulative impacts will arise

Visual Impacts Assessed

Construction Phase

- Visual scarring because of new powerline, clearing vegetation and construction works.

Operational Phase

- Change in the rural visual character of the site.
- Visual impact on key visual receptors and secondary visual receptors.
- Potential visual.
- Visibility from sensitive receptors.
- Visual intrusion of lighting at night.

Socio-Economic Impacts Assessed

Construction Phase

- Creation of business and employment opportunities
- Impacts associated with the presence of construction workers on-site;
- Security and safety impacts associated with the presence of construction workers;
- Noise, dust and safety impacts associated with construction related activities and the movement of heavy vehicles.

Operational Phase

- Creation of employment and business opportunities;
- Impact on rural sense of place and character of the area;
- Crime levels and pressure on local services.
- Socio-economic upliftment.

Impact Summary

The table below summarises the significance (with mitigation) of all impacts assessed in the sections above[5].

For ease of easy references, impacts are visually reflected using the following colour scheme[6].

All positive impacts (regardless of their significance)

Neutral or Negligible negative impacts

Very Low and Low negative impacts

Medium negative impacts

Medium – High, High and Very High negative impacts

Table 2: Summary of the significance of impacts associated with the Bloemsmond Grid Connection Infrastructure[7].

Impact	Significance (with mitigation)
Social Impacts during the construction phase	
Creation of employment and business opportunities	Medium positive
Presence of construction workers and potential impacts on family structures and social networks.	Low negative
Influx of job seekers.	Low negative
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers.	Low negative
Increased risk of veld fires	Low negative
Impact of heavy vehicles and construction activities.	Low negative
Loss of farmland.	Low negative
Social Impacts during the operational phase	
Promotion of renewable energy projects	High positive
Creation of employment and business opportunities	Medium positive
Establishment of Community Trust	High positive
Generate income for affected landowner/s	Medium positive
Visual impact and impact on sense of place	Low negative
Impact on tourism	Low positive and negative
Loss of farmland	Low Negative
Visual Impacts during construction and operation phase	
Change of local and surrounds visual resources due to the construction and operation of the proposed 35m high monopole structures	Low negative
Palaeontological Impacts	
Impact on potential palaeontological resources	Low negative
Agricultural Impacts	
Soil pollution with contaminants during the construction.	Low negative
Loss of Agricultural land	Low negative
Reduction in land capability	Low negative
Alteration of drainage patterns and erosion	Low negative
Soil pollution with contaminants during the operational phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the maintenance of the facility.	Low negative
Decrease in availability of soil for agriculture,	Low negative
Clearing of vegetation increases flow speed and a lower infiltration tempo increases silt transport (Cumulative)	Medium negative
Chemicals, hazardous substances and waste used or generated	Medium negative
Freshwater Ecology Impacts	

[5] To attain these outcomes, the mitigation measures reflected in section 7 of the report need to be implemented.

[6] Where specialist ratings fall across 2 of the groups, the worst case is reflected in the quick reference.

[7] This includes cumulative impacts associated with the facility

Impact	Significance (with mitigation)
Disturbance to riparian habitat	Negligable negative
Disturbance to watercourse bed and banks	Negligable negative
Sedimentation of downstream watercourses	Negligable negative
Water quality impacts downstream	Negligable negative
Alien plant introduction	Negligable negative
Alien Vegetation Management	Negligable negative
Solar Panel Washing	Negligable negative
Spills and Waste Management	Negligable negative
Terrestrial Fauna Impacts	
Direct loss of flora species of conservation concern and flora species endemic to the region	Medium negative
Stochastic events such as fire	Low/Medium negative
Staff or construction workers poaching and hunting	Low negative
Collisions with vehicles	Low/Medium negative
Intentional killing of fauna	Lownegative
Loss of species of conservation concern	Medium negative
Vegetation clearing/ construction preparation	Low/Medium negative
Access roads and construction works	Low/Medium negative
Vehicles and machinery	Medium negative
Soil disturbance	Low/Medium negative
Vegetation clearing	Low/Medium negative
Roads and hardened surfaces	Low/Medium negative

As can be seen from the table above, there are several positive impacts associated with the Bloemsmond Grid Connection Infrastructure. Most of the negative impacts are either low or negligible, with a few Low – Medium and Medium Impacts. There are no high or very high impacts associated with the Bloemsmond Grid Connection Infrastructure.

Impact Statement

None of the participating specialists identified any impacts that remain high after mitigation. Because of the risk adverse approach followed for the development of the preferred alignment and the fact that although the grid connection infrastructure will straddle sensitive features, no structures will be placed within the sensitive features.

From an ecological perspective the preferred infrastructure alignments will not result in major fragmentation of the landscape. The affected area is considered suitable for development and there are no impacts associated with the Bloemsmond Grid Connection Infrastructure that cannot be mitigated to a medium level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, the Bloemsmond Grid Connection Infrastructure can be supported from an ecology, visual, social, heritage and agricultural point of view.

A map showing the proposed activity in relation to the key sensitive features is in attached in **Appendix D**. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMPr, all areas outside of the proposed development footprint are to be demarcated as no go areas.

Please refer to the table in the section above listing the key impacts and their significance post mitigation for the preferred alternative. This section must be read in conjunction with the suggested mitigation measures listed in section 7 of this Report.

VI. CONCLUSIONS & RECOMMENDATIONS

This environmental process is currently being undertaken to present proposals to the public and potential I&APs and to identify and assess environmental impacts, issues and concerns raised because of the proposed Bloemsmond Grid Connection Infrastructure and alternatives.

Cape EAPrac is of the opinion that the information contained in this BAR and the documentation attached hereto is sufficient to allow the I&APs to apply their minds to the potential negative and/or positive impacts associated

with the development, in respect of the activities applied for. This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the project should be conditionally authorised. All specialists concur that the development as proposed (eastern alignment alternatives for the on-site substations, the eastern gird connection corridor alternatives from the on-site substations to the Bloemsmond Collector Substation, and the northern grid connection corridor (Alternative A) from the Bloemsmond Collector Substation to the Upington MTS) can be considered for approval and that there are no reason(s) why the development should not be implemented. All impacts range from high positive to medium negative and all high and medium - high negative impacts have been avoided by the risk adverse approach to the development of this grid connection infrastructure.

All stakeholders were requested to review the Draft BAR and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 30-day comment period. All comments received during this comment period will be included in the Final BAR to be submitted to DEFF for decision making.

It is Cape EAPrac's reasoned opinion that the following alternatives be considered for approval: the eastern on-site substation alternatives, the eastern grid connection corridor alternatives from the eastern on-site substations to the Bloemsmond Collector Substation and the northern grid connection corridor (Alternative A) from the Bloemsmond Collector Substation to the Upington MTS.

REMAINDER OF ENVIRONMENTAL PROCESS

The following process is to be followed for the remainder of the environmental process:

- This Draft BAR to be provided to all registered and potential I&AP's for review and comment;
- The Final BAR to be submitted to the DEFF for consideration and decision-making; and
- The DEFF's decision (Environmental Authorisation) and the appeal process on the Final BAR will be communicated with all registered I&APs.

DRAFT BASIC ASSESSENT REPORT

1 INTRODUCTION

Cape EAPrac has been appointed by Bloemsmond Grid (Pty) Ltd, hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner (EAP), to facilitate the Basic Assessment process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the Bloemsmond Grid Connection Infrastructure near Upington and Keimoes in the Northern Cape Province of South Africa.

The applicant proposes the construction and operation of grid connection infrastructure for the five proposed Bloemsmond solar PV facilities near Upington in the Northern Cape Province. This grid connection infrastructure will connect the following renewable energy infrastructure to the National Grid via the Eskom Upington Main Transmission Substation (MTS):

- AEP Bloemsmond Solar 1 (Authorised - 14/12/16/3/3/2/814)[8];
- AEP Bloemsmond Solar 2 (Authorised - 14/12/16/3/3/2/816);
- Bloemsmond 3 (Decision Pending - 14/12/16/3/3/1/2042);
- Bloemsmond 4 (Decision Pending - 14/12/16/3/3/1/2044); and
- Bloemsmond 5 (Decision Pending - 14/12/16/3/3/1/2043).

NOTE: The AEP Bloemsmond Solar 1 and AEP Bloemsmond Solar 2 have separate powerlines and on-site substations Authorised as part of their respective EA's. Bloemsmond 3, Bloemsmond 4 and Bloemsmond 5 have the IPP portion of the respective on-site sub-station considered and assessed in their applications for EA (decisions are pending). This report should therefore be considered in conjunction with the Final Environmental Impact Assessment Reports for AEP Bloemsmond Solar 1 and 2 as well as the Final Basic Assessment Reports for Bloemsmond 3, 4 and 5.

The purpose of this **Draft Basic Assessment Report** (BAR) is to describe the environment to be affected, the proposed project, consider all comments received, to present the site constraints identified by the various specialist during their site assessments, and identify and assess the impacts of this development on the receiving environment.

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RECOMMENDATION OF THIS EIA

The proposal by the Applicant is to develop joint grid connection infrastructure to connect five[9] renewable energy facilities to the National Grid via the Upington MTS. The intent of this project is to reduce the potential duplication of infrastructure and impacts by developing a single grid connection solution, rather than for each project to have a standalone connection.

NOTE: The proposed powerline alignment alternatives and substation positions were assessed in this environmental process as corridors (300m wide) to allow for minor adjustments / flexibility during the final design / micro-siting phase post environmental decision, and to avoid protracted administrative amendment processes because of these potential minor adjustments.

It is Cape EAPrac's reasoned opinion that the following alternatives be considered for approval:

[8] It must be noted that AEP Bloemsmond Solar 1 and AEP Bloemsmond Solar 2 have an approved grid connection to the Upington MTS. Should this BAR for the Bloemsmond Grid Connection Infrastructure be authorised, an application to amend the two facilities' EAs will be lodged to exclude all infrastructure associated with the grid connection.

[9] Two of these five facilities have been authorised, while three are awaiting decisions.

- **the eastern on-site substation positions.**
- **the eastern corridor alternatives from the eastern on-site substations to the Bloemsmond Collector Substation**
- **the northern grid connection corridor (Alternative A) from the Bloemsmond Collector Substation to the Upington MTS.**

1.1 OVERVIEW OF ALTERNATIVE ENERGY IN SOUTH AFRICA AND THE NORTHERN CAPE

This proposed grid connection infrastructure is directly linked to and inseverable from the Bloemsmond 1-5 renewable energy projects and as such, this review considers the grid connection infrastructure as part of the greater renewable energy projects.

South Africa's generation capacity is dominated by coal-fired generation stations with a net output of 35.6 GWp, which represents over 85% of the country's total installed capacity of over 44 GW.

Globally, renewable energy has gained momentum, with a significant rise in the uptake of various RE technologies such as solar PV, wind energy, biogas and other biofuels, hydroelectricity, landfill gas, geothermal energy, and concentrated solar power (CSP).

Ministerial determinations by the South African government to procure RE — such as the Integrated Resource Plan (IRP) for Electricity 2010-2030, which lays out the country's electricity future — have given growth in the renewable energy sector a significant boost.

South Africa's green economy, partly driven by the country's utility-scale Renewable Energy Independent Power Production Procurement Programme (REIPPPP), reflects these trends and is leading the way in some areas. According to Moody's, South Africa had the fastest growing green economy in the world in 2015. The REIPPPP, a key factor in this growth, is in its sixth year and has achieved remarkable successes. To date, the programme has:

- Procured over 6 300 MWp of RE generation capacity, of which over 2 500 MWp was connected and has been feeding electricity into the national grid since June 2016.
- Selected 102 preferred bidders to develop utility-scale projects across the country – with projects in every province across South Africa.
- Received a ministerial determination to procure a further 6 300 MWp of generation capacity. This is the second time capacity to the programme has been doubled – a testimony to its success.
- Attracted over R195 billion of investment into South Africa, with over 25% from foreign investors. In doing so, the programme, through local content requirements, has successfully stimulated the development of a local RE technology components manufacturing sector. Given the additional 6 300 MWp still to be procured, this sector is set to grow further.
- Achieved significant technology price reductions, with South Africa boasting some of the world's lowest clean energy costs.

Beyond these successes, the programme and, consequently, the utility-scale Renewable Energy industry, is well positioned to continue contributing to South Africa's national development, as enshrined in the government's Strategic Infrastructure Projects (SIP) and the National Development Plan (NDP). The programme's socio-economic development (SED) and enterprise development (ED) mechanisms give successful project developers a unique opportunity to be competitive in their bidding strategy, while contributing meaningfully to the local and national economy. Project developers have fully embraced the SED/ED component of the REIPPPP, resulting in numerous inspiring contributions to priority areas on the government's developmental agenda. Among other areas, these contributions span community development, local economic development, skills development and early childhood development.

The recent uncertainties involving the state-owned utility, Eskom, highlight the need for reforms in an evolving energy sector, where electricity generation, transmission and distribution systems require unbundling. The interest from local municipalities in procuring renewable energy generation capacity

from independent power producers (IPPs) contributes further to the shift in the structure of the country's power sector.

Regionally, the Northern Cape is suggested by many to be the ideal location for various forms of alternative energy; this has resulted in several feasibility studies being conducted, not least of which, an investigation by the Industrial Development Corporation in 2010 into potential for photovoltaic, thermal, solar and wind power (Northern Cape Business website, 2010).

The northern area of the Northern Cape and Namibia boasts the highest solar radiation intensity anywhere in Southern Africa. Solar energy is therefore likely to be the most viable alternative energy source for the Northern Cape, although wind-power potential is generally good along the coast (State of the Environment, S.A, 2014)

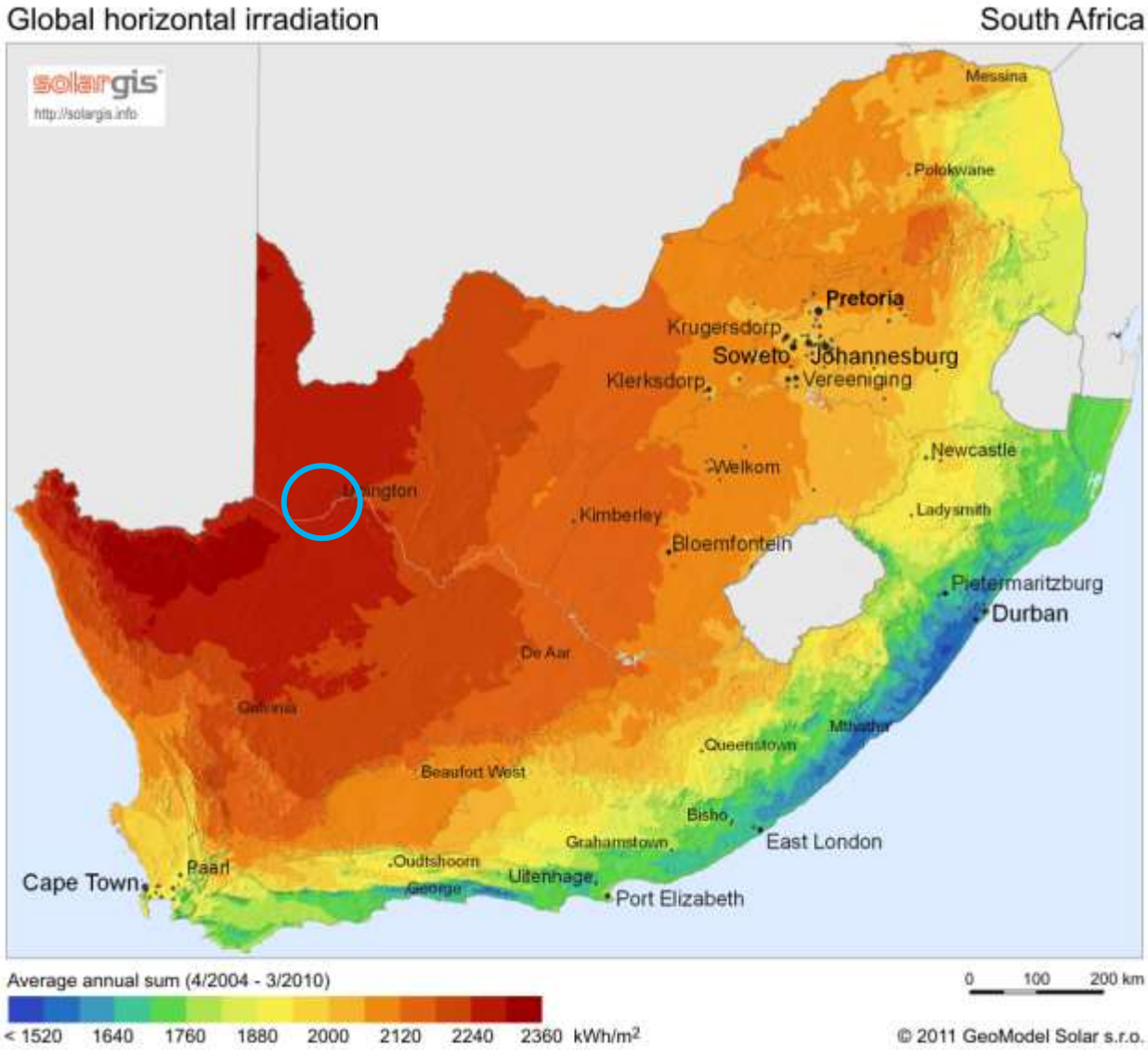

Figure 1: Global Horizontal radiation map for South Africa (Source: http://solargis.info, 2015) showing the approximate area proposed for Bloemsmond projects and their associated infrastructure.

The Northern Cape area is considered to have extremely favourable solar radiation levels over most of the year, making it ideal to produce solar-power via photovoltaic (fixed and tracking panels) and concentrated (solar thermal) solar technology systems. Several solar irradiation maps have been produced for South Africa, all of which indicate that the Northern Cape area has high solar irradiation.

The Northern Cape is not too dusty, the land is flat and sparsely populated, and there are little to no geological or climate risks, meaning that the sun can be used year-round (BuaNews online, 2014). An advantage that the Northern Cape has over the Sahara Desert is the relatively wind-free environment that prevails in large portions of the province. A Clinton Climate Initiative (CCI) pre-feasibility study has found that South Africa has one of the best solar resources on the planet (Northern Cape Business website – solar power, 2015).

The introduction of private sector generation offers multiple benefits; it will contribute greatly to the diversification of both the supply and nature of energy production, assist in the introduction of new skills and in new investment into the industry, and enable the benchmarking of performance and pricing. The Department of Energy (DoE), National Treasury (NT) and the Development Bank of Southern Africa (DBSA) established the IPP Office for the specific purpose of delivering on the IPP procurement objectives. The REIPPPP is a competitive bidding process used by national government to procure RE generation capacity in line with the national IRP for Electricity 2010-2030.

NOTE: It is the intention that Bloemsmond 1-5, which would include this Grid Connection Infrastructure, will submit a bid under this REIPPPP.

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013) identified eight (8) Renewable Development Zones (REDZs). The REDZs identified areas where large scale renewable energy facilities can be developed in in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country.

The Bloemsmond Grid Connection Infrastructure is located within the Upington REDZ and the Eastern Powerline Corridor, which was formally gazetted in 2018. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large-scale solar facilities and their associated infrastructure.

1.2 ASSUMPTIONS & LIMITATIONS

This section provides a brief overview of *specific assumptions and limitations* having an impact on this environmental application process:

- It is assumed that the information on which this report is based (specialist studies and project information, as well as existing information) is **correct, factual and truthful.**
- The proposed development is **in line** with the statutory planning vision for the area (namely the local Spatial Development Plan) as well as the Upington REDZ, and thus it is assumed that issues such as the cumulative impact of development in terms of character of the area and its resources, have been considered during the strategic planning for the area.
- It is assumed that all the relevant **mitigation and management measures** and agreements specified in this report will be implemented to ensure minimal negative impacts and maximum environmental benefits.
- It is assumed that due consideration will be given to the **discrepancies in the digital mapping**, caused by differing software programs, and that it is understood that the ultimate/final positioning of infrastructure will only be confirmed on-site with the relevant specialist/s.
- The Department of Water and Sanitation **will consider the submission of a water use application** necessary for allowing the use of water from any water resource on-site. The assumption is made that water provision is to be obtained from the local municipality.
- It is assumed that Stakeholders and Interested and Affected Parties notified of the availability of this will submit all relevant **comments within the designated 30-days** review and comment period, so that these can be included in the Final BAR to be timeously submitted to the competent authority, the Department Environment, Forestry and Fisheries, for consideration.

The assumptions and limitations of the various specialist studies are included in their respective reports attached in Appendix E.

2. PROPOSED ACTIVITY

Bloemsmond Grid (Pty) Ltd, a Special Purpose Vehicle (SPV), proposes the construction and operation of grid connection infrastructure for the five proposed Bloemsmond solar PV facilities near Upington in the Northern Cape Province. The Basic Assessment Report (BAR) considers and assesses a joint grid solution required to evacuate power from the following Renewable Energy Projects:

- AEP Bloemsmond Solar 1 (Authorised - 14/12/16/3/3/2/814)
- AEP Bloemsmond Solar 2 (Authorised - 14/12/16/3/3/2/816)
- Bloemsmond 3 (Decision Pending - 14/12/16/3/3/1/2042)
- Bloemsmond 4 (Decision Pending - 14/12/16/3/3/1/2044)
- Bloemsmond 5 (Decision Pending - 14/12/16/3/3/1/2043)

As is evident in the descriptions below, the proposed grid connection infrastructure will align as far as possible along landscape divides (i.e. farm roads/tracks, fence lines, fire breaks) to avoid impacting of the agricultural land use and ecological sensitive areas. In addition, the pylons/towers will not be located on prominent landscape or sensitive features and would become a smaller component of the greater solar energy facility landscape emerging in the area.

Each of the above projects included applications for authorisation for the IPP portions of the respective on-site substations, and this BAR assesses the remainder of the joint grid solution as described below. For ease of continuity the description of the project components is divided into the following spatially distinct sections:

1. Infrastructure between the individual on-site substations and the Bloemsmond Collector Substation;
2. The Bloemsmond Collector Substation;
3. Infrastructure between the Bloemsmond Collector Substation and the Upington MTS; and
4. Works within the Upington MTS.

These are discussed separately below.

2.1 INFRASTRUCTURE BETWEEN THE INDIVIDUAL ON-SITE SUBSTATIONS AND THE BLOEMSMOND COLLECTOR SUBSTATION:

As mentioned above, the IPP portions of the on-site substations have all been assessed as part of separate environmental application processes. This application thus includes each of the Eskom portions of the on-site substations required for the Bloemsmond Grid Cconnection Infrastructure, namely:

- Bloemsmond 3 substation/ switching station: either 33kV or 132kV
- Bloemsmond 4 substation/ switching station: either 33kV or 132kV
- Bloemsmond 5 substation/ switching station: either 33kV or 132kV and
- 33kV or 132kV overhead lines between each of the on-site substations and the Bloemsmond Collector Substation.

There are two alternatives proposed for the Bloemsmond 4 and Bloemsmond 5 substation/ switching stations: a western alternative and an eastern alternative for each project.

The on-site substations would include the following

- Platforms;
- Earth mat;
- 132kV (incoming/ outgoing) feeder bays as required, inclusive of breakers, CTs, VTs, isolators, surge arrestors and line terminal supports;

- New tubular busbar and bussection for the new feeder bays, inclusive of isolators, voltage transformers (VTs) and tubular busbar sections; and
- Access roads and fencing, lightning protection as may be required, and auxiliary buildings as may be required.

2.1.1 Bloemsmond Grid Connection Infrastructure:

The preferred powerline corridors for Bloemsmond 3, 4 and 5 extend from the respective eastern substation to the eastern boundary of Farm Bloemsmond 455 and then follow the eastern boundary (and PV facilities' access road) turning west into the Bloemsmond Collector Substation as described below:

- Bloemsmond 3-Bloemsmond Collector: a single circuit 33kV or 132kV line from Bloemsmond 3 substation/ switching station to the Bloemsmond Collector Substation
- Bloemsmond 4- Bloemsmond Collector: a single circuit 33kV or 132kV line from Bloemsmond 4 substation/ switching station to the Bloemsmond Collector Substation
- Bloemsmond 5-Bloemsmond Collector: a single circuit 33kV or 132kV line from Bloemsmond 5 substation to the Bloemsmond Collector Substation.

The Bloemsmond 1 and 2 approved on-site substations are directly adjacent to the Bloemsmond Collector Substation and as such will connect directly there.

Please note that this discussion relates to the preferred powerline corridor alternatives (alternative powerline corridor alignments between the on-site substations and the Bloemsmond Collector Substation are considered and discussed in section 2.7 of this BAR).

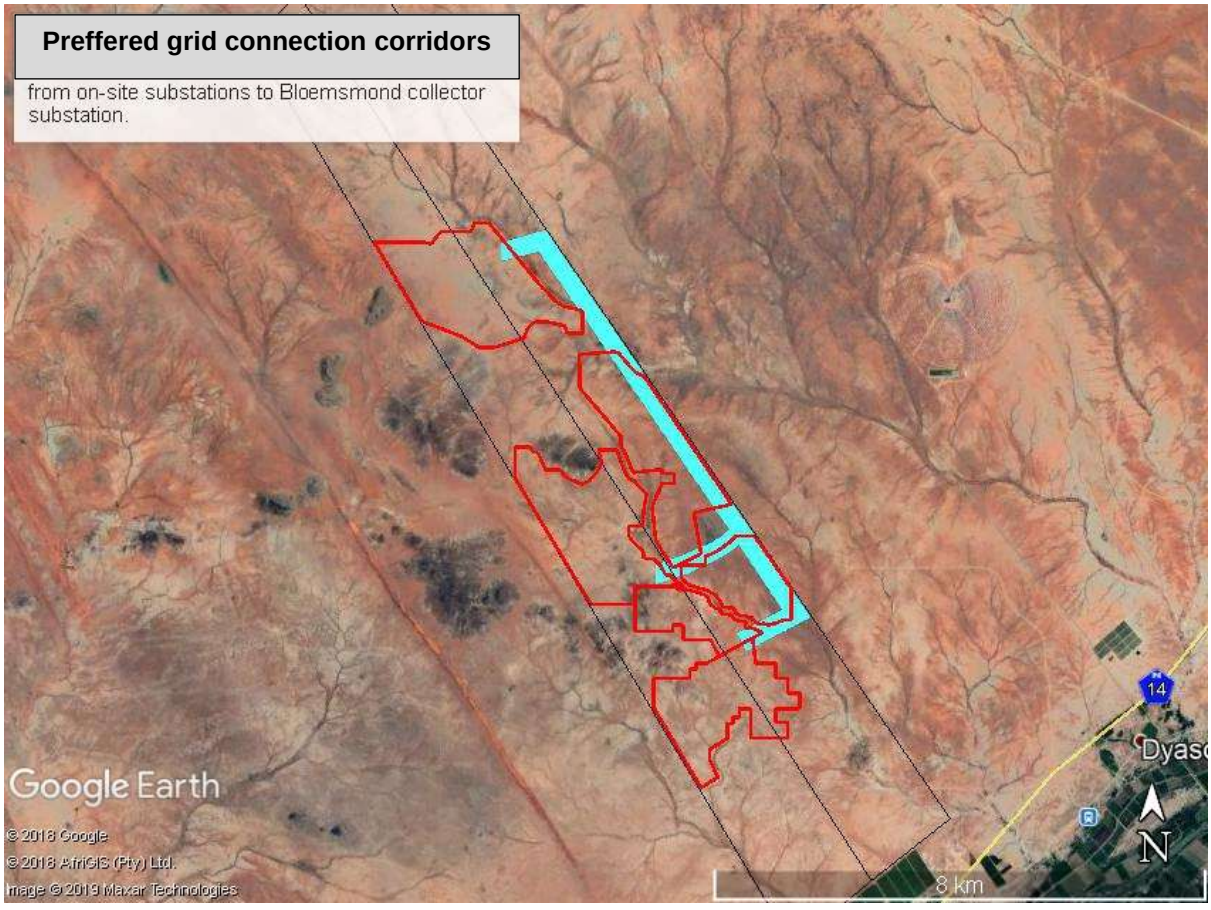

Figure 2: Preferred grid connection corridors between eastern on-site substation alternatives and the Bloemsmond Collector Substation.

2.1.2 The Bloemsmond Collector Substation:

The Bloemsmond Collector Substation is situated within the substation footprint authorised for Bloemsmond 1 and 2.

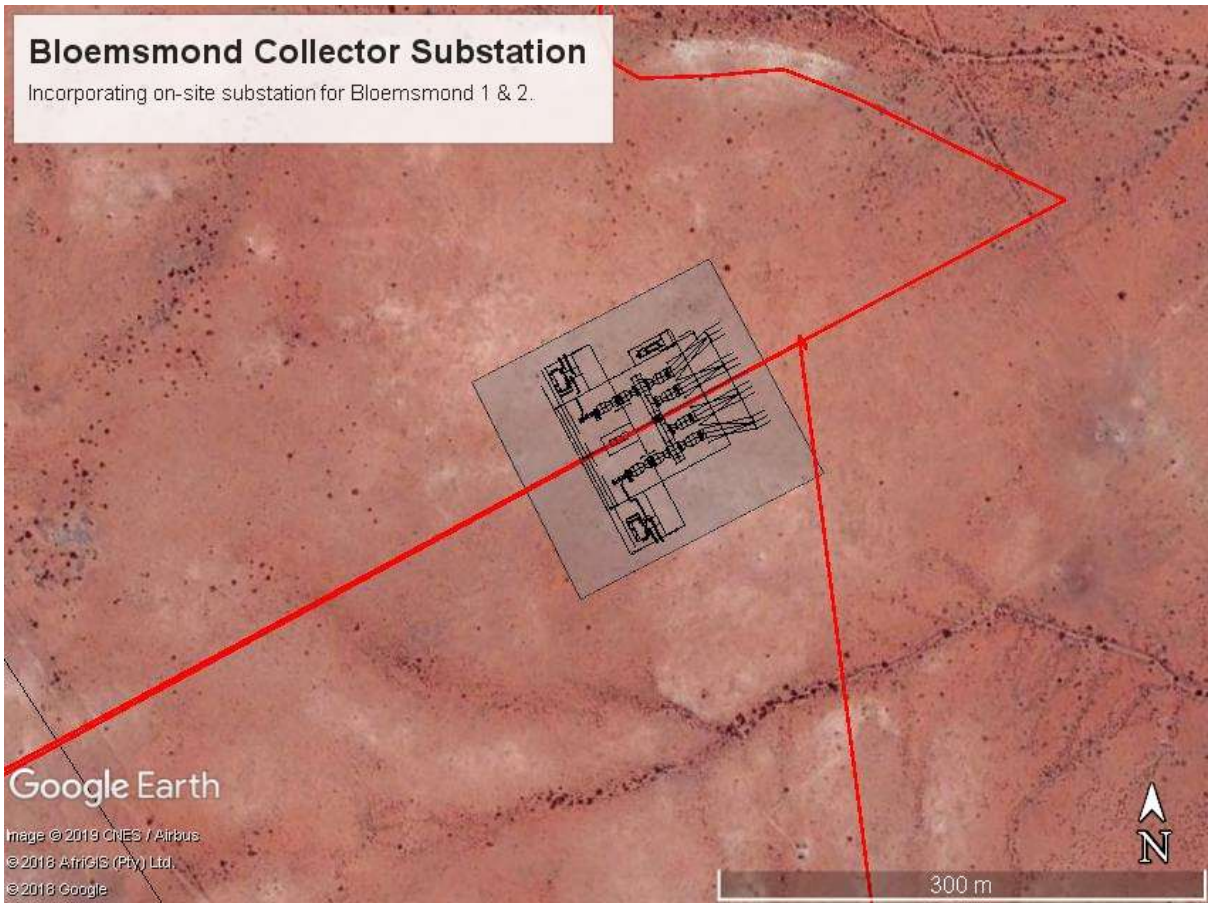

Figure 3: Bloemsmond Collector Substation.

The proposed Bloemsmond Collector Substation includes the following typical components:

- Platforms;
- Earth mat;
- Several 33kV-132kV incoming feeder bays (up to 3, depending on how many of the Bloemsmond projects will ultimately constructed), inclusive of breakers, CTs, VTs, isolators, surge arrestors and line terminal supports;
- Up to 2 outgoing 132kV feeder bays, inclusive of breakers, CTs, VTs, isolators, surge arrestors and line terminal supports;
- New tubular busbar and bussection for the new feeder bays, inclusive of isolators, voltage transformers (VTs) and tubular busbar sections; and
- Access roads and fencing, lightning protection as may be required, and auxiliary buildings as may be required.

2.2 INFRASTRUCTURE BETWEEN THE BLOEMSMOND COLLECTOR SUBSTATION AND THE UPINGTON MTS:

A grid connection corridor approximately 300m wide (which increases to ~1.3 km at the Upington MTS) and 12 km long is being assessed to allow for the optimisation of the grid connection and associated infrastructure to accommodate the identified environmental sensitivities. The grid connection infrastructure will be developed within the 300m wide grid connection corridor.

One double circuit 132kV powerline from the Bloemsmond Collector Substation to the Upington MTS will be constructed.

The grid connection crosses the following properties:

- Portion 5 of Farm Bloemsmond 455
- Portion 14 of Farm Bloemsmond 455
- Remainder of Farm Dyasonsklip 454
- Portion 3 of McTaggarts Camp 453
- Remainder 638 Tungsten Lodge
- Agricultural Holding 1080

Please note that this discussion is relating to the preferred grid connection corridor (Alternative A) between the Bloemsmond Collector Substation and the Upington MTS (the alternative grid connection corridor alignment (Alternative B) is considered and discussed in section 2.7 of this BAR).

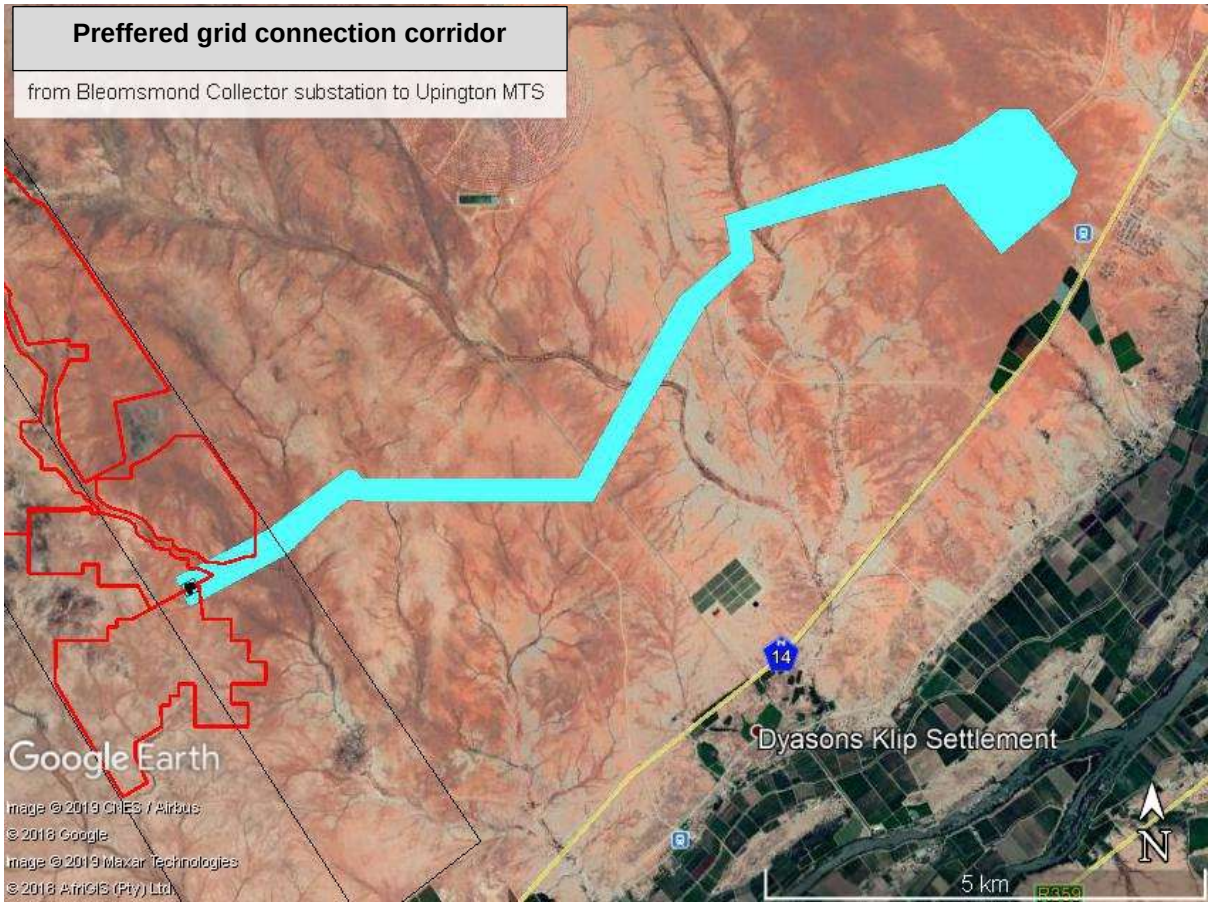

Figure 4: Preferred grid connection corridor (Alternative A) between the Bloemsmond Collector Substation and the Upington MTS.

Please refer to the Preliminary Technical Report attached in Appendix D for further technical details relating to the powerline (i.e. conductors, support structures etc.).

2.3 WORKS WITHIN THE UPINGTON MTS:

The following activities may take place within the authorised footprint of the existing Upington MTS:

- Establish 2 new 132kV feeder bays at the existing 400/132kV Upington MTS;
- Install 2 new 132kV line bays, inclusive of breakers, current transformers (CTs), isolators and surge arrestors; and

- Install a new tubular busbar and bussection for the new line bays, inclusive of isolators, voltage transformers (VTs) and tubular busbar sections.

2.4 ACCESS ROADS

A two-track access road will be constructed within the powerline servitude for construction and maintenance activities. No formal structures will be constructed as part of this access road, which will remain as a jeep track for maintenance activities.

2.5 PROJECT NEED AND DESIRABILITY

The need and desirability of grid connection infrastructure is directly related to the renewable energy projects as a whole. This section therefore considers the need and desirability cumulatively along with the Bloemsmond PV projects.

In keeping with the requirements of an integrated Environmental Impact process, the DEA and DP[10] *Guidelines on Need and Desirability (2010 & 2011)* were referenced to provide the following estimation of the activity in relation to the broader societal needs. The concept of need and desirability can be explained in terms of its two components, where *need* refers to *time,* and *desirability* refers to *place*. Questions pertaining to these components are answered in the sections below.

The section above considers the overall need for alternative, so-called 'green energy' considering the known environmental burdens associated with the impact of coal power generation through which most of our country's electricity is currently being generated. Associated aspects such as air pollution, water use, and carbon tax are discussed to further explain the need and desirability for 'green energy' projects in general.

2.5.1 Feasibility consideration

The commercial feasibility for the proposed 3 x100MW and 2 x 75MW Bloemsmond solar projects along with this associated infrastructure to be built on private land near Keimoes, has been informed by its contextual location, and economic, social and environmental impacts and influence. The project has gathered sufficient information and conducted studies of the site and the region to make qualified and reliable assumptions on the project's various impacts.

2.5.2 Solar Resource & Energy Production

The arid climate experienced in the Northern Cape lends itself to the availability of high levels of solar energy. Considering the steady nature of the solar radiation at the Bloemsmond sites, the resource is sufficient to guarantee a positive return on investment.

2.5.3 Solar Farm & Grid Connection

Among the outstanding characteristics of the Bloemsmond PV sites is the exceptionally flat nature, sufficient medium-low sensitivity environments and accessible location, facilitating the delivery of bulky PV panel and electrical pylon infrastructure, and the construction and assembly process. The proximity of the site to the N14 decreases the impact on secondary roads and natural habitat from the traffic going to and from Bloemsmond Grid Connection Infrastructure during construction and operations. The proximity of the existing Eskom Upington MTS also allows for connection via a relatively short distribution line. As none of the target properties are used for intensive agricultural purposes, the

[10] The Western Cape Provincial guidelines on Need and Desirability were considered in the absence of National and Northern Cape Guidelines.

Bloemsmond Grid Connection Infrastructure will not significantly interfere with the agricultural productivity of the area.

2.5.4 Social impact

Please refer to the Social Impact Assessment Report in Annexure E7 for a detailed description of the social environment. The Northern Cape region is economically challenged due to its arid climate, challenging agricultural conditions, lack of water and limited natural resources (away from the Orange River). The local economy, mainly supported by limited agriculture, simply isn't enough to accommodate the high level of unemployment.

Private sector development is seen to offer opportunities to access Enterprise Development funds of the main mining groups. This can contribute to entrepreneurial activities linked to their supply chain. The same applies to the investment, in terms of employment opportunities and entrepreneurial activities, associated with renewable energy projects.

Power generation is one of the rare growth opportunities for the Northern Cape (and even more so within the REDZ such as where Bloemsmond PV projects and their associated grid infrastructure is proposed) due to the high solar irradiation levels and its strategic position relative to the National Transmission Network. This setup creates unprecedented growth opportunities for the area and the establishment of a renewable energy project is considered important to diversify and complement the economic development of the region.

2.5.5 Employment & Skills Transfer

The benefits of renewable energy facilities to local regions are not confined to the initial investment in the project. They also provide a reliable and on-going income for landowners and municipality, creating direct employment opportunities for locals, as well as flow-on employment for local businesses through provision of products and services to the project and its employees.

The Bloemsmond Grid Connection Infrastructure will have a positive impact on local employment. During the estimated 18-month construction phase, the project will employ approximately 100 individuals of various qualifications. The majority will be provided by the local labour market. Limited operational phase job opportunities will be realised (these will mostly consist of maintenance activities).

2.5.6 Need (time)

Is the land use considered within the timeframe intended by the existing approved Spatial Development Framework (SDF)? (I.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP?)

Yes, the employment of renewable energy technology (including its associated infrastructure) has a spatial strategic place in the Kai !Garib Municipality SDF while the need for a policy on the development of sustainable solar energy facilities has been identified as Key Development Priority / Project.

Should the development occur here at this point in time?

Yes, the proposed Bloemsmond Grid Connection Infrastructure is to be located outside the Upington and Keimoes Urban Edges urban edge, but within a legislated REDZ and Strategic Powerline Corridor, and would promote diversification to the local economy as well as serve as a catalyst for further expansion in the stream of sustainable renewable energyRE development within these REDZ (identified as a priority development strategy in the IDP and the SDF). There are currently four renewable energy developments completed or currently under construction in very close proximity to the proposed Bloemsmond PV Pprojects.

Does the community / area need the activity and the associated land use concerned?

The Kai !Garib Municipality identified the opportunity for a renewable energy projects through their SDF and IDP processes, which include public participation. The proposed renewable energy developments and associated infrastructure will allow for a diversification of employment, skills and contribute to the potential development of small business associated with its construction, operation and maintenance activities.

The proposed solar facilities and their associated infrastructure will contribute electricity to the constrained Northern Cape and National electrical network, contributing to a provincial and national need. The Bloemsmond Grid Connection Infrastructure has been designed in such a way so as to avoid or minimise potential negative impacts of the local environment while enhancing potential positive impacts, locally and regionally. The social specialist undertook interviews with various municipal officials as part of the Social Impact Assessment. The proposed development was strongly supported by Mr McKay and Mr Clarke, the Director of Planning and Head of Engineering Services respectively at the Kai !Garib Municipality.

Are the necessary services with adequate capacity currently available?

Some existing, some new. The Bloemsmond Grid Connection Infrastructure includes the installation of an overhead powerline to connect to the existing Eskom Upington MTS via the Bloemsmond Collector Substation (feed into the national grid system). The cost of supplying the new infrastructure will be covered by the Applicant, and the impacts thereof have been assessed in this environmental process.

The water required for the construction of the Bloemsmond Grid Connection Infrastructure will be sourced from the Kai !Garib Municipality (this activity will not utilise water during operation). The applicant may at a later stage consider the utilisation of groundwater to supplement this supply, this will however be subject to approval in terms of the National Water Act.

Construction waste (general waste) will be disposed of at the existing landfill sites. Construction waste volumes associated with the installation of the Bloemsmond Grid Connection Infrastructure will be very low.

Is this development provided for in the infrastructure planning of the municipality?

Yes. Attracting private investment and the employment opportunities associated with renewable energy development are identified as priority strategies to create sustainable urban and rural settlements.

Is this project part of a national programme to address an issue of national concern or importance?

Yes. To meet the increasing power demand within South Africa, Eskom has set a target of 30% of all new power generation to be derived from independent power producers (IPPs). The Bloemsmond Grid Connection Infrastructure is associated with five renewable energy projects, which if implemented will assist in achieving this target. The proposed Bloemsmond Grid Connection Infrastructure is also situated within a legislated REDZ and a Strategic Powerline Corridor.

2.5.7 Desirability (place)

Is the development the best practicable environmental option for this land / site?

The target properties are outside the Upington and Keimoes Urban Edge, within a legislated REDZ and Strategic Powerline Corridor and as such will unlikely be considered for an alternative land use such as urban development. The properties have a poor agricultural potential due to the arid climate and other limiting factors. These factors have rendered the property vacant with limited land use option alternatives.

Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?

No. According to the IDP, attracting Renewable Energy Investment is seen as an IDP Strategy and economic driver to alleviate unemployment and poverty and “to ensure sustainable economic and social transformation in the District”. The performance of which would be reflected in the development of a

Renewable Energy Strategy and Policy for the District (IDP, 2012-2018). The IDP furthermore specifically promotes socio-economic development, SMME's, job creation and private sector investment and identifies solar energy as a growth opportunity within the local economy.

Would the approval of this application compromise the integrity of the existing approved environmental management priorities for the area?

Unlikely. According to the national vegetation map (Mucina & Rutherford 2018, the solar development site lies entirely within a vegetation type that is classified as Least Threatened, namely Bushmanland Arid Grassland and Kalahari Karroid Shrubland (ecosystems that cover most of their original extent and which are mostly undamaged, healthy and functioning). Considering the extent of this relatively intact ecosystem type, and the fact that the site is not highly sensitive (there are no unique, threatened or otherwise unique habitats present which are not widely available in the wider landscape), it can withstand some loss of natural area through development.

Do location factors favour this land use at this place?

Yes. The Northern Cape region has been identified as being one of the most viable areas for solar energy generation (this grid connection infrastructure is directly linked to renewable energy generation) due to the following factors:

- Excellent solar radiation (compared to other regions);
- Close to existing main transport routes and access points;
- Close to connection points to the local and national electrical grid; and
- Outside Critical Biodiversity Areas.

The proposed properties are furthermore situated within a legislated REDZ and Strategic Powerline Corridor and as such has been subjected to a detailed SEA in which highly sensitive landscapes were already excluded from these areas.

The ecological sensitive areas on and surrounding the grid connection infrastructure have informed the optimal location and layout for the proposed infrastructure, with minimal impact to the receiving environment, subject to implementation of mitigation measures.

How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas?

The alternatives considered for the grid connection infrastructure have been iteratively designed and informed by various investigations and assessments that considered both the natural and cultural landscapes. The natural and culturally sensitive areas have been identified and where possible, avoided to prevent negative impacts on such areas.

How will the development impact on people's health and wellbeing?

The grid connection infrastructure is located outside of the Upington and Keimoes Urban Edge and as a result is unlikely to impact negatively on the community's health and wellbeing. The closest populated settlement is situated on Kanoneiland, situated more than 8km from the grid connection infrastructure.

Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?

Unlikely. The next best land use alternative to PV and associated infrastructure is limited agriculture (the status-quo). However, the proposed affected properties will not have any significant agricultural value and has not been utilised for any intensive agricultural purposes. The carrying capacity of the properties is too low to generate noteworthy financial benefit from agricultural activities. The economic benefits and opportunities that the proposed solar development holds for the landowner and the local economy of the municipal area cannot be recovered from the current or potential agricultural activities.

The opportunity costs in terms of the water-use requirements of Bloemsmond Grid Connection Infrastructure are within acceptable bounds if one considers the minimal demand on the resources.

Will the proposed land use result in unacceptable cumulative impacts?

Unlikely. Since the Northern Cape, and specifically sites within the legislated REDZ have been identified as an area with high potential for renewable energy generation: solar irradiation and availability of vast tracts of land with low sensitivity; there are several on-going applications in the region already. The potential for further, future solar developments in the area cannot be discounted (as many have already been approved or are in progress). However, these will have synergistic benefits for the economy and growth of the area, while the contribution to cumulative habitat loss in the area associated with this and potential future solar development would be relatively small in relation to the land resources available, with low impacts restricted to the local area.

2.6 SITE SELECTION PROCESS

Site selection for the grid connection infrastructure is determined entirely by the location of the power generating facility (in this case, the Bloemsmond PV facilities) and that of a suitable substation connected to the national energy grid (in this case the Upington MTS). The section below therefore details the site selection process that was undertaken for the Bloemsmond PV projects.

2.6.1 Property Selection

2.6.1.1 Proximity to towns with a need for socio-economic upliftment

The Bloemsmond PV projects are situated approximately 30 km south west of Upington in the Northern Cape Province. The Kai !Garib Local Municipality is typically masked with high rates of unemployment and poverty, which is largely the case throughout the Northern Cape Province. To this extent, the Bloemsmond Grid Connection Infrastructure is situated near the towns of Upington, Keimoes and Kakamas. Consequently, local labour would be easy to source, which fits in well with the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) economic development criteria for socio-economic upliftment. Currently, a large proportion of local labour is used in the mining and agricultural industry. There are several negatives related to agricultural employment however; that it is very seasonal, and it is not always near the homes of farm workers, forcing workers to travel large distances daily to reach their place of employment. Over the years, employment in the mining sector has shown to be very volatile. The Northern Cape has been identified as a node for the development and construction of solar PV within South Africa and the locality of the Bloemsmond Grid Connection Infrastructure would therefore present new opportunities for local skilled labour through previous work experience on surrounding preferred bidder plants.

2.6.1.2 Access to grid

The new Upington MTS is near the Bloemsmond PV sites. The preferred option connects directly into the proposed new Eskom Upington MTS, via the proposed Bloemsmond Collector Substation. Ease of access into the Eskom electricity grid is vital to the viability of a solar PV facility. Projects that are near a connection point and/or demand centre are favourable, and reduce the losses associated with power transmission. In addition, Eskom's '2040 Transmission Network Study' has drawn on various scenarios to determine the grid's development requirements, as well as to identify critical power corridors for future strategic development, of which the Northern Strategic Powerline Corridor is one of these. The national power corridors consisting of five transmission power corridors of 100 km in width have been gazetted by the DEA following the outcomes of the SEA, which aimed to identify environmentally acceptable routes over which long-term EIA approvals can be secured. The Bloemsmond Grid Connection Infrastructure falls into the Northern Strategic Powerline Corridor.

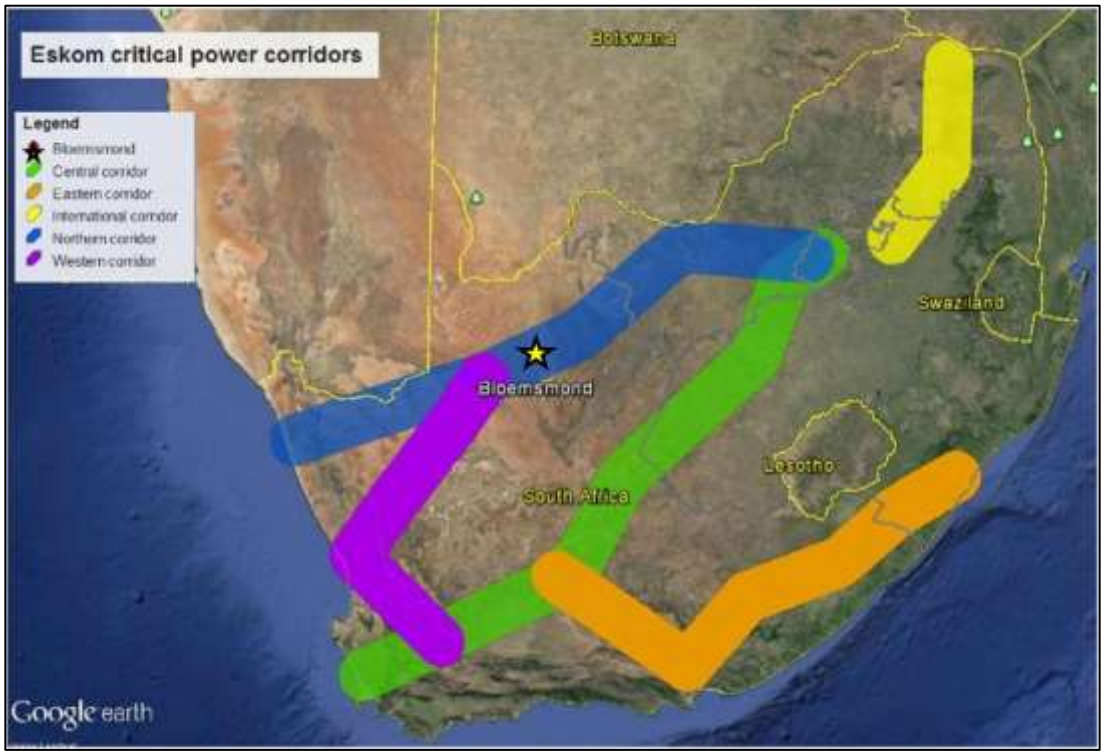

Figure 5: Eskom "Critical Power" Corridors. The Bloemsmond Grid Connection Infrastructure is within the Northern Strategic Powerline Corridor as shown by the yellow star.

2.6.1.3 Need and Desirability of the Development at the preferred site location

The Upington area has been ear-marked as a hub for the development of solar energy projects due to the viability of the solar resource for the area, and this area is included in the solar corridor which has been identified by the Northern Cape Spatial Development Framework. The overarching objective for the solar energy facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. From a regional site selection perspective, this region is considered to be preferred for solar energy development by virtue of its annual solar irradiation values. From a local perspective, the site has specifically been identified as being highly desirable for the development of a solar PV facility due to its suitable topography (i.e. in terms of slope and local topography), site access (i.e. to facilitate the movement of machinery during the construction phase), land availability, the extent of the site, and enabling optimal placement of the infrastructure considering potential environmental sensitivities or technical constraints, as well as the consolidation of renewable projects within an already identified node.

2.6.1.4 REDZ

The proposed Bloemsmond Grid Connection Infrastructure falls within the gazetted geographical areas / focus area most suitable for the rollout of the development of solar energy projects (called "Upington Solar priority area") within the Northern Cape Province.

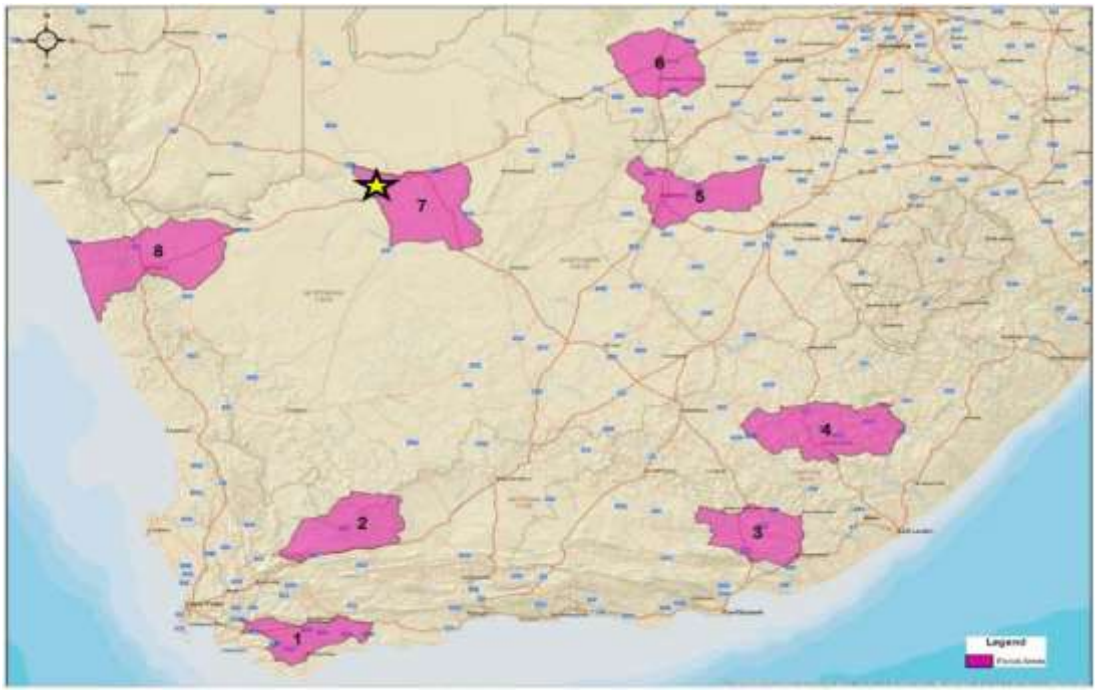

Figure 6: Renewable Energy Development Zones (CSIR 2014); Bloemsmond Grid Connection Infrastructure (shown by the yellow star) falls within REDZ 7.

2.6.1.5 Agricultural Potential

The unfavourable climate of the Kalahari environment greatly decreases agricultural potential. The area is known to be an agricultural-hub, but the affected land portions are located too far from the Orange River and its fertile banks to ever be considered for high intensity grazing and/or cultivation practices. The development does not encroach on land that is currently being used for grape production which is crucial for the economy of South Africa and the Upington area.

2.6.1.6 The Solar Irradiation

The economic viability of a solar facility is directly dependent on the annual direct solar irradiation values. The Northern Cape receives the highest average daily direct normal irradiation (DNI) in South Africa. In addition, Upington exhibits some of the best solar irradiation in South Africa, and the world. Global horizontal irradiation (GHI) for the Upington region varies between 2250 and 2300 kWh/m^2/annum. The GHI for the Bloemsmond PV facility sites is in the region of approximately 2278 kWh/m^2/annum. The high irradiation level is an important factor in a highly competitive bidding environment under REIPPPP, the economic viability of a project is a critical success factor.

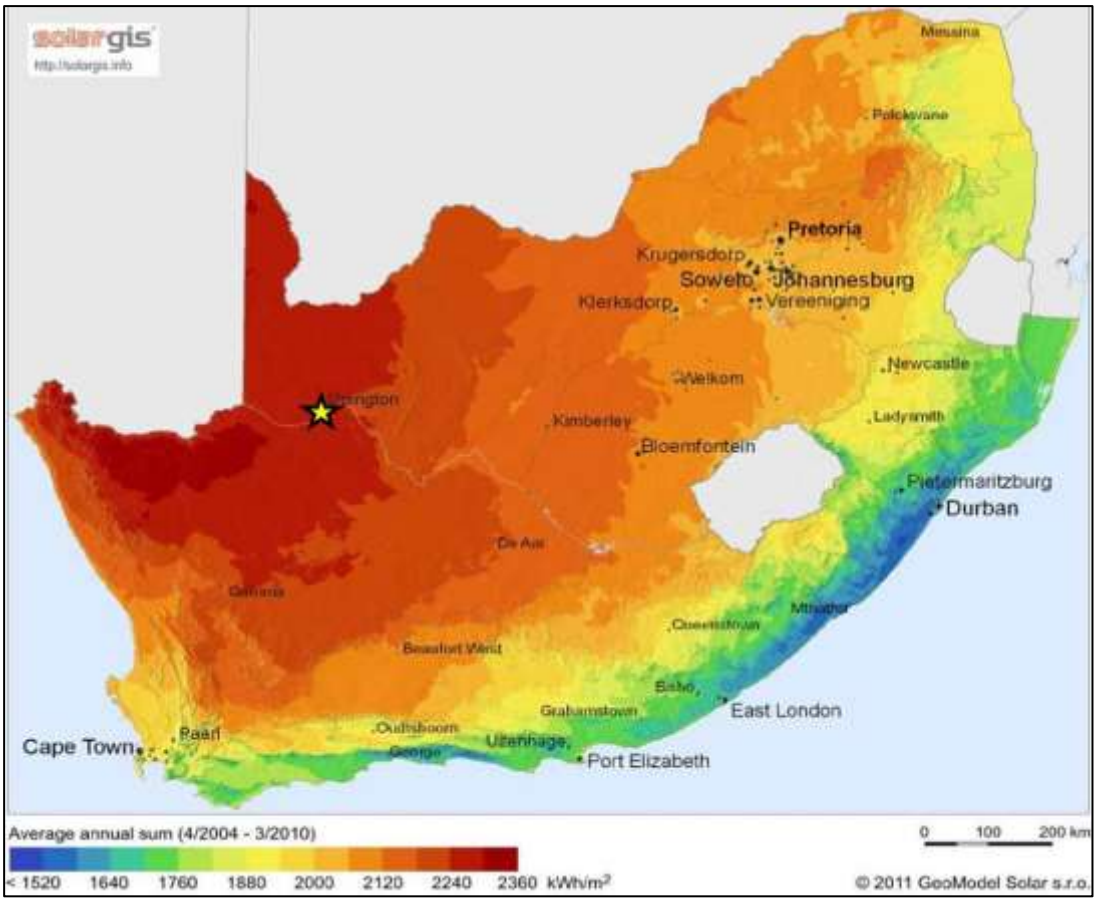

Figure 7: Global Horizontal radiation map for South Africa showing the approximate area proposed for Bloemsmond projects and their associated infrastructure.

2.6.1.7 Proximity to access road for transportation of material and components

The proximity of the site to the N14 decreases the impact on secondary roads from traffic during the construction and operation phases. As material and components would need to be transported to the Bloemsmond PV facilities, and thus also the Bloemsmond Grid Connection Infrastructure during the construction phase of the project, the accessibility of the site was a key factor in determining the viability of the project, particularly taking transportation costs (direct and indirect) into consideration and the impact of this on project economics and therefore the ability to submit a competitive bid under the Department of Mineral Resources and Energy REIPPPP.

2.6.1.8 Upington airport

The Upington airport is located approximately 28km to the south-west of the Bloemsmond Grid Connection Infrastructure, therefore the Bloemsmond Grid Connection Infrastructure will not pose any threat to the aviation industry.

2.7 CONSIDERATION OF ALTERNATIVES

Several layout alternatives have been considered as part of this environmental process. These are described below as follows:

- On-site substation position alternatives.
- Grid connection corridor alignment alternatives between the on-site substations and the Bloemsmond Collector Substation.

- Grid connection corridor alignment alternatives between the Bloemsmond Collector Substation and the Eskom Upington MTS.

2.7.1 On-site substation alternatives.

Alternative on-site substation positions were considered for the Bloemsmond 4 and 5 projects. These alternative substation positions would be utilised if the western corridor alternatives were selected as desirable. It must however be noted (as described below) that the western corridor alternatives were eliminated and as a result, the western substation alternatives for Bloemsmond 4 and 5 were no longer viable. The positioning of the preferred and alternative on-site substations are depicted in the figures below.

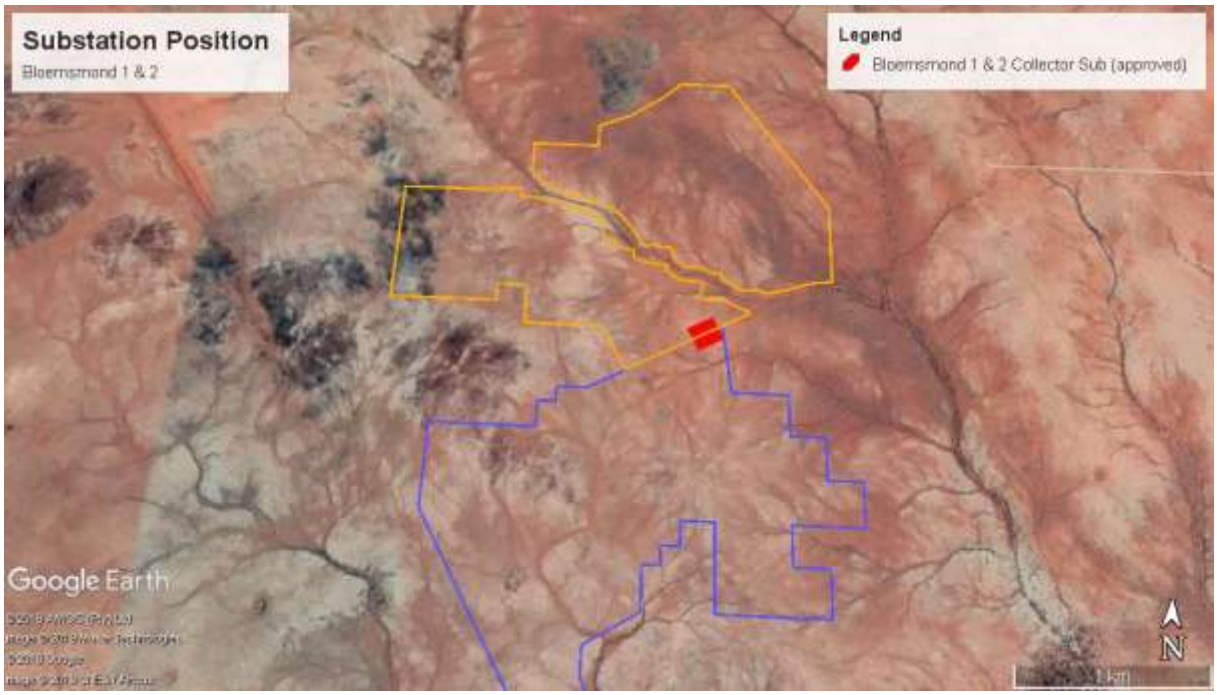

Figure 8: Bloemsmond 1 and 2 approved substation location.[11]

[11] The Bloemsmond 1 and 2 substation will also serve as the collector substation for all 5 projects.

Figure 9: Preferred substation for Bloemsmond 3.

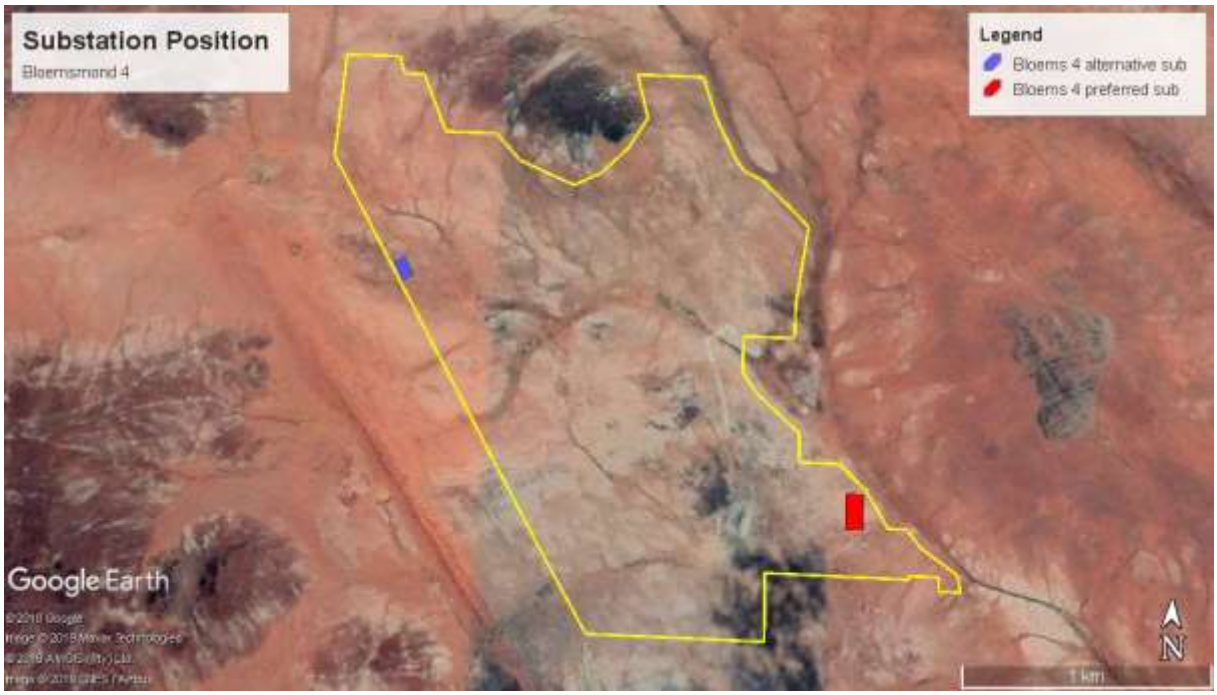

Figure 10: Preferred and alternative substations for Bloemsmond 4

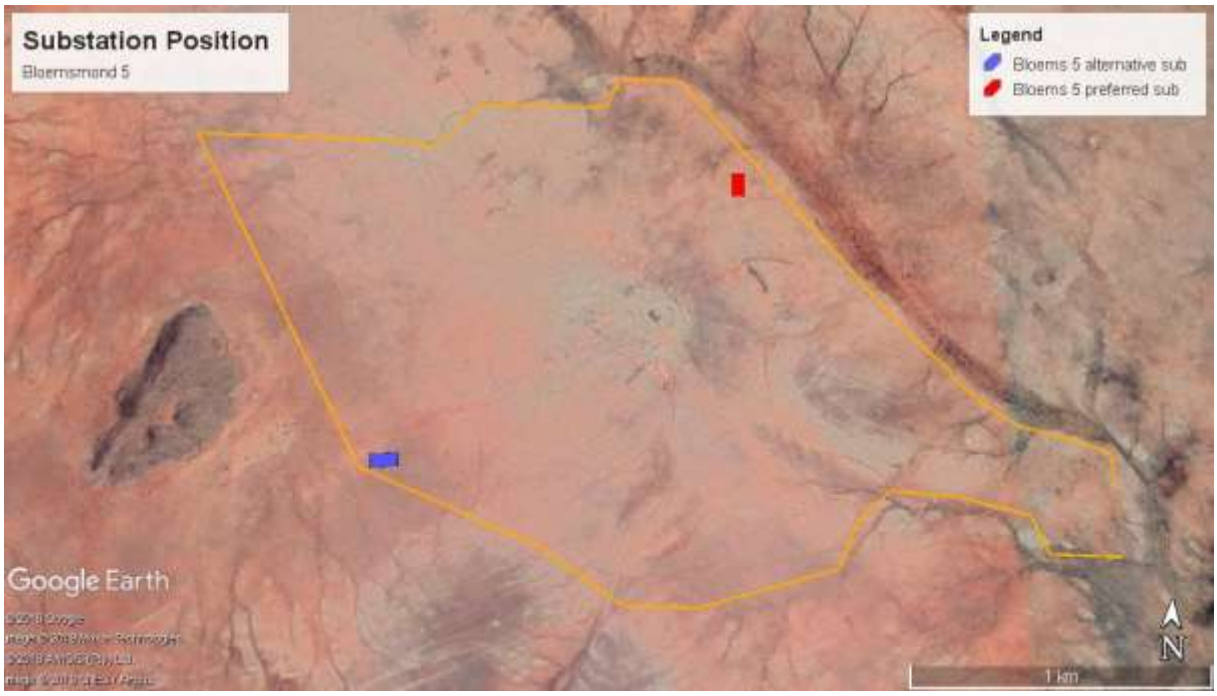

Figure 11: Preferred and alternative substations for Bloemsmond 5.

2.7.2 Grid connection corridor alternatives between the on-site substations and the Bloemsmond Collector Substation.

Alternative grid connection corridor alignments between the on-site substations and the Bloemsmond Collector Substation have been considered in this environmental process. These are described below.

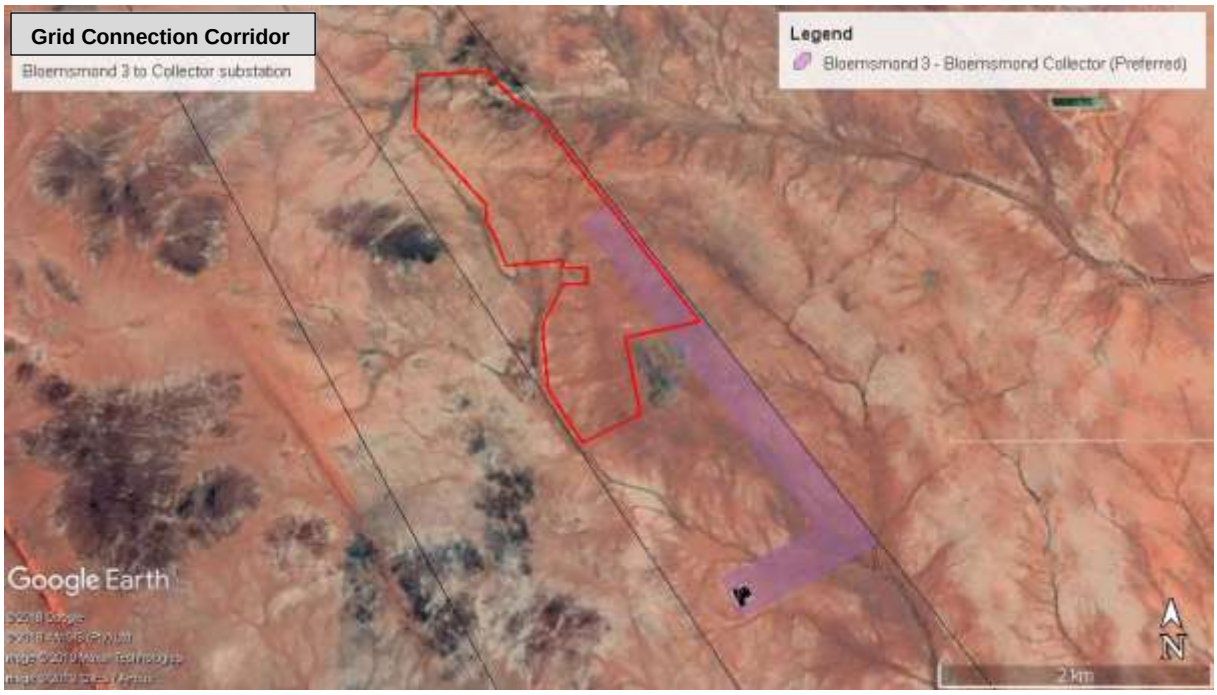

Figure 12: Grid connection corridor from Bloemsmond 3 on-site substation to Bloemsmond Collector Substation.

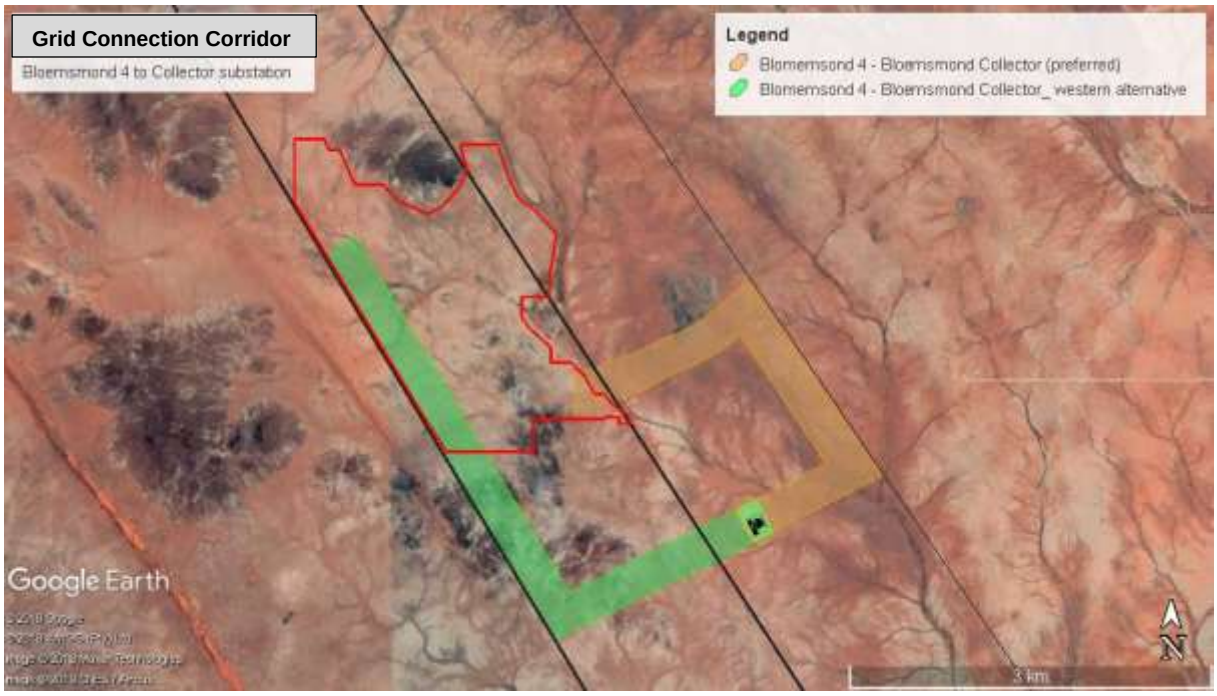

Figure 13: Grid connection corridor alternatives from Bloemsmond 4 on-site substation to Bloemsmond Collector Substation.

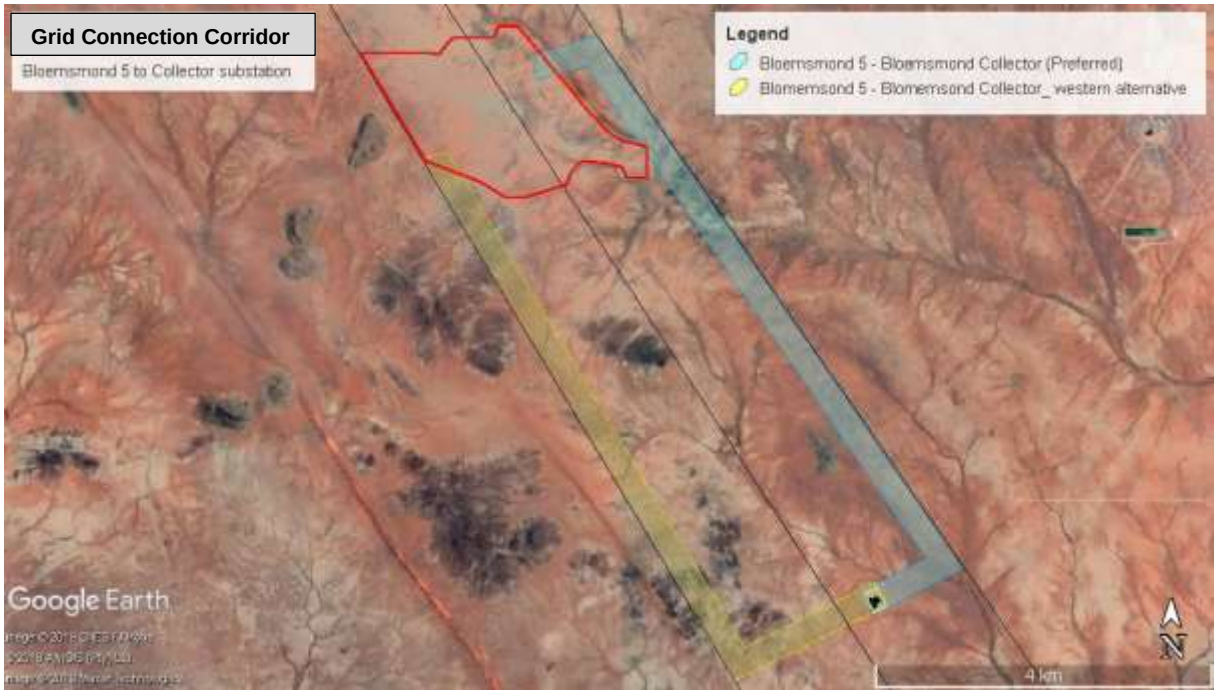

Figure 14: Grid connection corridor alternatives from Bloemsmond 5 on-site substation to Bloemsmond Collector Substation.

As can be seen in the images above, the corridor alternatives are aligned along either the western or eastern boundaries of the affected properties. The alignments along the eastern boundary have been identified as preferred and those along the western boundary have been eliminated for the following reasons:

- The eastern alignments cross multiple koppies that have been identified as sensitive avifaunal features. Alignment of powerline over these koppies would likely result in avifaunal fatalities because of collisions and electrocutions.

- The eastern alignments have a higher visual exposure and would result in a higher impact on the sense of place than the western alignments.

2.7.3 Grid connection corridor alternatives between the Bloemsmond Collector Substation and the Eskom Upington MTS.

Two grid connection corridor alternatives were considered for the section of grid connection between the Bloemsmond Collector Substation and the Upington MTS as depicted in the image below.

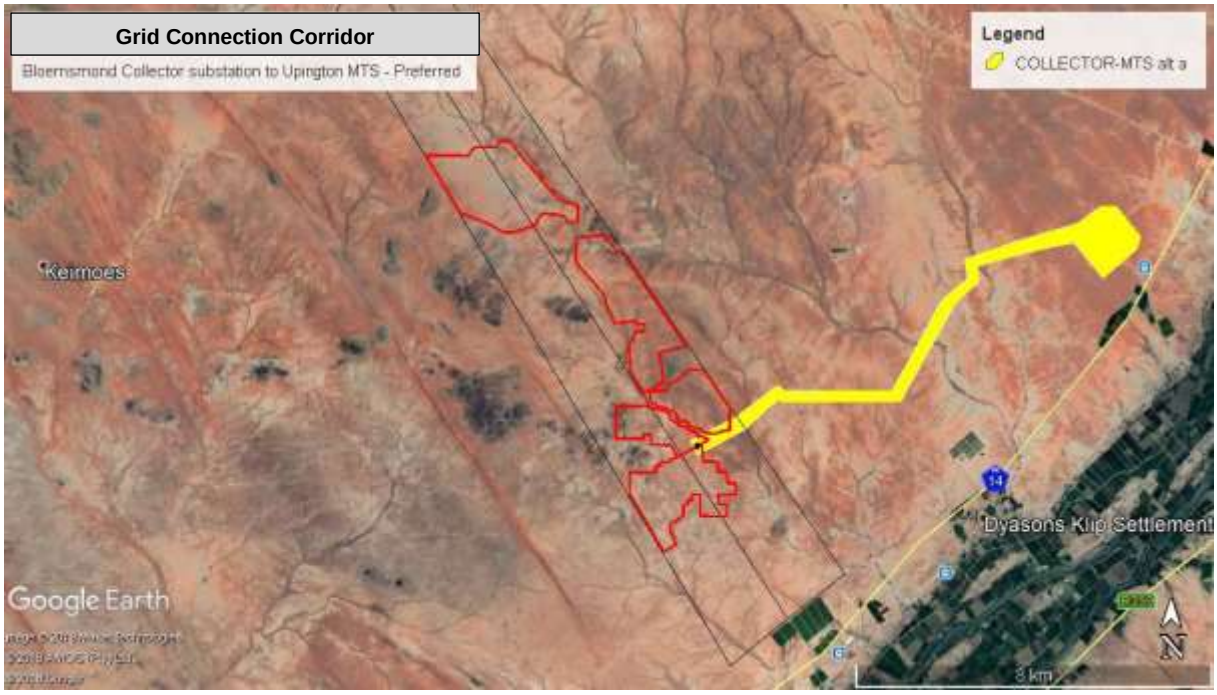

Figure 15: Alternative A - Preferred grid connection corridor from Bloemsmond Collector Substation to Upington MTS.

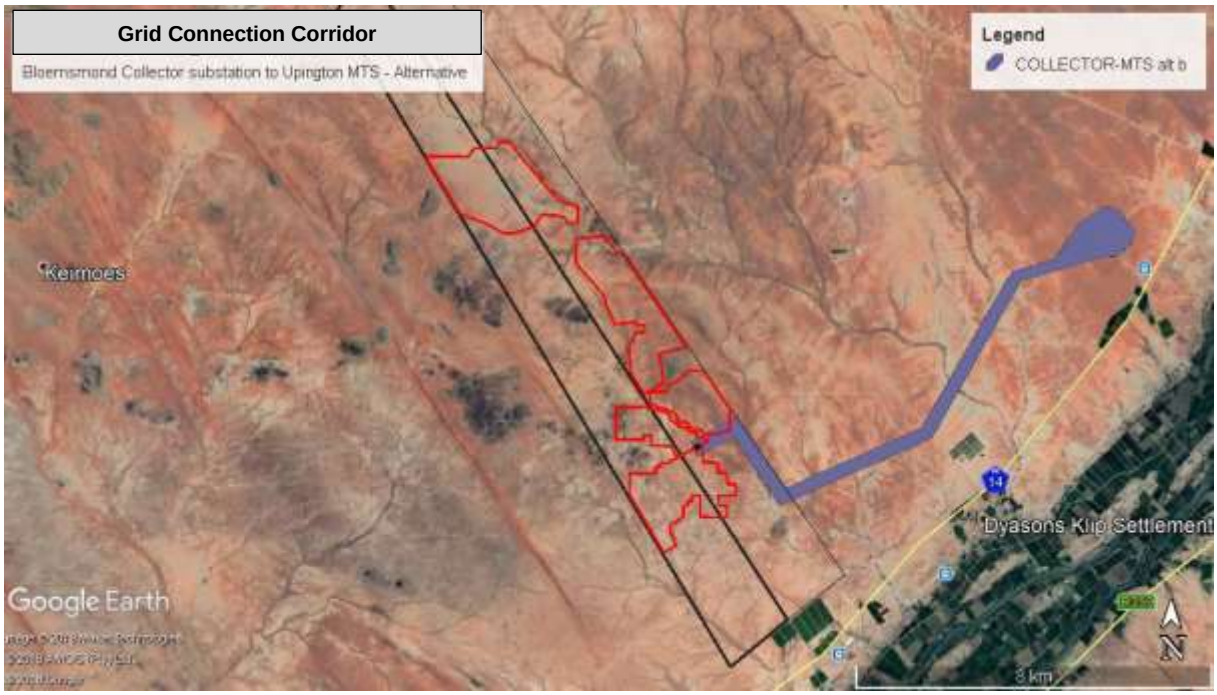

Figure 16: Alternative B grid connection corridor from Bloemsmond Collector Substation to Upington MTS.

The Alternative A alignment (northern alternative) was selected as the preferred alternative in this environmental process for the following reasons:

- The line is shorter, resulting in a lower impact on habitat.
- Due to the shorter alignment, collision and electrocution risk is reduces.
- It crosses fewer drainage features.
- It runs in parallel with an existing powerline, thus reducing landscape fragmentation.
- It has a lower visual exposure.

Due to the overall lower impact of grid connection corridor Alternative A, grid connection corridor Alternative B has been eliminated from further assessment.

2.7.4 The no-go alternative

The no go alternative is considered the option of not commencing with the activity (i.e. the activities proposed as part of the BAR).

In this instance the two separate 132kV powerlines that were authorised as part of the Bloemsmond 1 and Bloemsmond 2 developments can still be constructed under the “no-go” scenario.

This would result in an overall higher environmental impact (as two separate lines from the Bloemsmond properties to the collector substation have been authorised). It would also result in higher opportunity cost than the proposed joint connection infrastructure proposed in this environmental process.

2.7.5 Comparison of alternatives

The table below reflects the key environmental advantages and disadvantages of the grid connection alternatives including the identification of the preferred alternatives in each case.

Table 3: Comparison of Advantages and Disadvantages of grid connection infrastructure and corridor Alternatives.

Alternative	Preference	Reasons (incl. potential issues)
SUBSTATION POSITIONS		
Eastern alternatives	Preferred	- Aligned closer to the preferred powerline corridor
Western alternatives	Less Preferred	- Further away from the preferred powerline corridor, necessitating the need for additional powerline infrastructure and as a direct result, additional direct environmental impact.
GRID CONNECTION CORRIDORS FROM ON-SITE SUBSTATIONS TO BLOEMSMOND COLLECTOR SUBSTATION		
Eastern alternatives	Preferred	- Lower number of watercourse crossings - Does not cross any high sensitivity watercourses - Shorter - Closer to other disturbed areas - Does not cross any highly sensitive koppies (lower avifaunal impact)
Western alternatives	Least Preferred	- Higher number of watercourse crossings - Crosses several high sensitivity watercourses - Longer - Further away from disturbed areas disturbed areas - Crosses a high sensitivity koppie (higher avifaunal impact)
GRID CONNECTION CORRIDORS FROM BLOEMSMOND COLLECTOR SUBSTATION TO UPINGTON MTS		
Alternative A (northern)	Preferred	- Shorter route, resulting in lower impact on habitat transformation. - Less watercourse crossings resulting in a lower impact on hydrological features

Alternative	Preference	Reasons (incl. potential issues)
		- Lower visual exposure.
Alternative B (southern)	Least Preferred	- Longer route, resulting in higher impact on habitat transformation. - More watercourse crossings resulting in a higher impact on Hydrological Features - Higher Visual exposure.

As can be seen in the table above, the eastern on-site substation position and eastern grid connection corridors from the eastern on-site substations to the Bloemsmond Collector Substation are preferred. The northern grid connection corridor (Alternative A) from the Bloemsmond Collector Substation is preferred.

2.8 PROJECT PROGRAMME AND TIMELINES

As mentioned previously, the Bloemsmond PV projects (and their associated infrastructure -i.e. this application) intend to be bid into the REIPPPP. The programme has definite and stringent timelines that the project needs to meet. Note that the DoE has not yet released the exact dates of the bidding schedules, so the implementation schedule below is based on the best available information we have at this time and is subject to change.

Table 4: Preliminary implementation schedule.

	Description	Timeline
1	Expected REIPPPP submission date (5th round)	First Quarter of 2020
2	Preferred bidders selected	Third Quarter 2020
3	Finalisation of agreements	First Quarter 2021
4	Procurement of infrastructure	Second Quarter 2021
5	Construction	2021 - 2022
6	Commissioning	2022

The table above clearly depicts the dependence of the project on the REIPPPP's timelines. Any delay or acceleration within the REIPPPP will have a corresponding effect on the timelines of the projects. Also, as mentioned, no official public submission date for Round 5 has been communicated by the DoE.

NOTE: The Bloemsmond PV projects, including the Bloemsmond Grid Connection Infrastructure intend submitting their bids during the 5th bidding window or thereafter if unsuccessful in immediate bidding rounds.

3. LEGISLATIVE AND POLICY FRAMEWORK

The legislation that is relevant to this study is briefly outlined below. These environmental requirements are not intended to be definitive or exhaustive but serve to highlight key environmental legislation and responsibilities only.

3.1 NATIONAL LEGISLATION

This section deals with nationally promulgated or nationally applicable legislation associated with the proposed Bloemsmond Grid Connection Infrastructure.

3.1.1 The Constitution of the Republic of South Africa

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measures are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

The Constitution and Bill of Rights provides that:

Everyone has the right:

- to an environment that is not harmful to their health or well-being; and
- to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures:
    - prevent pollution and ecological degradation
    - promote conservation; and
    - secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

NEMA (discussed below) is the enabling legislation to ensure this primary right is achieved.

3.1.2 National Environmental Management Act (NEMA)

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)[12]. This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEFF) based on the findings of an Environmental Assessment (in this case, a Basic Assessment Process).

The project triggers activities listed in both listing notices 1 and 3 and as such require the undertaking of a Basic Assessment Process. Such a process must be conducted by an independent EAP. Cape EAPrac has been appointed to undertake this process. The figure below depicts a summary of the Basic Assessment process.

[12] The Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2014 (as amended in April 2017). These regulations came into effect on 08 December 2014 (amended on 07 April 2017) and replace the EIA regulations promulgated in 2006 and 2010.

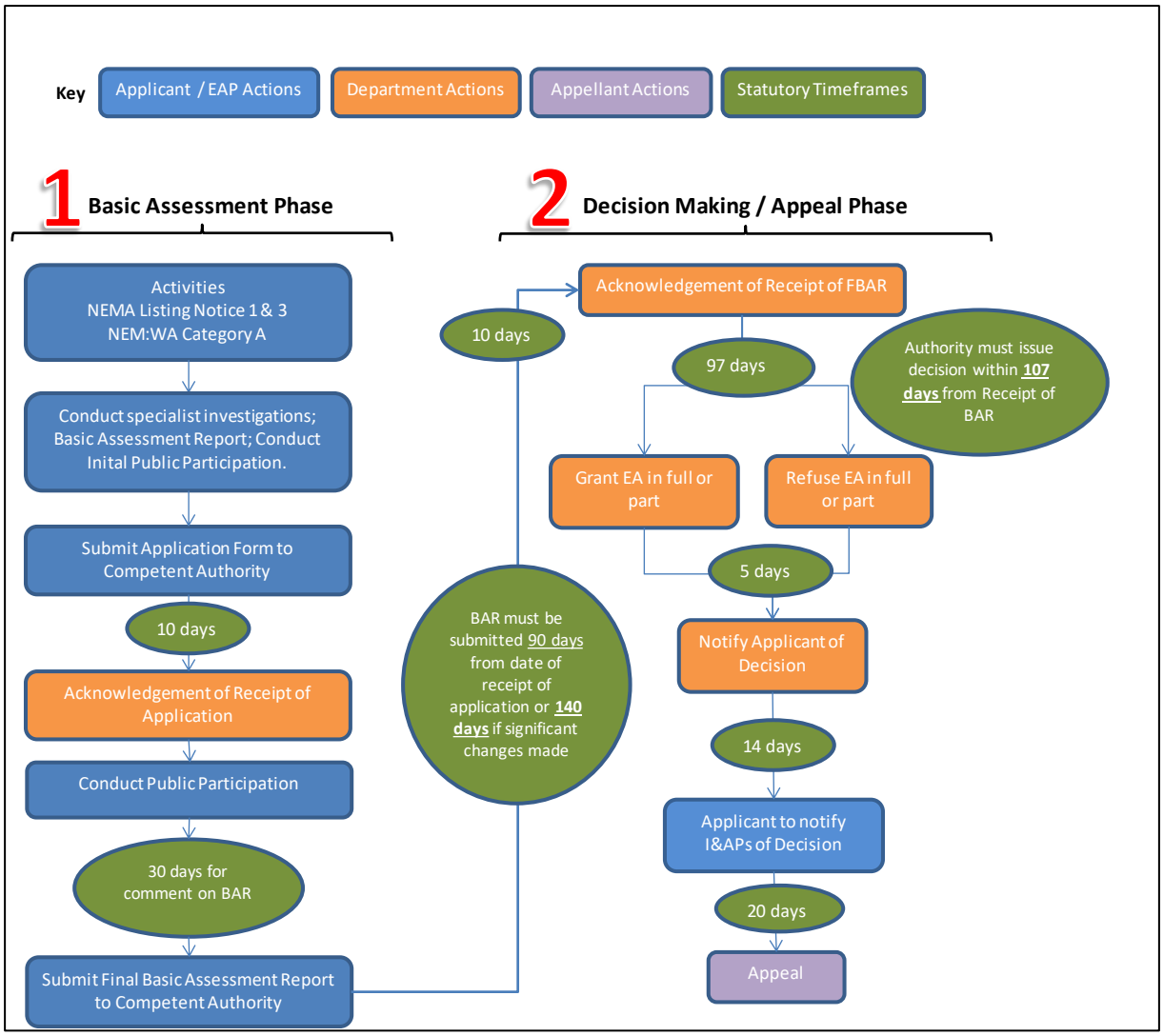

Figure 17: Summary of Basic Assessment Process in terms of the 2014 Regulations(as amended).

The listed activities associated with the proposed development, as stipulation under 2014 Regulations **327, 325 and 324** are as follows:

Table 5: NEMA 2014 (As amended in April 2017) listed activities applicable to the Bloemsmond Grid Connection Infrastructure.

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Description
11	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;	Construction of the on-site substations and Bloemsmond Collector Substation with a maximum capacity of 132 kilovolts and the construction of overhead powerlines with a maximum capacity of 132 kilovolts.
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; (c) if no development setback line exists, within 32m of a watercourse measured from the edge of a watercourse	Construction of powerline infrastructure straddeling the ephemeral washes and watercourses.

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;	Construction of powerline infrastructure straddeling the ephemeral washes and watercourses.
27	The clearance of an area of 1 hectares or more , but less than 20 hectares.	The construction of the substation (on-site and collector substation) and the temporary laydown areas will require the clearance of more than 1ha.
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 hectare;	The substations are considered to be industrial use and the development footprint of these substations will exceed 1ha.
Activity No(s):	**Basic Assessment Activity(ies) as set out in Listing Notice 3 (GN R985)**	**Description**
4	The development of a road wider than 4 metres with a reserve less than 13 metres. g. Northern Cape iii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	At the pylon positions, the construction access road will exceed 4m in width. These will however be rehabilitated to a single jeep track on completion of construction.
12	The clearance of an area of 300 square metres or more of indigenous vegetation. g. Northern Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	Portions of the powerline corridor (particularly the section between the Bloemsmond Collector substation and the Upington MTS) fall within a Critical Biodiversity Area and clearance of vegetation for the establishment of this powerline will exceed 300 square metres.
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more. g. Northern 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;	Portions of the powerline corridor (particularly the section between the Bloemsmond Collector Substation and the Upington MTS) fall within a Critical Biodiversity Area and the infrastructure in these CBAs will exceed 300 square metres.

Table 6: Activities applied for and their applicability to the components in the project description.

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Applicable Aspects of Project Description
11	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;	On-site switching-station / substation; Inverter-stations, transformers; Bloemsmond Grid Connection Infrastructure will connect from the on-site substation to the Upington MTS via the Bloemsmond Collector Substation.
12	The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more;	Powerline infrastructure.

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Applicable Aspects of Project Description
	where such development occurs— (a) within a watercourse;	
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;	Powerline infrastructure and maintenance track.
27	The clearance of an area of 1 hectares or more , but less than 20 hectares.	On-site substations Bloemsmond Collector substation Temporay laydown areas
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 hectare;	On-site substations Bloemsmond Collector substation
Activity No(s):	**Basic Assessment Activity(ies) as set out in Listing Notice 3 (GN R985)**	**Description**
4	The development of a road wider than 4 metres with a reserve less than 13 metres. g. Northern Cape iii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	Maintenance Track
12	The clearance of an area of 300 square metres or more of indigenous vegetation. g. Northern Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	Pylon positions and Bloemsmond Collector Substation.
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more. g. Northern 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;	Access Road and Bloemsmond Collector Substation

Before any of the above-mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the DEFF. Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who have a legal mandate in respect of the activity.

3.1.3 National Environmental Management: Biodiversity (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009) has been gazetted for public comment.

The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur. **However, the vegetation types on the preferred and alternative grid connection corridor alignments and substation positions are Least Threatened.**

NEMBA also deals with endangered, threatened and otherwise controlled species. The Act provides for listing of species as threatened or protected, under one of the following categories:

- **Critically Endangered**: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered**: any indigenous species facing a high risk of extinction in the wild soon, although it is not a critically endangered species.
- **Vulnerable**: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species**: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain activities, known as Restricted Activities, are regulated by a set of permit regulations published under the Act. These activities may not proceed without environmental authorisation.

The study area is in the Kalahari Karroid Shrubland (Least threatened) and Bushmanland Arid Grassland (Least threatened) vegetation types. The study area is not located in a threatened ecosystem the Lower Gariep Alluvial Vegetation threatened ecosystem is located south of the study area.

Kalahari Karroid Shrubland vegetation type is endemic to the Northern Cape Province. The vegetation type is characteristic of forming belts alternating with belts of Gordonia Duneveld on plains northwest of Upington through Lutzputs and Noenieput to the Rietfontein/Mier area in the north. Other patches occur around Kakamas and north of Groblershoop. The unit is also found in the neighbouring Namibia. The vegetation can be described as low karroid shrubland on flat, gravel plains. Karoo-related and northern floristic elements such as shrubs meet here, indicating a transition to the Kalahari region and sandy soils. Altitude varies mostly from 700 - 1100 m.

The conservation target is set at 21% with very little statutorily conserved in the Augrabies Falls National Park. Although only a small area has been transformed many of the belts of this type were preferred routes for early roads, thus promoting the introduction of alien plants (about a quarter of the unit has scattered *Prosopis* species). Erosion is very low (94%) (Mucina & Rutherford, 2010).

The Bushmanland Arid Grassland vegetation type occurs only in the Northern Cape Province. It spans about one degree of latitude from around Aggeneys in the west to Prieska in the east. The southern border of the unit is formed by edges of the Bushmanland Basin while in the northwest this vegetation unit borders on desert vegetation (northwest of Aggeneys and Pofadder). The northern border (near Upington) and the eastern border (between Upington and Prieska) are formed with often intermingling units of Lower Gariep Broken Veld, Kalahari Karroid Shrubland and Gordonia Duneveld. Most of the western border is formed by the edge of the Namaqualand hills. Altitude varies mostly from 600–1 200 m. The conservation target is set at 21% with only small patches statutorily conserved in Augrabies Falls National Park and Goegab Nature Reserve. Very little of the area has been transformed. Erosion is very low (60%) and low (33%) (Mucina & Rutherford, 2010).

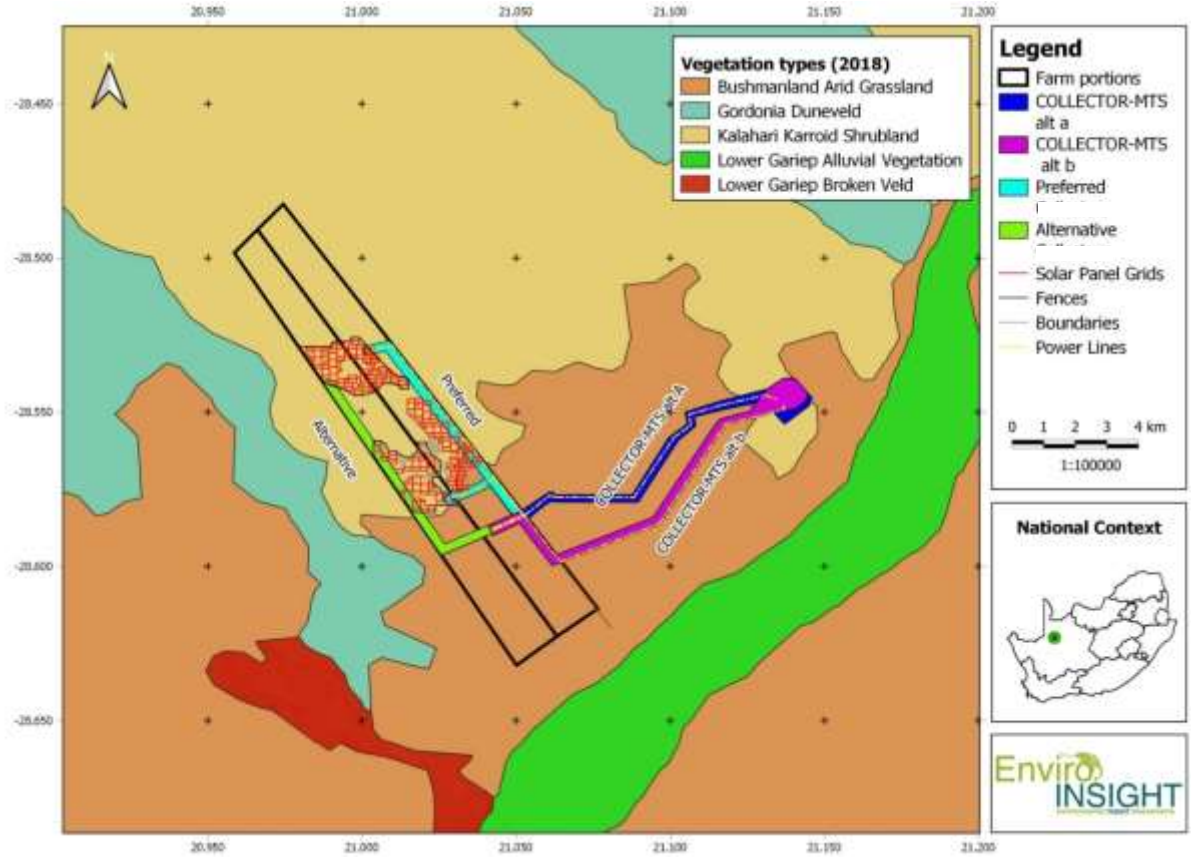

Figure 18: The study area for the Bloemsmond Grid Connection Infrastructure in relation to threatened ecosystems.

3.1.4 Conservation of Agricultural Resources Act – CARA (Act 43 of 1983):

The Conservation of Agricultural Resources Act (CARA) provides for the regulation of control over the utilisation of the natural agricultural resources to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. CARA defines different categories of alien plants:

- Category 1 - prohibited and must be controlled;
- Category 2 – must be grown within a demarcated area under permit; and
- Category 3 - ornamental plants that may no longer be planted, but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the flood lines of water courses and wetlands.

The abundance of alien plant species in the study area assessed for the Bloemsmond Grid Connection Infrastructure is very low, which can be ascribed mainly to the aridity of the study area.

The Department of Agriculture, Land Reform and Rural Development is guided by Act 43 of 1983.

To comply with their mandate in terms of this legislation, the applicant is required to take note of the following:

Article 7. (3)b of Regulation 9238: CONSERVATION OF AGRICULTURE RESOURCES, 1983 (Act 43 of 1983)

Utilisation and protection of vleis, marshes, water sponges and water courses

- 7.(1) “no land user shall utilize the vegetation in a vlei, marsh or water sponge or within the flood area of a water course or within 10 meters horizontally outside such flood area in a manner that causes or may cause the deterioration of or damage to the natural agriculture resources.”

- (3)(b) “cultivate any land on his farm unit within the flood area of a water course or within 10 meters horizontally outside the flood area of a water course”.

Kindly refer to the Freshwater Ecological Impact Assessment in Annexure E2 for a discussion of potential impacts on the freshwater resources in the study area.

3.1.5 The Subdivision of Agricultural Land, Act 70 Of 1970

The Subdivision of Agricultural Land Act 70 of 1970 (SALA”) came into operation on 2 January 1971. The Department of Agriculture, Forestry and Fisheries (DAFF) administers the Subdivision of Agricultural Land Act No. 70 of 1970. Subdivision of agricultural land, therefore, requires DAFF’s consent.

DAFF is considered a commenting authority on this environmental process, but will be a decision-making authority on the SALA application which will take place after the project receives an EA.

3.1.6 National Water Act, No 36 of 1998

Section 21c & i of the National Water Act (NWA) requires the Applicant to apply for authorisation from the Department of Water and Sanitation for an activity in, or in proximity to any watercourse. Such an application would be required for any access road or PV infrastructure that crosses any watercourse.

Section 21(a) of the National Water Act is related to the abstraction of water from a water resource (including abstraction of groundwater); a Water Use Licence (WUL) would be required for such abstraction.

Water required for the construction of the Bloemsmond Grid Connection Infrastructure (this activity will not utilize water during operation) is to be sourced from the Kai !Garib Local Municipality. Should the applicant in the future, wish to utilise groundwater for the purposes of construction or operation of the facility, such use will require a licence in terms of Section 21(a) of the NWA.

The freshwater specialist has identified several drainage lines and alluvial washes which occur on plains as well as slopes, as well as pans occur on plains within the broader study area. The final preferred alignment has avoided all main drainage lines, pans and the high sensitivity alluvial washes. The powerline does however straddle some of the low and medium sensitivity alluvial washes, but Pylon positions will be situated outside of these washes. Such encroachments will require authorisation in terms of the National Water Act. Proof that such applications have been lodged with the Department of Water and Sanitation are included in Annexure G7.

The Department of Water and Sanitation have been registered as a key stakeholder in this environmental process.

3.1.7 National Forests Act (No. 84 of 1998):

The National Forests Act (NFA) provides for the protection of forests as well as specific tree species, quoting directly from the Act: “*no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated”.*

The ecological specialist, Enviro Insight, identified the following species within the study area assessed for the Bloemsmond Grid Connection Infrastructure, which are protected in terms of the National Forest Act.

Table 7: Species present in the study area that are protected in terms of the National Forest Act.

Species	Common Name	SANBI National Red List[13]	Northern Cape Protected[14]	National Forest Act (1998)[15]	Habitat Description
Boscia albitrunca	Shepherd's tree	Least Concern	Yes	Yes	Terrestrial – including seven provinces excluding Western and Eastern Cape
Vachellia erioloba	Camel thorn	Least Concern	Yes	Yes	Widespread in the arid northern provinces of South Africa, also Namibia, Botswana, Zimbabwe, southern Angola and south-western Zambia

Notwithstanding, the significance associated with the removal of protected trees for the proposed development, the applicant will be required to apply in terms of the NFA for a licence to remove individuals of these two species.

The Department of Agriculture, Forestry and Fisheries (DAFF) (now the department of Environment, Forestry and Fisheries (DEFF)) have been registered as a key stakeholder in this environmental process and will be requested to provide comment in this regard.

3.1.8 National Heritage Resources Act, 25 of 1998

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority in the Northern Cape and is registered as a Stakeholder for this environmental process.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will comment on the detailed Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an BA process.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- any development or other activity which will change the character of a *site* exceeding 5 000 m² in extent; and
- the re-zoning of a site exceeding 10 000m^2 in extent.

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority.

[13] http://redlist.sanbi.org/

[14] Northern Cape Nature Conservation Act (Act No 9 of 2009)

[15] Notice of the list of protected tree species under the National Forests Act 84 of 1998 published in GN 182 in GG 41100 of 8 September 2017

- In terms of Section 36 (3), no person may destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority.
- In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

Mr Jaco van der Walt of HCAC heritage consultants, has undertaken a heritage impact assessment for the proposed Bloemsmond Grid Infrastructure. This heritage study has included a Paleontological Desktop Assessment undertaken by Dr John Almond.

The application in terms of Section 38 of the National Heritage Act has been lodged with SAHRA via their SAHRIS system.

3.1.9 National Energy Act (No. 34 of 2008)

The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation; while taking environmental management requirements into account. In addition, the Act also provides for energy planning, and increased generation and consumption of Renewable Energies.

The objectives of the Act are to amongst other things, to:

- Ensure uninterrupted supply of energy to the Republic.
- Promote diversity of supply of energy and its sources.
- Facilitate energy access for improvement of the quality of life of the people of the Republic.
- Contribute to the sustainable development of South Africa's economy.

The National Energy Act therefore recognises the significant role which electricity plays growing the economy while improving citizens' quality of life. The Act provides the legal framework which supports the development of Renewable Energy facilities for the greater environmental and social good and provides the backdrop against which South Africa's strategic planning regarding future electricity provision and supply takes place.

3.2 PROVINCIAL LEGISLATION

This section deals with provincially promulgated or provincially applicable legislation associated with the proposed Bloemsmond Grid Infrastructure.

3.2.1 Northern Cape Nature Conservation Act, No. 9 of 2009

The Northern Cape Nature Conservation Act provides inter alia for the sustainable utilisation of wild animals, aquatic biota and plants as well as permitting and trade regulations regarding wild fauna and flora within the province. In terms of this act the following section may be relevant with regards to any security fencing the solar development may require.

Manipulation of boundary fences: 19. No Person may –

(a) erect, alter, remove or partly remove or cause to be erected, altered, removed or partly removed, any fence, whether on a common boundary or on such person's own property, in such a manner that any wild animal which as a result thereof gains access or may gain access to the property or a camp on the property, cannot escape or is likely not to be able to escape therefrom.

It is recommended that the perimeter fencing around the solar development site will be constructed in a manner which allows for the passage of small and medium sized mammals: The biodiversity specialist has made recommendations in terms of appropriate fencing.

The ecology specialist identified the following species protected in terms of this Act.

Table 8: Species identified on-site that are protected in terms of the Northern Cape Nature Conservation Act.

Species	Common Name	SANBI National Red List[16]	Habitat Description
Aloe claviflora	Aanteelaalwyn	Least Concern	Well drained areas on rocky slopes or flat stony areas at the margins of Kalahari Thornveld. Usually, but not always, on calcrete
Anacampseros albissima		Least Concern	Rock outcrops and quartz flats. Southern Angola through Namibia to the Richtersveld, and eastwards through Bushmanland to Griqualand West.
Boscia albitrunca	Shepherd's tree	Least Concern	Terrestrial – including seven provinces excluding Western and Eastern Cape
Boscia foetida		Least Concern	Terrestrial – Northern Cape
Hoodia gordonii	Bitterghaap, Bobbejaanghaap	Least Concern	Occurs in a wide variety of arid habitats from coastal to mountainous, also on gentle to steep shale ridges, found from dry, rocky places to sandy spots in riverbeds – Desert, Nama Karoo, Savanna, Succulent Karoo.
Vachellia erioloba	Camel thorn	Least Concern	Widespread in the arid northern provinces of South Africa, also Namibia, Botswana, Zimbabwe, southern Angola and south-western Zambia

Please also refer to the Ecological Impact Report attached in Annexure E1 for further information on protected species present within the study area assessed for the Bloemsmond Grid Connection Infrastructure,.

3.2.2 Nature and Environmental Conservation Ordinance, No 19 of 1974

This legislation was developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered. The provincial environmental authorities are responsible for implementing the provisions of this legislation, which includes the issuing of permits etc. In the Northern Cape, the Department of Environment and Nature Conservation fulfils this mandate as per the Northern Cape Nature Conservation Act as described above.

3.2.3 Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)

The purpose of the Act is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, excluding the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa

[16] http://redlist.sanbi.org/

Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that must be protected.

Chapter 2 of the act allows for the declaration of astronomy advantage areas whilst Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of astronomy advantage areas include, amongst others, the following:

- Restrictions on use of radio frequency spectrum in astronomy advantage areas;
- Declared activities in core or central astronomy advantage area;
- Identified activities in coordinated astronomy advantage area; and
- Authorisation to undertake identified activities.

The South African SKA Project Office have been registered as a key stakeholder on this environmental process and have been requested to provide input in terms of the Astronomy Geographic Advantage Act and potential impact to SKA. The SKA-SA project office provided comment on the five parent projects (AEP Bloemsmond Solar 1 & 2 and Bloemsmond 3, 4 & 5) and have confirmed that the projects pose a low risk to SKA, due to the distance from the nearest SKA station.

3.2.4 Northern Cape Provincial Spatial Development Framework (PSDF) 2012

The Northern Cape Provincial Spatial Development Framework (PSDF) 2012 states that the overarching goal for the Province is to enable sustainability through sustainable development. The Province considers social and economic development as imperative to address the most significant challenge facing the Northern Cape, which is poverty.

The PSDF considers the release of greenhouse gas (GHG) emissions created by human activity as the key cause of global warming, which in turn could result in major negative effects and disasters in the short- and medium-term. This effect would increasingly undermine human development gains. Innovative strategies would have to be implemented to reduce the impact of global deterioration.

The PSDF identifies key sectoral strategies and plans which are the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. Within the PSDF a policy has been included which states that renewable energy sources (including the utilisation of solar energy) are to comprise 25% of the Province's energy generation capacity by 2020.

The overall energy objective for the Province also includes promoting the development of renewable energy supply schemes which are strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the Province through appropriate financial and fiscal instruments.

Considering the need for the development of renewable energy facilities to achieve the objective of sustainability the development of the proposed grid infrastructure within the Northern Cape and within the study area is aligned with the Northern Cape PSDF.

3.2.5 Northern Cape Province Provincial Growth and Development Strategy

The Northern Cape Provincial Growth and Development Strategy (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;
- 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 several 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;
- Enhancing infrastructure for economic growth and social development.

Of specific relevance to this EIA and more specifically, the SIA is that the NCPGDS refer to the need to ensure the availability of inexpensive energy. The section notes that 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. In this regard the NCPGDS notes "the development of energy sources such as solar energy, the natural gas fields, bio-fuels, etc., could be some of the means by which new economic opportunity and activity is generated in the Northern Cape". The NCPGDS also highlights the importance of close co-operation between the public and private sectors for the economic development potential of the Northern Cape to be realised.

The NCPGDS also highlights the importance of enterprise development and notes that the current levels of private sector development and investment in the Northern Cape are low. In addition, the province also lags in the key policy priority areas of SMME Development and Black Economic Empowerment. The proposed solar energy facility therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province.

In this regard care will need to be taken to ensure that the proposed STPs and other renewable energy facilities do 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 document also indicates that due to the provinces 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, such as the proposed solar energy facility, do not affect the tourism potential of the province.

3.2.6 Northern Cape Climate Change Response Strategy

The key aspects of the PCCRS Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "The Provincial Climate Change Response Strategy will be underpinned by specific critical sector climate change adaptation and mitigation strategies that include the water, agriculture and human health sectors as the 3 key adaptation sectors, the industry and transport alongside the energy sector as the 3 key mitigation sectors with the disaster management, natural resources and Human society, livelihoods and services sectors as 3 remaining key sectors to ensure proactive long term responses to the frequency and intensity of extreme weather events such as flooding and wild fire, with heightened requirements for effective disaster management".

Key points from MEC's address include the NCPG's commitment to develop and implement policy in accord with the National Green Paper for the National Climate Change Response Strategy (2010), and

an acknowledgement of the NCP's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, and environmental learnership is indented as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (but also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy. The MEC also indicated that the NCP was involved in the processing several wind and solar energy facility EIA applications.

3.3 REGIONAL AND MUNICIPAL LEGISLATION

This section deals with regionally and municipally promulgated or regionally or municipally applicable legislation associated with the proposed Bloemsmond Grid Infrastructure [17].

3.3.1 ZF Mgcawu District Municipality Integrated Development Plan

The vision set out in the ZFMDM is "Quality support to deliver quality services". The mission is a "Centre of excellence in providing quality basic services through support to local municipalities".

In terms of the National Spatial Development Perspective, The ZF Mgcawu District area has been classified as a "medium" importance area which means that no significant investment is concentrated in the region. In terms of the National Spatial Development Perspective, The ZF Mgcawu District area has been classified as a "medium" importance area which means that no significant investment is concentrated in the region.

The IDP lists several strategic objectives and development objectives. The relevant objectives include:

Strategic objective
To Facilitate the Development of Sustainable regional land use, economic, spatial and environmental planning frameworks that will support and guide the development of a diversified, resilient and sustainable district economy. The associated development objective is to:

- Establish a vehicle to ensure all businesses are co-operating (i.e. District LED Forum);
- Create investment opportunities in sectoral development (i.e. investment activities; Entrepreneurial business support programme);
- Enable an environment for business establishment and support initiatives (i.e. Increase the number of businesses; entrepreneurial support)

Strategic objective
To market, develop and co-ordinate tourism in the ZFMDM. The associated development objective is to:

- Promote the Green Kalahari tourism brand in the ZF Mgcawu district

The IDP identifies several key challenges. The following are relevant to the proposed development:

- High rate of unemployment;
- Inadequate human capital;
- Youth development;
- Access to health care facilities.

In terms of the Kai Garib Municipality, the priority issues include:

- Lack of Basic Services;

[17] This section includes legislation applicable to both the District (Category C) and Local (Category B) municipalities.

- Lack of proper housing / existing informal settlements/ Lack of Land Ownership;
- Poverty & unemployment, lack of youth development and social issues contributing thereto (Local Economic Development) / Lack of farming land/ commonage;
- Lack of sport and recreational facilities and services;
- Lack of sufficient and proper health services (HIV/AIDS).

The IDP also notes that the ZF Mgcawu District Municipality acknowledges that climate change poses a threat to the environment, its residents, and future development. Actions are required to reduce carbon emissions (mitigation) and prepare for the changes that are projected to take place (adaptation) in the District. ZF Mgcawu District Municipality has therefore prioritised the development of a Climate Change Vulnerability Assessment and Climate Change Response Plan.

3.3.2 Kai! Garib Local Municipality Integrated Development Plan

The vision for the Kai! Garib LM is "Creating an economically viable and fully developed municipality, which enhances the standard of living of all the inhabitants / community of Kai! Garib through good governance, excellent service delivery and sustainable development." The mission is the "Provision of transparent, accountable and sustainable service delivery".

The IDP notes that that the activities of the KGLM are guided by several values, of which the following are relevant to the proposed development:

- Transparency in planning and management;
- Proper understanding of the needs of communities;
- The implementation of a development orientated approach to Local Government;
- Building capacity among the staff and Community wherever possible to enable them to play an effective role in Local Government.

The IDP is aligned with the National Government identified Key Performance Areas (KPA's) which are:

- KPA 1: Service Delivery and Infrastructure Development;
- KPA 2: Local Economic Development;
- KPA 3: Municipal Financial Viability and Management;
- KPA 4: Institutional Development and Transformation;
- KPA 5: Public Participation and Good Governance.

KPA 2, Local Economic Development, is the most relevance KPA for the proposed development.

3.4 GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS

This section includes relevant Guidelines, Policies and Authoritative reports applicable to the proposed Bloemsmond Grid Infrastructure.

3.4.1 National Protected Area Expansion Strategy (NPAES) for S.A. 2008 (2010)

Considering that South Africa's protected area network currently falls far short of sustaining biodiversity and ecological processes, the NPEAS aims to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to Climate Change. Protected areas, recognised by the National Environmental Management: Protected Areas Act (Act 57 of 2003), are considered formal protected areas in the NPAES. The NPAES sets targets for expansion of these protected areas, provides maps of the most important protected area expansion, and makes recommendations on mechanisms for protected area expansion.

The NPAES identifies 42 focus areas for land-based protected area expansion in South Africa. These are large intact and un-fragmented areas suitable for the creation or expansion of large protected areas. The closest focus area is the Eastern Kalahari Bushveld Focus Area; the proposed Bloemsmond Grid

Connection Infrastructure will not affect this or any other NPAES focus area as it is situated considerable distance from the Eastern Kalahari Bushveld Focus Area.

3.4.2 Critical Biodiversity Areas

A Critical Biodiversity Areas (CBA) Map is a spatial plan for ecological sustainability. It identifies a set of biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape.

CBA Maps can be given formal legal status through the National Environmental Management: Biodiversity Act (Act 10 of 2004).

The Northern Cape Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province.

According to the CBA Map, the Bloemsmond Grid Connection Infrastructure is mostly located in the category “Other Natural Areas” with a section of the Powerline route between the Bloemsmond Collector Substation and the Upington MTS falling in a Type 2 CBA. From an ecological perspective, development is preferred within “transformed” and “Other Natural Areas” rather than in “CBA’s”

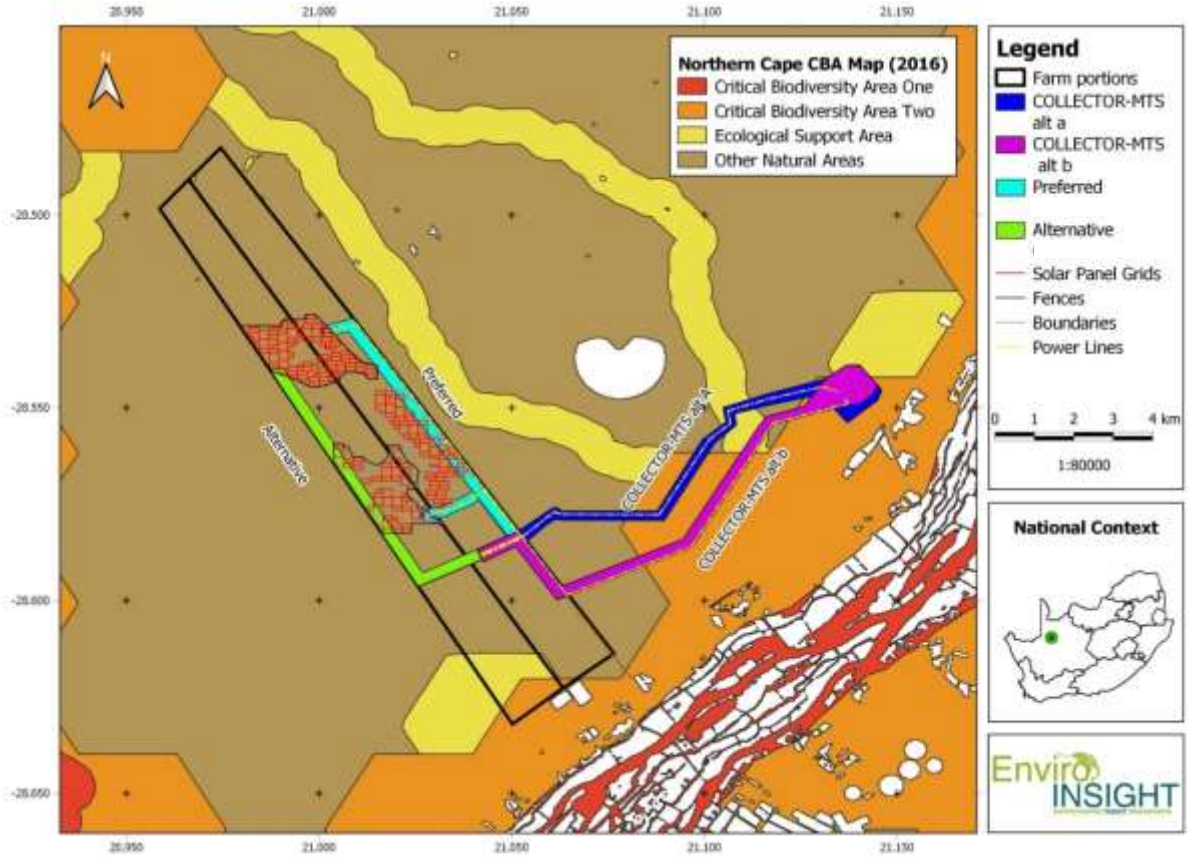

Figure 19: The study area for the Bloemsmond Grid Connection Infrastructure in relation to the Northern Cape Critical Biodiversity Areas (2016).

3.4.3 White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)

The White Paper on Renewable Energy Policy of 2003 supplements Government’s predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of RE and aims to create the necessary conditions for the

development and commercial implementation of RE technologies. The position of the White Paper on RE Policy is based on the integrated resource planning criterion of:

"Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options."

The White Paper on Renewable Energy Policy sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing Renewable Energy in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible and affordable coal resources. However, massive RE resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The White Paper on Renewable Energy Policy fosters the uptake of Renewable Energy in the economy and has several objectives that include ensuring equitable resources are invested in renewable technologies; directing public resources for implementation of Renewable Energy technologies; introducing suitable fiscal incentives for Renewable Energy and; creating an investment climate for the development of the RE sector.

The White Paper on Renewable Energy Policy set a target of 10 000GWh to be generated from RE by 2013 to be produced mainly from biomass, wind, solar and small-scale hydro. The target was subsequently reviewed in 2009 during the RE summit of 2009. The objectives of the White Paper on Renewable Energy Policy are considered in six focal areas, namely; financial instruments, legal instruments, technology development, awareness raising, capacity building and education, and market based and regulatory instruments. The policy supports the investment in Renewable Energy facilities as they contribute towards ensuring energy security through the diversification of energy supply, reducing GHG emissions and the promotion of Renewable Energy sources.

3.4.4 White Paper on the Energy Policy of the Republic of South Africa (1998)

The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of renewable energy and encouraging new entries into the generation market. South Africa has an attractive range of cost-effective renewable resources, taking into consideration social and environmental costs. Government policy on renewable energy is thus concerned with meeting the following challenges:

- Ensuring that economically feasible technologies and applications are implemented.
- Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options.
- Addressing constraints on the development of the renewable industry.

The policy states that the advantages of Renewable Energy include; minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include; higher capital costs in some cases; lower energy densities; and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future. The White Paper on Energy Policy therefore supports the advancement of Renewable Energy sources and ensuring energy security through the diversification of supply.

3.4.5 Integrated Energy Plan (IEP), 2016

The development of a National Integrated Energy Plan (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 economi**c** expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives were 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; and
- 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 consider 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, considering 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 RE, the document refers to wind and solar energy. The document does however appear to support solar over wind noting that solar PV and CSP with storage present excellent opportunities to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Solar technologies also present the greatest potential for job creation and localisation. Incentive programmes and special focused programmes to promote further development in the technology, as well as solar roll-out programmes should be pursued.

3.4.6 Integrated Resource Plan for Electricity (2010-2030)

The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's national electricity plan. The primary objective of the IRP is to determine the long-term electricity demand and detail how this demand should be met in terms of generating capacity, type,

timing and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation.

The current iteration of the IRP led to the Revised Balanced Scenario (RBS) that was published in October 2010. Following a round of public participation which was conducted in November / December 2010, several changes were made to the IRP model assumptions. The document outlines the proposed generation new-build fleet for South Africa for the period 2010 to 2030. This scenario was derived based on a cost-optimal solution for new-build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation.

The Policy-Adjusted IRP reflects recent developments with respect to prices for renewables. In addition to all existing and committed power plants, the plan includes 9.6GW of nuclear; 6.25GW of coal; 17.8GW of renewables; and approximately 8.9GW of other generation sources such as hydro, and gas.

3.4.7 National Development Plan 2030 (2012)

The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. The NDP aims to achieve this by drawing on the energies of its people, growing and inclusive economy, building capabilities, enhancing the capacity of the state and promoting leaderships and partnerships throughout society. While the achievement of the objectives of the NDP requires progress on a broad front, three priorities stand out, namely:

- Raising employment through faster economic growth.
- Improving the quality of education, skills development and innovation.
- Building the capability of the state to play a developmental, transformative role.

In terms of the Energy Sector's role in empowering South Africa, the NDP 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.
- Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.
- Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change.

The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The proposed project will assist in reducing carbon emissions targets and creating jobs in the local area as well as assist in creating a competitive infrastructure based on terms of energy contribution to the national grid.

3.4.8 The New Growth Path Framework

The aim of the New Economic Growth Path Framework is to enhance growth, employment creation and equity. 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.

The New Growth Path also identifies five other priority areas as part of the programme, through a series of partnerships between the State and the private sector. The Green Economy as one of the five priority areas to create jobs, including expansions in construction and the production of technologies for solar, wind and biofuels. In this regard clean manufacturing and environmental services are projected to create 300 000 jobs over the next decade.

3.4.9 National Infrastructure Plan

The South African Government adopted a National Infrastructure Plan in 2012. The aim of the plan is to transform the economic landscape while simultaneously creating significant numbers of new jobs and strengthen the delivery of basic services. 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.

As part of the National Infrastructure Plan, Cabinet established the Presidential Infrastructure Coordinating Committee (PICC). The Committee identified and developed 18 Strategic Integrated Projects (SIPs). The SIPs cover social and economic infrastructure across all nine provinces (with an emphasis on lagging regions) and consist of:

- Five geographically-focussed SIPs;
- Three spatial SIPs;
- Three energy SIPs;
- Three social infrastructure SIPs;
- Two knowledge SIPs;
- One regional integration SIP;
- One water and sanitation SIP.

The three energy SIPs that are related to the Bloemsmond Grid Connection Infrastructure are SIP 8, 9 and 10.

Table 9: Strategic Infrastructure Projects applicable to or associated with the Bloemsmond Grid Connection Infrastructure

SIP 8: Green energy in support of the South African economy
Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010); Support bio-fuel production facilities.
SIP 9: Electricity generation to support socio-economic development
Accelerate the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances; Monitor implementation of major projects such as new power stations: Medupi, Kusile and Ingula.
SIP 10: Electricity transmission and distribution for all
Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

3.4.10 Strategic Environmental Assessment (SEA) for Wind and Solar PV energy in South Africa

The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2013) identified eight (8) Renewable Development Zones (REDZs). The REDZs identified areas where large scale renewable energy facilities can be developed in in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country. The Bloemsmond Grid Infrastructure site is located within the Upington REDZ and Strategic Powerline Corridor (Northern Corridor), which was formally gazetted in 2018. The area has therefore been identified as suitable for the establishment of renewable energy facilities, specifically large-scale solar farms and their associated Infrastructure.

3.4.11 Conservation of Migratory Species of Wild Animals

Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) is an intergovernmental treaty and is the most appropriate instrument to deal with the conservation of

terrestrial, aquatic and avian migratory species. The convention includes policy and guidelines with regards to the impact associated with man-made infrastructure. CMS requires that parties (South Africa is a signatory) take measures to avoid migratory species from becoming endangered (Art II, par. 1 and 2) and to make every effort to prevent the adverse effects of activities and obstacles that seriously impede or prevent the migration of migratory species i.e. powerlines (Art 111, par. 4b and 4c).

An Avifaunal Specialist has been appointed to consider the impact of the proposed Bloemsmond Grid Connection Infrastructure. Birdlife Africa South Africa has also been given an opportunity to comment in this regard.

3.4.12 The Agreement on the Convention of African-Eurasian Migratory Water Birds

The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory water birds and their habitat across Africa, Europe, the Middle East Central Asia, Greenland and the Canadian Archipelago. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle and is a legally binding agreement by all contracting parties (South Africa included) to guarantee the conservation of migratory water birds within their national boundaries through species and habitat protection and the management of human activities. As mentioned above, an Avifaunal Specialist has been appointed to consider the impact of the proposed Bloemsmond Grid Connection Infrastructure (Annexure E1). Birdlife Africa South Africa has also been given an opportunity to comment in this regard.

3.4.13 Guidelines to minimise the impacts on birds of Solar Facilities and Associated Infrastructure in South Africa

The “Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa” (Smit, 2012) is perhaps the most important (although not legally binding) document from an avifaunal impact perspective currently applicable to solar development in South Africa. The guidelines are published by BirdLife South Africa (BLSA) and detail the recommended procedure for conducting an avifaunal specialist study as well as list all the potential impacts of interactions between birds and solar facilities and associated infrastructure. We are aware of changes to the BLSA best-practise guidelines recently published at the Birds and Renewable Energy Forum in Johannesburg (2015) and although the revised requirements are still a work in progress and have not yet been ratified, they will inform this assessment where applicable. Please refer to Annexure E1 for a copy of the Avifaunal assessment undertaken for this project.

3.4.14 Environmental Impact Assessment Guideline for Renewable Energy Projects

The Minister of Environmental Affairs published the Environmental Impact Assessment Guideline for Renewable Energy in terms of section 24J of the National Environmental Management Act, 1998 (Act No. 107 of 1998) on 16 October 2016.

In pursuit of promoting the country’s Renewable Energy development imperatives, the Government has been actively encouraging the role of Independent Power Producers (IPPs) to feed into the national grid. Through its REIPPPP, the DoE has been engaging with the sector to strengthen the role of IPPs in renewable energy development. Launched during 2011, the REIPPPP is designed to contribute towards a target of 3 725MW, and towards socio-economic and environmentally sustainable development, as well as to further stimulate the renewable industry in South Africa.

To facilitate the development of the first phase of IPPs in South Africa, these guidelines have been written to assist project planning, financing, permitting, and implementation for both developers and regulators. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders, e.g., Eskom, IDC, etc.

- Private Sector Entities (as project funder/developer/consultant);
- Other interested and affected parties (as determined by the project location and/or scope).

This guideline aims to ensure that all potential environmental issues pertaining to renewable energy projects are adequately and timeously assessed and addressed as necessary to ensure sustainable roll-out of these technologies by creating a better understanding of the environmental approval process for renewable energy projects.

The guidelines list the following possible environmental impacts associated with the development of solar energy facilities (and in this instance the associated infrastructure).

Table 10: Potential environmental impacts of solar energy projects and associated infrastructure (Adapted from DEA, 2015) showing where they have been considered in this report

Impact Description	Relevant Legislation	Applicability to this project
Visual Impact	NEMA	Specialist input attached in Annexure E6.
Noise Impact (CSP)	NEMA	Not applicable, as CSP is not considered as a technology alternative.
Land Use Transformation (fuel growth and production)	NEMA, NEMPAA, NHRA	Not Applicable to PV. Agricultural specialist input however attached in Annexure E3
Impacts on Cultural Heritage	NEMA, NHRA	Heritage impact assessment attached in Annexure E4.
Impacts on Biodiversity –	NEMA, NEMBA, NEMPAA, NFA	Biodiversity specialist input attached in Annexure E1 and E2 (Ecology and Freshwater respectively)
Impacts on Water Resources –	NEMA, NEMICMA, NWA, WSA	The project will obtain water directly from the local municipality. A freshwater ecologist has assessed the potential impacts on freshwater resources (Annexure E2).
Hazardous Waste Generation (CSP and PV)	NEMA, NEMWA, HAS	No Hazardous waste will be generated as part of the Grid Infrastructure.
Electromagnetic Interference	NEMA	The nearest SKA station has been identified as Rem-Opt-9, at approximately 30km from the proposed Bloemsmond Grid Connection Infrastructure. SKA has provided confirmation that the Bloemsmond projects will not result in significant impact on SKA infrastructure.
Aircraft Interference	NEMA, MSA	The SA CAA have been automatically registered as an interested and affected party on this environmental process. There are no airports nor landing strips near the proposed bloemsmond Grid Connection Infrastructure.

Impact Description	Relevant Legislation	Applicability to this project
Loss of Agricultural Land	SALA	Agricultural specialist input is attached in Annexure E3
Sterilisation of mineral resources	MPRDA	The Department of Mineral Resources has been registered as an I&AP on this environmental process.

Assuming an IPP project triggers the need for BA or S&EIR under the EIA regulations, included in the assessment process is the preparation of an environmental management programme (EMPr). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMPr. Potential mitigation measures for solar energy projects include but are not limited to:

- Conduct pre-disturbance surveys as appropriate to assess the presence of sensitive areas, fauna, flora and sensitive habitats;
- Plan visual impact reduction measures such as natural (vegetation and topography) and engineered (berms, fences, and shades, etc.) screens and buffers;
- Utilise existing roads and servitudes as much as possible to minimise project footprint;
- Site projects to avoid construction too near pristine natural areas and communities;
- Locate developments away from important habitat for faunal species, particularly species which are threatened or have restricted ranges, and are collision-prone or vulnerable to disturbance, displacement and/or habitat loss;
- Fence sites as appropriate to ensure safe restricted access;
- Ensure dust abatement measures are in place during and post construction;
- Develop and implement a storm water management plan;
- Develop and implement waste management plan; and
- Re-vegetation with appropriate indigenous species to prevent dust and erosion, as well as establishment of alien species.

The recommendations of these guidelines have been explicitly considered in this Basic Assessment process and where necessary, additional specialist input has been obtained. Please see section 6 of this BAR for a full assessment of impacts.

3.4.15 Sustainability Imperative

The norm implicit to our environmental law is the notion of sustainable development (“SD”). SD and sustainable use and exploitation of natural resources are at the core of the protection of the environment. SD is generally accepted to mean development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The evolving elements of the concept of SD *inter alia* include the right to develop; the pursuit of equity in the use and allocation of natural resources (the principle of intra-generational equity) and the need to preserve natural resources for the benefit of present and future generations. Economic development, social development and the protection of the environment are considered the pillars of SD (the triple bottom line).

“Man-land relationships require a holistic perspective, an ability to appreciate the many aspects that make up the real problems. Sustainable planning must confront the physical, social, environmental and economic challenges and conflicting aspirations of local communities. The imperative of sustainable planning translates into notions of striking a balance between the many competing interests in the

ecological, economic and social fields in a planned manner. The 'triple bottom line' objectives of sustainable planning and development should be understood in terms of economic efficiency (employment and economic growth), social equity (human needs) and ecological integrity (ecological capital)."

As was pointed out by the Constitutional Court, SD does not require the cessation of socio-economic development but seeks to regulate the manner in which it takes place. The idea that developmental and environmental protection must be reconciled is central to the concept of SD - it implies the accommodation, reconciliation and (in some instances) integration between economic development, social development and environmental protection. It is regarded as providing a "conceptual bridge" between the right to social and economic development, and the need to protect the environment.

Our Constitutional Court has pointed out that the requirement that environmental authorities must place people and their needs at the forefront of their concern so that environmental management can serve their developmental, cultural and social interests, can be achieved if a development is sustainable. "*The very idea of sustainability implies continuity. It reflects the concern for social and developmental equity between generations, a concern that must logically be extended to equity within each generation. This concern is reflected in the principles of inter-generational and intra-generational equity which are embodied in both section 24 of the Constitution and the principles of environmental management contained in NEMA.*" [Emphasis added.]

In terms of NEMA sustainable development requires the integration of the relevant factors, the purpose of which is *to ensure that development serves present and future generations.*[18]

It is believed that the proposed Bloemsmond solar facilities supports the notion of sustainable development by presenting a reasonable and feasible alternative to the existing vacant land use type, which has limited agricultural potential due the lack of water and infrastructure.

Furthermore, the proposed grid connection infrastructure is directly linked to five alternative energy projects (reliant on a natural renewable resource – solar energy) is in line with the national and global goal of reducing reliance on fossil fuels, thereby providing long-term benefits to future generations in a sustainable manner.

4. PLANNING CONTEXT

The proposed Bloemsmond Grid Connection Infrastructure is situated within a Gazetted Strategic Powerline Corridor, namely the Northern Strategic powerline corridor. and the establishment of this infrastructure is thus compliant with national strategic planning objectives.

Please refer to the discussions on planning context in the main facilities respective BAR's and EIR's for planning requirements for the facilities as a whole.

5. SITE DESCRIPTION AND ATTRIBUTES

The following sections provide a description of the natural environmental and built environment context of the affected land parcels, with focus on the affected properties for the proposed Bloemsmond Grid Connection Infrastructure.

5.1 LOCATION & BUILT ENVIRONMENT

The target properties, Portion 5 of Farm Bloemsmond 455, Portion 14 of Farm Bloemsmond 455, Remainder of Farm Dyasonsklip 454, Remainder of Farm Rooipunt 617, Remainder 638 Tungsten

[18] Refer to definition of "sustainable development" in section 1 of NEMA.

Lodge and Olyvenhouts Drift Settlement Agricultural Holding 1080, are in the ZF Mgcawu District (previously Siyanda District) of the Northern Cape Province, within the jurisdiction area of the Kai !Garib Local Municipality. The combined size of the properties is in excess of 12000ha in size and is located approximately 15km East of Keimoes.

The proposed Bloemsmond Grid Connection Infrastructure is accessed and is situated directly north of the N14.

No buildings, ruins or any other structures were noted on or within the direct proximity of the proposed Bloemsmond Grid Connection Infrastructure.

5.2 GEOLOGY & CLIMATE

The following information relating to geology and climate was obtained from the Agricultural Specialist; please refer to Annexure E3 for a full copy of his report.

5.2.1 Geology & Soils

The area lies in the Kalahari geological group of the Namaqualand metamorphic complex. This is the youngest of the geological groups formed in the past 65 million years. The lithology (mineralogical composition and texture of rocks) of this area consists of:

5.2.1.1 Sand

During a very dry period in Southern Africa some 100 000 years ago sand was transported from the Namib dessert by strong and continuous winds and distributed over the Kalahari.

5.2.1.2 Limestone

Limestone is a sedimentary rock consisting largely of calcium-carbonate, which is usually derived from the shells of minute marine or fresh-water animals. Sand, clay and minerals such as magnesia or iron oxide are also present.

Sedimentary and Volcanic rocks (parent material of soils) found in the area include Migmatite, Schist, Gneiss, Kinzigite and granite.

5.2.1.3 Soil

Calcic soils are prone to develop under the climatic conditions and geology of the area.

Calcic soils originate in arid climates with the accumulation of secondary lime, forming a distinctive horizon consisting chiefly of calcite. In calcic soils either hardpan carbonate or a soft carbonate horizon or (rarely) gypsic horizon dominates the morphology of the sub-soil.

AGIS indicates the typical profile for soils in this region as follows:

- Soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils;
- Lime generally present in part or most of the landscape;
- Red and yellow well drained sandy soil with high base status;
- Freely drained, structure less soils;
- Favourable physical properties; and
- Soils may have restricted soil depth, excessive drainage, high erodibility and low natural fertility.

5.2.2 Climate

The region is classified as an arid zone with desert climate. Specific parameters are shown in the table below.

Table 11: Climatic parameters of associated with the Bloemsmond Grid Connection Infrastructure.

Rainfall

Annual rainfall	0-200mm
Summer rainfall	<62.5mm
Winter rainfall	<62.5mm
Variation in rainfall	<62.5mm40 – 50 %
Temperature	
Mean maximum temperature	>35°C
January Temperature	>27.5°C
Mean Minimum Temperature	2-4°C
July Temperature	<7.5°C
Temperature range	>15°C
First frost expected	21-31 May
Last frost expected	01 – 10 September
Hours of sunshine	>80%
Evaporation	>2400mm
Humidity	<30%

5.3 TOPOGRAPHY

The land surface of South Africa is divided into 22 physiographic regions, according to topography, altitude and surface form. The site lies on the border of The Southern Kalahari and Bushmanland regions, on the Interior Plateau. The area consists of level plains with some relief. The topography has a slope gradient of less than 5% and a regular shape.

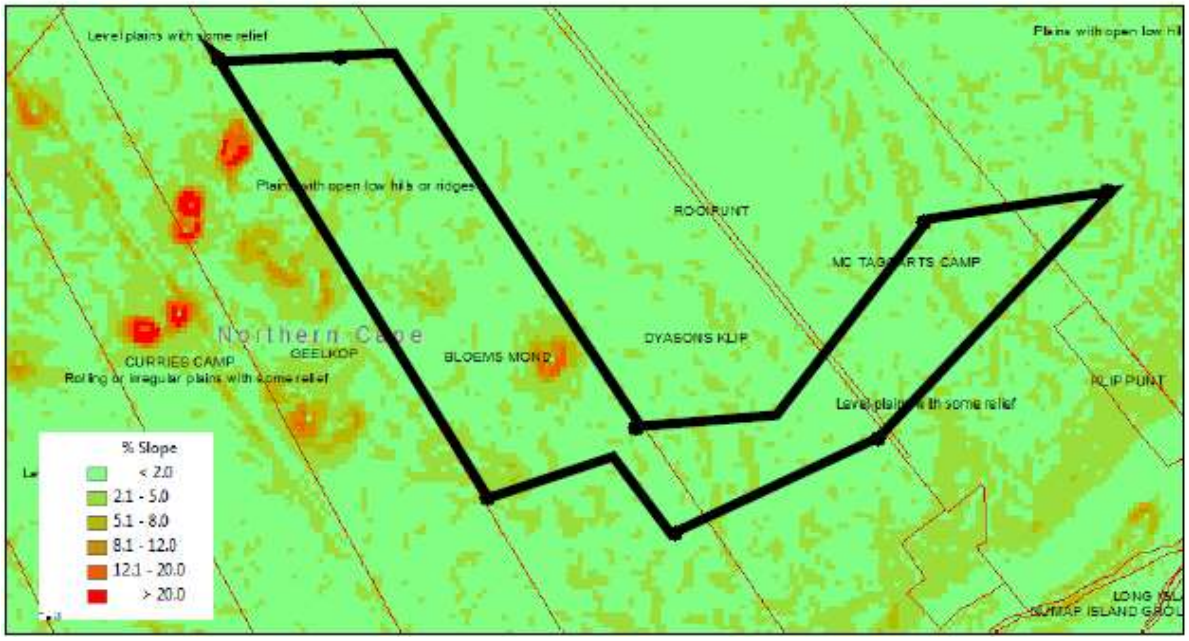

Figure 20: Topographical Map (Lubbe, 2019)

5.4 BOTANICAL COMPOSITION OF THE SITE

Enviro Insight in conjunction with confluent environmental undertook a Botanical Impact Assessment which formed part of larger Ecological Impact Assessment Report. Please refer to the Ecological Impact Assessment attached in **Annexure E1** from which the following has been drawn.

5.4.1 Broad-Scale Vegetation Patterns

The study area is in the Kalahari Karroid Shrubland (Least threatened) and Bushmanland Arid Grassland [19] (Least threatened) vegetation types. The study area is not located in a threatened ecosystem. The Lower Gariep Alluvial Vegetation threatened ecosystem is located south of the study area.

Kalahari Karroid Shrubland vegetation type is endemic to the Northern Cape Province. The vegetation type is characteristic of forming belts alternating with belts of Gordonia Duneveld on plains northwest of Upington through Lutzputs and Noenieput to the Rietfontein/Mier area in the north. Other patches occur around Kakamas and north of Groblershoop. The unit is also found in the neighbouring Namibia. The vegetation can be described as low karroid shrubland on flat, gravel plains. Karoo-related and northern floristic elements such as shrubs meet here, indicating a transition to the Kalahari region and sandy soils. Altitude varies mostly from 700 - 1100 m.

The conservation target is set at 21% with very little statutorily conserved in the Augrabies Falls National Park. Although only a small area has been transformed many of the belts of this type were preferred routes for early roads, thus promoting the introduction of alien plants (about a quarter of the unit has scattered *Prosopis* species). Erosion is very low (94%) (Mucina & Rutherford, 2012).

Table 12: Attributes of the Kalahari Karroid Shrubland vegetation type.

Name of vegetation type	Kalahari Karroid Shrubland
Code	NKb5
Conservation Target (percent of area) from NSBA	21%
Protected (percent of area) from NSBA	0.1%
Remaining (percent of area) from NSBA	99.2%
Description of conservation status from NSBA	Least threatened
Description of the Protection Status from NSBA	Hardly protected
Area (km^2) of the full extent of the Vegetation Type	8283.90
Name of the Biome	Nama-Karoo

The Bushmanland Arid Grassland vegetation type occurs only in the Northern Cape Province. It spans about one degree of latitude from around Aggeneys in the west to Prieska in the east. The southern border of the unit is formed by edges of the Bushmanland Basin while in the northwest this vegetation unit borders on desert vegetation (northwest of Aggeneys and Pofadder). The northern border (near Upington) and the eastern border (between Upington and Prieska) are formed with often intermingling units of Lower Gariep Broken Veld, Kalahari Karroid Shrubland and Gordonia Duneveld. Most of the western border is formed by the edge of the Namaqualand hills. Altitude varies mostly from 600–1 200m. The conservation target is set at 21% with only small patches statutorily conserved in Augrabies Falls National Park and Goegab Nature Reserve. Very little of the area has been transformed. Erosion is very low (60%) and low (33%) (Mucina & Rutherford, 2012.

Table 13: Attributes of Bushmanland Arid Grassland

Name of vegetation type	Bushmanland Arid Grassland
Code as used in the Book - contains space	NKb3
Conservation Target (percent of area) from NSBA	21%
Protected (percent of area) from NSBA	0.4%
Remaining (percent of area) from NSBA	99.4%
Description of conservation status from NSBA	Least threatened
Description of the Protection Status from NSBA	Hardly protected
Area (km^2) of the full extent of the Vegetation Type	45478.96
Name of the Biome	Nama-Karoo

[19] Only the corridor alternatives between the Bloemsmond Collector Substation and the Upington MTS cross the Bushmanland Arid Grassland. The remainder of activities are situated entirely within Kalahari Karroid Shrubland.

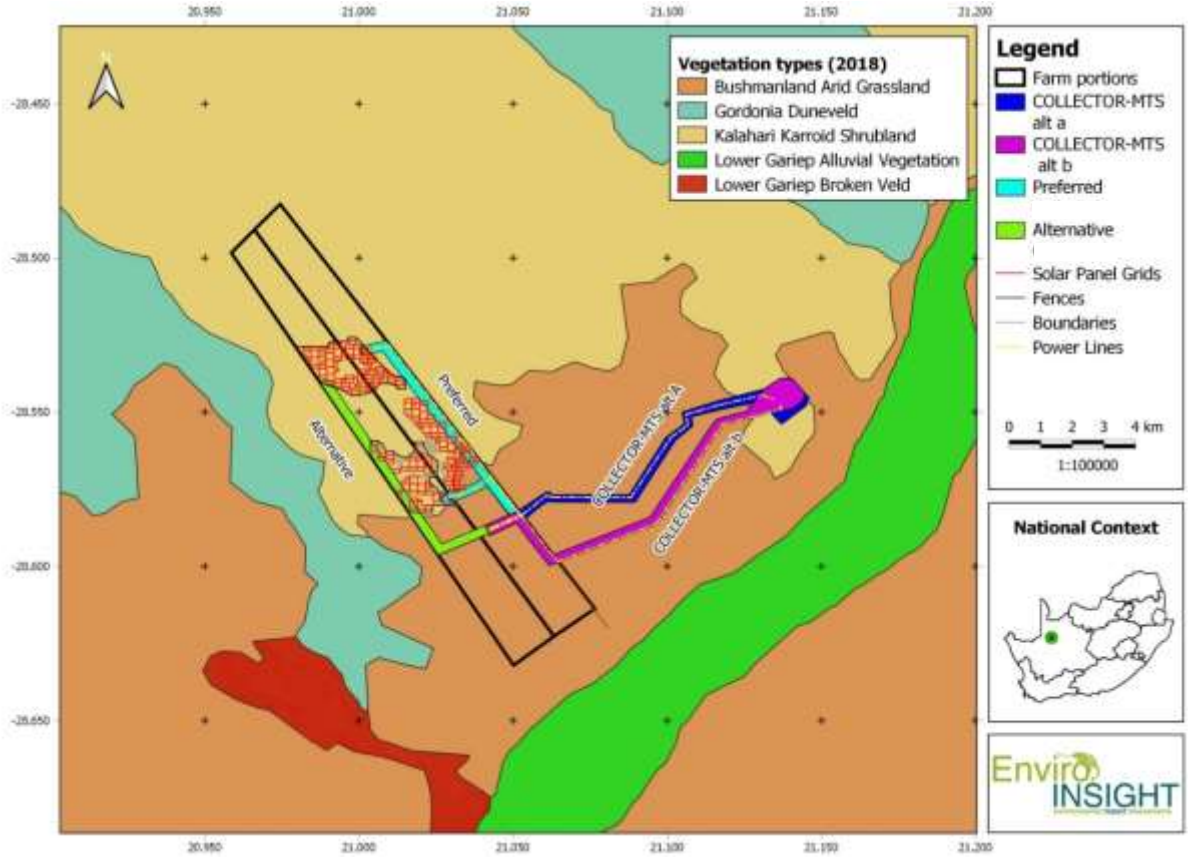

Figure 21: Regional vegetation types in relation to the study area (Mucina & Rutherford, 2012).

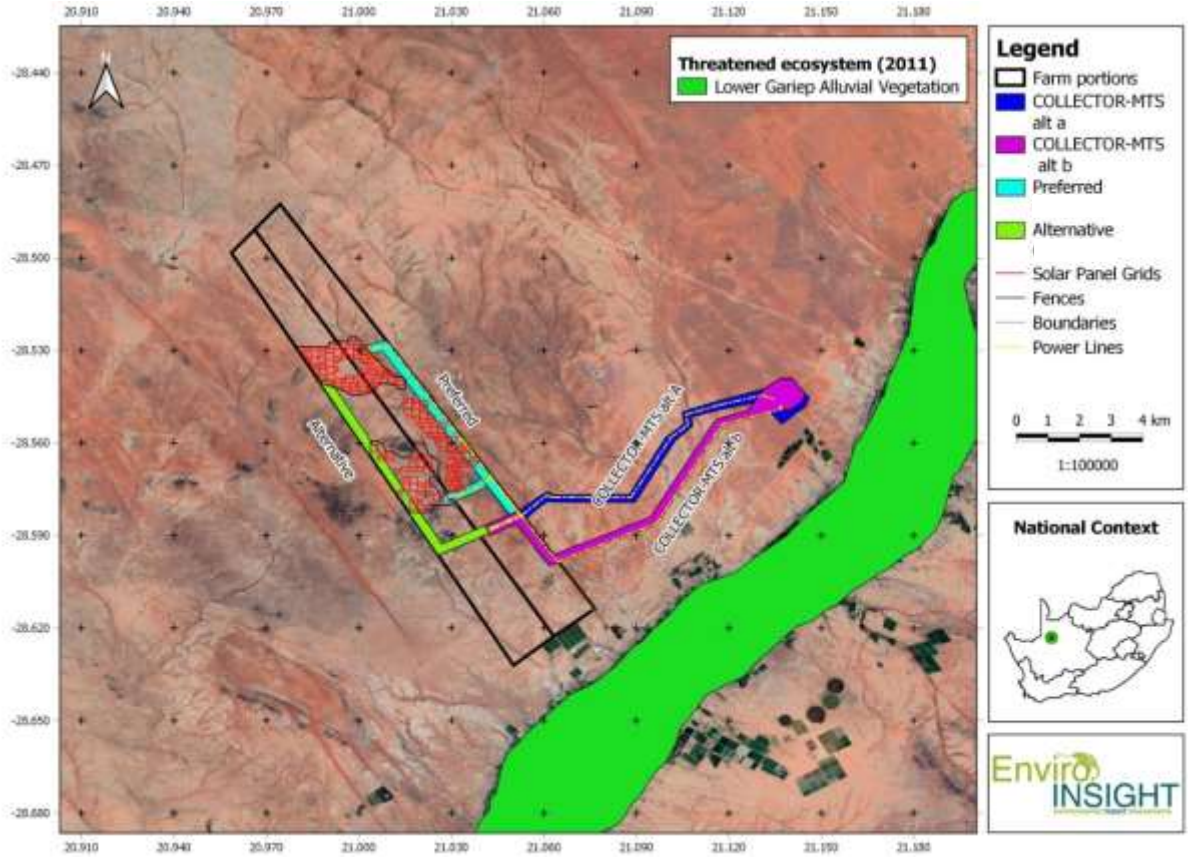

Figure 22: The study area for the Bloemsmond Grid Connection Infrastructure in relation to threatened ecosystems.

5.4.2 Habitats & Plant Communities

Based on the outcome of the field study, the botanical specialist identified the following plant communities present within the study area for the Bloemsmond Grid Connection Infrastructure.

5.4.2.1 Shrubland

This dwarf shrubland is found on the plains between the drainage lines in the study area. The Shrubland habitat is characterised by shrubs, forbs and succulent's characteristic of the Kalahari and sandy soils. A list of species recorded in this habitat is provided in the tables below.

Protected species (for which a permit for removal will be required) include: *Aloe claviflora, Avonia albissima, Boscia albitrunca, Boscia foetida subsp. foetida, Euphorbia gariepina subsp. gariepina, Mesembryanthemum sp., Vachellia erioloba.*

The grass layer is poorly recorded due to a combination of overgrazing and late season sampling.

Figure 23: Vegetation and landscape features of the shrubland.

Table 14: Plant species recorded in the shrubland during the site visit.

Growth form	Species
Trees and shrubs	*Boscia albitrunca, Boscia foetida subsp. foetida, Leucosphaera bainesii, Monechma genistifolium subsp. australe, Parkinsonia africana,* ***Prosopis sp.,*** *Rhigozum trichotomum, Searsia pendulina, Senegalia mellifera subsp. detinens, Seriphium plumosum, Vachellia erioloba, Zygophyllum dregeanum*
Graminoids	*Oropetium capense*

Succulents	*Aloe claviflora, Euphorbia gariepina subsp. gariepina, Kleinia longiflora, Mesembryanthemum sp., Sansevieria aethiopica, Tylecodon sp.*
Herbs and creepers	*Acanthopsis hoffmannseggiana, Aptosimum albomarginatum, Aptosimum spinescens, Asparagus cf. pearsonii, Avonia albissima, Barleria lichtensteiniana, Barleria rigida, Blepharis mitrata, Blepharis sp., Cucumis zeyheri, Harpagophytum procumbens, Tapinanthus oleifolius*

*Medicinal plants; Species indicated in bold are alien invasive species.

5.4.2.2 Drainage Line

This dwarf shrubland is found along the small and narrow ephemeral drainage lines flowing in the landscape. The drainage lines on the footslopes and plains are covered by sandy to sandy loam soils, while higher up it becomes rockier. Typical species are indicated in the table below. Protected species (for which a permit for removal will be required) include: *Boscia albitrunca, Boscia foetida* subsp. *foetida, Euphorbia gariepina subsp. gariepina* and *Vachellia erioloba.*

Figure 24: Vegetation and landscape features of the drainage line.

Table 15: Plant species recorded in the Drainage Line during the site visit.

Growth form	Species
Trees and shrubs	*Boscia albitrunca, Boscia foetida subsp. foetida, Leucosphaera bainesii, Monechma genistifolium subsp. australe, Parkinsonia africana, Rhigozum trichotomum, Searsia pendulina, Senegalia mellifera subsp. detinens, Vachellia erioloba, Zygophyllum dregeanum*
Graminoids	*Stipagrostis namaquensis*
Succulents	*Euphorbia gariepina subsp. gariepina, Kleinia longiflora*
Herbs and creepers	*Acanthopsis hoffmannseggiana, Aptosimum albomarginatum, Aptosimum spinescens, Asparagus cf. pearsonii, Avonia albissima, Barleria lichtensteiniana, Barleria rigida, Blepharis mitrata, Blepharis sp., Cucumis zeyheri, Harpagophytum procumbens, Tapinanthus oleifolius*

5.4.3 Listed and Protected Plant Species

According to the Botanical Database of Southern Africa (BODATSA)[20] for the xMin, yMin 20.20°,-29.20°: xMax, yMax 21.4°, -28.20° extent (WGS84 datum) four Red List species are present. In addition, six species are protected under the Northern Cape Nature Conservation Act (Act No 9 of 2009) of which two species are protected under the National Forest Act (Act No 84 of 1998). All potential Red and Orange Listed plant species are indicated in the table below.

The SANBI Red Listed species *Aloidendron dichotomum* was recorded on site. Climate change models project a 36% decline in range in 100 years, assuming dispersal into newly suitable areas. Patterns of modelled declines have been supported by field and repeat photo studies. However, no colonization of newly suitable areas has yet happened. Without dispersal, the models predict a 73% decline in 100 years, qualifying the species as Endangered. This is a vital flagship species for climate change impacts on biodiversity. It is also likely to be a keystone and umbrella species. This species is not likely to be more sensitive to climate change than others. Foden's study has shown that this species is a useful indicator of climate change and that, because modelled and actual mortality are shown to be relatively similar, the modelled future range shifts need to be seriously considered (Foden 2002, Foden et al. 2007). We have assessed this species based on the modelled future range shifts. Main threats include climate change, harvesting and trampling by livestock. Damage by baboons, scale insects and fungus has been observed, but none of these seem to cause mortality. There is a large amount of morphological variation between populations. Genetic studies show that there is much genetic variation between populations. Degree of interbreeding between populations is unknown, but large dispersal distance and bird pollinators make genetic exchange seem likely. The population is declining due to mortality of individuals in northern subpopulations.

Potential plant species of conservation concern.

Species	SANBI National Red List[21]	Northern Cape Protected[22]	National Forest Act (1998)[23]	Habitat Description	Present on site
Acanthopsis hoffmannseggiana	Data deficient - Taxonomically Problematic			Sandy plains, stony hillsides and ridges, usually associated with weathered quartzite and granite, but also occurs on mudstone (in Prince Albert area) and limestone (Asbestos Mountains), usually at an elevation between 650 and 1000 m.	Yes
Aloe claviflora	Least Concern	Yes		Well drained areas on rocky slopes or flat stony areas at the margins of Kalahari Thornveld. Usually, but not always, on calcrete	Yes
Aloidendron dichotomum	Vulnerable			On north-facing rocky slopes (particularly dolomite) in the south of its range. Any slopes and	Yes

[20] http://posa.sanbi.org/sanbi/Explore

[21] http://redlist.sanbi.org/

[22] Northern Cape Nature Conservation Act (Act No 9 of 2009)

[23] Notice of the list of protected tree species under the National Forests Act 84 of 1998 published in GN 182 in GG 41100 of 8 September 2017

Species	SANBI National Red List[21]	Northern Cape Protected[22]	National Forest Act (1998)[23]	Habitat Description	Present on site
				sandy flats in the central and northern parts of range.	
Anacampseros albissima	Least Concern	Yes		Rock outcrops and quartz flats. Southern Angola through Namibia to the Richtersveld, and eastwards through Bushmanland to Griqualand West.	Within portions 5 & 14 of the Farm Bloemsmond 455.
Boscia albitrunca	Least Concern	Yes	Yes	Terrestrial – including seven provinces excluding Western and Eastern Cape	Within portions 5 & 14 of the Farm Bloemsmond 455.
Boscia foetida	Least Concern	Yes		Terrestrial – Northern Cape	Within portions 5 & 14 of the Farm Bloemsmond 455.
Dinteranthus wilmotianus	Near Threatened			Alluvial gravel soils – desert, Nama Karoo	Within portions 5 & 14 of the Farm Bloemsmond 455. High likelihood to occur in study area
Felicia deserti	Data deficient			Terrestrial – Nama Karoo, Succulent Karoo	Possible
Hoodia gordonii	Least Concern	Yes		Occurs in a wide variety of arid habitats from coastal to mountainous, also on gentle to steep shale ridges, found from dry, rocky places to sandy spots in riverbeds – Desert, Nama Karoo, Savanna, Succulent Karoo.	Within portions 5 & 14 of the Farm Bloemsmond 455. High likelihood to occur in study area
Vachellia erioloba	Least Concern	Yes	Yes	Widespread in the arid northern provinces of South Africa, also Namibia, Botswana, Zimbabwe, southern Angola and south-western Zambia	Within portion 5 & 14 of the Farm Bloemsmond 455.

5.5 FAUNAL COMPONENT OF THE SITE

Enviro Insight in conjunction with confluent environmental undertook a Botanical Impact Assessment which formed part of larger Ecological Impact Assessment Report. Please refer to the Ecological Impact Assessment attached in **Annexure E1** from which the following has been drawn.

5.5.1 Mammals

Of the observed and expected mammal species, the black-footed cat *Felis nigripes* (expected) is listed as Vulnerable while the honey badger *Mellivora capensis* (observed in the current study) was listed as Near Threatened (IUCN 2015) but as of 2016, has been downgraded to Least Concern; it is however still NEMBA protected. The Cape fox (*Vulpes chama*) (observed during the current survey) is also protected by the NEMBA.

Three of the observed mammal species within the study areas are Red-Listed in South Africa and two species are protected by NEMBA. These species are discussed below and the probability of occurrence for selected threatened and near threatened mammal species on the respective study areas is shown in the table below.

Table 16: The probability of occurrence[24] for selected threatened and near threatened mammal taxa by study area

Species	Probability of occurring on Bloemsmon Grid infrastructure site.
Felis nigripes (Small-spotted/black footed cat)	Low
Vulpes chama (Cape fox)	Confirmed
Mellivora capensis (Honey Badger)	Low

5.5.1.1 Honey Badger (*Mellivora capensis*)

Honey badgers were recorded once through spoor tracking within the drainage line habitat of the study area. Their presence is unusual even though the study area does not represent a stronghold for the species. This species is often associated with more savanna type habitats encountered in the Kalahari and Bushveld which is represented in the drainage line habitat (and not the more karroid habitats to the north). It is often subject to snaring and persecution due to its penchant for raiding commercial honey farms and chicken breeding facilities. The presence of honey badgers in the study area should be considered as a healthy ecological indicator and the NEMBA protection warrants due consideration.

5.5.1.2 Small-spotted cat (*Felis nigripes*)

This cat species is a relatively uncommon resident that is nationally protected. It was not observed during the survey period but is predicted to be resident within suitable habitats within the surrounding study areas, mostly associated with termitaria. Termitaria represent one of the most important micro habitat types within the greater study area and should form the cornerstone of the mitigation measures to ensure protection for this species.

5.5.1.3 Cape fox (*Vulpes chama*)

This canid species is a relatively uncommon resident that is nationally protected. The stronghold of this species is centred around more arid savanna systems and the Mpumalanga grassland habitats. It was not sighted during the survey period although road kill was seen within the greater study area. Despite widespread and intensive persecution by farmers, it is a relatively common species throughout its range and can be relatively resilient to impacts.

5.5.2 Mammalian Importance

Mammalian importance relates to species diversity, endemism and the presence of topographical features or primary habitat units with the intrinsic ability to sustain mammal species of conservation importance. Throughout the study areas most of the habitats are generic in their ability to support the prevailing mammal population, including species of conservation concern. Except for inselberg ridges, no unique geographical or topographical features exist which would cause the areas targeted for solar

[24]High: regular, expected to be present daily/weekly, Moderate: uncommon but expected to be present at least once a month Low: irregular or occasional to very rare

farms to be classified as a “No Go” area. Therefore, the region as a whole is considered to be an area of medium mammalian importance although the study areas should still be managed in a holistic manner at a policy level, prioritising general best practice (not fatal flaw or high sensitivity related) mitigation and monitoring of mammal species, both general and of conservation concern.

Areas with elevated mammal sensitivities include inselberg ridges, seasonal drainage lines, artificial impoundments and windmills. The seasonal drainage lines act as linear dispersal corridors for mammal species. Greater species diversity (as well as a unique composition) was observed in this habitat and therefore, these systems are earmarked as being of high mammal importance. It must be noted that this elevated diversity could also be attributed to the highly trackable substrate within the drainage line making the detection of mammal species through spoor tracking easier. However, the probability is high that the corridor potential of the habitat type acts as a factor increasing the presence of mammal species. Intermittent impoundments and water sources throughout a region that is inherently arid is an obvious cause for increased mammal diversity, density and therefore sensitivity within these habitat types, due to the inherent water dependence of the taxonomic group as well as the increased foraging potential of the ecosystem. The presence of impenetrable fences also limits migration and dispersal making enclosed populations totally dependent on these water points. Finally, the ridge systems (connected or otherwise) may not provide habitat for mammal species of conservation concern but are a crucial source of food for avifaunal species of conservation concern which rely on small to medium mammals as the cornerstone of their prey base. Therefore, these systems are unique in the landscape and must be subject to appropriate buffering.

5.5.3 Herpetofauna

The study area resides on the 2821CA and 2820DB QDGC’s. These QDGC’s along with ten adjacent cells (2820BC, 2820BD, 2821AC, 2821AD, 2821CB, 2821CD, 2821CC, 2820DD, 2820DB) were considered to represent similar habitats and therefore the predicted species list was derived from observation records from these QDGCs. Expected species lists derived in this manner may therefore represent an overestimation of the diversity expected as very specific habitat types may be required by a species which may be present in a QDGC but not necessarily on the study site within the QDGC. Conversely, many large areas in South Africa are poorly sampled for herpetofauna and expected species lists derived from a single QDGC may therefore underestimate the species diversity. Drawing expected species from surrounding QDGCs therefore increases the likelihood of obtaining a species list that suffers less from poor sampling in the area, but it also artificially inflates the expected number of species because many different habitats in the surrounding QDGCs may not be present on the study area. To counteract this, all possible attempts were made to refine the expected species list based on species-specific habitat requirements and a good understanding of the habitat types and quality of the study area. Species that are unlikely to occur in the study area but that do occur in the surrounding QDGCs were kept in the expected species list (precautionary principle) and species with a high probability of occurrence on the study area were added to the list even if ReptileMAP (2019) and FrogMAP (2019) did not have a record for the selected QDGCs.

The QDGC’s near the project area are poorly sampled and are characterised by moderate diversity and low endemicity for reptiles and low diversity and endemicity for amphibians (FrogMAP, 2019; ReptileMAP, 2019).

The herpetofauna species list derived from records collected for the QDGCs is presented in the Ecological Impact assessment attached in Annexure E1. Five amphibian species have previously been recorded within and surrounding the study area. A total of 59 reptile species could potentially occur within and surrounding the project area although only twelve have previously been recorded from within 2821CA QDGC.

The study area intersects multiple habitat features, such as boulders, gravel plains and dry river beds and arid living rupicolous and some arenicolous reptile species are therefore expected to be present in the project area. However, the project area is situated adjacent to the Orange River, which is suitable

habitat for mesic herpetofauna assemblages, but the habitat is unsuitable for such species, which may temporarily persist or pass through the study area.

No threatened (CR, EN or VU) herpetofauna are expected to occur within the study area and no other species of conservation concern are expected to be resident or breeding within the study area. However, there are two NT species that may occur within and surrounding the study area, as follows:

5.5.3.1 Giant Bullfrog (Pyxicephalus adspersus)

The Giant Bullfrog is listed by Minter et al. (2004) as Near Threatened. However, the IUCN (2019) considers this species to be of Least Concern across its global distribution. This species may undergo an escalation in conservation status soon and must pre-emptively be considered to be of conservation importance. This species has not been recorded in 2821CA in which the study area is situated, but has been observed in adjacent QDGCs (FrogMAP, 2019). In arid regions Giant Bullfrogs utilise small pans that are difficult to detect without heavy rainfall, it is likely that suitable breeding habitat occurs within the study area.

5.5.3.2 Verrox's Tent Tortoise (Psammobates tentorius verroxii)

Although Verrox's Tent Tortoise is listed by Bates et al. (2014) as Least Concern, the IUCN (2019) considers the species to be Near Threatened. This small, scarce tortoise species is rarely seen. It is active in early mornings and evenings during the wet season when it feeds on succulents and perennial plants, but burrow beneath the base of shrubs during dry spells. This tortoise species has been recorded in the 2821CA QDGC on which the study area is situated (ReptileMAP, 2019). It is likely to be a permanent resident within the study area.

5.5.4 Avifaunal Component of the Study Site

A desktop study was undertaken in which bird species that could potentially occur in the vicinity of the study area were identified using data from the second South African Bird Atlas Project (SABAP 2; [SABAP2, 2019]). An approach was adopted to ensure that all species potentially occurring within the study area, whether resident, nomadic, or migratory, are identified.

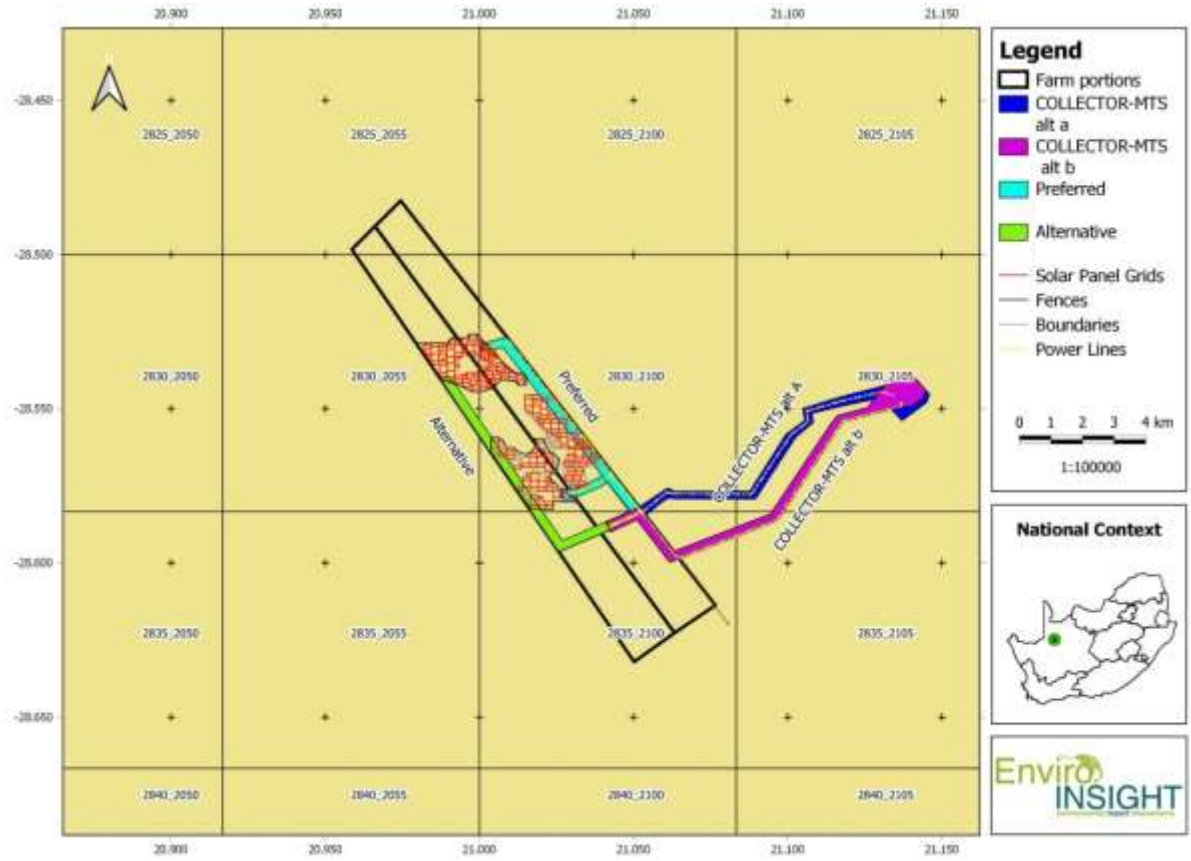

Figure 25: The study area for the Bloemsmond Grid Connection Infrastructure in relation to the SABAP2 pentads (Enviro Insight, 2019)

The following main literature sources were consulted by the specialist for the avifauna study:

- Information relating to avifauna species of conservation concern (SCC) was obtained from the Southern Africa Bird Atlas Project (SABAP 2, 2019), Hockey *et al.* (2005) and Taylor *et al.* (2015);
- Hockey *et al.* (2005) were consulted for general information on the life history attributes of relevant bird species;
- The conservation status of bird species is categorised according to Taylor *et al.* (2015) the IUCN Red List of threatened species (IUCN, 2019); and
- Avifaunal Impact Assessment: Proposed construction of the AEP Bloemsmond Solar 2 Photovoltaic (PV) facility and associated infrastructure, Kai !Garib Local Municipality (Widdows 2015).

The desktop assessment referred to above was supplemented by a detailed field assessment.

The specialist recorded 75 species in relatively suboptimal conditions. Many of the bird species expected and observed in the study areas (most of them non-passerines) are dependent upon local availability of suitable habitat or food and their presence is not directly determined by the surrounding indigenous vegetation. In addition, many of the recorded birds were represented by highly mobile species, able to move around to areas where rain has fallen. These include several of the lark species, finchlarks, canaries and buntings. Several of these mobile species form flocks. This is another key conclusion that has shown that the avifaunal assemblages are dictated by optimal conditions, rather than prevailing habitat types. However, distinct groupings of bird species were observed in some more “unique” habitat types such as the rocky ridges and large drainage lines. For the purposes of this study, the discussion will focus on species of conservation concern.

The most abundant species was Scaly-feathered Finch *Sporopipes squamifrons*, with a relative abundance of 25.0 birds/km. Other common species which occurred at significantly lower abundances included Black-chested Prinia *Prinia flavicans* (7.7 birds/km), Kalahari Scrub-robin (6.7 birds/km), and Chestnut-vented Warbler *Sylvia subcaeruleum* (6.1 birds/km). These three species were markedly more common than the next most abundant species such as Cape Turtle-dove *Streptopelia capicola*, Namaqua Dove *Oena capensis* and Fawn-coloured Lark *Calendulauda africanoides*. The remaining species all had relative abundances of less than two birds/km.

Some species showed rather clear preferences for parts of the study area. Northern Black Korhaan Afrotis afraoides was found exclusively in the eastern half of the site, which is less dense with fewer woody plant species and a more expansive grass layer. The Red-crested Korhaan Lophotis ruficrista, which prefers more closed woodland, showed the opposite trend, being detected only within the woodier western half of the site. Amongst the passerines, Desert Cisticola Cisticola aridulus, Fawn-coloured Lark Calendulauda africanoides, and White-browed Sparrow-weaver Plocepasser mahali also showed a distinct preference for the less woody eastern half of the site.

Red-listed species are considered fundamental to this study, because of their susceptibility to the various threats posed by solar facilities and associated infrastructures. Only six species that have been recorded in the area are threatened, while one other species is considered Near-Threatened. The most important of these is the Critically Endangered White-backed Vulture Gyps africanus, which has been recorded in the area previously during SABAP2 and hence has a high probability of occurring again. Two Red-listed species were recorded during the field survey, a pair of Verreaux's Eagle Aquila verreauxii (Vulnerable) and a single Lanner Falcon Falco biarmicus (Vulnerable). Both species were considered to have a high likelihood of occurring in the area. Another species of concern that may have a high probability of occurring in the study area is the Martial Eagle Polemaetus bellicosus (Endangered). The local populations of these species are, however, mostly of moderate importance, as the study area and surrounds most likely serve as only part of the foraging range of occasional individuals passing through.

An additional three species which have not yet been recorded in the area, but have a moderate probability of occurring, are also considered. These include the Tawny Eagle Aquila rapax (Endangered), Secretary bird Sagittarius serpentarius (Vulnerable) and the European Roller Coracias garrulus (Near-Threatened). The Kori Bustard Ardeotis kori (Near-threatened) was recorded during SABAP1 and therefore has a moderate probability of occurring again, especially considering that the species favours open savanna as characterised by the study area.

Other red-listed species which may occur with negligible frequency and therefore are of less concern include the Vulnerable Black Stork Ciconia nigra and Burchell's Courser Cursorius rufus. The lack of suitable microhabitats such as water bodies and shrubland plains, respectively, will likely exclude these species from the study area.

Table 17: Red-listed species recorded in the study area

English name	Taxonomic name	Red-list status	Estimated importance of local population	Probability of occurrence	Threats
Vulture, White-backed	*Gyps africanus*	Critically Endangered	Low	High	Habitat loss/Disturbance Collisions/Electrocution
Eagle, Martial	*Polemaetus bellicosus*	Endangered	Moderate	High	Habitat loss/Disturbance Collisions/Electrocution
Eagle, Tawny	*Aquila rapax*	Endangered	Low	Moderate	Habitat loss/Disturbance Collisions/Electrocution
Courser, Burchell's	*Cursorius rufus*	Vulnerable	Low	Low	Habitat loss/Disturbance

English name	Taxonomic name	Red-list status	Estimated importance of local population	Probability of occurrence	Threats
Eagle, Verreaux's	*Aquila verreauxii*	Vulnerable	Moderate	Recorded	Habitat loss/Disturbance Collisions/Electrocution
Falcon, Lanner	*Falco biarmicus*	Vulnerable	Moderate	Recorded	Habitat loss/Disturbance Collisions/Electrocution
Secretarybird	*Sagittarius serpentarius*	Vulnerable	Low	Moderate	Habitat loss/Disturbance Collisions
Stork, Black	*Ciconia nigra*	Vulnerable	Low	Low	Collisions
Bustard, Kori	*Ardeotis kori*	Near-threatened	Moderate	Moderate	Habitat loss/Disturbance Collisions
Roller, European	*Coracias garrulus*	Near-Threatened	Low	Moderate	Habitat loss/Disturbance

During the walking transects regular scans were made to detect any large flying birds to establish the presence of flight paths across the study area. Aside from the pair of Verreaux's Eagle seen soaring over the area at a height of approximately 150 to 200m, only Gabar Goshawk Melierax gabar was seen flying within the study area on one occasion. The Lanner Falcon was seen perched on the large powerline on the southern boundary of the Bloemsmond Property possibly using the pylons as vantage points during hunting forays. This powerline was also observed from the study area at various times during the day on three consecutive days to determine whether it is used by large raptors and vultures. No other red-listed species or any other large birds where seen using the pylon structures for roosting or hunting during the period of the site visit, although this does not exclude the possibility that birds may use these structures at other times of the year. No nest or communal nesting sites of red-listed species were found in the study area during the site visit, which could be due to the absence of suitably large trees in the area. These observations seem to suggest that red-listed or large communal species are not currently using the study area or parts thereof for roosting or nesting.

Much of the avifauna within the study area appears similar to that found across the Kalahari bioregion of the Northern Cape. The apparent lack of red-listed species in the area could be attributed to their naturally low densities and large ranges (eagles and Secretary bird), the absence of suitable habitat (Black Stork and Burchell's Courser) and nesting/roosting trees (White-backed Vulture). However, certain species may use the study area on occasion as part of their large ranges, such as Martial Eagle and Kori Bustard, as well as the unreported Tawny Eagle and Secretary bird. However, since the study area appears not to directly support large and healthy populations of red-listed species, the sensitivity of the study area in general can be considered to be of medium significance with respect to avifauna.

5.6 SOCIO ECONOMIC CONTEXT

This section provides an overview of the spatial context of the Province, District Municipality, and Local Municipality within which the Bloemsmond Grid Connection Infrastructure is proposed for development and provides the socio-economic basis against which potential issues can be identified.

5.6.1 Spatial Context of the Northern Cape Province

The Northern Cape Province is located in the north-western extent of South Africa and comprises South Africa's largest province; occupying an area 372 889km² in extent, equivalent to nearly a third (30.5%) of the country's total land mass. It is also South Africa's most sparsely populated province with a population of 1 145 861, and a population density of 3.1/km². It is bordered by the Provinces of Western

Cape, and Eastern Cape Provinces to the south, and south-east; Free State, and North West Provinces to the east; Botswana and Namibia, to the north; and the Atlantic Ocean to the west. The Northern Cape is the only South African province which borders Namibia, and therefore plays an important role in terms of providing linkages between Namibia and the rest of South Africa. The Orange River is a significant feature and is also the main source of water in the Province, while also constituting the international border between the Northern Cape and Namibia.

The Northern Cape offers unique tourism opportunities including wildlife conservation destinations, natural features, historic sites, festivals, cultural sites, stars gazing, adventure tourism, agricultural tourism, ecotourism, game farms, and hunting areas, etc. The Province is home to the Richtersveld Botanical and Landscape World Heritage Site, which comprises a United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site under the World Heritage Convention. The Northern Cape is also home to 2 Transfrontier National Parks, namely the Kgalagadi Transfrontier Park, and the Richtersveld /Ai-Ais Transfrontier Park, as well as 5 national parks, and 6 provincial reserves.

The Northern Cape also plays a significant role in South Africa's science and technology sector, as it is home to the SKA, the SALT, and the MeerKAT.

The Northern Cape makes the smallest contribution to South Africa's economy (contributing only 2% to South Africa's Gross Domestic Product per region (GDP-R) in 2007). At 26% the mining sector is the largest contributor to the provincial GDP. The Northern Cape's mining industry is of national and international importance, as it produces approximately 37% of South Africa's diamond output, 44% of its zinc, 70% of its silver, 84% of its iron-ore, 93% of its lead and 99% of its manganese.

In 2007 the agricultural sector contributed 5.8% to the Northern Cape GDP per region which was equivalent to approximately R1.3 billion. The agricultural sector also employs approximately 19.5% of the total formally employed individuals (LED Strategy). The sector is experiencing significant growth in value-added activities, including game-farming; while food production and processing for the local and export market is also growing significantly (PGDS, July 2011). Approximately 96% of the land is used for stock farming; including beef cattle and sheep or goats, as well as game farming; while approximately 2% of the province is used for crop farming, mainly under irrigation in the Orange River Valley and Vaalharts Irrigation Scheme (LED Strategy).

5.6.2 Spatial Context of the District[25]

The ZF Mgcawu District Municipality (ZFMDM) consists of six Local Municipalities namely, Dawid Kruiper; Kai !Garib; //Khara Hais; Tsantsabane, !Kheis and Kgatelopele, and covers an area of more than 100 000 km^2 (almost 30% of the Northern Cape Province). Of this total, 65% (65 000 km^2) is made up of the Kalahari Desert, Kgalagadi Transfrontier Park and the former Bushman Land. The largest town in the region is Upington, which also functions as the district municipal capital. Following the municipal elections in 2011, Riemvasmaak (Sending and Vredesvallei) were included within the KGLM. The Riemvasmaak Community is located ~ 60 km west of Kakamas. Based on the Household Community Survey data the population of the ZFMDM was 252 692 in 2016 compared to 236 763 in 2011. The DLKM and KGLM are home to ~ 70 % of the ZFMDM population.

Table 18: Population of Local Municipalities within the ZFMDM

Local Municipality	Population	Percentage
Dawid Kruiper	107 161	42.4%
Kai !Garib	68 929	27.3%
Tsantsabane	39 345	15.6%
!Kheis	16 566	7.5%
Kgatelopele	20 691	8.2%

[25] ZF Mgcawu District Municipality

The Coloured population group make up the dominant group in the ZFMDM, DKLM and KGLM, followed by Black Africans and Whites. In terms of language, Afrikaans, followed by Setswana and IsiXhosa are the three main languages spoken in the area.

The ZFMDM accounts for ~ 30% of the Northern Cape economy. Agriculture plays a key role in the local economy and is strongly linked to irrigation along the Gariep River (Orange River). The Orange River is perennial with a flow which varies between 50 and 1800 cubic meter per second (cum/s) depending on the season. The flow of the river is largely controlled by the releases of the dams upstream, like the Bloemhof, Gariep and Van der Kloof dams. Agriculture in the ZFMDM is dominated by grape production for table grapes, which is mainly exported to Europe, as well as livestock and game farming.

The Orange River over area delivers a major part is that South Africa's table grape production. More than 90% of Africa's total dried vine fruit production is produced in the Northern Cape. The Orange River Wine Cellars Co-op, based in Upington, is the second largest winemaking cooperative in the world and has wine cellars in Groblershoop, Grootdrink, Upington, Keimoes and Kakamas.

Livestock farming occurs mainly on large farms where farming is extensive. Most of the farms are privately owned. The central parts of the region consist mainly of semi-desert areas and are therefore, with a few exceptions, mainly suitable for extensive livestock farming. In terms of employment, the most important economic sectors are Agriculture, followed by Community, Social and Personal, and Private Households.

Tourism represents one of the most important economic sectors in the Northern Cape as well as within the ZFMDM. In this regard the ZFMDM IDP indicates that tourism is the fastest growing component of the economy. Key tourism assets include the world renowned Kgalagadi Transfrontier Park, Augrabies National Park and Pitskop Nature Reserve near Upington.

Minerals and mining also play an important role in the local economy of the ZFMDM. Key mining activities include copper and zinc of Areachap north of Upington. Various small concentrations of calcite, lead, fluorspar, barite, wolfram and amethyst. Salt is also being mined at two pans, namely Groot Witpan, 95 km northwest of Upington and at Witpan, 115km northwest of Upington. In terms of social well-being the ZFMDM's greatest social challenges are illiteracy, poverty and low education levels.

5.6.3 Spatial context of the Local Municipality[26]

The proposed facility is in the KGLM, a category-B municipality[27]. The municipality is approximately 7 445 km² in size (~7.2% of the ZFMDM) and is bordered to the north, south and west by a District Management Area (NCDMA08) and in the east by the //Khara Hais and !Kheis Local Municipalities. In terms of land use, the Kai !Garib Local Municipality is largely rural and agricultural with three urban/semi-urban nodes at Kakamas, the designated administrative center of the municipality, Keimoes and Kenhardt.

The Orange River (Gariep River) plays a key role in the day to day life of most of the inhabitants in the KGLM and is critical to the area's economic well-being. The main towns of Kakamas and Keimoes are situated amid an intensive irrigation farming community stretching from Groblershoop in the east up to Blouputs in the west. Farming includes crops such as vineyards, pecan nut- and citrus plantations. Local areas within the KGLM where intensive irrigation is undertaken include Blouputs, Eksteenskuil, Riemvasmaak and Cannon Island.

The KGLM also has two unique trust communities that in many ways' functions differently than other communities. The first is Riemvasmaak which is located ~ 60 km west from Kakamas and falls with

[26] Kai !Garib

[27] A category-B municipality is defined as a municipality that shares executive and legislative authority in its area with a category- C municipality within whose area it falls.

Ward 1 of the municipality. The Riemvasmaak community consists of ~ 250 households and were forcefully removed from their land in 1973 and returned in 1994. The Riemvasmaak Community Trust is divided in two sections namely Vredesvallei and Mission.

Of relevance to the proposed development is the second Trust community, the Blocuso Trust Community, which consists of 3 farms, namely, Bloemsmond, Curriescamp and Soverby. These farms are in Ward 8, ~ 10 km north east of Keimoes. The community of Bloemsmond is located immediately to the south of the site. The farms were handed over to the three families by Queen Victoria in 1886. However, the properties were forcefully resold to white farmers in 1914 and the previous owners became farm workers. The Independent church of Gordonia under the leadership of Ds Saul Damon bought back the farms between 1914 and 1934. In 2000 the government assisted the 466 families on the three farms to buy the farms from the church. The communities established the Blocuso Trust and used the government subsidies to buy the farms and provide basic services like electricity and clean water. Since the Blocuso Trust was established the government have provided the trust with great assistance in terms of infrastructure projects.

The Municipal Area is divided into 9 wards. The proposed grid connection infrastructure is in Ward 8.

Table 19: List of Wards in the KGLM

Ward	Areas
1	Augrabies, Noudonsies, Zeekoeisteek, Blouput Riemvasmaak
2	Cillie, Marchand, Perde-eiland, Omdraai
3	Kakamas Dorp, Alheit, Bloukamp, Truterkamp
4	Kromhout Boerdery, Kakamas Oos (Langverwag), Neus
5	Lennertsville, Koms, Keimoes Dorp, Akasia Park
6	Gardenia, Whalsig, Noodkamp, Vaaldriehoek
7	Lutzburg, Friersdale, Warmsand, Eenduin, Swartbooisberg, Bloemsmond,
8	Eksteenskuil Eilande, Soverby, McTaggerscamp, Curriescamp, Blaauwsekop, Kanoneiland
9	Kenhardt, Southern Farms

6. IMPACT ASSESSMENT

This section was of the report was completed with input from the following specialists:

- Terrestrial Ecology (Enviro Insight & Confluent Environmental, 2019)
- Avifauna (Enviro Insight & Confluent Environmental, 2019)
- Botany (Enviro Insight & Confluent Environmental, 2019)
- Freshwater Ecology (Confluent Environmental, 2019)
- Agricultural (Lubbe, 2019)
- Palaeontology (Almond, 2019)
- Archaeology and Heritage (HCAC, 2019)
- Visual (Stead, 2019)
- Socio Economic (Barbour, 2018)

The impacts will firstly be discussed per specialist discipline and then summarised in the impact summary and statement below[28].

6.1 ASSESSMENT METHODOLOGY

All possible impacts need to the assessed – the **direct, in-direct as well as cumulative impacts**. Impact criteria should include the following:

[28] The assessment tables reflected in this section are those of the preferred site alternative. Please see the discussion in section 2.4 above for impacts associated with alternatives.

- **Nature of the impact:** impacts associated with the proposed Bloemsmond Grid Connection Infrastructure have been described in terms of whether they are negative or positive and to what extent.
- **Duration of impacts: Impact were assessed in terms of their anticipated duration:**
    - Short term (e.g. during the construction phase)
    - Medium term (e.g. during part or all of the operational phase)
    - Permanent (e.g. where the impact is for all intents and purposes irreversible)
    - Discontinuous or intermittent (e.g. where the impact may only occur during specific climatic conditions or during a particular season of the year)
- **Intensity or magnitude: The size of the impact (if positive) or its severity (if negative):**
    - Low, where the receiving environment (biophysical, social, economic, cultural etc) is negligibly affected or where the impact is so low that the remedial action is not required;
    - Medium, where the receiving environment (biophysical, social, economic, cultural etc) is altered, but not severely affected, and the impact can be remedied successfully; and
    - High, where the receiving environment (biophysical, social, economic, cultural etc) would be substantially (i.e. to a very large degree) affected. If a negative impact, could lead to irreplaceable loss of a resource and/or unacceptable consequences for human wellbeing.
- **Probability: Should describe the likelihood of the impact occurring indicated as:**
    - Improbable, where the possibility of the impact is very low either because of design or historic experience;
    - Probable, where there is a distinct possibility that the impact will occur;
    - Highly probable, where it is most likely that the impact will occur; or
    - Definite, where the impact will occur regardless of any prevention measures.
- **Significance: The significance of impacts can be determined through a synthesis of the assessment criteria. Significance can be described as:**
    - Low, where it would have negligible effect on the receiving environment (biophysical, social, economic, cultural etc), and on the decision;
    - Medium, where it would have a moderate effect on the receiving environment (biophysical, social, economic, cultural etc), and should influence the decision;
    - High, where it would have, or there would be a high risk of, a large effect on the receiving environment (biophysical, social, economic, cultural etc). These impacts should have a major influence on the decision;
    - Very high, where it would have, or there would be a high risk of, an irreversible negative impact on the receiving environment (biophysical, social, economic, cultural etc) and irreplaceable loss of natural capital/resources or a major positive effect on human well-being. Impacts of very high significance should be a central factor in decision-making.
    - Provision should be made for with and without mitigation scenarios.
- **Confidence: The level of confidence in predicting the impact can be described as:**
    - Low, where there is little confidence in the prediction, due to inherent uncertainty about the likely response of the receiving ecosystem, or inadequate information;
    - Medium, where there is a moderate level of confidence in the prediction, or

- High, where the impact can be predicted with a high level of confidence

- **Consequence**: **What will happen if the impact occurs**
  - Insignificant, where the potential consequence of an identified impact will not cause detrimental impact to the receiving environment;
  - Significant, where the potential consequence of an identified impact will cause detrimental impact to the receiving environment.
  - Provision must be made for with and without mitigation scenarios.

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**

  The specialist should determine whether the impacts are negative, positive or neutral ("cost – benefit" analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Cumulative impact**

  Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments planned and already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

  Care must be taken to ensure that where cumulative impacts can occur that these impacts are considered and categorised as **additive** (incremental or accumulative); **interactive**, **sequential** or **synergistic**.

Based on a synthesis of the information contained in the above-described procedure, the specialists assessed the potential impacts in terms of the following significance criteria:

- **No significance**: The impacts do not influence the proposed development and/or environment in any way.
- **Low significance**: The impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance**: The impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance**: The impacts will have a major influence on the proposed development and/or environment.

6.2 IDENTIFICATION OF IMPACTS ASSESSED

The potential key impacts identified and assessed by the various specialists (more details on the significance and ratings of these impacts are provided in section 6.4 – 6.11 below and in the attached specialist reports).

6.2.1 Ecological Impacts Assessed

Construction Phase

- Vegetation clearing for construction could impact indigenous species as well as riparian and terrestrial plant communities. Vegetation clearing will also lead to **habitat loss** for fauna and potentially the loss of sensitive faunal species, habitats and ecosystems within the remaining natural areas.

- Presence and operation of construction machinery on site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site. Disturbance could affect faunal species.
- Increased human presence can lead to faunal conflict.

Operational Phase

- The presence of the development could disrupt the connectivity of the landscape.
- Collisions and Electrocutions
- Human-animal conflict can occur.
- Alien clearing will improve the ecology and habitat of the area.

Cumulative Impacts

- Transformation of intact habitat could disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

6.2.2 Freshwater Impacts Assessed

- Disturbance to riparian habitat;
- Disturbance to watercourse bed and banks;
- Sedimentation of downstream watercourses;
- Water Quality Impacts; and
- Alien plant introduction

6.2.3 Heritage Impacts Assessed

Construction Phase

- Impact on scenic routes during construction

Operational Phase

- Impacts on the heritage resources.
- Impact on scenic routes.
- Impact of new structures on cultural landscape and character.

Cumulative impacts

- Change to the rural character.

6.2.4 Archaeological Impacts Assessed

Construction Phase

- Disturbance to surface and sub-surface sediments

Operational Phase

- None

Cumulative Impacts

- No cumulative impacts will arise

6.2.5 Visual Impacts Assessed

Construction Phase

- Visual scarring because of new development, clearing vegetation and construction works.

Operational Phase

- Change in the rural visual character of the site.
- Visual impact on key visual receptors and secondary visual receptors.
- Potential visual.
- Visibility from sensitive receptors.
- Visual intrusion of lighting at night.
- Socio-economic upliftment.

6.2.6 Socio-Economic Impacts Assessed

Construction Phase

- Creation of business and employment opportunities
- Impacts associated with the presence of construction workers on site;
- Security and safety impacts associated with the presence of construction workers;
- Noise, dust and safety impacts associated with construction related activities and the movement of heavy vehicles.

Operational Phase

- Creation of employment and business opportunities;
- Impact on rural sense of place and character of the area;
- Crime levels and pressure on local services.

6.3 SITE CONSTRAINTS AND POTENTIAL RISKS & IMPACTS

The following spatial site-specific constraints were identified by various specialists and the EAP during the initial stage of the environmental process.

Table 20: Summary of potential site constraints identified during the initial phase of the BAR Process and which are assessed in the section below.

Specialist Discipline	Site Constraints
Flora:	Sensitive vegetation associated with the koppies, water courses and pans.
Fauna	Sensitive habitat associated with the koppies, water courses and pans.
Avifauna	Habitat and Avifaunal Flight paths associated with the koppies
Agricultural	No specific spatial constraints identified.
Heritage	Presence of ephemeral Archeaology scatters.
Visual	Scenic Receptors (water courses and Koppies).

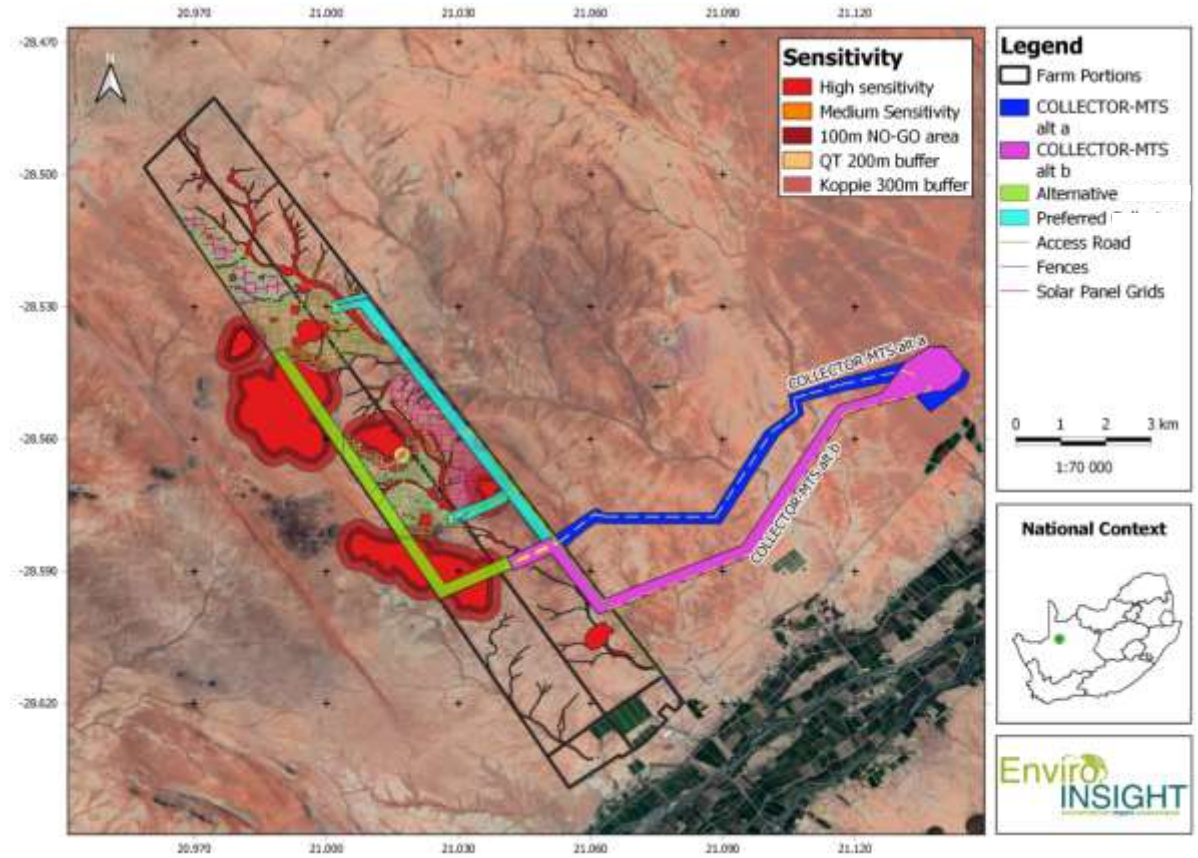

Figure 26: Showing sensitive features and buffer areas identified within and in proximity to the on-site substations, and grid connection corridors between the on-site substations and the Bloemsmond Collector Substation.

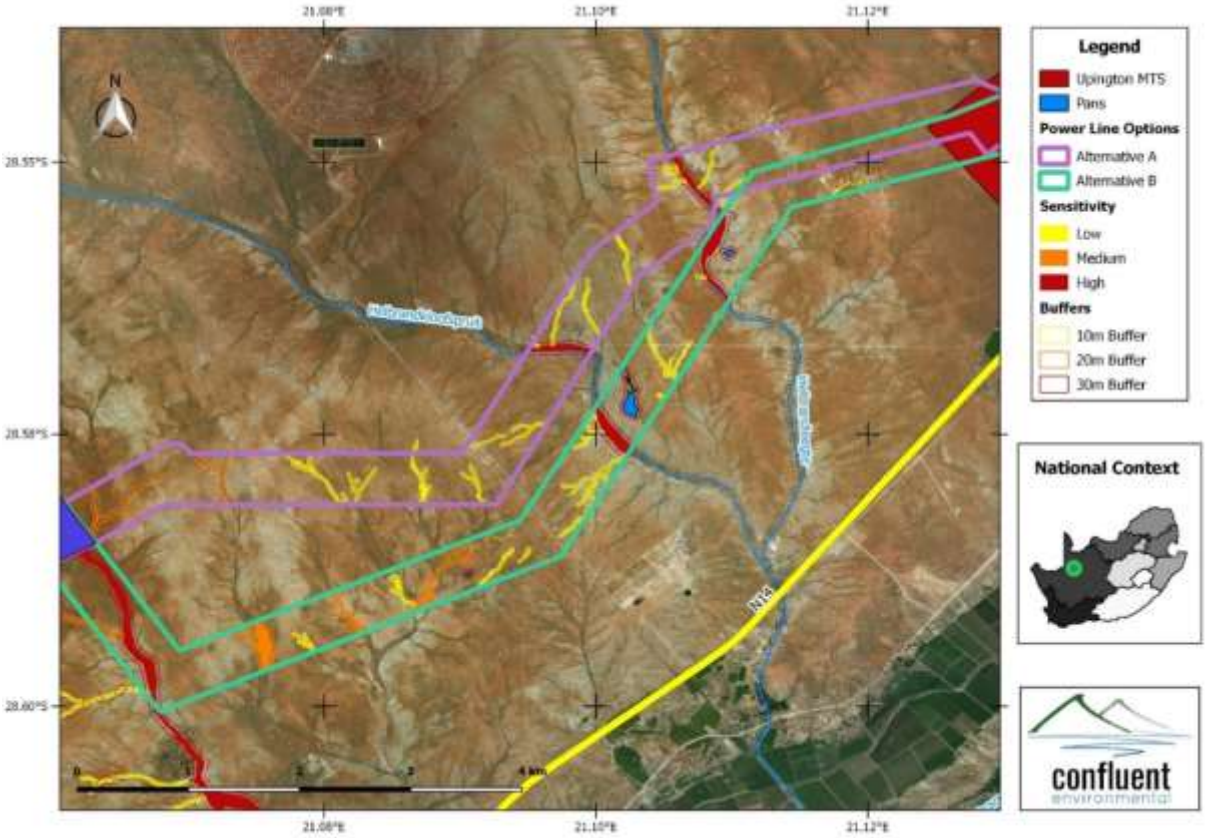

Figure 27: Showing sensitive features and buffer areas identified in proximity to the grid connection corridors between the Bloemsmond Collector Substation and the Upington MTS

As can be seen, the grid connection infrastructure avoids the high sensitivity areas to a large degree. Although the grid connection corridors straddle these high sensitivity areas (mostly associated with watercourses), the pylon positions of the powerline will be outside of these areas.

6.4 TERRESTRIAL FAUNA IMPACTS

An Ecological Assessment (encompassing Terrestrial Fauna, Avifauna and Botany) was undertaken by Enviro Insight in conjunction with Confluent Environmental. A copy of this assessment is attached in **Annexure E1** from which the following is drawn.

The specialist identified the following potential impacts on fauna, which are assessed in detail in the tables below:

- Loss and/or displacement of critically endangered/endangered animal species;
- Impact on natural communities of scientific, conservation or education value;
- Decrease in diversity of natural animal communities;
- Decrease in availability and reliability of food sources for animal communities;
- Possibility to introduce and/or enhance the spread of alien animal species;
- Threat to the ecological functioning of natural terrestrial communities due to:
- Isolation of animal communities by destruction of habitat; and
- Physical destruction of the habitat.
- Construction of barriers to animal movement or migration.

Table 21: Pre-Mitigation Impact of the Bloemsmond Grid Connection Infrastructure on Terrestrial Fauna.

Impact	Impacts Status	Spatial scale	Temporal scale	Probability	Severity	Significance value	Significance rating
Loss of existing habitat due to loss of vegetation							
Slashing of vegetation	Negative	1	3	5	3	15	High
Site camps and laydown areas	Negative	1	4	5	3	15	High
Direct loss of flora species of conservation concern and flora species endemic to the region	Negative	1	4	4	4	16	High
Stochastic events such as fire	Negative	4	3	4	4	16	High
Direct mortality of fauna							
Staff or construction workers poaching and hunting	Negative	1	2	4	3	12	Medium/High
Collisions with vehicles	Negative	1	4	4	4	16	High
Intentional killing of fauna	Negative	1	4	4	3	12	Medium/ High
Loss of species of conservation concern	Negative	2	4	4	4	16	High
Vegetation clearing/ construction preparation	Negative	1	2	4	3	12	Medium/ High
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust and lighting							
Access roads and construction works	Negative	2	4	4	3	12	Medium/High
Introduction of alien flora affecting native floral and faunal assemblages							
Vehicles and machinery	Negative	3	4	4	4	16	High
Soil Disturbance	Negative	2	3	4	4	16	High
Increase in erosion reduces habitat quality							

Impact	Impacts Status	Spatial scale	Temporal scale	Probability	Severity	Significance value	Significance rating
Vegetation clearing	Negative	1	3	3	3	9	Medium
Roads and hardened surfaces	Negative	1	4	4	3	12	Medium/High

Table 22: Post - Mitigation Impact of the Bloemsmond Grid Connection Infrastructure on Terrestrial Fauna.

Impact	Impacts Status	Spatial scale	Temporal scale	Probability	Severity	Significance value	Significance rating
Loss of existing habitat due to loss of vegetation							
Slashing of vegetation	Negative	1	3	3	3	9	Medium
Site camps and laydown areas	Negative	1	4	3	2	6	Medium
Direct loss of flora species of conservation concern and flora species endemic to the region	Negative	1	4	3	2	6	Medium
Stochastic events such as fire	Negative	4	3	2	2	4	Low/Medium
Direct mortality of fauna							
Staff or construction workers poaching and hunting	Negative	1	2	1	2	2	Low
Collisions with vehicles	Negative	1	4	2	2	4	Low/Medium
Intentional killing of fauna	Negative	1	4	1	2	2	Low
Loss of species of conservation concern	Negative	2	4	3	3	9	Medium
Vegetation clearing/ construction preparation	Negative	1	2	2	2	4	Low/Medium
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust and lighting							
Access roads and construction works	Negative	1	1	2	2	4	Low/Medium
Introduction of alien flora affecting native faunal assemblages							
Vehicles and machinery	Negative	2	4	3	2	6	Medium
Soil disturbance	Negative	2	3	2	2	4	Low/Medium
Increase in erosion reduces habitat quality							
Vegetation clearing	Negative	1	3	2	2	4	Low/Medium
Roads and hardened surfaces	Negative	1	4	3	2	6	Medium

As can be seen from the table above, the significance of all impacts on Terrestrial Fauna can be mitigated to Medium or Low.

6.4.1 Cumulative Impacts on Fauna

There are many solar developments and their associated infrastructure within the area, which raises the possibility of significant cumulative impacts. As the proposed development occurs in a Renewable Energy Development Zone (REDZ), the large number of renewable energy projects, especially solar facilities, is expected within the region. This includes several approved, preferred-bidder PV projects immediately adjacent to the site on Dyason's Klip and the operational Abengoa Khi Solar One CSP facility north-east of the site, as well as several mixed CSP/PV developments north of Dyason's Klip. The Bloemsmond Grid Connection Infrastructure would contribute a relatively small portion of transformation of the target properties.

The most significant cumulative impacts on terrestrial fauna would be:

- Vegetation and habitat loss
- Increased habitat fragmentation
- Reduced landscape connectivity for fauna species
- Loss of critical habitat for species of conservation concern
- Loss of provincially protected species and nationally protected tree species
- Loss of avifauna species due to electrocution and collision with infrastructure
- Surface water impacts
- Increased erosion
- Loss of vegetation cover will cause increased dust pollution
- Increased alien flora and fauna species

The development would contribute to cumulative impacts in the area, which are becoming increasingly large due to the concentration of renewable energy facilities in the immediate area.

The concentration of development within the area will however increase the fragmentation of the landscape and impact landscape connectivity. As the Orange River is an important landscape feature, movement to and from the river towards the west is especially vulnerable to impact and is clearly going to become increasingly constrained. Although there may be some local disruption of landscape connectivity, levels of transformation in the area have not yet reached the levels that suggest that significant impacts will start to occur on broader ecological processes and the long-term ability of fauna and flora to respond to environmental change.

6.4.2 Concluding Statement – Terrestrial Faunal Impact

The primary function of this assessment is to guide the selection of the alignment based on the sensitivity map generated from Confluent (2019) indicated in in the figures in section 6.3 of this report. Based upon the ground-truthing, Impact Analysis and Sensitivity analysis, it is the conclusion of the terrestrial ecologist that Alternative A (the northern corridor) between the Bloemsmond Collector Substation and the Upington MTS and the eastern grid connection corridors (between the eastern on-site substations and the Bloemsmond Collector Substation) be chosen as the preferred alignments for the Bloemsmond Grid Connection Iinfrastructure.

Specifically, the conclusions are based on the following key points.

- It is anticipated that a number of access roads and laydown camps need to be constructed, including the clearing of vegetation during the construction and stringing of the pylons. Although intensive clearing is unlikely to take place underneath the powerlines, it is anticipated that sensitive succulent vegetation will be destroyed during the construction of access roads. In addition, the placement of access roads and laydown camps next to habitat features with a high probability of sustaining breeding Ludwig's Bustards and other birds of prey species is likely to displace individuals or it could result in the total abandoning of these areas. Therefore, the increased presence of drainage lines, ephemeral depressions (when inundated) and the intact vegetation show a preference for Alternative A between the Bloemsmond Collector Substation and the Upington MTS.
- Permit applications for the removal of species listed in terms of the National Forest Act (Act No 84 of 1998) and the Northern Cape Nature Conservation Act (Act No 9 of 2009) which will be harmed or destroyed by the proposed development will be required from the competent authority. Protected tree species were not marked with a GPS or the number of individuals counted. This will be required prior to submitting permit applications with the competent authority.

In order for the lower impact to be achieved, the following mitigations / conditions of authorisation will have to be adopted:

- That Alternative A (the northern corridor) between the Bloemsmond Collector Substation and the Upington MTS and the eastern grid connection corridors (between the eastern on-site substations and the Bloemsmond Collector Substation) be chosen as the preferred alignments for Grid infrastructure.
- All drainage lines, depressions, inselbergs and ridges and quartz plains (as defined in this document) are regarded as sensitive habitat units. Therefore, these areas should be buffered accordingly where no construction personnel or vehicles may enter such areas. Those areas surrounding the laydown sites that are not part of the proposed corridor/servitude should be considered as “no-go” areas for employees, machinery or even visitors;
- Loss of any ridge habitat should be avoided where possible since they are often utilised by foraging bustards and act as suitable habitat for flora species of conservation concern. These should be indicated to the contractor by the Environmental Control Officer and an EMPr must be developed in order to monitor regional Cumulative Impacts;
- Prior to construction, the company must screen the alignment for any nesting birds of prey (with reference to nest-building activities, incubating and brooding individuals) prior to the construction phase. If active nests are identified or nest-building activities are noticed, the particular pylon should be barricaded and construction should cease in the nearby vicinity until the fledglings have left the nest. Under no circumstances should an inactive nest be removed or destroyed during the construction phase;
- If breeding Ludwig’s Bustards are encountered at the substation position or pylon positions, construction activities should cease in that particular area until the nestlings have successfully fledged and left the area. In general, construction activities should not take place during the peak breeding months of: Ludwig’s Bustards (and to a lesser degree Kori Bustards): July – September in areas where ; Martial Eagle: April to June) if breeding Ludwig’s Bustards are encountered in a particular construction area;
- It is strongly advised that the alignment be monitored bimonthly for at least two years after commencement of the operational phase to quantify the mortality of Ludwig’s Bustards involved in collisions (counting of carcasses or signs of carcasses). The data should be made available to the infrastructure mortality incident register of the EWT. If after the first year no significant incidents have taken place, the monitoring frequency can be readjusted; and
- All labour or staff should be advised (induction) by means of environmental awareness training on the ecological and conservation importance of the avifaunal community in the area.

6.5 AVIFAUNAL IMPACTS

An Ecological Assessment (encompassing Terrestrial Fauna, Avifauna and Botany) was undertaken by Enviro Insight in conjunction with Confluent Environmental. A copy of this assessment is attached in **Annexure E1** from which the following is drawn.

The Specialist firstly undertook a desktop study in which bird species that could potentially occur near the study area were identified using data from the second South African Bird Atlas Project (SABAP2). The species list produced by the specialist is based on an area much larger than the actual study area. This approach was adopted to ensure that all species potentially occurring within the study area, whether resident, nomadic, or migratory, are identified.

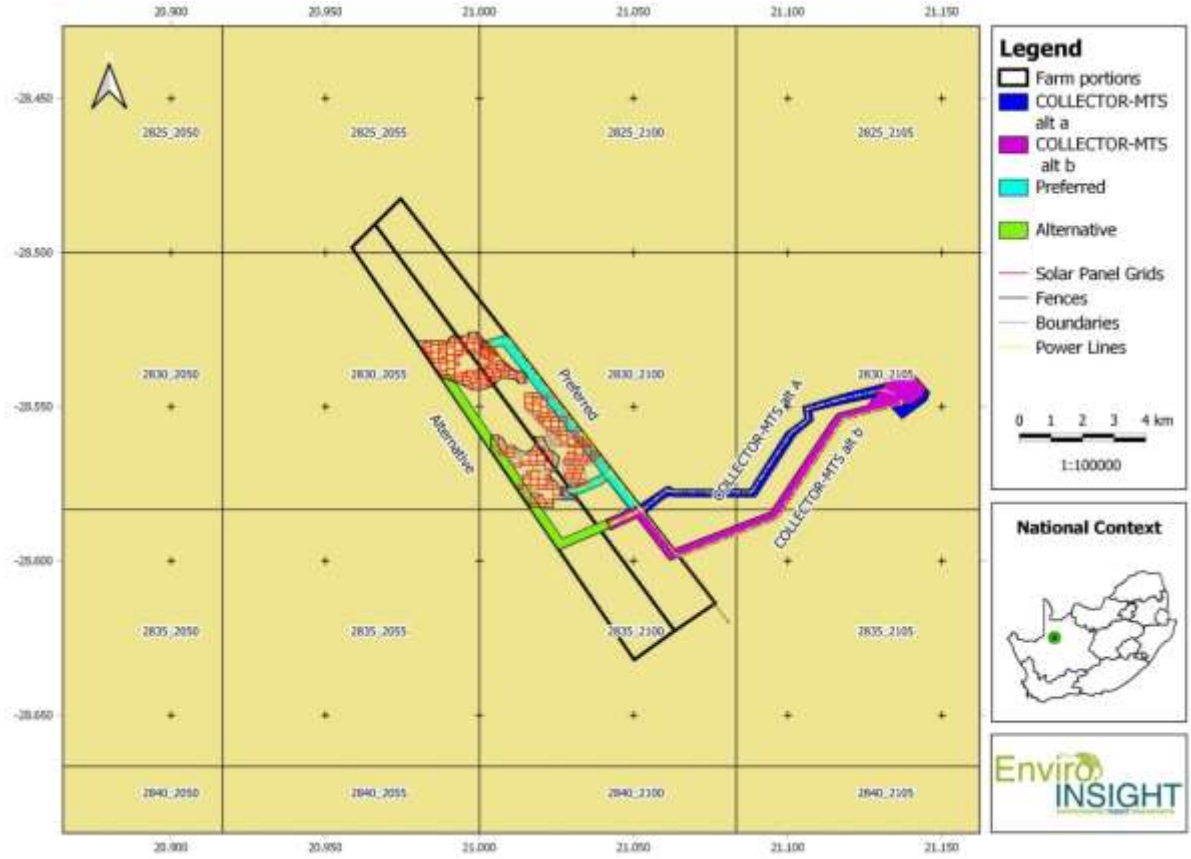

Figure 28: The study area in relation to the SABAP2 pentads.

As with the terrestrial fauna, the following potential impacts on Avifauna were identified (it must be noted that many of the impacts identified and assessed in respect of terrestrial fauna are also applicable to avifauna).

- Loss and/or displacement of critically endangered/endangered animal species;
- Impact on natural communities of scientific, conservation or education value;
- Impact on natural movement of species (flight pathways etc.);
- Disturbance of non-resident or migrant species (birds over-wintering, breeding);
- Decrease in diversity of natural animal communities;
- Decrease in availability and reliability of food sources for avifaunal communities;
- Threat to the ecological functioning of natural terrestrial communities due to:
- Isolation of animal communities by destruction of habitat; and
- Physical destruction of the habitat.
- Construction of barriers to animal movement or migration.
- Collisions and Electrocutions.

The section below includes the consideration and assessment of impacts on avifauna[29].

6.5.1 Electrocution

6.5.1.1 Impact

Electrocution occurs when a bird creates a circuit between the live components or a combination of a live and earth component of a powerline, thereby creating a fatal electrical shorting. The most common incidences occur when a species with a large wingspan attempts to perch on a pylon or flies off, creating

[29] This excludes the assessment of general impacts on fauna, which are detailed and discussed above.

unwanted contact. High-risk species include vultures (of the genera *Gyps, Torgos* and *Trigonoceps*) as well as other large birds of prey such as the Martial Eagle (*Polemaetus bellicosus*) (Ledger & Annegarn, 1981; Kruger, 1999; Van Rooyen, 2000). Vultures are non-pertinent to this particular PAOI. In addition, some species will attempt to roost and even breed on the tower structures if available nesting platforms are a scarce commodity, e.g. in the Karoo region where large trees are confined to riverine areas, thus increasing the relative importance and sensitivity of these habitat types. Other types of electrocutions happen by means of so-called "bird-streamers", where larger birds excrete on take-off and thereby create a short-circuit electrocution through the highly conductive uric acid (Van Rooyen & Taylor, 1999). Other species also likely to be affected include those prone towards roosting on pylons such as larger Storks, Herons and large Ducks and Geese. It is vital to confirm and ascertain that cross-rope suspension towers will be used, thereby reducing the inherent risk of electrocution to large birds due to the large gap between the energised components.

6.5.1.2 Mitigation

All self-supporting pylons should be fitted with *metal* (not rubber) *bird guards* to discourage birds from perching above the insulator strings[30].

6.5.2 Collision

6.5.2.1 Impact

Collisions with earth wires account for most negative bird interactions with powerlines in South Africa/ African context. Earth wires are much thinner in diameter when compared to the live components, and therefore invisible to approaching birds. Many of the species likely to be affected include heavy, large-bodied, less manoeuvrable terrestrial species such as Cranes, Storks, Flamingos, larger waterbirds, Bustards and Korhaans. These species, especially nocturnal fliers or those species with extended neck flight patterns (e.g. storks) find it difficult to make a sudden change in direction while flying – resulting in collisions. No matter the alignment chosen, the current powerline options poses a potential threat to the local avifaunal community due to possible collisions with the earth wire, especially for Endangered Ludwig's Bustards.

6.5.2.2 Mitigations

All of the following habitats are considered highest risk for collision.

- Drainage lines of the systems and ephemeral depressions – irrespective of their non-perennial status as birds will seasonally feed on fairy shrimp and utilise standing fresh water;
- Drainage lines, livestock troughs and depressions in close proximity to the alignment (usually within 100 m from the alignment);
- Farm and livestock water points.

Areas where bird collisions are likely to be high could be mitigated by increasing the visibility of the lines through applications of bird diverters and flappers (Ferrar & Janns 1999). However, the entire PAOI is considered as high-risk due to the presence of multiple susceptible species, suitable foraging habitat and breeding habitat, especially for the Endangered Ludwig's Bustard (*Neotis ludwigii*). Therefore, it is recommended that the entire length of the powerlines be marked with appropriate bird diverters in accordance to the prescribed specification. The placement of the proposed grid connection

[30] The Avifaunal specialist reccomended the use of cross rope suspension towers as the preferred supporting structures. This is not technically achievable, as these structures can only be considered for transmission infrastructure and not distribution infrastructure as is applicable to the Bloemsmond Grid Connection Infrastructure.

infrastructure alongside any existing infrastructure will greatly increase the visibility of the earth wires and many bird species have already become accustomed to the existing lines which will reduce collisions;

The specifications of the diverters are as follows:

The "Double Loop Bird Flight Diverter" (BFD) is recommended as a marking device on the earth wires. The installation should meet the following criteria:

- Diverters should make use of the largest available spirals, preferably using the model with a diameter range of at least 300 mm and at least 1 m in length (see http://www.preformedsa.co.za);
- Diverters should be performed PVC that are UV resistant in order to maximise time between maintenance or replacement;
- Diverters should be applied to all earth wires in a staggered fashion, alternating between black and white diverters for maximum contrast and visibility;
- Diverters should be fitted to the entire span as Ludwig's Bustards often perceive the Diverters during their approach, while so they deviate their course only to collide with unmarked spans near their edges (see Shaw, 2013); and
- All diverters should be spaced at 10 m intervals from each other.

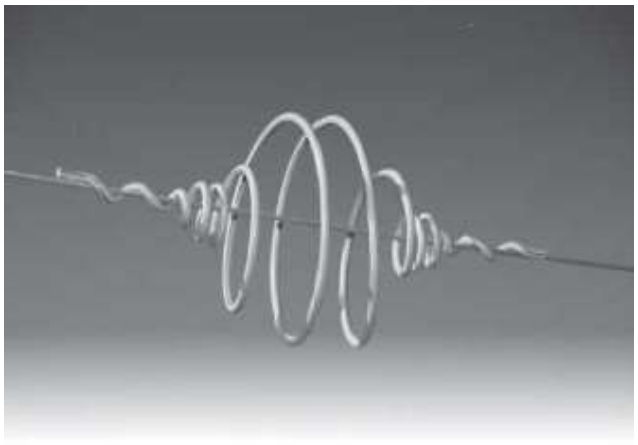

Figure 29: An example of the Double Loop Bird Flight Diverter fitted to the earth wires.

6.6 AGRICULTURAL IMPACTS

Mr Christo Lubbe undertook a specialist assessment of the potential impacts of the Bloemsmond Grid Connection Infrastructure on the agricultural environment. A copy of this assessment is attached in Annexure E3.

The agricultural specialist identified the following potential impacts associated with the Bloemsmond Grid Connection Infrastructure:

- Loss of agricultural land
- Erosion and change of drainage patterns
- Pollution

An assessment of these impacts for the various phases of the development are included below.

6.6.1 Agricultural Impacts during construction

The agricultural impacts during the construction phase of the Bloemsmond Grid Connection Infrastructure are assessed in the table below:

Table 23: Assessment of agricultural Impacts during the construction of the Bloemsmond Grid Connection Infrastructure.

Nature: Soil pollution with contaminants during the construction phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the construction of the substation infrastructure.		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Medium Term	Very short
Magnitude	Low	Minor
Probability	Probable	Probable
Significance	Low	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:	See section 7 of this BAR for a summary of mitigation measures.	
Cumulative impacts:	No, site-bound	
Residual Risks:	Yes, it is impossible to clear the affected area completely.	
Nature: Loss of agricultural land as a result of the Grid Connection Infrastructure		
	Without mitigation	**With mitigation**
Extent	Local – Regional	Local
Duration	Long-term	Long-term
Magnitude	Moderate	Low
Probability	Probable	Improbable
Significance	Medium	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:	See section 7 of this BAR for a summary of mitigation measures.	
Cumulative impacts:	Low	
Residual Risks:	No, after decommissioning this impact will be reversed when rehabilitation has been completed.	
Nature: The construction of the Grid Connection Infrastructure will cause impairment of the land capability with the potential risk of erosion		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Short term	Short term
Magnitude	Low	Low
Probability	Probable	Probable
Significance	Medium	Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:	See section 7 of this BAR for a summary of mitigation measures.	
Cumulative impacts:	No cumulative impacts are expected to occur, as all impacts will be site bounded.	
Residual Risks:	No. Affected areas will be rehabilitated, as the impact will only be applicable during construction phase.	
Nature: The establishment of the Grid Connection infrastructure may alter drainage patterns with construction and cause erosion		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Long term	Long term

Magnitude	Low	Low
Probability	Probable	Probable
Significance	Low	Low
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation	See section 7 of this BAR for a summary of mitigation measures.	
Cumulative impacts:	No, all impacts will be site bounded.	
Residual Risks:	No. Affected areas will be rehabilitated when operation has ceased.	

6.6.2 Agricultural Impacts during operation

The agricultural impacts during the operational phase of the Bloemsmond Grid Connection Infrastructure are assessed in the table below:

Table 24: Assessment of agricultural Impacts during the operation of the Bloemsmond Grid Connection Infrastructure

Nature: Soil pollution with contaminants during the operational phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the maintenance of the facility – particularly relating to the Transformer Oils.		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Long Term	Long Term
Magnitude	Low	Minor
Probability	Probable	Probable
Significance	Low	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:	See section 7 of this BAR for a summary of mitigation measures	
Cumulative impacts:	No, site-bound	
Residual Risks:	Yes, It is impossible to clear the affected area completely.	
Nature: Loss of Agricultural Land as a result of establishment of the Grid infrastructure.		
	Without mitigation	**With mitigation**
Extent	Local – Regional	Local
Duration	Long-term	Long-term
Magnitude	Moderate	Low
Probability	Probable	improbable
Significance	Medium	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:	See section 7 of this BAR for a summary of mitigation measures	
Cumulative impacts:	Low	
Residual Risks:	No, after decommissioning this impact will be reversed when rehabilitation has been completed.	

6.6.3 Agricultural Impacts during closure and decommissioning

The agricultural impacts during the closure and decommissioning phase of the Bloemsmond Grid Connection Infrastructure are assessed in the table below:

Table 25: Assessment of agricultural Impacts during the closure and decommissioning of the Bloemsmond Grid Connection Infrastructure.

Nature: Soil pollution with contaminants during the decommissioning phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the decomissioning of substation infrastructure.		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Medium Term	Very short
Magnitude	Low	Minor
Probability	Probable	Probable
Significance	Low	Low
Status (Positive or negative)	Negative	Negative
Reversibility	Partly reversible	Fully reversible
Irreplaceable loss of Resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:	See section 7 of this BAR for a summary of mitigation measures	
Cumulative impacts:	No, site-bound	
Residual Risks:	Yes, It is impossible to clear the affected area completely	

6.6.4 Cumulative agricultural impacts

To assess the cumulative impacts the specialist prepared an overview map showing the drainage, land capability and land cover is used to identify possible impacts that may accumulate on similar developments within a 30 km radius from this facility.

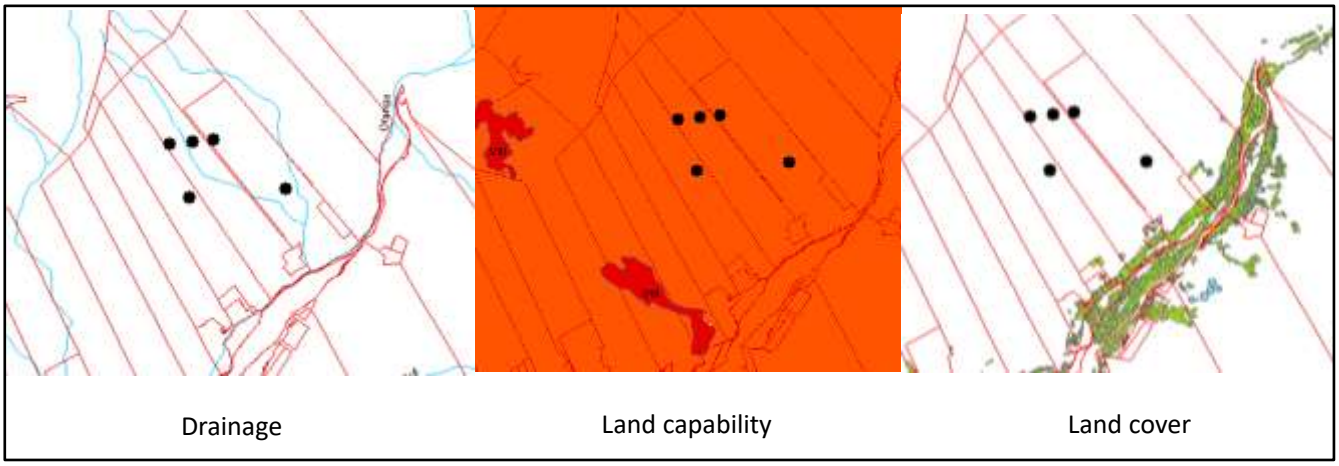

Figure 30: Solar developments (each would include its associated infrastructure) near the Bloemsmond Grid Connection Infrastructure overlaid onto drainage, land capability and land cover maps.

The following cumulative impacts were identified by the agricultural specialist.

- Loss of agricultural land
- Altering drainage patterns
- Changing agricultural character to industrial

Table 26: Assessment of cumulative agricultural Impacts of the Bloemsmond Grid Connection Infrastructure

Nature: The quantity of available soil for agricultural production decreases as result of the footprints of these facilities. The quality of soil decreases in the way the construction of these structures alters the workability of the soil. This includes the physical deformation in the soil profile.		
	Overall impact of proposed project considered in isolation	**Cumulative impact of the projects in the area**
Extent	Local – Regional	Regional
Duration	Long Term	Long Term
Magnitude	Low	Moderate
Probability	Probable	Probable
Significance	Low	Medium
Status (Positive or negative)	Negative	Negative

Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:	See section 7 of this BAR for a summary of mitigation measures	
Nature: Clearing of vegetation increases flow speed and a lower infiltration tempo increases silt transport.		
	Overall impact of proposed project considered in isolation	**Cumulative impact of the projects in the area**
Extent	Local	Regional
Duration	Long Term	Long Term
Magnitude	low	Low
Probability	Improbable	Probable
Significance	Low	Medium
Status (Positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of Resources?	No	No
Can impacts be mitigated?	Yes	Yes
Mitigation:	See section 7 of this BAR for a summary of mitigation measures	

6.6.5 Conclusion and recommendation of agricultural specialist

With reference to applicable sections of the Regulations for renewable energy in terms of Act 70 of 1970 and Act 43 of 1983, it can be stated that the proposed study area will not suffer major agricultural impacts by the proposed development. The reasons include aspects such as soil potential, geology, climate, loss of cultivating land and stock farming and other possible impacts.

The study area does not have high potential soil because of the low annual rainfall, high evaporation rate and extreme temperatures. Soils formed under these conditions have little movement of soluble nutrients and insoluble clay particles in the soil profile, restricting the adsorption of nutrients that would be available to plants. The soil is thus low in nutrient availability and has a low response to fertilizer input.

6.7 HERITAGE IMPACTS

A detailed Heritage impact Assessment was undertaken by HCAC for Bloemsmond projects 1-5[31] Additional specialists have also undertaken assessments for existing infrastructure within the study area assessed for the Bloemsmond Grid Connection Infrastructure. The following has been summarised from these studies.

Morris (2013) describes the environment of the farm as an arid, gently sloping plain with shallow drainage lines running through it. The landscape is very sparsely vegetated. Higher ground drains towards multiple depressions (seasonal washes), forming waterways towards the river corridor. No structures or ruins were noted along the proposed grid connection infrastructure corridor alignments.

6.7.1 Historic Background

From a colonial perspective, early travellers such as Wikar and Gordon travelled along the Orange River in the 1770s and described various communities living along the river (Penn 1995). By the mid-19th century the stretch of the Orange River to the west of Upington was settled by the Korana, a Khoekhoen group whose origins are still unclear (Strauss 1979). With increasing Trekboer encroachment from the

[31] The assessment for Bloemsmond 1 and 2 included the consideration and assessment of powerlines between the Bloemsmond Collector Substation and the Upington MTS.

south, the Korana became involved in a struggle to maintain an independent existence. The attempt by the Korana to resist resulted in two wars, that of 1868-9 and 1878-9.

According to Morris (2013), the name Dyason's Klip (one of the properties that is crossed by the grid connection infrastructure) is derived from events which occurred during the Korana War of 1879-1880. Apparently a certain Captain Dyason of the Northern Border Police was killed by Korana adversaries while walking between two rocks at this place in 1880. However, it is not recorded exactly where these stones are situated. The adjoining property of McTaggarts Camp also derives its name from events during the Korana War when Captain McTaggart set up his military camp here. It is assumed that the camp was located close to the river and that it is unlikely to have left much of an archaeological trace.

In his assessment of the Olyvenhout's Drift Agricultural Holding 1080 (one of the properties crossed by the grid connection infrastructure), Dreyer (2006) reported finding a heavily soldered food tin resembling British rations from the Anglo-Boer War (1899-1902). He considered it possible that a British camp may have existed in the area. Van der Walt (2011) reported the presence of a sandy track marking an old wagon-track on the farm Geel Kop to the west of Dyason's Klip. The wagon road between Keimoes and Upington crossed the farm and is marked on maps dating to 1908 (Van der Walt 2011). To the north of the farm Geel Kop, on the farm Van Rooi's Vley 443, is the Rebellion Tree monument (Van der Walt 2011). It marks the Rebellion of 1914 in which many Afrikaners opposed the plan of the South African government to invade German South-West Africa at the commencement of World War I (Van Vollenhoven 2012). The site is a Provincial Heritage site.

Van der Walt (2011) mentions the presence of mining exploration trenches on the farm Geel Kop dating to 1929 and Morris (2013) also reports on tungsten mining on the north-western portion of the farm McTaggarts Camp dating to the early 1930s. Morris (2013) identified two ruined mud-brick structure, presumably that of 19th/20th century farm workers, on the farm Dyason's Klip.

Early mapping (1906-1914) shows the location of former farmsteads on early farms in relation to the proposed site boundary. The mapping highlights the alignment of several historic roads through the area, including that of the current N14, which remains roughly unchanged. Mapping furthermore emphasises use of the area for sheep farming and describes soil conditions as sandy, with several pans and dams within the proximity of the study area.

Basic historic background research did not identify or highlight any significant historic or other heritage-related themes, which may be negatively impacted through the proposed development.

6.7.2 Heritage Resources and Issues

6.7.2.1 Cultural Landscape Context

The term "*cultural landscape*" refers to the imprint created on a natural landscape through human habitation and cultivation over an extended period of time. While the Cape has been inhabited for many hundreds of thousands of years (pre-colonial history) prior to Western settlement (colonial history), the nomadic lifestyles of early inhabitants are rarely as evident within the landscape as the imprints made by humans during the last two – three hundred years and more. Unlike ancient landscapes in parts of the world where intensive cultivation over periods much longer than locally have allowed natural and cultural components of the landscape to become interwoven, landscape components along the Southern Cape have not yet developed in such a manner. The fact that natural and cultural landscape components in the region is therefore more distinguished means that the cultural landscape tends to be very vulnerable to the cumulative impact of inappropriate large-scale development.

"*The concept of landscape gives expression to the products and processes of the spatial and temporal interaction of people with the environment. It may thus be conceived as a particular configuration of topography, vegetation cover, land use and settlement pattern which establishes some coherence of natural and cultural processes and activities*." (Green, B.H.1995).

Taken in conjunction of the above the study area therefore forms part of a cultural landscape, which by itself, as well as within a broader context, provides a more lasting framework for the understanding and management of heritage resources. While it itself a heritage resource, cultural landscape could in a sense the cultural regarded as a "patchwork" within which all other heritage resources are embedded and which adds to their meaning and sense of place.

While the NHRA does not clearly define the term "cultural landscape", it is briefly referred to in the schedule of definitions. Based on local and international best-practice and within the context of definitions assigned to the terms heritage resource, place and cultural significance, cultural landscape can be defined as "*A place of cultural significance, which engenders qualities relating to its aesthetic, architectural, historical, scientific, social, spiritual, linguistic, technological, archaeological or palaeontological value*[32]".

The study area may be described as forming part of a typical Kalahari landscape and defined by flat and wide open spaces overgrown by sparse, low-growing vegetation. From a Pre-Modern perspective, the site formed part of an area mostly used for small stock farming and so, modern man-made features noted on the site included e.g. shallow pans, fences, wind pumps and cement water reservoirs related to said land use. The study area is north of the Orange/ Gariep River Corridor, which is characterised by intensive agricultural farming, including vineyards. The landscape within the direct proximity of the study area is visually dominated by the 200m high CSP structure. Of further relevance is the fact that several other solar energy facilities and their associated infrastructure have already been authorised and built within the study area. From a cultural landscape perspective therefore, the study area is considered to be of *no local cultural significance*.

6.7.2.2 Archaeology

Findings from archaeological impact assessments undertaken with relation to the already-authorised solar energy facilities to which this proposal relate, did not identify or highlight any archaeological resources considered of high or moderate cultural significance. These findings may be summarised as outlined below:

While *Morris (July 2013)* identifies vleis as potential areas of interest from archaeological perspective, none of these features occur along the proposed grid connection infrastructure corridor alignments.

During field work, *ACO Associates (November 2014)* identified, *"Very ephemeral scatters of ESA and MSA material; Some stone cairns which are unlikely to represent graves; A ruined mud brick shepherd's hut and Evidence for 20th century mining, possibly of tungsten"*. The report concludes that potential impacts of the proposal are likely to be limited and controllable and does not recommend any mitigation or the need for archaeological monitoring during the construction phase. The report recommends that:

- If any human remains are uncovered during construction, the ECO should have the area fenced off and contact SAHRA (Tel: 021 462 4502) immediately;

GA Heritage (October 2013) identified scatterings of Stone Age archaeological occurrences, most of which were likely to be of Later Stone Age origin and one of Middle Stone Age origin. The report indicates that finds were not concentrated or unique but recommends that archaeological monitoring of construction excavations be undertaken.

6.7.2.3 Palaeontology

The combined Bloemsmond 3, 4 and 5 PV solar facility project areas on Portions 5 and 14 of the farm Bloemsmond 455 is a narrow, NNW-SSE trending strip of fairly flat-lying, arid terrain at 880 to 760 m amsl that stretches away from the northern banks of the Gariep River *c*. 25 km SW of Upington, Northern Cape. The grid connection corridor alternatives to the Upington MTS traverse similar sandy to gravelly

[32] ***Winter, S (October 2004)***

terrain NW of the Gariep River that is transected by several shallow, ephemeral water courses, including tributaries of the Cohensleegte, Helbrandkloofspruit and Helbrandleegte.

The geology of the combined PV and grid connection project area near Upington is shown on the 1: 250 000 geology map 2820 Upington. A comprehensive sheet explanation for this map has been published by Moen (2007). The area is underlain at depth by a range of ancient Precambrian basement rocks – largely high grade metamorphic rocks (*e.g.* gneisses, metapelites) and intrusive granitoids – that belong to the **Namaqua-Natal Province** of Mid Proterozoic (Mokolian) age (Cornell *et al.* 2006, Moen 2007), such as the **Dyason's Klip Gneiss, Riemvasmaak Gneiss** and **Kanoneiland Granite**, among other units. These basement rocks are approximately two to one billion years old and entirely unfossiliferous (Almond & Pether 2008). They only crop out as small, isolated patches of basement rocks or low *Inselberge*. Over half of the study area is covered by fine-grained aeolian (wind-blown) sands of the **Gordonia Formation** (**Qg**, pale yellow in Fig. 3) as well as **Late Caenozoic calcretes** (**T**, dark yellow in Fig. 3). Prominent NW-SE trending linear dunes of orange-hued sands are clearly visible on satellite images of the region to the west of the study area. These superficial deposits are assigned to the Late Cretaceous to Recent Kalahari Group, the geology of which is reviewed by Thomas (1981), Dingle *et al.* (1983), Thomas & Shaw 1991, Haddon (2000) and Partridge *et al.* (2006). The Gordonia dune sands are considered to range in age from the Late Pliocene / Early Pleistocene to Recent, dated in part from enclosed Middle to Later Stone Age stone tools (Dingle *et al*., 1983, p. 291) while the Kalahari calcretes are probably for the most part also of Pleistocene or younger age. Additional Late Caenozoic superficial deposits present in the project area include **surface gravels** as well as **alluvial sands and gravels**, especially along drainage lines, which are not mapped at 1: 250 000 scale. Outcrops of Orange River alluvial deposits are not mapped within the project footprint.

The fossil heritage associated with each of the rock units represented in the Bloemsmond study area has been previously outlined in previous desktop studies for the region to the southwest of Upington by Almond (2014a, 2014b, 2015).

The igneous and metamorphic **basement rocks** are entirely unfossiliferous. The fossil record of the **Kalahari Group** is generally sparse and low in diversity. The **Gordonia Formation** dune sands were mainly active during cold, drier intervals of the Pleistocene Epoch that were inimical to most forms of life, apart from hardy, desert-adapted species. Porous dune sands are not generally conducive to fossil preservation. However, mummification of soft tissues may play a role here and migrating lime-rich groundwaters derived from the underlying bedrocks (including, for example, dolerite) may lead to the rapid calcretisation of organic structures such as burrows and root casts. Occasional terrestrial fossil remains that might be expected within this unit include calcretized rhizoliths (root casts) and termitaria (*e.g. Hodotermes*, the harvester termite), ostrich egg shells (*Struthio*) and shells of land snails (*e.g. Trigonephrus*) (Almond 2008, Almond & Pether 2008). Other fossil groups such as freshwater bivalves and gastropods (*e.g. Corbula, Unio*) and snails, ostracods (seed shrimps), charophytes (stonewort algae), diatoms (microscopic algae within siliceous shells) and stromatolites (laminated microbial limestones) are associated with local watercourses and pans. Microfossils such as diatoms may be blown by wind into nearby dune sands. These Kalahari fossils (or subfossils) can be expected to occur sporadically but widely, and the overall palaeontological sensitivity of the Gordonia Formation is therefore considered to be low. Underlying calcretes of the **Mokolanen Formation** might also contain local concentrations of trace fossils such as rhizoliths, termite and other insect burrows, or even mammalian trackways, especially in areas associated with ancient wetlands.

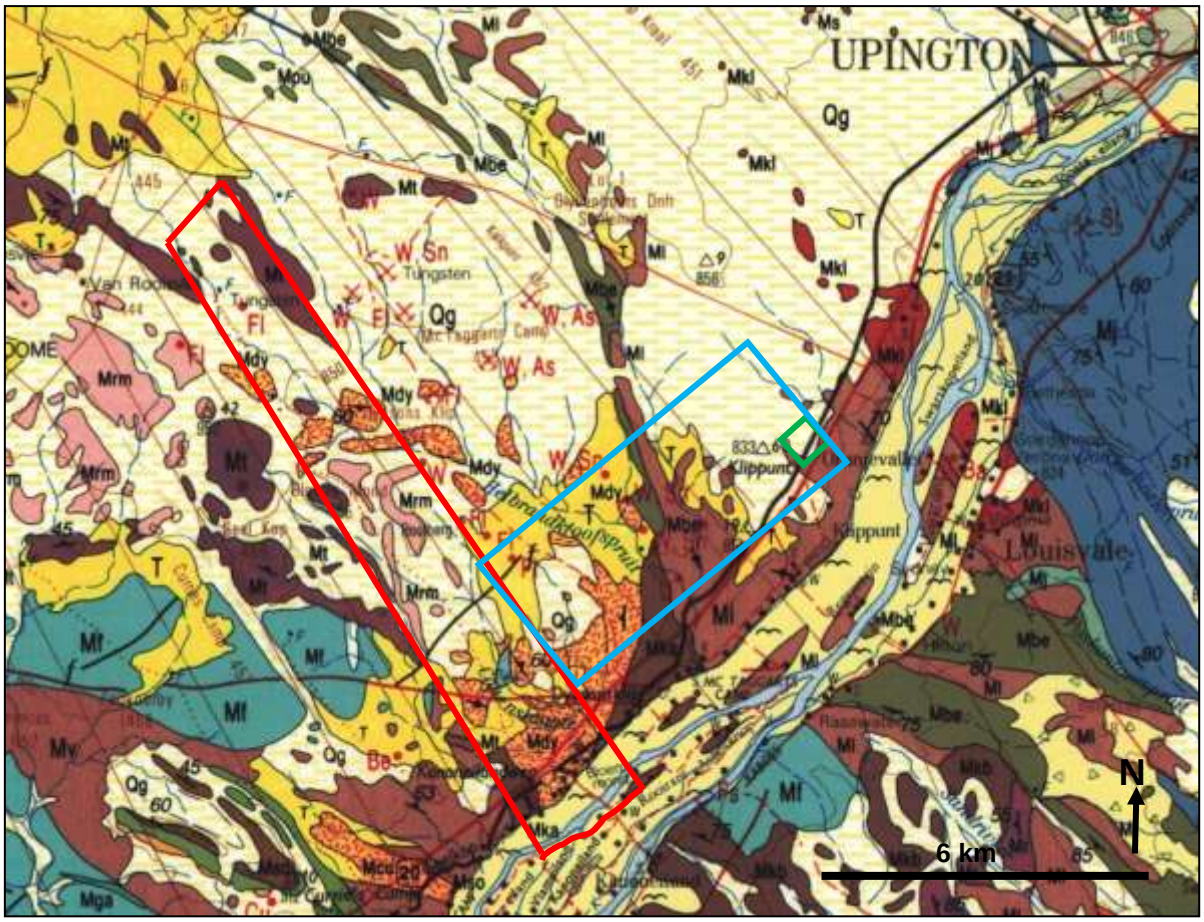

Figure 31: Extract from 1: 250 000 geological map 2820 Upington (Council for Geoscience, Pretoria)

The map above shows the location of Farm Bloemsmond 455 (red polygon), *c*. 25 km WSW of Upington, Northern Cape Province, where the Bloemsmond 1,2,3,4 and 5 solar facilities will be located. The blue rectangle approximately encloses the additional study area for the associated grid connection corridor alterantives to the existing Upington MTS (small green square). The combined solar facility and grid connection study area is underlain at depth by unfossiliferous Precambrian (Middle Proterozoic / Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province, including a wide range of highly metamorphosed sediments and intrusive igneous rocks (*e.g.* Mdy – Dyason's Klip Gneiss; Mrm – Riemvasmaak Gneiss; Mka – Kanoneiland Granite). The basement rocks are extensively mantled by red aeolian (wind-blown) sand of the Gordonia Formation (Kalahari Group) (Qg, white with yellow stripes), Late Caenozoic calcretes (T, dark yellow), surface gravels as well as alluvial sands and gravels (several of these superficial deposits are not mapped at 1: 250 000 scale). The overall palaeontological sensitivity of the entire study area is rated as LOW.

The igneous and metamorphic Precambrian basement rocks underlying the Bloemsmond solar PV facilites and associated grid connection study area at depth are entirely unfossiliferous. The overlying Late Caenozoic aeolian sands, calcretes and stream gravels of the Kalahari Group mantling the older bedrocks are generally of low palaeontological sensitivity, although occasional concentrations of fossil material (*e.g.* mammalian bones and teeth, trace fossils) may occur here.

It is concluded that none of the proposed Bloemsmond Grid Connection Infrastructure will have significant impacts on local palaeontological heritage resources.

A considerable number of solar and other renewable energy developments have been proposed on both sides of the Gariep River in the Upington region of the Northern Cape, as shown on the SAHRIS website. However, few palaeontological assessment reports (PIAs) are available for these projects, including those in the vicinity of Farm Bloemsmond 455 (*e.g.* Durand 2013, Almond 2014a, 2014b, 2015). In all

the reports examined, the palaeontological significance of the renewable energy project was assessed as low. Given the large outcrop area of the potentially-fossiliferous, but generally low-sensitivity, Kalahari Group, it is concluded that cumulative impacts of the proposed Bloemsmond solar PV facilities and associated grid connections in the context of other developments in the region are of LOW impact significance.

It is therefore recommended that, pending the discovery of significant new fossils remains before or during construction, exemption from further specialist palaeontological studies and mitigation be granted for the proposed Bloemsmond Grid Connection Infrastructure.

The following mitigation measures should be impimented.

- Should any substantial fossil remains (*e.g.* mammalian bones and teeth) be encountered during construction, however, these should be safeguarded, preferably *in situ*, and reported by the ECO to SAHRA, *i.e.* The South African Heritage Resources Authority, as soon as possible (Contact details: SAHRA. 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). This so that appropriate action can be taken by a professional palaeontologist, at the developer's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (*e.g.* stratigraphy, sedimentology, taphonomy) by a professional palaeontologist. A Chance Fossil Finds Procedure for the Upington study region is appended to this report.

6.7.2.4 Eco-Tourism[33]

One of the goals of ecotourism is to offer tourists insight into the impact of human beings on the environment, and to foster a greater appreciation of our natural habitats and from an economic perspective, heritage resources may prove to be valuable resources when used in sustainable manner through eco-tourism. This may for example include investment in adaptive reuse of historic buildings so as to conserve and enhance the unique character and historic themes pertinent to this area. Heritage tourism can therefore serve as a driver for economic development, including infrastructure development and poverty alleviation through job creation. The broader region's rich archaeological, palaeontological, historical and natural heritage has the potential to provide unique tourism opportunities when developed and used in responsible and sustainable ways.

Given the location as well as pattern of existing land use in and within the proximity of the study area and furthermore, the very low density of heritage resources considered of cultural significance noted as part of this assessment, it is our considered opinion that the proposed development would offer significant heritage-related eco-tourism opportunities.

6.7.3 Heritage Informants And Assessment Of Impacts

According to the requirements of Section 38(3) of the NHRA it is crucial that the land use planning and BA processes be informed by and incorporate heritage informants and indicators as done through mapping and grading of relevant heritage resources identified as part of a HIA. It is the purpose of this Section to summarise heritage informants and indicators and the manner in which heritage resources should be incorporated into the overall design of the proposed development.

From a regional and natural landscape perspective, the proposed development site forms part of a highly-transformed landscape that has already been altered through mining activities as well as high concentration of proposals for development of renewable energy (solar) facilities. The proposal put forward in this report would relate to a reduction in the total distance of powerlines required to be installed for the Bloemsmond Grid Connection Infrastructure by combining powerlines across the projects.

[33] Section included in accordance with requirements set by National Department of Environmental Affairs

It is concluded that none of the two route alignment alternatives are likely to have any significant impacts on local palaeontological heritage resources. However, the recommendations reflected in the desktop palaeontological study shall be adhered to.

6.8 PALAEONTOLOGICAL IMPACTS

Dr John Almond from Natura Viva undertook a desktop paleontological assessment of the proposed Bloemsmond Grid Connection Infrastructure. A copy of this assessment is included in **Annexure E5**. The potential impacts on Palaeontological resources identified in the specialist study are summarised below.

The fossil heritage associated with all the rock units represented within the Bloemsmond Grid Connection Infrastructure study area has been previously outlined in previous desktop studies for the region to the southwest of Upington by Almond (2014a, 2014b, 2015).

The igneous and metamorphic basement rocks are entirely unfossiliferous. The fossil record of the Kalahari Group is generally sparse and low in diversity. The Gordonia Formation dune sands were mainly active during cold, drier intervals of the Pleistocene Epoch that were inimical to most forms of life, apart from hardy, desert-adapted species. Porous dune sands are not generally conducive to fossil preservation. However, mummification of soft tissues may play a role here and migrating lime-rich groundwaters derived from the underlying bedrocks (including, for example, dolerite) may lead to the rapid calcretisation of organic structures such as burrows and root casts. Occasional terrestrial fossil remains that might be expected within this unit include calcretized rhizoliths (root casts) and termitaria (*e.g. Hodotermes*, the harvester termite), ostrich egg shells (*Struthio*) and shells of land snails (*e.g. Trigonephrus*) (Almond 2008, Almond & Pether 2008). Other fossil groups such as freshwater bivalves and gastropods (*e.g. Corbula, Unio*) and snails, ostracods (seed shrimps), charophytes (stonewort algae), diatoms (microscopic algae within siliceous shells) and stromatolites (laminated microbial limestones) are associated with local watercourses and pans. Microfossils such as diatoms may be blown by wind into nearby dune sands. These Kalahari fossils (or subfossils) can be expected to occur sporadically but widely, and the overall palaeontological sensitivity of the Gordonia Formation is therefore considered to be low. Underlying calcretes of the Mokolanen Formation might also contain local concentrations of trace fossils such as rhizoliths, termite and other insect burrows, or even mammalian trackways, especially in areas associated with ancient wetlands.

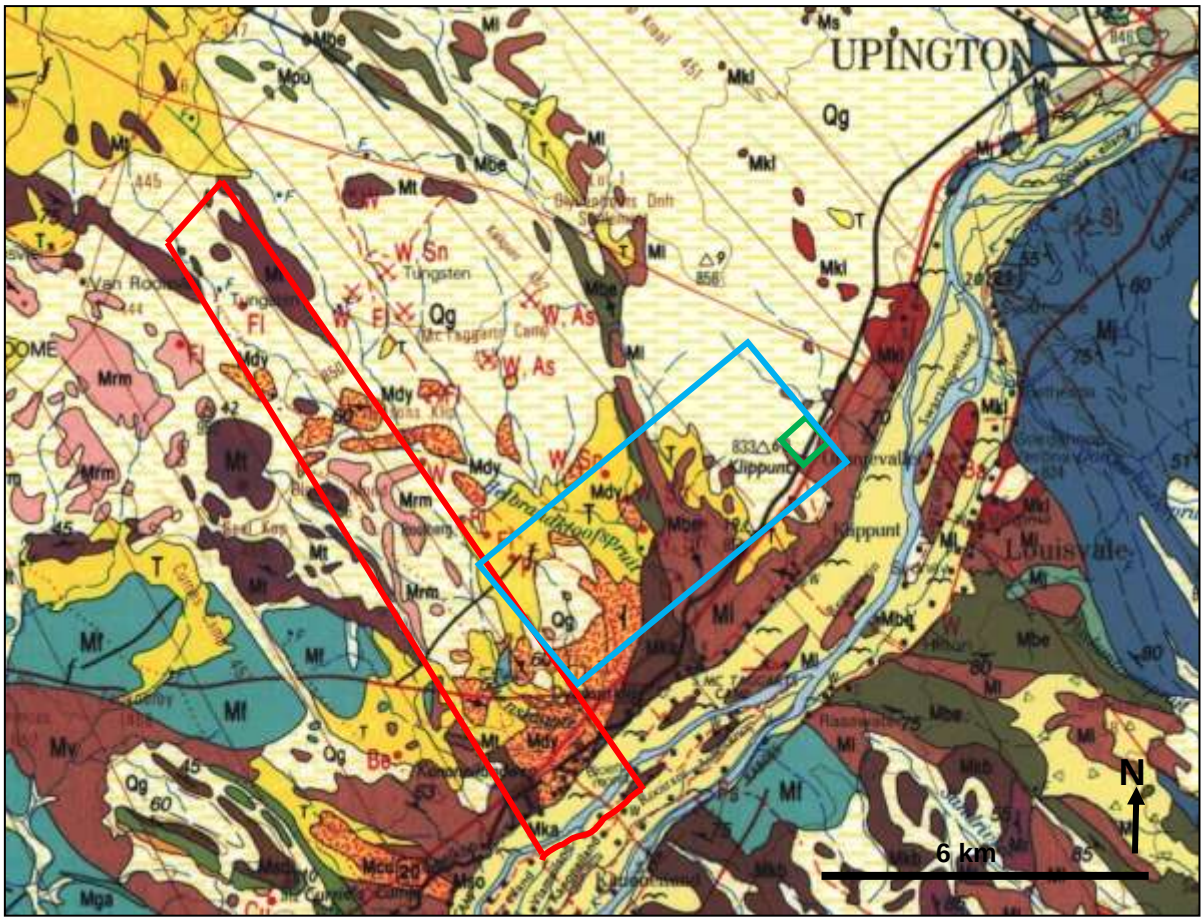

Figure 32: Extract from 1:250 000 geological map 2820 Upington (Council for Geoscience, Pretoria) showing the location of Farm Bloemsmond 455.

From the map above, the study area is underlain at depth by unfossiliferous Precambrian (Middle Proterozoic / Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province, including a wide range of highly metamorphosed sediments and intrusive igneous rocks.

The basement rocks are extensively mantled by red aeolian (wind-blown) sand of the Gordonia Formation (Kalahari Group) (Qg, white with yellow stripes), Late Caenozoic calcretes (T, dark yellow), surface gravels as well as alluvial sands and gravels (several of these superficial deposits are not mapped at 1: 250 000 scale).

The overall palaeontological sensitivity of the entire study area is rated as LOW.

6.8.1 Conclusion and recommendations of palaeontological specialist

The igneous and metamorphic Precambrian basement rocks underlying the Bloemsmond Grid Connection Infrastructure study area at depth are entirely unfossiliferous. The overlying Late Caenozoic aeolian sands, calcretes and stream gravels of the Kalahari Group mantling the older bedrocks are generally of low palaeontological sensitivity, although occasional concentrations of fossil material (*e.g.* mammalian bones and teeth, trace fossils) may occur here.

It is concluded that the proposed the Bloemsmond Grid Connection Infrastructure is unlikely to have significant impacts on local palaeontological heritage resources.

A considerable number of solar and other renewable energy developments have been proposed on both sides of the Gariep River in the Upington region of the Northern Cape, as shown on the SAHRIS website. However, few palaeontological assessment reports (PIAs) are available for these projects, including those near Farm Bloemsmond 455 (*e.g.* Durand 2013, Almond 2014a, 2014b, 2015). In all the reports

examined, the palaeontological significance of the renewable energy project was assessed as low. Given the large outcrop area of the potentially-fossiliferous, but generally low-sensitivity, Kalahari Group, it is concluded that cumulative impacts of the proposed Bloemsmond PV energy facilities and associated grid connections in the context of other developments in the region are of LOW impact significance.

6.9 VISUAL IMPACTS

Mr Stephen Stead of VRMA, undertook a detailed visual impact assessment of the proposed Bloemsmond Grid Connection Infrastructure. A copy of this assessment is attached in Annexure E6 of the BAR and a summary thereof is provided below.

The following landscape impacts were identified as having a likelihood of occurring during the construction and operation of the proposed grid connection infrastructure.

- Construction Phase
  - Loss of *site* landscape character from the removal of vegetation for the construction road, the construction of the monopole structures and cables;
  - Possible soil erosion from temporary roads crossing drainage lines;
  - Windblown litter from the laydown and construction sites.
- Operation Phase
  - Massing effect on the landscape from a large-scale modification;
  - On-going soil erosion;
  - On-going windblown dust.
- Decommissioning Phase
  - Movement of vehicles and associated dust;
  - Windblown dust from the disturbance of cover vegetation / gravel.
- Cumulative Impacts
  - A long-term change in land use setting a precedent for powerline routings relating to future solar energy projects in the area.
  - Potential loss of scenic resources located on the adjacent property to the west that could influence future eco-tourism opportunities in this area.

Table 27: Assessment of Visual Impacts relating to the preferred grid connection corridors from the on-site sub stations to the Bloemsmond Collector Substation.

Nature: Change of local and surrounds visual resources due to the construction and operation of the proposed (32m high) monopole structures,		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Long-term	Long-term
Magnitude	Medium	Low
Probability	Probable	Probable
Significance	**Medium to Low**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Possible	Possible

Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Impact Motivation The eastern corridors do not contain any significant visual resources or topographic prominence. The area is remote with limited receptors and is located within the vicinity of the already authorised Bloemsmond PV 1 & 2 which does include powerlines that will increase the visual absorption capacity of the locality once constructed.		
Mitigation: The laydown area should be sited away from the N14 road as well as the viticulture areas, and preferably not located on portions of the study area that have local prominence. Dust management during the lifetime of the project.		
Cumulative impacts: Multiple powerlines routings can create negative massing effects that sterilise landscape quality. Routings should be aligned as close as possible to other powerline routing or road access lines.		
Residual Risks: With the associated powerline and vehicle access located away from the western scenic resources, the low profile and prominence of the PV panels would result in a low intensity landscape impact and are not likely to degrade the scenic resource.		

Table 28: Assessment of Visual Impacts relating to the alternative grid connection corridors from the on-site sub stations to the Bloemsmond Collector Substation.

Nature: Change of local and surrounds visual resources due to the construction and operation of the proposed (32m high) monopole structures.		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Long-term	Long-term
Magnitude	High	High
Probability	Probable	Probable
Significance	**Medium to High**	**Medium to High**
Status (positive or negative)	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Impact Motivation The proposed study area does not contain any significant visual resources. The area is remote with limited receptors and is located near to the already authorised Bloemsmond PV 1 & 2. Visual intrusion is likely to be into the western areas where there are natural features that do create visual resources.		
Mitigation: The laydown area should be sited away from the N14 road as well as the viticulture areas, and preferably not located on portions of the site that have local prominence. Dust management during the lifetime of the project.		
Cumulative impacts: From a cumulative perspective, locating powerline and road access to the west in close proximity to the western scenic resources, could reduce the potential for future eco-tourism opportunities in this area. Given that there is game farming taking place in the area, this is a possibility. For this reason, the western corridors are not preferred.		
Residual Risks: With the associated powerline and vehicle access located away from the western scenic resources, a low intensity landscape impact would result which is not likely to degrade the scenic resource.		

Table 29: Assessment of impacts of the preferred grid connection corridor (Alternative A) from the Bloemsmond Collector Substation to the Upington MTS

Nature: Change of local and surrounds visual resources due to the construction and operation of the proposed (32m high) monopole structures.		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Long-term	Long-term
Magnitude	Medium	Low
Probability	Probable	Probable
Significance	**Medium to Low**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Impact Motivation The preference is to have the powerline routings aligned with the current Dyasonsklip and Sirius Powerline currently under construction. This would reduce construction and maintenance impacts associated with creating new roads for the powerline construction and long-term maintenance.		
Mitigation: Dust management during the lifetime of the project. Careful management of long-term impacts where the route passes over shallow drainage lines.		
Cumulative impacts: From a cumulative perspective, the location of the powerline and road access to the north would reduce exposure to south scenic resources that have the potential for future eco-tourism opportunities along the N14 National Road.		
Residual Risks: If the associated powerline and vehicle access is located away from the southern N14 scenic resources, a low intensity landscape impact is more likely, posing less threat of the degradation of the scenic resources. On decommissioning, the limited footprint required for the construction of the roads, would allow for effective rehabilitation of the impacted area back to the current agricultural land use and associated rural sense of place.		

Table 30: Assessment of impacts of the alternative grid connection corridor (Alternative B) from the Bloemsmond Collector Substation to the Upington MTS

Nature: Change of local and surrounds visual resources due to the construction and operation of the proposed (32m high) monopole structures.		
	Without mitigation	**With mitigation**
Extent	Local	Local
Duration	Long-term	Long-term
Magnitude	Medium	Medium
Probability	Probable	Probable
Significance	**Medium to High**	**Medium to High**
Status (positive or negative)	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Impact Motivation The preference is to have the powerline routings aligned with the current Dyasonsklip and Sirius Powerline currently under construction (preference for the northern routing alternative a). The more southern routing, while not a fatal flaw, does create a corridor of no-go land between the Dyasonsklip and Sirius Powerline and the Southern Collector Grid corridor (alternative b).		
Mitigation: Dust management during the lifetime of the project. Careful management of long-term impacts where the route passes over shallow drainage lines.		

Cumulative impacts: From a cumulative perspective, the two kilometre buffer between the powerline and the N14 National Road would reduce exposure to scenic resources along the route that have potential for future eco-tourism opportunities. Cumulative impacts from the route are thus rated Low.
Residual Risks: If the associated powerline and vehicle access is located away from the southern N14 scenic resources, a low intensity landscape impact is more likely, posing less threat of the degradation of the scenic resources.. Although residual risks to scenic resources are Low, there is a visual preference for the northern route due to the routing being further from the N14 .

6.9.1 Visual Recommendations

The visual specialist has provided the following recommendations from a visual perspective. These are further summarised in section 8 below.

6.9.1.1 Construction Phase

During the construction phase heavy vehicles, components, equipment and construction crews will frequent the area and may cause, at the very least, a cumulative visual nuisance to landowners and residents in the area as well as to road users. The proposed project is semi-industrial in nature and would be located in an agricultural area with limited man made infrastructure. The following actions should be implemented during the construction phase:

- Adopt responsible construction practices aimed at containing the construction activities to specifically demarcated areas thereby limiting the removal of natural vegetation to the minimum.
- Limit access to the construction areas to existing access roads.
- Rehabilitate all disturbed areas to acceptable visual standards as soon as possible after construction is complete in each area.
- Construction should not take place at night-time.
- The laydown area should be sited away from the N14 road and preferably not located on areas that are prominent.
- Topsoil (if any) from the footprints of the road and structures should be stockpiled for rehabilitation and restoration purposes.
- Strict litter control.
- Temporary roads should be well marked and should only cross drainage lines on areas identified as permanent road features where erosion and soil loss management can be contained.

6.9.1.2 Operation Phase

During the operation phase movement of vehicles frequenting the area may cause, at the very least, a cumulative visual nuisance to landowners and residents in the area as well as to road users.

The following actions should be implemented during operation phase:

- Strict litter control.
- Continued erosion control.

6.9.1.3 Deconstruction Phase (if required)

During the de-construction phase heavy vehicles, components, equipment and construction crews will frequent the area and may cause, at the very least, a cumulative visual nuisance to landowners and residents in the area as well as to road users. The following actions should be implemented during construction phase:

- Adopt responsible de-construction practices aimed at containing the activities to impacted areas only.

- Rehabilitate all disturbed areas to acceptable visual standards as soon as possible after de-construction is complete in an area.
- De-construction should not take place at night-time.
- If very dry conditions prevail and dust becomes a nuisance, water should be sprayed on the road surface (or implement another suitable mitigation to reduce wind-blown dust).
- Strict litter control.
- All monopoles need to be removed from site and adequately processed in accordance with national legislation.

6.9.2 Visual conclusions and reccomendations

Due to the relative remoteness of the locality and some topographic screening, no high exposure and sensitive receptors were identified for the study area, and as such Visual Exposure and Sensitivity to landscape change for both preferred routing sites is defined as ***Low***. However, scenic resources were identified within the project zone of visual influence. These visual resources include low hills, rocky outcrops and long red dunes and were located. These scenic resources would fall within the project Zone of Visual Influence of the Western Alternative Collector routings. These landscape features do add value to the regional landscape context and have potential for eco-tourism, adding value to the existing game farming taking place in the area. As such, there is a need to protect these resources from higher levels of visual intrusion.

The VRM study found that all routings do include shallow washes, and could include sensitive vegetation. Should these areas be identified by the Ecological / surface water hydrology specialist as significant, they would need to be excluded from the mono-pole positioning.

The bushmanland arid grassland portions of the western grid connection corridors, as well as the southern grid connection corridor from the Bloemsmond Collector Substation to the Upington MTS (Alternative B), were assigned as Class III visual objectives. The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. The proposed development may attract attention, but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

The ***western grid connection corridors*** are aligned along the western boundary of the Bloemsmond property where there are scenic resources, which include rocky outcrops and dune landscapes. Although no receptors are currently using these landscape resources for tourism, a powerline landscape modification within close vicinity to these scenic resources, could detract from future eco-tourism opportunities. As the proposed routing is likely to be visually intrusive as seen from these areas, ***these corridors are not recommended***.

The ***southern grid connection corridor from the Bloemsmond Collector Substation to the Upington MTS (Alternative B)*** was assigned a Class III visual objective due to the closer proximity to the N14 national Highway, which would include tourist related receptors. However, due to the higher VAC levels created by the existing (and future proposed) powerlines in the area as well as the 1.7km distance between the road, this landscape modification would meet the Class III visual objective.

The bushmanland arid grassland portions of the ***eastern grid connection corridors***, as well as the ***northern grid connection corridor from the Bloemsmond Collector Substation to the Upington MTS (Alternative A)***, were assigned as Class IV visual objectives. This is due to the seldom seen nature of these routings that have limited scenic resources and closer proximity to existing PV and CSP projects (and associated powerlines). The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape but working within international best practice for landscape modification management and restoration. As these routings would meet the Class IV visual objects, these two routings are visually preferred routings. Mitigations have been provided and would need to be implemented. Should they be effectively implemented, it is

unlikely that the eastern grid connection corridors, as well as the northern grid connection corridor from the Bloemsmond Collector Substation to the Upington MTS (Alternative A) would degrade significant visual resources.

6.10 FRESHWATER ECOLOGY IMPACTS

Dr Jackie Dabrowski of confluent Environmental, undertook a detailed freshwater ecology assessment of the proposed Bloemsmond Grid Connection Infrastructure. A copy of this assessment is attached in **Annexure E2** of the BAR and a summary thereof is provided below.

6.10.1 layout and design phase impacts

From an aquatic ecosystem perspective the optimal layout is the one that impacts least on sensitive watercourses. Based on the sensitivity maps produced for all the Bloemsmond grid connection corridor alternatives, it is possible to identify common impacts that require mitigation in every alternative. Where there are alternative specific mitigation measures required these are highlighted. As discussed in the Aquatic specialist report, the preferred alternative for the grid connection from the Bloemsmond Collector Substation to the Upington MTS is Alternative A (northern alternative), and within Bloemsmond Farm 455 the eastern grid connection corridor alternatives are preferred. Considering the latter, it is fortunate that the eastern access road is also the preferred road access alternative.

At Bloemsmond Farm 455, drainage lines and alluvial washes are so numerous in the landscape that it is not realistic to expect that the powerlines or access roads would be able to avoid every single one. However, situations where powerlines cross drainage lines, or run parallel to them in close proximity should be avoided. This is to protect infrastructure from the effects of flooding, and to reduce the risk of impacts affecting fauna making use of drainage lines. The layout should consider routing powerlines away from high sensitivity watercourses (including pans) as far as possible.

Table 31. Impact Assessment for the layout and design phase for the corridor alternatives from the facility on-site substations to the Bloemsmond Collector Substation

Impact	Intensity	Duration	Extent	Probability	Significance	Reversibility	Irreplaceability	Confidence
Impact: Further refinement of the development layout								
Without mitigation	High	Ongoing	Local	Almost certain	Moderate	Medium	Medium	High
With mitigation	Low	Medium term	Limited)	Probably	Minor	Medium	Medium	High
Impact: Layout of access roads								
Without mitigation	High	Long term	Local	Probably	Minor	Medium	Medium	High
With mitigation	Moderate	Medium term	Very limited	Unlikely	Negligible	High	Low	High
Impact: Stormwater management								
Without mitigation	Low	Medium term	Limited	Unlikely	Negligible	Medium	Medium	High
With mitigation	Very Low	Brief	Very limited	Rare	Negligible	High	Low	High

Mitigation Measures

- Apart from road crossings where necessary, no infrastructure (e.g. pylons) should be planned in any watercourse to avoid erosion and disturbance of the watercourse (bed, banks and riparian zone), as well as potential damage to infrastructure during surface flooding. Infrastructure may span low sensitivity drainage lines provided supports are placed outside of buffered areas;
- Where it is necessary for powerlines and roads to cross drainage lines, these crossings should be perpendicular to the drainage line in order to reduce impacts;

- Where sensitive areas such as pans occur ensure that access roads and / or powerlines are diverted at least 50m around them (the width of the buffer zone).
- The layout of powerlines and access roads should aim as far as possible not to surround watercourses with infrastructure (e.g. a pan sandwiched between a road and a fence);
- Limited development may be planned in buffer zones of low sensitivity watercourses;
- Buffer zones for pans and the pans themselves are no-go zones.

6.10.1.1 Access Roads

When planning the layout of access roads in the study area, there are additional mitigation measures that may be taken to reduce negative impacts.

Mitigation Measures

- Road crossings should ensure the continuity of substrate and flows in the watercourse;
- Construct road crossings on straight channel segments, avoiding meanders;
- As with gridline crossings, road crossings should be perpendicular to the stream;
- As far as possible, road layouts should follow the paths of existing roads to minimize cumulative impacts unless an alternative route is identified that has significantly fewer drainage line crossings;
- Review the layout of roads in relation to sensitive areas and ensure the minimum number of road crossings is achieved, in low sensitivity drainage lines only (if possible). For instance, the current route for the preferred B5BC Eastern Alternative corridor appears to have one or two unnecessary road crossings of a high sensitivity drainage line to the north which could quite easily be reduced;

6.10.1.2 Stormwater Management

The region is naturally arid and has low annual rainfall, but in the event of significant rainfall events stormwater from impervious surfaces will need to be effectively managed to limit erosion and conserve water. Impervious surfaces in this case mainly refer to tarred roads and buildings such as the substations and visitor centre etc. The impacts of stormwater management have been assessed collectively because the mitigation measures would apply to any of the alternative options selected for development.

Mitigation Measures

- Minimise alteration to existing drainage networks as far as possible avoiding levelling or infilling as this will alter flow paths causing flooding and erosion;
- Rainwater collection tanks should be installed on building roofs in order to reduce the risk of channelled flows from gutters, and store water for a variety of uses (e.g. dust suppression);
- Consider the use of alternative materials for paved and parking areas that allow greater water infiltration rates such as gravel;
- Considering the beneficial effects of vegetation in terms of intercepting rainwater and reducing erosion, plan to minimize the disturbance of vegetation as much as possible;
- Should stormwater need to be discharged into a drainage line from any surface, methods of energy dissipation such as stilling basins should be employed to reduce flow velocities entering the watercourse. Where this type of modification to flows as well as the bed and banks of the watercourse are concerned, the plan should be reviewed by an aquatic specialist to ensure the risk of degradation is not too great.
- Stormwater should be diverted away from roads early and often so as to disperse flows widely;

6.10.2 Construction phase impacts

Table 32. Impact Assessment for the construction phase for the corridor alternatives from the facility on-site substations to the Bloemsmond Collector Substation

Impact	Intensity	Duration	Extent	Probability	Significance	Reversibility	Irreplaceability	Confidence
Impact: Disturbance to watercourse bed and banks								
Without mitigation	High	Medium term	Limited	Probably	Minor	Medium	Low	High
With mitigation	Low	Short term	Very limited	Unlikely	Negligible	High	Low	High
Impact: Disturbance to riparian habitat								
Without mitigation	3	4	1	4	Minor	High	Low	High
With mitigation	Very low	Short term	Very limited	Probably	Negligible	High	Low	High
Impact: Sedimentation of downstream watercourses								
Without mitigation	Moderate	Medium term	Local	Probably	Minor	Medium	Low	High
With mitigation	Low	Short term	Limited	Unlikely	Negligible	High	Low	High
Impact: Water quality impacts downstream								
Without mitigation	Low	Short term	Limited	Probably	Negligible	High	Low	Medium
With mitigation	Very low	Brief	Very Limited	Rare	Negligible	High	Low	Medium
Impact: Alien plant introduction								
Without mitigation	High	Long term	Local	Probably	Minor	Medium	Medium	High
With mitigation	Very low	Short term	Limited	Unlikely	Negligible	High	Low	High

6.10.2.1 Disturbance to watercourse bed and banks

During the construction phase heavy machinery and other vehicles may need to cross watercourses. While this practice should be avoided wherever possible, it may be necessary where drainage lines cross the full extent of the grid connection corridors. In areas where there are numerous drainage lines this may result in heavy machinery entering and traversing watercourses as they manoeuvre. This may destabilise consolidated sediments resulting in erosion and downstream sedimentation. It could also result in compaction of soil and destruction of riparian vegetation.

Mitigation Measures

- Where watercourse crossings are unavoidable, crossing structures should be put in place to protect the bed and banks from soil destabilisation, subsequent vegetation loss and erosion;
- Avoid having to cross the two large, high sensitivity drainage lines that transect the Bloemsmond Collector Substation – Upington MTS Alternative A and Alternative B. These are the Helbrandkloofspruit and Helbrandleegte Stream. Where possible, the existing roads intersecting the grid connection corridors linked to the N14 should be used for access, as opposed to crossing the river beds;
- Temporarily fence high sensitivity areas (drainage lines and pans) along their buffers in the vicinity of the development with single-strand wire fencing, not danger tape. The aim is to exclude easy access by people and vehicles, but still allow the movement of fauna for the duration of construction;

- Where vehicle access and work within a watercourse is unavoidable, such as the construction of a road crossing, then demarcate the access, parking and lay down areas using temporary fencing; and,
- Where excessive damage has occurred to the watercourse bed, banks or riparian zone, this must be rehabilitated immediately under the guidance of an aquatic specialist.

6.10.2.2 Disturbance to riparian habitat

Drainage lines are distinguished as having the largest shrubs and trees in the landscape in the study area. These riparian zones provide important ecological functions that must be preserved wherever possible. Where roads or other infrastructure intersect drainage lines, vegetation will need to be cut or removed. In the latter case this can result in destabilisation of the soil leading to erosion.

Mitigation Measures

- Only trim or remove riparian vegetation where it is absolutely necessary;
- Areas that have been cleared should be revegetated with indigenous species after construction. If necessary, erosion control through silt traps or similar should be used;
- Where vegetation has been removed along the banks of a watercourse, it will be necessary to check for alien plant establishment which needs to be cleared on a regular basis.

6.10.2.3 Sedimentation of downstream watercourses

A number of construction phase activities can increase erosion at the site resulting in sedimentation of downstream watercourses. Such activities include the disturbance of soils and vegetation both in watercourses and the broader environment as large areas of disturbed soil and vegetation would be prone to erosion. These include steep slopes, access roads and recently cleared areas (e.g. laydown areas). Erosion of these areas will eventually lead to habitat degradation in watercourses downstream. This occurs where sediment accumulates, forming bars and smothering the river bed. Creation of new sand bars also provides ideal habitat for colonisation by invasive plants (alien or indigenous) which further alters the instream habitat.

Mitigation Measures

- Limit disturbance to soil and vegetation as far as possible to reduce the risk of erosion.
- Ideally construction should be planned outside of the “wet” season to minimise the risk of erosion. However the area is naturally arid, and heavy rainfall is therefore a low risk for most of the year.
- Establish sediment traps (e.g. silt fences or erosion berms) on areas prone to erosion. Although rainfall is an unlikely event, it must be planned for. Allowance must be made to clear sediment from the traps if erosion occurs during the construction period.
- If active erosion results in the formation of gullies, these areas must be infilled with topsoil and covered with hessian or a geotextile (e.g. hessian sheets or geotextiles) prior to revegetation.
- Where sedimentation downstream occurs as a direct result of construction activities this must be assessed and manual removal (using spades) under the supervision of a freshwater ecologist or environmental site officer may be recommended.

6.10.2.4 Water Quality Impacts

Construction activities have the risk of introducing a range of detrimental contaminants into watercourses. Even if there is no flow at the time of construction, these contaminants may leach into groundwater, or be washed into river systems during periods of flowing water. Possible contaminants include hydrocarbons (fuel and oil from vehicles) or cement waste. In addition, solid waste such as plastic litter could be dispersed by construction workers. Erosion (as described above) results in increased suspended sediment loads when rivers are flowing.

Mitigation Measures

- Vehicle parking and refuelling areas must be located > 50m from the edge of watercourses, and be clearly defined. No refuelling or vehicle maintenance should take place within 50 m of a watercourse.
- Any fuel storage areas must be bunded to prevent spills from spreading if they occur.
- Waste collection and removal must be arranged on a regular basis, and allowance must be made for conducting a litter clean-up for up to 100m downstream and upstream of the watercourses at the development site.
- Follow recommended mitigation measures for sedimentation of downstream watercourses as above.

6.10.2.5 Alien plant introduction

Wide-scale disturbance during construction has the potential to facilitate invasion by alien plants such as Mexican poppies (*Argemone Mexicana*) and mesquite (*Prosopis juliflora).* Mesquite was not observed at the study area although it is meant to occur on and adjacent to Bloemsmond Farm 455 according to Van den Berg (2010).

Mitigation Measures

- Any imports of foreign material to the site should be cleared with a botanical specialist to ensure they do not pose a risk and do not originate from areas with high levels of alien invasion.
- Alien plants must be continually removed from disturbed areas throughout the construction period. Any uncertainty about plant identification must be clarified with a botanical specialist.

6.10.3 operational phase impacts

Table 33. Impact Assessment for the operational phase for the corridor alternatives from the facility on-site substations to the Bloemsmond Collector Substation

Impact	Intensity	Duration	Extent	Probability	Significance	Reversibility	Irreplaceability	Confidence
Without mitigation	High	Ongoing	Local	Probably	Minor	Medium	Medium	High
With mitigation	Very low	Short term	Limited	Rare	Negligible	High	Low	High

6.10.3.1 Alien Vegetation Management

Disturbance to soil and vegetation that occurred during construction is likely to create opportunities for the establishment of alien vegetation. If left to spread unmanaged, these plants (particularly *Prosopis* spp.) can displace indigenous plant species and degrade habitat. Furthermore, unmanaged alien vegetation provides a source for dispersal to neighbouring areas.

Mitigation Measures

- When conducting inspections of any infrastructure on site, include a checklist of likely alien plants to check for throughout the site;
- Staff at the plant must be educated and made aware of alien vegetation that could be present and that must be eradicated;
- Depending on the species that establish, it is essential that recommended methods of control be employed and adequate stores of herbicide / tools are kept on site for this purpose. Alternatively a reputable contractor can be used for ongoing control of aliens; and,

- Alien plant control requires ongoing control and commitment. Therefore, alien plant management must form an integral part of the plant's Environmental Management Programme.

6.10.3.2 Spills and Waste Management

During operation of the grid connection infrastructure there may be occasional spills (e.g. petrochemicals) related to vehicles and grid connection infrastructure. There may be residual waste associated with the construction phase (e.g. materials). The management of these aspects should be covered in the grid connection infrastructure's Environmental Management Programme.

Mitigation Measures

- If spills occur (e.g. oil or hydraulic fluid) there must be a procedure for the containment and management thereof;
- Any waste construction materials must be disposed of responsibly, such as at the local landfill site;
- Human waste should be stored in septic tanks kept well away from any watercourses; and,
- General refuse must be contained in animal-proof bins.

6.10.4 Conclusion of Aquatic specialist

The watercourses assessed in this study were in a very good ecological state. Both drainage lines and pans provide important ecological and hydrological functions in the landscape, and it is important that these functions are preserved as far as possible. The PV developments and associated infrastructure (i.e. this Grid Connections Infrastructure) proposed for the Bloemsmond Solar projects have been well planned in terms of considering environmentally sensitive areas in the planning and layout phase. Impacts within the footprint of powerlines are inevitable, the majority of these are considered negligible in their mitigated state. Provided the site is well managed during the construction and operational phase, following suggested mitigation measures, the development is considered as a positive contribution to the alternative energy needs of South Africa.

6.11 SOCIAL IMPACTS

Mr Tony Barbour undertook a Social Impact Assessment of the proposed Bloemsmond Grid Connection Infrastructure. A copy of this assessment is included in **Annexure E7** and the following summary is provided in this regard. This proposed grid connection infrastructure is directly linked to and inseverable from the Bloemsmond 1-5 Rrenewable Eenergy projects and as such, the Social Impact Assessment considers the grid connection infrastructure as part of the greater Renewable Energy projects.

The social specialist divided his assessment into the following sections which are discussed separately below.

- Assessment of compatibility with relevant policy and planning context;
- Assessment of social issues associated with the construction phase;
- Assessment of social issues associated with the operational phase;
- Assessment of social issues associated with the decommissioning phase;
- Assessment of the no go alternative; and
- Assessment of cumulative impacts.

6.11.1 Assessment of social impacts associated with policy and planning.

The findings of the review indicate that renewable, including solar energy which includes the associated infrastructure, is strongly supported at a national, provincial and local level.

6.11.2 Assessment of social impacts associated with the construction phase

The social specialist identified both positive and negative impacts associated with the construction phase, these impacts were identified as follows:

- Creation of employment and business opportunities, and opportunity for skills development and on-site training (Positive Impact);
- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Noise, dust and safety impacts of construction related activities and vehicles; and
- Impact on productive farmland.

An assessment of these identified social impacts during construction are included in the tables below.

Table 34: Assessment of positive social impacts during the construction phase

Nature: Creation of employment and business opportunities during the construction phase		
	Without Mitigation	**With Enhancement**
Extent	Local – Regional (3)	Local – Regional (4)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	High (8)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (44)	Medium (56)
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impact be enhanced?	Yes	
Enhancement:	see section 7 of the BAR dealing with suggested mitigation measures	
Cumulative impacts:	Opportunity to up-grade and improve skills levels in the area.	
Residual impacts:	Improved pool of skills and experience in the local area.	

Table 35: Assessment of negative social impacts during the construction phase

Nature: Potential impacts on family structures and social networks associated with the presence of construction workers		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short term for community as a whole (2)	Short term for community as a whole (2)
Magnitude	Moderate for the community as a whole (6)	Low for community as a whole (4)
Probability	Probable (3)	Probable (3)
Significance	Medium for the community as a whole (30)	Low for the community as a whole (21)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in	Yes, if people contract HIV/AIDS. Human capital plays a critical role in

	communities that rely on farming for their livelihoods	communities that rely on farming for their livelihoods
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation:	See mitigation measures reflected in section 7 of the BAR.	
Cumulative impacts:	Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.	
Residual impacts:	Same as cumulative impacts assessed above	
Assessment of No Go option	There is no impact as the current status quo would be maintained. The potential positive impacts on the local economy associated with the additional spending by construction workers in the local economy will also be lost.	

Nature: Potential impacts on family structures, social networks and community services associated with the influx of job seekers		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Permanent (5) (For job seekers that stay on the town)	Permanent (5) (For job seekers that stay on the town)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status	Negative	Negative
Reversibility	No in case of HIV and AIDS	No in case of HIV and AIDS
Irreplaceable loss of resources?	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods
Can impact be mitigated?	Yes, to some degree. However, the risk cannot be eliminated	
Mitigation:	See section 7 of the BAR for a summary of the mitigation measures.	
Cumulative impacts:	Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.	
Residual impacts:.	Same as cumulative impacts assessed above	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

Nature: Potential risk to safety of scholars, farmers and farm workers, livestock and damage to farm infrastructure associated with the presence of construction workers on site		
	Without Mitigation	**With Mitigation**
Extent	Local (3)	Local (2)

Duration	Short term (2)	Short term (2)
Magnitude	Medium (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (33)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock losses and damage to farm infrastructure etc.	Yes, compensation paid for stock losses and damage to farm infrastructure etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See section 7 of the BAR for a summary of the Mitigation Measures.	
Cumulative impacts:	No, provided losses are compensated for.	
Residual impacts:	See cumulative impacts above.	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

Nature: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires		
	Without Mitigation	**With Mitigation**
Extent	Local (4)	Local (2)
Duration	Short term (2)	short term (2)
Magnitude	Moderate due to reliance on agriculture for maintaining livelihoods (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Medium (36)	Low (24)
Status	Negative	Negative
Reversibility	Yes, compensation paid for stock and crop losses etc.	Yes, compensation paid for stock and crop losses etc.
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See section 7 of the BAR for a summary of mitigation measures.	
Cumulative impacts:	No, provided losses are compensated for.	
Residual impacts:	See cumulative impacts.	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

Nature: Potential noise, dust and safety impacts associated with movement of construction related traffic to and from the site		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short Term (2)	Short Term (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Probable (3)

Significance	Medium (30)	Low (15)
Status	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See section 7 of the BAR for a summary of Mitigation measures	
Cumulative impacts:	If damage to local farm roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were not responsible for the damage. Dust impacts to vineyards could also impact on future contracts.	
Residual impacts:	See cumulative impacts above.	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

Nature: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the powerlines will damage farmlands and result in a loss of farmlands for grazing.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long term-permanent if disturbed areas are not effectively rehabilitated (5)	Short term if damaged areas are rehabilitated (2)
Magnitude	Medium (6)	Minor (2)
Probability	Probable (3)	Highly Probable (4)
Significance	Medium (36)	Low (20)
Status	Negative	Negative
Reversibility	Yes, disturbed areas can be rehabilitated.	Yes, disturbed areas can be rehabilitated.
Irreplaceable loss of resources?	Yes, loss of farmland. However, disturbed areas can be rehabilitated	Yes, loss of farmland. However, disturbed areas can be rehabilitated
Can impact be mitigated?	Yes, however, loss of farmland cannot be avoided	
Mitigation:	See below	
Cumulative impacts:	Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, disturbed areas can be rehabilitated.	
Residual impacts:	See cumulative impacts.	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	

6.11.3 Assessment of social Impacts Associated with the operational phase.[34]

[34] This includes the operational phase impacts of the PV facilities as a whole, as the operational phase impacts of the grid connection cannot be considered in isolation.

The social specialist identified both positive and negative impacts associated with the operational phase of the solar PV facilities (because the grid connection infrastructure would not be required without the proposed PV facilities), these impacts were identified as follows:

- The establishment of renewable energy infrastructure (positive);
- Creation of employment and business opportunities. The operational phase will also create opportunities for skills development and training (positive);
- Generation of additional income for the landowner (positive);
- Benefits associated with the establishment of a Community Trust (positive);
- The visual impacts and associated impact on sense of place; and
- Potential impact on tourism.

An assessment of both these positive and negative impacts are included in the tables below.

Table 36: Assessment of positive social impacts during the operational phase.

Nature: Development of infrastructure to generate clean, renewable energy		
	Without Mitigation	**With Mitigation**
Extent	Local, Regional and National (4)	Local, Regional and National (5)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Highly Probable (4)	Definite (5)
Significance	High (64)	High (85)
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	Yes, impact of climate change on ecosystems	Reduced CO_2 emissions and impact on climate change
Can impact be mitigated?	Yes	
Enhancement:	See section 7 of the BAR for a summary of mitigation measures (these measures include the relative enhancement opportunities	
Cumulative impacts:	Overall reduction in CO_2 emission, reduction in water consumption for energy generation, contribution to establishing an economically viable commercial renewables generation sector in the Northern Cape and South Africa.	
Residual impacts:	See cumulative impacts above	
Assessment of No-Go option	The No-Development option would represent a lost opportunity for South Africa to supplement its current energy needs with clean, renewable energy.	
Nature: Creation of employment and business opportunities associated with the operational phase		
	Without Mitigation	**With Enhancement**
Extent	Local and Regional (1)	Local and Regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Definite (5)
Significance	Low (27)	Medium (50)
Status	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	

Enhancement:	See section 7 of the BAR for a summary of mitigation measures (these measures include the relative enhancement opportunities
Cumulative impacts:	Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area
Residual impacts:	See cumulative impacts above
Assessment of No-Go option	There is no impact as it maintains the current status quo. However, the potential opportunity costs in terms of the loss of employment and skills and development training would be lost.

Nature: Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development		
	Without Mitigation	**With Enhancement**
Extent	Local and Regional (2)	Local and Regional (3)
Duration	Long term (4)	Long term (4)
Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	Medium (30)	High (65)
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement:	See section 7 of the BAR for a summary of mitigation measures (these measures include the relative enhancement opportunities	
Cumulative impacts:	Promotion of social and economic development and improvement in the overall well-being of the community	
Residual impacts:	See cumulative impacts	
Assessment of No-Go option	There is no impact as it maintains the current status quo. However, the potential opportunity costs in terms of the supporting the social and economic development in the area would be lost. This would also represent a negative impact.	

Nature: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc. (+)		
	Without Mitigation	**With Enhancement**
Extent	Local (1)	Local (3)
Duration	Long term (4)	Long term (4)
Intensity	Low (4)	Moderate (6)
Likelihood	Probable (3)	Definite (5)
Significance	Low (27)	Medium (53)
Status	Positive	Positive
Reversibility	Yes	Yes
Can impact be enhanced?	Yes	
Enhancement:	See section 7 of the BAR for a summary of mitigation measures (these measures include the relative enhancement opportunities	

Cumulative impacts:	Support for local agricultural sector and farming
Residual impacts:	See cumulative impacts
ssessment of No-Go option	There is no impact as it maintains the current status quo.

Table 37: Assessment of negative social impacts during the operational phase of the development.

Nature: [35]Visual impact associated with the proposed solar facility and the potential impact on the area's rural sense of place.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (4)	Highly Probable (4)
Significance	Medium (32)	Low (28)
Status	Negative	Negative
Reversibility	Yes, solar facility can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See section 7 of the BAR for a summary of the suggested mitigation measures.	
Cumulative impacts:	Potential impact on current rural sense of place	
Residual impacts:	See cumulative impacts	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	
Nature: Potential impact of the SEF on local tourism		
	Without Mitigation	**With Enhancement / Mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	Low (24) (Applies to both – and +)	Low (24) (Applies to both – and +)
Status	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)	Negative (Potential to distract from the tourist experience of the area) Positive (Potential to attract people to the area)
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impact be enhanced?	Yes	
Enhancement:	See section 7 of the BAR for a summary of mitigation measures (including opportunities for enhancement	

[35] This assessment includes visual impacts from a social perspective. Please also refer to the detailed standalone Visual Impact Assessment that was undertaken.

Cumulative impacts:	The proposed Grid Infrastructure forms part of 5 of a number of solar energy facilities proposed in the KGLM area. Due to size and scale of the infrastructure the cumulative impacts are not rated significant.
Residual impacts:	See cumulative impacts
Assessment of No-Go option	There is no impact as it maintains the current status quo.

6.11.4 Assessment of social impacts associated with the decommissioning phase

The social specialist identified negative impacts associated with loss of jobs after the decommissioning of the development. These impacts are assessed in the table below.

Table 38: Assessment of social Impacts associated with the decommissioning of the development.

Nature: Social impacts associated with retrenchment including loss of jobs, and source of income		
	Without Mitigation	**With Mitigation**
Extent	Local and regional (2)	Local and regional (1)
Duration	Medium Term (2)	Very Short Term (1)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (40)	Low (24)
Status	Negative	Negative
Reversibility	Yes, assumes retrenchment packages are paid to all affected employees	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Mitigation:	See section 7 of the BAR for a summary of the suggested mitigation measures.	
Cumulative impacts:	Loss of jobs and associated loss of income etc. can impact on the local economy and other businesses. However, decommissioning can also create short term, temporary employment opportunities associated with dismantling etc.	
Residual impacts:	See cumulative impacts	

6.11.5 Assessment of Cumulative Social Impacts.

The social specialists identified several cumulative impacts associated with sense of place, accommodation availability and local economics. An assessment of these potential cumulative impacts are included in the table below.

Table 39: Assessment of cumulative social impacts associated with the development.

Nature: Visual impacts associated with the establishment of more than one PV facility and their associated infrastructure and the potential impact on the area's rural sense of place and character of the landscape.		
	Without Mitigation	**With Mitigation**
Extent	Local and regional (2)	Local and regional (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	Medium (30)	Low (24)
Status	Negative	Negative
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	No

Can impact be mitigated?	Yes	
Enhancement:	See section 7 of the BAR	
Cumulative impacts:	Impact on other activities whose existence is linked to rural sense of place and character of the area, such as tourism, bird watching, and hunting.	
Residual impacts:	See cumulative impacts	
Assessment of No-Go option	There is no impact as it maintains the current status quo.	
Nature: The establishment of a number of renewable energy facilities in the KGLM and ZFMDM will place pressure on local services, specifically medical, education and accommodation		
	Without Mitigation	**With Mitigation**
Extent	Local and regional (3)	Local and regional (1)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (52)	Low (28)
Status	Negative	Negative
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Enhancement:	See below	
Cumulative impacts:	Negative impact on the local services	
Residual impacts:	See cumulative impacts	
Comment on No-Go option	There is no impact as it maintains the current status quo.	
Nature: The establishment of a number of solar energy facilities in the KGLM and ZFMDM will create employment, skills development and training opportunities, creation of downstream business opportunities.		
	Without Mitigation	**With Mitigation**
Extent	Local and regional (3)	Local and regional (4)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Highly Probable (4)	Definite (5)
Significance	Medium (44)	High (70)
Status	Positive	Positive
Reversibility	Yes. Solar energy plant components and other infrastructure can be removed.	
Irreplaceable loss of resources?	No	No
Can impact be mitigated?	Yes	
Enhancement:	See section 7 of the BAR	
Cumulative impacts:	Positive impact on the local and regional economy through the creation of downstream opportunities and wage spend in the local economy	
Residual impacts:	See cumulative impacts	

Assessment of No-Go option	There is no impact as it maintains the current status quo. This would represent a lost socio-economic opportunity for the KGLM.

6.11.6 Assessment of social impacts of the no-go alternative.

The social specialist assessed the impacts associated with lost opportunities, should the no-go alternative be implemented. The outcome of this assessment is included in the table below.

Table 40: Assessment of social impacts associated with the no-go alternative.

Nature: The no-development option would result in the lost opportunity for South Africa to supplement is current energy needs with clean, renewable energy		
	Without Mitigation	**With Mitigation**
Extent	Local-International (4)	Local-International (4)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Moderate (56)	Moderate (56)
Status	Negative	Positive
Reversibility	Yes	
Irreplaceable loss of resources?	N/A	N/A
Can impact be mitigated?	Yes	
Enhancement:	See section 7 of the BAR	
Cumulative impacts:.	Reduce carbon emissions via the use of renewable energy and associated benefits in terms of global warming and climate change	
Residual impacts:	See cumulative impacts	

6.11.7 Conclusion and recommendation of social specialist

The findings of the Social Impact Assessment indicate that the development of the proposed Bloemsmond Grid Connection Infrastructure will create employment and business opportunities for locals during both the construction and operational phase of the project.

The establishment of a Community Trust associated with the PV facilities will also benefit the local community. The enhancement measures listed in the report should be implemented to maximise the potential benefits. The significance of this impact is rated as High Positive. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated with a coal-based energy economy and the challenges created by climate change, represents a significant positive social benefit for society. The findings of the Social Impact Assessment also indicate that the REIPPPP has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives. The establishment of the proposed Bloemsmond Grid Connection Infrastructure is therefore supported by the findings of the Social Impact Assessment.

Due the number of other renewable energy projects proposed in the local municipal area, it is recommended that the Kai !Garib Local Municipality liaise with the proponents to investigate how best the Community Trusts can be established and managed to promote and support local, socio-economic development in the region as a whole.

6.12 CUMULATIVE IMPACT ASSESSMENT

This section is summarised from the cumulative impact assessments that took place by each of the participating specialists. For further details in this regard, the reader is referred to the specialist assessments contained in **Appendix E**.

Where appropriate, certain specialists did include a cumulative assessment of a much wider area than the accepted 30km radius.

No potentially fatal flaws have been identified associated with cumulative impacts.

The 2014 EIA Regulations (as amended) (GNR 326) define a cumulative impact as follows:

"Cumulative impact in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities."

There are several other renewable energy facilities (each which include their own grid connection infrastructure) near the proposed Bloemsmond Grid Connection Infrastructure as detailed in the table below.

A Strategic Environmental Assessment process was undertaken by the CSIR to identify geographical areas most suitable for the rollout of Renewable Energy projects and the supporting electricity grid network. The aim of the assessment was to designate REDZ within which such development will be incentivised and streamlined. After the SEA, these REDZ have been gazetted. The Bloemsmond Grid Connection Infrastructure is within one of these Gazetted REDZ as well as a Strategic Powerline Corridor and as such deemed more suitable for such development on a cumulative scale.

Cumulative impacts that could occur due to the development of solar energy facilities and associated infrastructure near each other include impacts such as:

- Visual impacts
- Socio-economic impacts
- Loss of vegetation and the inability to achieve conservation targets
- Impacts to soil and agricultural potential
- Impacts on heritage resources (in this area particularly relating to Archaeology resources)
- Surface water resources

In terms of possible cumulative impacts, one needs to look at the presence of similar facilities on the farm portion as well as the greater landscape.

The table below reflects the other renewable energy facilities (each which include their own grid connection infrastructure) near the proposed Bloemsmond Grid Connection Infrastructure.

Table 41: Renewable Energy Facilities in proximity to Bloemsmond Grid Connection Infrastructure and their status

#	Project	Property	Status
1	Khi Solar 1 (CSP)	Portion 3 of the Farm McTaggarts Camp 453	Operational
2	Upington CSP tower 2 and 3 (CSP)	Portion 3 of the Farm McTaggarts Camp 453	Authorised
3	Rooipunt Solar Park (PV)	Remainder farm Rooipunt 617	Authorised
4	Sasol CSP Phase 1 and 2 (CSP)	Portions 443 and 450 of 450 van roois vley	Authorised
5	Sirius Solar One (PV)	Remainder of Farm Tungsten Lodge	In Construction
6	Sirius Solar 2 (PV)	Remainder of Farm Tungsten Lodge	Authorised
7	Sirius Solar 3 (PV)	Remainder of Farm Tungsten Lodge	EIA in Process
8	Sirius Solar 4 (PV)	Remainder of Farm Tungsten Lodge	EIA in Process
9	S-Kol (PV)	Farm Geelkop 456	Authorised

#	Project	Property	Status
10	Ofir ZX (PV)	Remainder of Farm 616	Authorised
11	Sonneberg PV Facility	Portion 11 of 474	Authorised
12	Dyasonsklip 1	Farm Dyasonsklip 454	Under construction
13	Dyasonsklip 2	Farm Dyasonsklip 454	Under construction
14	RE Capital 3C	Farm Dyasonsklip 454	Authorised
15	Dyasonsklip SEF 1	Farm Dyasonsklip 454	Authorised
16	AEP Bloemsmond Solar 1	Portion 5 and 14 of Bloemsmond 455	Authorised
17	AEP Bloemsmond Solar 2	Portion 5 and 14 of Bloemsmond 455	Authorised
18	Bloemsmond 3	Portion 5 and 14 of Bloemsmond 455	EIA in Process
19	Bloemsmond 4	Portion 5 and 14 of Bloemsmond 455	EIA in Process
20	Bloemsmond 5	Portion 5 and 14 of Bloemsmond 455	EIA in Process

Cape EAPrac does not have details on the exact configuration of these facilities, however, based on the assumption that each facility along with its associated infrastructure on average will result in the transformation of approximately 230ha, one can assume the following transformation of the two vegetation types associated with the greater area.

Table 42: Potential habitat transformation proximity to Bloemsmond Grid Connection Infrastructure.

Status	Transformation Area in Hectares
In operation	230
Under construction	675
Authorised	2530
EIA in Progress	1150

It is impossible to foresee how many of these projects will reach preferred bidder status in terms of the REIPPPP and will eventually be constructed. As a worst-case scenario one can assume a total transformation of 4585 hectares.

Potential cumulative impacts identified for the project include various negative impacts such as loss of habitat, visual massing, loss of agricultural land an influx jobseekers and change in the area's sense of place, but also include positive cumulative impacts on the economy, business development, and employment.

From an ecological perspective, cumulative impacts associated with the development are a concern. However, the loss of the habitat within the preferred alternative is not considered highly significant, given the context surrounding the site. As a result, the overall cumulative impact of the development is considered likely to be medium.

In terms of habitat loss, the affected vegetation type is still approximately 96% intact and is an extensive vegetation type, the cumulative loss of 4585ha of habitat is not considered highly significant, especially given the spatial context of the site within a REDZ.

From a social perspective the project is deemed to have a medium positive cumulative impact from employment, skills and business opportunities and skills development and a low negative cumulative impact from large-scale in-migration of people

From a visual perspective, the cumulative visual risk to scenic resources was rated medium negative. Retaining the vegetation around the proposed PV areas will retain the surrounding agricultural sense of place, and further localise the combined zone of visual influence. With successful rehabilitation of the area back to an agricultural land use on closure, the cumulative visual risk could be reduced to negligible in the long term.

6.13 IMPACT SUMMARY

The table below summarises the significance (with mitigation) of all impacts assessed in the sections above[36].

For ease of easy references, impacts are visually reflected using the following colour scheme[37].

All positive impacts (regardless of their significance)

Neutral or Negligible negative impacts

Very Low and Low negative impacts

Medium negative impacts

Medium – High, High and Very High negative impacts

Table 43: Summary of the significance of impacts associated with the Bloemsmond Grid Connection Infrastructure[38].

Impact	Significance (with mitigation)
Social Impacts during the construction Phase	
Creation of employment and business opportunities	Medium positive
Presence of construction workers and potential impacts on family structures and social networks.	Low negative
Influx of job seekers.	Low negative
Safety risk, stock theft and damage to farm infrastructure associated with presence of construction workers.	Low negative
Increased risk of veld fires	Low negative
Impact of heavy vehicles and construction activities.	Low negative
Loss of farmland.	Low negative
Social Impacts during the operational phase	
Promotion of renewable energy projects	High positive
Creation of employment and business opportunities	Medium positive
Establishment of Community Trust	High positive
Generate income for affected landowner/s	Medium positive
Visual impact and impact on sense of place	Low negative
Impact on tourism	Low positive and negative
Visual Impacts during construction and operation phase	
Change of local and surrounds visual resources due to the construction and operation of the proposed 35m high monopole structures	Low negative
Palaeontological Impacts	
Impact on potential palaeontological resources	Low negative
Agricultural Impacts	
Soil pollution with contaminants during the construction.	Low negative
Loss of Agricultural land	Low negative
Reduction in land capability	Low negative
Alteration of drainage patterns and erosion	Low negative
Soil pollution with contaminants during the operational phase may take place, including spillages of hydrocarbon (fuel oil) and cement. This is possible during the maintenance of the facility.	Low negative
Decrease in availability of soil for agriculture,	Low negative
Clearing of vegetation increases flow speed and a lower infiltration tempo increases silt transport (Cumulative)	Medium negative
Chemicals, hazardous substances and waste used or generated	Medium negative

[36] To attain these outcomes, the mitigation measures reflected in section 7 of the report need to be implemented.

[37] Where specialist ratings fall across 2 of the groups, the worst case is reflected in the quick reference.

[38] This includes cumulative impacts associated with the facility

Impact	Significance (with mitigation)
Freshwater Ecology Impacts	
Disturbance to riparian habitat	Negligable negative
Disturbance to watercourse bed and banks	Negligable negative
Sedimentation of downstream watercourses	Negligable negative
Water quality impacts downstream	Negligable negative
Alien plant introduction	Negligable negative
Alien Vegetation Management	Negligable negative
Solar Panel Washing	Negligable negative
Spills and Waste Management	Negligable negative
Terrestrial Fauna Impacts	
Direct loss of flora species of conservation concern and flora species endemic to the region	Medium negative
Stochastic events such as fire	Low/Medium negative
Staff or construction workers poaching and hunting	Low negative
Collisions with vehicles	Low/Medium negative
Intentional killing of fauna	Lownegative
Loss of species of conservation concern	Medium negative
Vegetation clearing/ construction preparation	Low/Medium negative
Access roads and construction works	Low/Medium negative
Vehicles and machinery	Medium negative
Soil disturbance	Low/Medium negative
Vegetation clearing	Low/Medium negative
Roads and hardened surfaces	Low/Medium negative

As can be seen from the table above, there are several positive impact associated with Bloemsmond Grid Infrastructure. Most of the negative impacts are either low or negligible, with a few Low – Medium and Medium Impacts. There are no high or very high impacts associated with The Bloemsmond Grid Connection Infrastructure.

6.14 IMPACT STATEMENT

None of the participating specialists identified any impacts that remain high after mitigation. Because of the risk adverse approach followed for the development of the preferred corrdiors and the fact that although grid connection infrastructure will straddle sensitive features, no structures will be placed within the sensitive features.

From an ecological perspective the preferred grid connection infrastructure corridors will not result in major fragmentation of the landscape. The affected area is considered suitable for development and there are no impacts associated with Bloemsmond Grid Connection Infrastructure that cannot be mitigated to a medium level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, the Bloemsmond Grid Infrastructure can be supported from an ecology, visual, social, heritage and agricultural point of view.

A map showing the proposed activity in relation to the key sensitive features is in attached in **Appendix D**. All sensitive features along with their appropriate buffers are shown in this plan. As required by the EMPr, all areas outside of the proposed development footprint are to be demarcated as no go areas.

Please refer to the table in the section above listing the key impacts and their significance post mitigation for the preferred alternative. This section must be read in conjunction with the suggested mitigation measures listed in section 7 of this Report.

The table below shows the listed activities applied for with a reference of where the impacts associated with the specific activity are assessed by specialists.

Table 44: Specialist Impact Assessment of Listed Activities.

Listed activity as described in GN R.983, 984 and 985	Reference to Impact Assessment
Regulation 983 – Basic Assessment	
GN R983 Activity 11: *The development of facilities or infrastructure for the transmission and distribution of electricity-* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.*	Annexures E1, E2, E3, E4, E5, E7, E8, E12, E13 & E14.
GN R983 Activity 12: The development of- (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	Annexures E1, E8, E11 & E13
GN R983 Activity 19: *The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic* *(i) a watercourse;*	Annexures E1, E8, E11 & E13

7. MITIGATION MEASURES

Please refer to the table below, which summarises the mitigation measures recommended by both the Specialists and Cape EAPrac. This table summarises the mitigations, and details whether they should be included as conditions of approval, or whether they have been included as actions in the EMPr. In instances where suggested mitigations have already been incorporated into the design phase, they have been reflected as such.

Table 45: Mitigation measures required for the construction, operation and decommissioning of the Bloemsmond Grid Connection Infrastructure.

Mitigation	Condition of Approval	Included in EMPr
Agriculture		
Implementation of proper erosion control, and drainage on the access road and maintenance tracks underneath the powerline		✓
Dust control on the access road during construction.		✓
A designated area for refuelling must be constructed with an impervious floor and low wall that will keep the spillage inside. Any spillage must be cleaned with absorbent material as soon as possible and disposed into clearly marked containers. Where spillage takes place, contaminated soil must be excavated and replaced with unpolluted soil. The contaminated soil should be collected by a licenced landfill contractor.		✓
Ensure that most infrastructure features are erected on transformed or non-arable land. Implement stormwater management as an integral part of planning and as a guideline for the positioning of structures. Use existing roads and conservation structures to the maximum in the planning and operation phases. Rehabilitate disturbed areas as soon as possible after construction.	Already mitigated with the design of the preferred layout.	
Erosion and sediment control with proper water run-off control planning.		✓
Appropriate handling and storage of chemicals and hazardous substances and waste should be done.		✓
When spillage accidently takes place, it should be removed and replaced with unpolluted soil. The clean soil can be sourced from excavations nearby. The polluted soil must be piled at a temporary storage facility with a firm waterproof base and is protected from inflow of storm water. It must have an effective drainage system to a waterproof spillage collection area. Contaminated soil must be disposed of at a hazardous waste storage facility.		✓
Clear trees and bushes selectively, leaving grass un-disturbed. Use mechanised machinery when installing posts to eliminate need for foundations. Construct on alternate strips to combat possible erosion.		✓
Establish structures on the contour. Use grass strips to regulate flow speed		✓
Terrestrial Fauna asnd Avifauna		
All vehicle speeds associated with the project should be monitored and should be limited to 40 km/h (maximum) during the construction and operation phases;		✓
Speed humps need to be placed at pre-determined locations to force project vehicles to reduce speed;		✓
Road mortalities should be monitored by both vehicle operators (for personal incidents only) and the ECO (all road and fence kill on periodic monitoring basis as well as specific incidents) with trends being monitored and subject to review as part of the monthly reporting. Monitoring should occur via a logbook system where staff takes note of the date, time and location of the sighting/ incident. This will allow determination of the locations where the greatest likelihood exists of causing a road mortality and mitigate against it through both the embedded measures mentioned above (reducing vehicle speeds in sensitive areas) and below (e.g. fauna underpasses, fence removals and seasonal speed reductions). Finally, mitigation should be adaptable to the on-site situation which may vary over time;		✓
Reduce direct mortalities by allowing for fauna to cross the roads, particularly where the roads cross a sensitive natural habitat (e.g. wetlands or artificial water points). This can be achieved by constructing fauna underpasses under the roads (large culverts or large open-ended concrete pipes laid into the raised roads). These underpasses should be used in conjunction with "fauna barriers" which prevent the most susceptible small fauna from crossing the roads on the surface by directing them towards the underpasses where they can cross under the roads safely. It is important to note that utilization of underpasses is strongly dependent on animal body size (larger culverts are more successful) and the surrounding habitat (Mata et. al 2005);		✓
All staff operating motor vehicles must undergo an environmental induction training courses that includes instruction on the need to comply with speed limits, to respect all forms of wildlife (especially reptiles and amphibians) and, wherever possible, prevent accidental road kills of fauna. Dead mammals should never be handled due to the risk of rabies and snakes should only be handled after inductions have taken place due to the risks of post-mortem envenomation. Drivers not complying with speed limits should be subject to penalties		✓

Should large holes or burrows be located at the sites, and where avoidance of these areas is not possible, a zoological specialist should be contacted to investigate and possibly remove any species located within them.		✓
Equipment with low noise emissions must be used or silencers should be fitted on all engines;		✓
A dust monitoring system should be implemented during the construction and operational phase;	✓	
Reduce exterior lighting to that necessary for safe operation, and implement operational strategies to reduce spill light. Use down-lighting from non-UV lights where possible, as light emitted at one wavelength has a low level of attraction to insects. This will reduce the likelihood of attracting insects and their predators at night;		✓
Keep noise levels suppressed as per the local municipality or national standards. Do not unnecessarily disturb faunal species, especially during the breeding season and those with juveniles;		✓
All staff should be subjected to an induction training program where appropriate conservation principles, safety procedures, snake bite avoidance and first aid treatment are taught. Several staff members should complete a snake handling course in order to safely remove snakes from construction areas.		✓
Disturbance of surrounding natural areas should be avoided and the spread of alien flora into natural areas should be controlled.		✓
Continuous monitoring of the growth and spread of alien flora coupled with an adaptive management approach to identify suitable control mechanisms. No chemical control should take place in close proximity of watercourses unless authorised by the competent authority		✓
An Alien and Invasive species eradication action plan should be compiled, in order to ensure that the spread and establishment of Alien and Invasive species are controlled and that disturbances are minimal and mitigated where necessary.		✓
Vegetation clearing should be done for as short a time as possible. Erosion control methods during the construction phase should be implemented to limit erosion where applicable.		✓
Revegetation in natural areas after clearance should commence directly where natural areas have been disturbed unnecessarily;		✓
Heavy vehicles should preferably not operate in the wet season as gravel roads can be disturbed and lead to erosion if not managed.		✓
All drainage lines, depressions, inselbergs and ridges and quartz plains (as defined in this document) are regarded as sensitive habitat units. Therefore, these areas should be buffered accordingly where no construction personnel or vehicles may enter such areas. Those areas surrounding the laydown sites that are not part of the proposed corridor/servitude should be considered as “no-go” areas for employees, machinery or even visitors;	✓	
Loss of any ridge habitat should be avoided where possible since they are often utilised by foraging bustards and act as suitable habitat for flora species of conservation concern. These should be indicated to the contractor by the Environmental Control Officer and an EMPr must be developed in order to monitor regional Cumulative Impacts;	✓	
Prior to construction, ECO or appointed specialist must screen the alignment for any nesting birds of prey (with reference to nest-building activities, incubating and brooding individuals) prior to the construction phase. If active nests are identified or nest-building activities are noticed, the particular pylon should be barricaded and construction should cease in the nearby vicinity until the fledglings have left the nest. Under no circumstances should an inactive nest be removed or destroyed during the construction phase;	✓	
If breeding Ludwig’s Bustards are encountered at the substation or pylon positions, construction activities should cease within these areas until the nestlings have successfully fledged and left the area.	✓	
It is strongly advised that the alignment be monitored bimonthly for at least two years after commencement of the operational phase to quantify the mortality of Ludwig’s Bustards involved in collisions (counting of carcasses or signs of carcasses). The data should be made available to the infrastructure mortality incident register of the EWT. If after the first year no significant incidents have taken place, the monitoring frequency can be readjusted	✓	
All labour or staff should be advised (induction) by means of environmental awareness training on the ecological and conservation importance of the avifaunal community in the area	✓	
All self-supporting pylons should be fitted with *metal* (not rubber) *bird guards* [39].	✓	

[39] The Avifaunal specialist reccomended the use of cross rope suspension towers as the preferred supporting structures. This is not technically achievable, as these structures can only be considered for transmission infrastructure and not distribution infrastructure as is applicable to the Bloemsmond Grid Connection Infrastructure.

Diverters should make use of the largest available spirals, preferably using the model with a diameter range of at least 300 mm and at least 1 m in length - Diverters should be performed PVC that are UV resistant in order to maximise time between maintenance or replacement; - Diverters should be applied to all earth wires in a staggered fashion, alternating between black and white diverters for maximum contrast and visibility; - Diverters should be fitted to the entire span as Ludwig's Bustards often perceive the - Diverters during their approach, while so they deviate their course only to collide with unmarked spans near their edges (see Shaw, 2013); - All diverters should be spaced at 10 m intervals from each other.		
Social		
Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.		✓
Before the construction phase commences the proponent should meet with representatives from the KGLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.		✓
Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria;		✓
The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.		✓
Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase		✓
The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.		✓
The KGLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.		✓
Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories;		✓
The proponent should consider the option of establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from local communities, local KGLM Councillor for Ward 8, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community associated with construction workers;		✓
The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation;		✓
The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;		✓
The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area;		✓
The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.		✓
Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks;		✓
The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days after their contract coming to an end;		✓
It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.	✓	
The proponent should implement a policy that no employment will be available at the gate.		✓

The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area;	✓	
The proponent must enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;		✓
Traffic and activities should be strictly contained within designated areas		✓
Strict traffic speed limits must be enforced on the farm		✓
All farm gates must be closed after passing through		✓
Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties		✓
The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below)		✓
The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested		✓
Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.		✓
Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation		✓
Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;		✓
Smoking on site should be confined to designated areas;		✓
Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle;		✓
Contractor to provide fire-fighting training to selected construction staff		✓
The movement of heavy vehicles associated with the construction phase should be timed to avoid times of the week, such as weekends, when the volume of traffic travelling along the N14 may be higher;	Already mitigated with the design of the preferred layout[40]	
Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.		✓
All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits		✓
An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;	✓	
All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase		✓
The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed		✓
The implementation of the Rehabilitation Programme should be monitored by the ECO		✓
Implement a skills development and training programme aimed at maximising the number of employment opportunities for local community members; Maximise opportunities for local content, procurement and community shareholding		✓
The KGLM should liaise with the proponents of other renewable energy projects in the area to investigate how best the Community Trusts can be established and managed so as to promote and support local, socio-economic development in the region as a whole.		✓
The KGLM should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the KGLM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager		✓

[40] Refer to Traffic Management Plan

Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community;		✓
Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the renewable energy facilities and their associated infrastructure.		✓
The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned.		✓
All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning		✓
Revenue generated from the sale of scrap metal during decommissioning should be allocated to funding closure and rehabilitation of disturbed areas.		✓
The Northern Cape Provincial Government, in consultation with the ZFMDM, KGLM and the proponents involved in the development of renewable energy projects in the GKLM, should consider establishing a Development Forum to co-ordinate and manage the development and operation of renewable energy projects in the area with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the KGLM and ZFMDM.		✓
Freshwater Ecology		
No infrastructure to be planned in any watercourse to avoid erosion as well as potential damage to infrastructure during surface flooding. Infrastructure may however straddle watercourses.	✓	
Buffer zones for pans and the pans themselves are no-go zones	Already mitigated with the design of the preferred layout	
Minimise alteration to existing drainage networks as far as possible, avoiding leveling or infilling as this will alter flow paths and cause erosion;		✓
Rainwater collection tanks should be installed on building roofs in order to reduce the risk of channeled flows from gutters.		✓
Consider the use of materials for parking areas that allow greater water infiltration rates such as gravel		✓
Should stormwater need to be discharged into a drainage line from any surface, methods of energy dissipation such as stilling basins should be employed to reduce flow velocities entering the watercourse		✓
Only slash or trim vegetation where it is necessary		✓
Clear vegetation outside of major bird breeding seasons		✓
Temporarily fence no-go and sensitive areas along their buffers with single-strand wire fencing, not danger tape. The aim is to exclude easy access by people and vehicles, but still allow the movement of fauna;		✓
Where vehicle access and work within a watercourse is unavoidable, such as the construction of a road crossing, then demarcate the access, parking and lay down areas using temporary fencing		✓
Where excessive damage has occurred to the watercourse bed, banks or riparian zone, this must be rehabilitated immediately under the guidance of an aquatic specialist.		✓
Limit disturbance to soil and vegetation as far as possible to reduce the risk of erosion.		✓
Establish sediment traps (e.g. silt fences or erosion berms) on areas prone to erosion. Although rainfall is an unlikely event, it must be planned for. Allowance must be made to clear sediment from the traps if erosion occurs during the construction period.		✓
If active erosion results in the formation of gullies, these areas must be infilled with topsoil and covered with hessian or a geotextile (e.g. hessian sheets or geotextiles) prior to revegetation.		✓
Where sedimentation downstream occurs as a direct result of construction activities this must be assessed and manual removal (using spades) under the supervision of a freshwater ecologist or environmental site officer may be recommended.		✓
Vehicle parking and refueling areas must be located > 50m from the edge of watercourses, and be clearly defined		✓
No refueling or vehicle maintenance should take place within 500 m of a watercourse.		✓

Any fuel storage areas must be bunded to prevent spills from spreading if they occur. Waste collection and removal must be arranged on a regular basis, and allowance must be made for conducting a litter clean-up for up to 100m downstream and upstream of the watercourses at the development site.		✓
A botanical specialist should be consulted prior to imports of foreign soil or fill material to the site to ensure they do not pose a risk and do not originate from areas with high levels of alien invasion.		✓
Alien plants must be continually removed from disturbed areas throughout the construction period. Any uncertainty about plant identification must be clarified with a botanical specialist		✓
When conducting inspections of any infrastructure on site, include a checklist of likely alien plants to check for throughout the site;		✓
Staff at the plant must be educated and made aware of alien vegetation that could be present and that must be eradicated;		✓
Depending on the species that establish, it is essential that recommended methods of control be employed, and adequate stores of herbicide/tools are kept on site for this purpose. Alternatively, a reputable contractor can be used for ongoing control of aliens		✓
Alien plant control requires ongoing control and commitment. Therefore, alien plant management must form an integral part of the plant's Environmental Management Plan.		✓
Retain natural vegetation intact as far as possible as this acts as a dust suppressant;		✓
Wash panels only when required to conserve water;		✓
Avoid the use of detergents, but if required select environmentally friendly options.		✓
If spills occur (e.g. oil or hydraulic fluid) there must be a procedure for the containment and management thereof;		✓
Any waste construction materials must be disposed of responsibly, such as at the local landfill site;		✓
Human waste should be stored in septic tanks kept well away from any watercourses;		✓
A reliable contractor must be appointed for the removal of refuse from the plant;		✓
General refuse must be contained in animal-proof bins.		✓
Visual		
Light spillage reduction management should be implemented		✓
Dust management during the lifetime of the project.		✓
The laydown area should be sited away from the N14 road as well as the viticulture areas, and preferably not located on portions of the site that have local prominence		✓
Dust management during the lifetime of the project.		✓
Adopt responsible construction practices aimed at containing the construction activities to specifically demarcated areas thereby limiting the removal of natural vegetation to the minimum.		✓
Limit access to the construction site to existing access roads.		✓
Rehabilitate all disturbed areas to acceptable visual standards as soon as possible after construction is complete in each area.		✓
Construction should not take place at night-time.		✓
Topsoil from the footprints of the pylon structures should be stockpiled for rehabilitation and restoration purposes.		✓
If very dry conditions prevail and dust becomes a nuisance, water should be sprayed on the road surface (or implement another suitable mitigation to reduce wind-blown dust).		✓
Strict litter control.		✓
Temporary roads should be well marked and should only cross drainage lines on areas identified as permanent road features where erosion and soil loss management can be contained.		✓
Signage on the N14 should be moderated		✓
All buildings should be painted a grey-brown colour.		✓
Fencing should be simple, diamond shaped (to catch wind-blown litter) and be transparent in appearance. The fences should be checked on a monthly basis for the collection of litter caught on the fence.		✓
Palaeontology		

Should any substantial fossil remains (*e.g.* mammalian bones and teeth) be encountered during construction, however, these should be safeguarded, preferably *in situ*, and reported by the ECO to SAHRA, *i.e.* The South African Heritage Resources Authority, as soon as possible (Contact details: SAHRA. 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Phone: +27 (0)21 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). This so that appropriate action can be taken by a professional palaeontologist, at the developer's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (*e.g.* stratigraphy, sedimentology, taphonomy) by a professional palaeontologist.	✓	
A Chance Fossil Finds Procedure must form part of the EMPr		✓
Botanical		
Undertake preconstruction walk-through of the grid corridors to locate species of conservation concern that can be translocated (such as aloes) as well as comply with the Northern Cape Nature Conservation Act and DENC/DAFF permit conditions.		✓
Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained.		✓
Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.		✓
Environmental Control Officer (ECO) to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near high density Acacia erioloba.		✓
Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.		✓
All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.		✓
Archaeology		
Archaeological resources identified for protection must be permanently fenced		✓
If excavations and earthmoving activities expose significant archaeological or heritage resources, such activities must stop and SAHRA must be notified immediately.		✓
If exposed during development, archaeological resources must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer.	✓	
In the event of exposing human remains during construction, the matter will fall into the domain of the South African Heritage Resources Agency and will require a professional archaeologist to undertake mitigation if needed. Such work will also be at the expense of the developer	✓	

8. PUBLIC PARTICIPATION PROCESS

Section 41 in Chapter 6 of regulation 982 details the public participation process that must take place as part of an environmental process. The table below provides a quick reference to show how this environmental process has or intends to comply with these legislated requirements relating to public participation.

Please refer to **Appendix F**, where all evidence of public participation is included.

Table 46: Public participation requirements in terms of S41 of R982

Regulated Requirement	Description
(1) If the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land. (2) Subregulation (1) does not apply in respect of-. (a) linear activities;	The proposed grid connection infrastructure is deemed to constitute a linear activity and as such not required to obtain landowner consent. Land owners along the powerline corridor were interviewed by the social specialist and where also given an opportunity to comment on the Draft BAR.

Regulated Requirement	Description
The person conducting a public participation process must consider any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by -	
(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of - (i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) any alternative site;	A site notice was placed at four positions along the N14. Photographic evidence of these notices is attached in **Annexure F3**.
(b) giving written notice, in any of the manners provided for in section 47D of the Act, to -	
(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	There are no tenants on the affected portions, other than the respective landowners (who have been notified)
(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	Owners of adjacent properties have been notified of this environmental process. Such owners have been requested to inform the occupiers of the land of this environmental process. Please refer to **Annexure F4** for copies of these notifications
(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;	The ward councillor has been notified of this environmental process. Please refer to **Annexure F4** for copies of these notifications
(iv) the municipality which has jurisdiction in the area;	The Kai !Garib municipality (Planning and Technical Services) have been notified of this environmental process. Please refer to **Annexure F4** for copies of these notifications.
(v) any organ of state having jurisdiction in respect of any aspect of the activity; and	Please refer to section **Annexure F1** showing the list of organs of state that were notified as part of this environmental process. Please refer to **Annexure F4** for copies of these notifications.
(vi) any other party as required by the competent authority;	DEFF were given an opportunity to comment on the Draft BAR and EMPr.
(c) placing an advertisement in - (i) one local newspaper; or (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;	An advert calling for registration of I&APs was placed in Die Gemsbok local newspaper. Please refer to **Annexure F3** for a copy of this advertisement. There is currently no official Gazette that has been published specifically for providing public notice of applications
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);and	Adverts were not placed in provincial or national newspapers, as the potential impacts will not extend beyond the borders of the municipal area.
(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to -	Notifications have included provision for alternative engagement in the event of illiteracy, disability or any other disadvantage. In such instances, Cape EAPrac will engage

Regulated Requirement	Description
(i) illiteracy; (ii) disability; or (iii) any other disadvantage.	with such individuals in such a manner as agreed on with the competent authority.
(3) A notice, notice board or advertisement referred to in subregulation (2) must - (a) give details of the application or proposed application which is subjected to public participation; and (b) state - (i) whether basic assessment or S&EIR procedures are being applied to the application; (ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.	Please refer to **Annexure F3**.
(4) A notice board referred to in subregulation (2) must - (a) be of a size at least 60cm by 42cm; and (b) display the required information in lettering and in a format as may be determined by the competent authority.	Please refer to **Annexure F3**.
(5) Where public participation is conducted in terms of this regulation for an application or proposed application, subregulation (2)(a), (b), (c) and (d) need not be complied with again during the additional public participation process contemplated in regulations 19(1)(b) or 23(1)(b) or the public participation process contemplated in regulation 21(2)(d), on condition that - (a) such process has been preceded by a public participation process which included compliance with subregulation (2)(a), (b), (c) and (d); and (b) written notice is given to registered interested and affected parties regarding where the - (i) revised basic assessment report or, EMPr or closure plan, as contemplated in regulation 19(1)(b); (ii) revised environmental impact report or EMPr as contemplated in regulation 23(1)(b); or (iii) environmental impact report and EMPr as contemplated in regulation 21(2)(d); may be obtained, the manner in which and the person to whom representations on these reports or plans may be made and the date on which such representations are due.	This will be complied with if final reports are produced later in the environmental process.
(6) When complying with this regulation, the person conducting the public participation process must ensure that -	All reports that are submitted to the competent authority will be subject to a public participation process. These include: - Draft BAR - Draft EMPr

Regulated Requirement	Description
(a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and (b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application. (7) Where an environmental authorisation is required in terms of these Regulations and an authorisation, permit or licence is required in terms of a specific environmental management Act, the public participation process contemplated in this Chapter may be combined with any public participation processes prescribed in terms of a specific environmental management Act, on condition that all relevant authorities agree to such combination of processes.	- All specialist reports that form part of this environmental process.

8.1 REGISTRATION OF KEY STAKEHOLDERS

Several key stakeholders were automatically registered and were given an opportunity to comment on the Draft BAR. Copies and proof of these notifications are included in **Annexure F4**. A list of key stakeholders registered for this process included in the table below.

Table 47: Key Stakeholders automatically registered as part of the Environmental Process

Stakeholders Registered		
Neighbouring property owners	Department of Environmental Affairs and Nature Conservation	Department of Water and Sanitation
All parties registered as having prospecting rights on the farm	Kai !Garib Municipality: Municipal Manager	Department of Science and Technology
Kai !Garib: Ward 8 Councillor	South African National Roads Agency Limited	The Council for Scientific and Industrial Research
South African Heritage Resources Agency	Department of Transport and Public Works	The South African Square Kilometre Array
Northern Cape Heritage Resources Authority	Department of Health	The South African Civil Aviation Authority
Department of Agriculture, Forestry and Fisheries	Department of Minerals and Energy	Affected Land Owner
Provincial Department of Agriculture	Eskom	Department of Communications
Endangered Wildlife Trust.	Department of Mineral Resources	SENTECH
Department of Environmental Affairs, Biodiversity Directorate.	Birdlife Africa.	

9. CONCLUSION AND RECOMMENDATIONS

This environmental process is currently being undertaken to present proposals to the public and potential I&APs and to identify and assess environmental impacts, issues and concerns raised because of the proposed Bloemsmond Grid Connection Infrastructure and alternatives.

Cape EAPrac is of the opinion that the information contained in this BAR and the documentation attached hereto is sufficient to allow the I&APs to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. This environmental process has not identified any fatal flaws with the proposal and as such it is our reasoned view that the project should be conditionally authorised. All specialists concur that the development as

proposed (eastern grid connection corridor alternatives s from the eastern on-site substations to the Bloemsmond Collector Substation and the northern grid connection corridor (Alternative A) from the Bloemsmond Collector Substation to the Upington MTS) can be considered for approval and that there are no reason(s) why the development should not be implemented. All impacts range from high positive to medium negative and all high and medium - high negative impacts have been avoided by the risk adverse approach to the development of this grid connection infrastructure.

All stakeholders were requested to review the Draft BAR and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 30-day comment period. All comments received during this comment period will be included in the Final BAR to be submitted to DEFF for decision making.

It is Cape EAPrac's reasoned opinion that the following alternatives be considered for approval: the eastern on-site substation alternatives, the eastern grid connection corridor alternatives from the eastern on-site substations to the Bloemsmond Collector Substation, and the northern grid connection corridor (Alternative A) from the Bloemsmond Collector Substation to the Upington MTS.

REMAINDER OF ENVIRONMENTAL PROCESS

The following process is to be followed for the remainder of the environmental process:

- This Draft BAR to be provided to all registered and potential I&APs for review and comment;
- The Final BAR to be submitted to the DEFF for consideration and decision-making; and
- The DEFF's decision (Environmental Authorisation) and the appeal process on the Final BAR will be communicated with all registered I&APs.

10. ABBREVIATIONS

AIA	Archaeological Impact Assessment
BGIS LUDS	Biodiversity Geographic Information System Land Use Decision Support
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
CEMPr	Construction Environmental Management Programme
DEFF	Department of Environment, Forestry and Fisheries
DEA&NC	Department of Environmental Affairs and Nature Conservation
DME	Department of Minerals and Energy
DSR	Draft Scoping Report
EAP	Environmental Impact Practitioner
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt

NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PM	Post Meridiem; “Afternoon”
PSDF	Provincial Spatial Development Framework
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
S.A.	South Africa
SACAA / CAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
TOPS	Threatened and Protected Species

11. REFERENCES

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[41] This reference list excludes specialist studies that form part of this environmental process and which are contained in Annexure E1 – E12

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