

Grid connection infrastructure for the Aggeneys 2 solar PV facility

Northern Cape Province

Basic Assessment Report

June 2019

DEA Reference No.: 14/12/16/3/3/1/2024

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PROJECT DETAILS

DEA Reference No.	: <u>14/12/16/3/3/1/2024</u>
Title	: <u>Final</u> Basic Assessment Report for the Grid connection infrastructure for the Aggeneys 2 solar PV facility, Northern Cape Province
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Report Revision	: Revision 0
Date	: <u>June</u> 2019

When used as a reference this report should be cited as: Savannah Environmental (2019) Final Environmental Basic Assessment Report for the Grid Connection Infrastructure for the Aggeneys 2 solar PV facility, Northern Cape Province.

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PURPOSE OF THE BASIC ASSESSMENT REPORT

ABO Wind Aggeneys 2 PV (Pty) Ltd, a Special Purpose Vehicle (SPV), proposes the construction and operation of a grid connection solution for the proposed Aggeneys 2 solar PV facility, in the Northern Cape. The Bloemhoek 1 Grid Connection Solution (hereafter referred to as Bloemhoek 1) will include the development of a collector substation and a single-circuit power line (up to 220kV in capacity) to connect the Aggeneys 2 solar PV facility¹ to the national grid. Other associated infrastructure includes access tracks/roads which will primarily be used to provide access to the power line and collector substation area. Two alternative corridors of up to 1km in width and up to 17km in length (known as the project development corridor) are being assessed to allow for the optimisation of the grid connection solution infrastructure to accommodate the environmental sensitivities identified within the corridor.

ABO Wind Aggeneys 2 PV (Pty) Ltd has appointed Savannah Environmental as an independent environmental consultant to undertake Basic Assessment Process for the proposed grid connection infrastructure for the Aggeneys 2 solar PV facility. The BA process is being undertaken in accordance with the requirements of the EIA Regulations of December 2014 (GNR 326), as amended on 07 May 2017, promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This final Basic Assessment Report aims to:

- » Identify and evaluate potential environmental (biophysical and social) impacts and benefits of the proposed development (including design, construction, operation and decommissioning) within the broader study area through a desktop review of existing baseline data and specialist studies.
- » Identify potentially sensitive environmental features and areas on the site.
- » Define the scope of studies to be undertaken within the Basic Assessment process.
- » Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the Basic Assessment process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the Basic Assessment Phase of the process.

Within this context, the objectives of this Basic Assessment process are to, through a consultative process:

- » Identify the relevant policies and legislation relevant to the project;
- » Motivate the need and desirability of the proposed project, including the need and desirability of the activity in the context of the preferred location;
- » Identify and confirm the preferred activity and technology alternative;
- » Identify and confirm the preferred site;
- » Identify the key issues to be addressed in the Basic Assessment Process;
- » 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.

¹ This project comprises the development of a 100MW PV facility and is the subject of a separate Basic Assessment process.

LEGAL REQUIREMENTS IN TERMS OF THE EIA REGULATIONS

An overview of the contents of the final Basic Assessment Report, as prescribed by Appendix 1 of the 2014 EIA Regulations (GNR 326) as amended; and where the corresponding information can be found within the report is provided in **Table 1**.

Table 1: Legal requirements in terms of the EIA regulations

EIA REGULATIONS 2014 (as amended) GNR 326: Appendix 1 CONTENT OF THE BASIC ASSESSMENT REPORTS		Cross-reference in this Basic Assessment Report
<i>A Basic Assessment Report must contain all the information that is necessary for the competent authority to consider and come to a decision on the application, and must include-</i>		
(a)	Details of – (i) The EAP who prepared the report. (ii) The expertise of the EAP, including a curriculum vitae.	Section 1.2 Appendix A
(b)	The location of the activity, including – (i) The 21 digit Surveyor General code of each cadastral land parcel. (ii) Where available, the physical address and farm name. (iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	Chapter 2 Section 2.1
(c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities are to be undertaken. (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Chapter 2 Section 2.2
(d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered. (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Chapter 6 Section 6.1
(e)	A description of the policy and legislative context within which the development is proposed including- (i) 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 (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools, frameworks and instruments.	Chapter 4 Section 4.1 – 4.3
(f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Chapter 3 Section 3.1 – 3.4
(g)	A motivation for the preferred site, activity and technology alternative.	
(h)	A full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including –	
	(i) Details of all the alternatives considered.	
	(ii) Details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	Chapter 6 Section 6.3 – 6.6
	(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	Chapter 6 Section 6.3 Appendix C6

EIA REGULATIONS 2014 (as amended) GNR 326: Appendix 1 CONTENT OF THE BASIC ASSESSMENT REPORTS		Cross-reference in this Basic Assessment Report
(iv)	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Chapter 7 Section 7.1 – 7.7
(v)	The impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts – (aa) Can be reversed. (bb) May cause irreplaceable loss of resources. (cc) Can be avoided, managed or mitigated.	Chapter 8
(vi)	The methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.	Chapter 8
(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Chapter 8 Section 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, and 8.9
(viii)	The possible mitigation measures that could be applied and level of residual risk.	Chapter 8 Section 8.3, 8.4, 8.5, 8.6, 8.7, 8.8 and 8.9
(ix)	The outcome of the site selection matrix.	Chapter 5 Section 5.3
(x)	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.	Chapter 5 Section 5.3
(xi)	A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Chapter 10 Section 10.6 – 10.7
(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- (i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) 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.	Chapter 8
(j)	An assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	Chapter 9 Section 9.1
(k)	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 of to these Regulations	Appendix K

<p align="center">EIA REGULATIONS 2014 (as amended) GNR 326: Appendix 1 CONTENT OF THE BASIC ASSESSMENT REPORTS</p>	<p align="center">Cross-reference in this Basic Assessment Report</p>
<p>and an indication as to how these findings and recommendations have been included in this Report;</p>	
<p>(l) An environmental impact statement which contains-</p> <ul style="list-style-type: none"> (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale of which superimposes the proposed activity and its associated structures and infrastructures on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative and risks of the proposed activity and identified alternatives. 	<p>Chapter 10 Section 10.6 – 10.7</p>
<p>(m) Based on the assessment and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr</p>	<p>Appendix D – J</p>
<p>(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.</p>	<p>N/A</p>
<p>(o) A description of any assumptions, uncertainties, and gaps of knowledge which relate to the assessment and mitigation measures proposed.</p>	<p>Chapter 6 Section 6.5</p>
<p>(p) A reasoned opinion as to whether the proposed activity should or should not be authorised, and if it the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.</p>	<p>Chapter 10 Section 10.7</p>
<p>(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.</p>	<p>Appendix K</p>
<p>(r) An undertaking under oath or affirmation by the EAP in relation to-</p> <ul style="list-style-type: none"> (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) 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. 	<p>Appendix M</p>
<p>(s) Where applicable, details of the financial provision for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts.</p>	<p>N/A</p>
<p>(t) Any specific information that may be required by the Competent Authority.</p>	<p>N/A</p>
<p>(u) Any other matters required in terms of section 24(4)(a) and (b) of the Act.</p>	<p>N/A</p>
<p>2. Where a government notice gazetted by the Minister Provides for any protocol or minimum information requirement to be applied to a scoping report, the requirements as indicated in such notice will apply.</p>	<p>N/A</p>

INVITATION TO COMMENT ON THE DRAFT BASIC ASSESSMENT REPORT

The BA Report was available for review from **2 May 2019 to 3 June 2019** at the following locations:

- » Aggeneys Public Library, Havelock Street (next to OK Furniture), Aggeneys
- » www.savannahSA.com

This final BA Report includes all comments received, as well as responses to those comments (refer to **Appendix C8**). Where applicable, this final BA Report has been amended to address these comments. All amendments and/or additions to this Report have been underlined for ease of reference.

EXECUTIVE SUMMARY

Background

ABO Wind Aggeneys 2 PV (Pty) Ltd proposes the construction and operation of a grid connection solution for the proposed Aggeneys 2 solar PV facility, in the Northern Cape Province. The grid connection infrastructure will include the development of a collector substation and a single-circuit power line (up to 220kV in capacity) to connect the Aggeneys 2 solar PV facility to the national grid. Other associated infrastructure includes tracks/access roads which will primarily be used to provide access to the power line and collector substation area.

Two (2) alternative corridors (**Figure 0.1**) of up to 1km in width and up to 17km in length (known as the project development corridors) are being assessed to allow for the optimisation of the grid connection infrastructure to accommodate the environmental sensitivities identified within the corridors.

The grid connection infrastructure will comprise of the following key infrastructure and components:

- » A new Collector Substation/ Switching Station:
 - * Construction of a new platform with earth mat and civil works.
 - * New 132kV or 220kV feeder bay/s and busbar/s complete with protection equipment.
- » A new single circuit 132kV or 220kV OHL between the existing Aggeneys MTS and a new Collector Substation associated with the Aggeneys 2 solar PV facility, complete with structures, foundations, conductor, fibre layout, insulation and assemblies.
- » Access tracks/roads up to 6m in width, where required.
- » Works within the existing Aggeneys MTS HV yard:
 - * Establish new 132 or 220kV feeder bay/s within the existing HV yard at the Aggeneys Main Transmission Substation

(MTS) (inclusive of line bays, busbars, bussection and protection equipment).

Potential impacts associated with the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility are expected to occur during the construction, operation and decommissioning phases. The conclusion of the findings of the independent specialist studies is that the potential impacts associated with the proposed development are anticipated to be at a site or localised level, with few impacts extending from local to regional, which include both negative and positive impacts. The following provides a summary of the findings of the specialist studies undertaken:

- » *Ecology:*

From the findings of the Ecological Impact Assessment (**Appendix D**), it can be concluded that no impacts of high ecological significance were identified which could hinder the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility. The proposed development is considered to be appropriate and acceptable from an ecological perspective and will not result in detrimental impacts to ecosystems and habitat features present within the development corridors, and within the surrounding area.
- » *Avifauna:*

From the results of the avifauna assessment, it can be concluded that the development corridors are considered to represent a broadly suitable environment for the location of the proposed grid connection infrastructure. Considering that the study area supports a typical bioregional avifaunal assemblage within an extensive vegetation type, and that there are no known breeding or roosting sites of red-listed priority species within the immediate vicinity, there are no impacts associated with the development that are considered to be of high residual significance and which cannot be mitigated to a low

acceptable level. From the results of the avifauna impact assessment, it can be concluded that no fatal-flaws will be associated with the development of the grid connection infrastructure. Therefore the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility is considered to be acceptable from an avifaunal perspective.

» *Freshwater features:*

From the findings, it can be concluded that the development of the grid connection infrastructure will have an overall negative impact of low significance with the implementation of the recommended mitigation measures. The construction of the grid connection infrastructure for the Aggeneys 2 solar PV facility is therefore supported from a freshwater features perspective and considered acceptable subject to obtaining of the necessary water use licence from the Department of Water and Sanitation.

» *Soil and Agricultural Potential:*

Two impacts have been identified to be associated with the development of the grid connection infrastructure from a soils perspective. These impacts include the loss of potentially productive agricultural land through the installation of the power line and construction of the collector substation and associated infrastructure; and increased wind erosion due to disturbance of the soil. Both impacts are expected to occur during the construction and operation phases. No fatal flaws have been identified from a soils and agricultural potential perspective and all impacts can be mitigated to be within low and acceptable levels of impact. Therefore, the development of the grid connection infrastructure is considered to be acceptable from a soils and agricultural perspective.

» *Heritage:*

The heritage impacts expected during the construction phase include impacts to

palaeontological resources, archaeological resources and graves and impacts to the cultural landscape. There are no heritage resources of significance present within the development corridors, although several isolated stone artefacts attributable to background scatter were noted. Impacts to heritage resources were identified to be associated with grid connection infrastructure for the construction phase. No impacts are expected to occur during the operation phase of the grid connection infrastructure.

The significance of the impacts ranges from medium to low, with the implementation of the recommended mitigation measures. No impacts of high significance are expected, and the development of the grid connection infrastructure is considered to be acceptable from a heritage perspective.

» *Visual:*

The impacts include a change in the character of a relatively natural area, a change in the character of the landscape as seen from the N14, the Loop 10 road and local homesteads, a change in the landscape as seen from local settlement areas. The significance of the impacts ranges between medium and low, with the implementation of the recommended mitigation measures. No impacts of a high significance are expected to occur.

The Visual Impact Assessment concluded that the development of the grid connection infrastructure will largely impact visually on an area where there currently is a strong influence of urban and urban fringe development and therefore changes to the landscape quality are unlikely to be problematic. In conclusion, the development of the grid connection infrastructure is considered to be acceptable from a landscape and visual impact perspective.

» *Social:*

The Social Impact Assessment (**Appendix J**) identified that most social impacts associated with the development of the grid connection infrastructure will have a short term duration associated with the construction phase and long-term duration during the operation phase of the project. Both positive and negative impacts have been identified for both the construction and operation phases of the grid connection infrastructure.

During the construction phase, negative impacts include nuisance, dust and noise impacts, an influx of construction workers and job seekers to the area, disruption of daily living patterns and disruption of services supplied and impacts on infrastructure. The significance of the negative construction phase impacts is low, with the implementation of recommended mitigation measures. The positive social impact associated with the construction of grid connection infrastructure includes positive economic impacts and the stimulation of the area's economy. The significance of the positive impacts will be medium with the implementation of the recommended enhancement measures.

Impacts associated with the operation of the grid connection infrastructure will be both positive and negative. The negative impacts are related to a transformation in the sense of place which has a significance of medium to high, with the implementation of the

recommended mitigation measures. The positive impacts associated with the operation of the grid connection infrastructure relates to the benefit associated with connecting the Aggeneys 2 solar PV facility to the national grid and balancing the national energy mix through enhancing the supply of renewable energy. The significance of the positive impacts will be high with the implementation of the recommended enhancement measures.

» *Cumulative Impact:*

Based on the specialist cumulative assessment and findings regarding the development of the grid connection infrastructure and its contribution to the overall impact of all grid connection infrastructure for solar PV facilities to be developed within a 30km radius, it can be concluded that there are no impacts or risks identified to be considered as unacceptable with the development of the grid connection infrastructure within the surrounding area. In addition, no impacts that will result in whole-scale change are expected.

No environmental fatal flaws or impacts of very high or high significance were identified to be associated with the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility on the identified project development corridors.

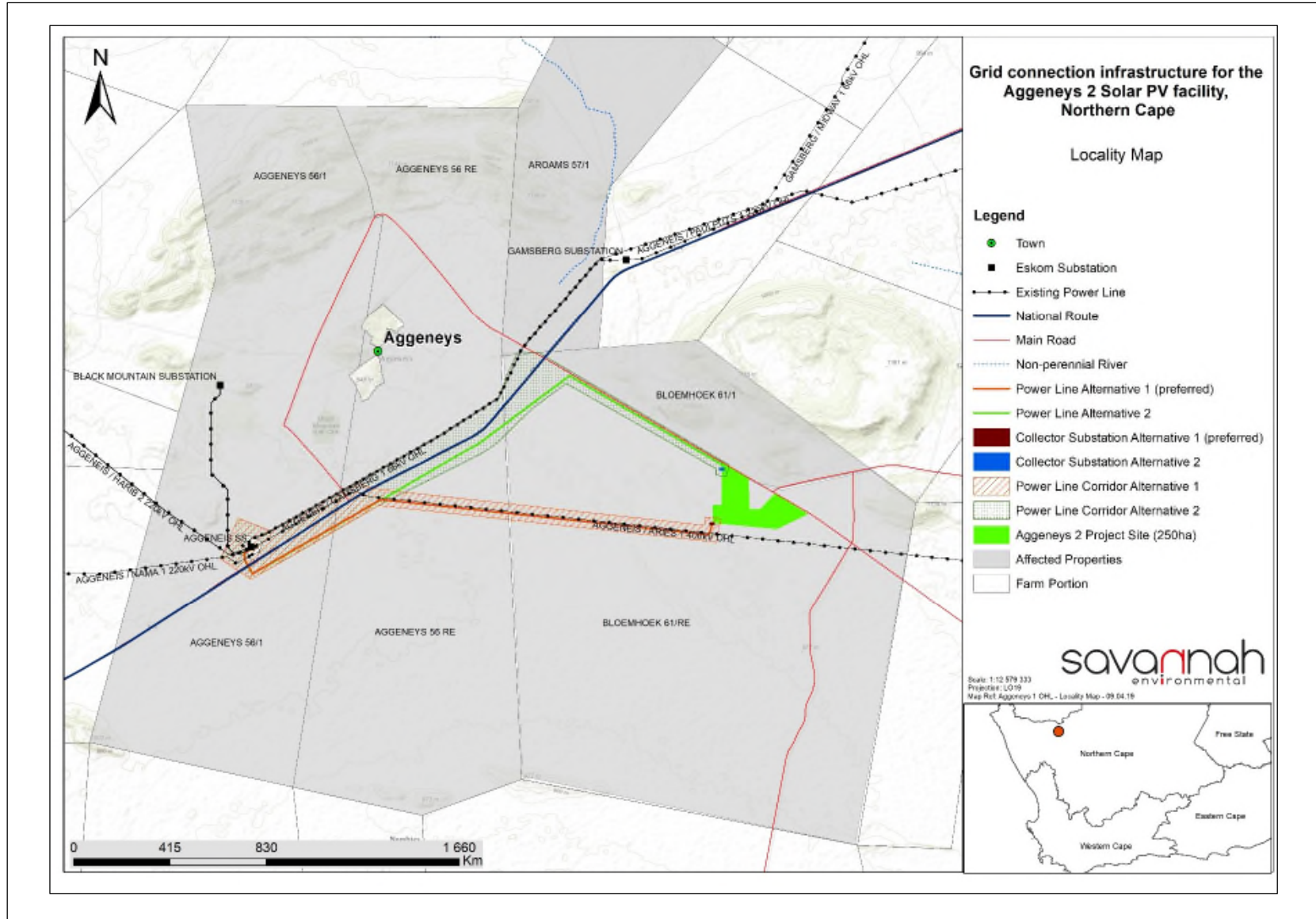


Figure 0.1: A locality map showing the project development corridors for the proposed Aggeneys 2 solar PV facility grid connection infrastructure.

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Appendix C7:	Minutes of Meetings
Appendix C8:	Comments and Responses Report
Appendix D:	Ecological Impact Assessment
Appendix E:	Avifauna Impact Assessment
Appendix F:	Freshwater Impact Assessment
Appendix G:	Soils and Agricultural Potential Impact Assessment
Appendix H:	Heritage Impact Assessment
Appendix I:	Visual Impact Assessment
Appendix J:	Social Impact Assessment
Appendix K:	Environmental Management Programme
Appendix L:	A3 Maps and Coordinates

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need for a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Commissioning: Commissioning commences once construction is completed.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

- i. The land, water and atmosphere of the earth;
- ii. Micro-organisms, plant and animal life;
- iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supplies water to a reservoir that supplies water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, workforce, consumers, environmental interest groups, and the public.

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances).

Pre-construction: The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CBOs	Community-Based Organisations
CDM	Clean Development Mechanism
CSIR	Council for Scientific and Industrial Research
CO ₂	Carbon dioxide
D	Diameter of the rotor blades
DAFF	Department of Forestry and Fishery
DEA	National Department of Environmental Affairs
DENC	Department of Economic Development and Nature Conservation
DME	Department of Minerals and Energy
DOT	Department of Transport
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EGI	Electricity Grid Infrastructure
EMPr	Environmental Management Programme
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
Ha	Hectare
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEP	Integrated Energy Planning
km ²	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
m ²	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework

CHAPTER 1: INTRODUCTION

ABO Wind Aggeneys 2 PV (Pty) Ltd, a Special Purpose Vehicle (SPV), proposes the construction and operation of a grid connection solution for the proposed Aggeneys 2 solar PV facility, in the Northern Cape. The grid connection infrastructure for the Aggeneys 2 solar PV facility will include the development of a collector substation and a single-circuit power line (up to 220kV in capacity) to connect the Aggeneys 2 solar PV facility² to the national grid. Other associated infrastructure includes access tracks/roads that will primarily be used to provide access to the power line and collector substation area. Two alternative corridors of up to 1km in width and up to 17km in length (known as the project development corridors) are being assessed to allow for the optimisation of the grid connection infrastructure to accommodate the environmental sensitivities identified within the corridor.

The development of the Aggeneys 2 PV facility and the associated grid connection infrastructure (as assessed within this Basic Assessment (BA) Report) is in response to identified objectives of the national and provincial governments, and local and district municipalities to develop renewable energy facilities for power generation purposes. The project development corridors are located within the Springbok Renewable Energy Development Zone (REDZ), and within the northern corridor of the Strategic Transmission Corridors. The assessed corridors are considered favourable for the development of grid infrastructure due to the need to connect the proposed Aggeneys 2 solar PV facility to the national grid.

The nature and extent of the grid connection infrastructure, as well as the potential environmental impacts associated with the construction, operation and decommissioning phases of the infrastructure of this nature, are explored in detail in this BA Report. Site-specific environmental issues and constraints within the assessed corridors are considered within independent specialist studies in order to test the environmental suitability of the corridors for the development of the proposed grid connection infrastructure. The additional objective of the specialist studies is to also delineate areas of sensitivity within the corridor, comparatively assess the alternatives, and ultimately inform the placement of the power line and associated infrastructure with the assessed corridor.

This final BA Report has been prepared in accordance with the requirements of Appendix 1 of the EIA Regulations published on 08 December 2014 (as amended in April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This report consists of the following sections:

- » **Chapter 1** provides a background to the proposed grid connection infrastructure and the BA process.
- » **Chapter 2** provides a description of the grid connection infrastructure.
- » **Chapter 3** provides a description of the identified project alternatives.
- » **Chapter 4** outlines the strategic regulatory and legal context for energy planning in South Africa and specifically for the grid connection infrastructure.

² This project comprises the development of a 100MW PV facility and is the subject of a separate Basic Assessment (BA) process.

- » **Chapter 5** describes the need and desirability of the grid connection infrastructure within the assessed corridors.
- » **Chapter 6** outlines the approach to undertaking the BA process.
- » **Chapter 7** describes the existing biophysical and socio-economic environment within and surrounding the assessed corridors for the development.
- » **Chapter 8** provides an assessment of the potential issues and impacts associated with the alternative corridors proposed for the grid connection infrastructure and presents recommendations for the mitigation of significant impacts.
- » **Chapter 9** provides an assessment of the potential for cumulative impacts.
- » **Chapter 10** presents the conclusions and recommendations based on the findings of the BA Report.
- » **Chapter 11** provides references used in the compilation of the BA Report.

This Chapter of the BA Report includes the following information required in terms of Appendix 1

Requirement	Relevant Section
3(a) the details of the (i) EAP who prepared the report and (ii) the expertise of the EAP, including a curriculum vitae.	The details of the EAP who prepared the report and the expertise of the EAP is included in Section 1.5 . The curriculum vitae of the EAP, project team and independent specialists are included in Appendix A .
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the assessed corridors is included in Section 1.3, Table 1.1 and Figure 1.1 . The information provided includes the 21-digit Surveyor General code of the affected properties and the farm names. Additional information is also provided regarding the location of the development which includes the relevant province, local and district municipalities, ward and current land zoning.

1.1 Overview of the Grid Connection Infrastructure for Aggeneys 2

ABO Wind Aggeneys 2 PV (Pty) Ltd is proposing the establishment of the Aggeneys 2 solar PV facility to add new capacity to the national electricity grid. The project is proposed to be part of the Department of Energy's (DoE) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. In order for the Aggeneys 2 solar PV facility to evacuate the generated solar power to the national grid, a grid connection solution must be established between the solar PV facility and the Eskom grid connection point. The grid connection infrastructure assessed in this report is considered to be the grid connection solution for the Aggeneys 2 solar PV facility and includes the development of specific infrastructure in order to enable the connection establishment. The infrastructure includes:

- » A collector substation;
- » A single-circuit overhead power line up to 220kV; and
- » Access tracks/roads.
- »

Two alternative corridors of up to 1km in width and up to 17km in length (known as the project development corridors) are being assessed to allow for the optimisation of the grid connection infrastructure to accommodate the environmental sensitivities identified within the corridor. Alternatives assessed within this final BA Report are indicated in **Figure 1.1**, and include:

- » **Alternative 1:** A collector substation located adjacent to the facility substation in the south-eastern corner of the PV facility project site, as well as a single-circuit power line up to 220kV and approximately

14km in length, connecting to the Aggeneys Main Transmission Substation (MTS). This corridor is located directly adjacent and parallel to the existing Aggeneys – Aries 400kV line. This is considered to be the preferred option from a technical perspective due to the fact that the power line is shorter compared to Alternative 2.

- » **Alternative 2:** A collector substation located adjacent to the facility substation within the northern portion of the PV facility project site, as well as a single-circuit power line up to 220kV and approximately 17km in length connecting to the Aggeneys MTS. This is considered to be the alternative option from a technical perspective.

The grid connection infrastructure will be developed within the nominated preferred corridor. Access tracks/roads will be associated with the proposed new power line and where new access roads are required, these would be up to 6m in width.

Table 1.1 provides an overview of the project details. The key infrastructure components proposed as part of the grid connection infrastructure are described in greater detail in Chapter 2 of this final BA Report.

Table 1.1: Details of the assessed corridors for the grid connection infrastructure

Province	Northern Cape Province	
District Municipality	Namakwa District Municipality	
Local Municipality	Khâi-Ma Local Municipality	
Ward number(s)	4	
Nearest town(s)	Aggeneys – 11km Pofadder – 58km	
Affected Properties: Farm name(s), number(s) and portion numbers	Assessed Corridors:	
	<ul style="list-style-type: none"> » The Remaining Extent of the Farm Bloemhoek 61 » Portion 1 of the Farm Bloemhoek 61 » Portion 2 of the Farm Bloemhoek 61 » Portion 3 of the Farm Bloemhoek 61 » The Remaining Extent of the Farm Aggeneys 56 » <u>The Remaining Extent of Portion 1 of the Farm Aggeneys 56</u> » Portion 2 of the Farm Aggeneys 56 » <u>Portion 12 of the Farm Aggeneys 56</u> » <u>Portion 13 of the Farm Aggeneys 56</u> » Portion 1 of the Farm Aroams 57 	
SG 21 Digit Code (s)	<u>Assessed Corridor: Alternative 1</u>	<u>Assessed Corridor: Alternative 2</u>
	<ul style="list-style-type: none"> » C05300000000006100000 » C05300000000005600000 » C05300000000005600001 » C05300000000005600002 » <u>C05300000000005600012</u> » <u>C05300000000005600013</u> 	<ul style="list-style-type: none"> » C05300000000006100000 » C05300000000006100001 » C05300000000006100002 » C05300000000006100003 » C05300000000005600000 » C05300000000005600001 » C05300000000005600002 » <u>C05300000000005600012</u> » <u>C05300000000005600013</u> » C05300000000005700001
Current zoning and land use	Agricultural (with some mining activities taking place within the area)	

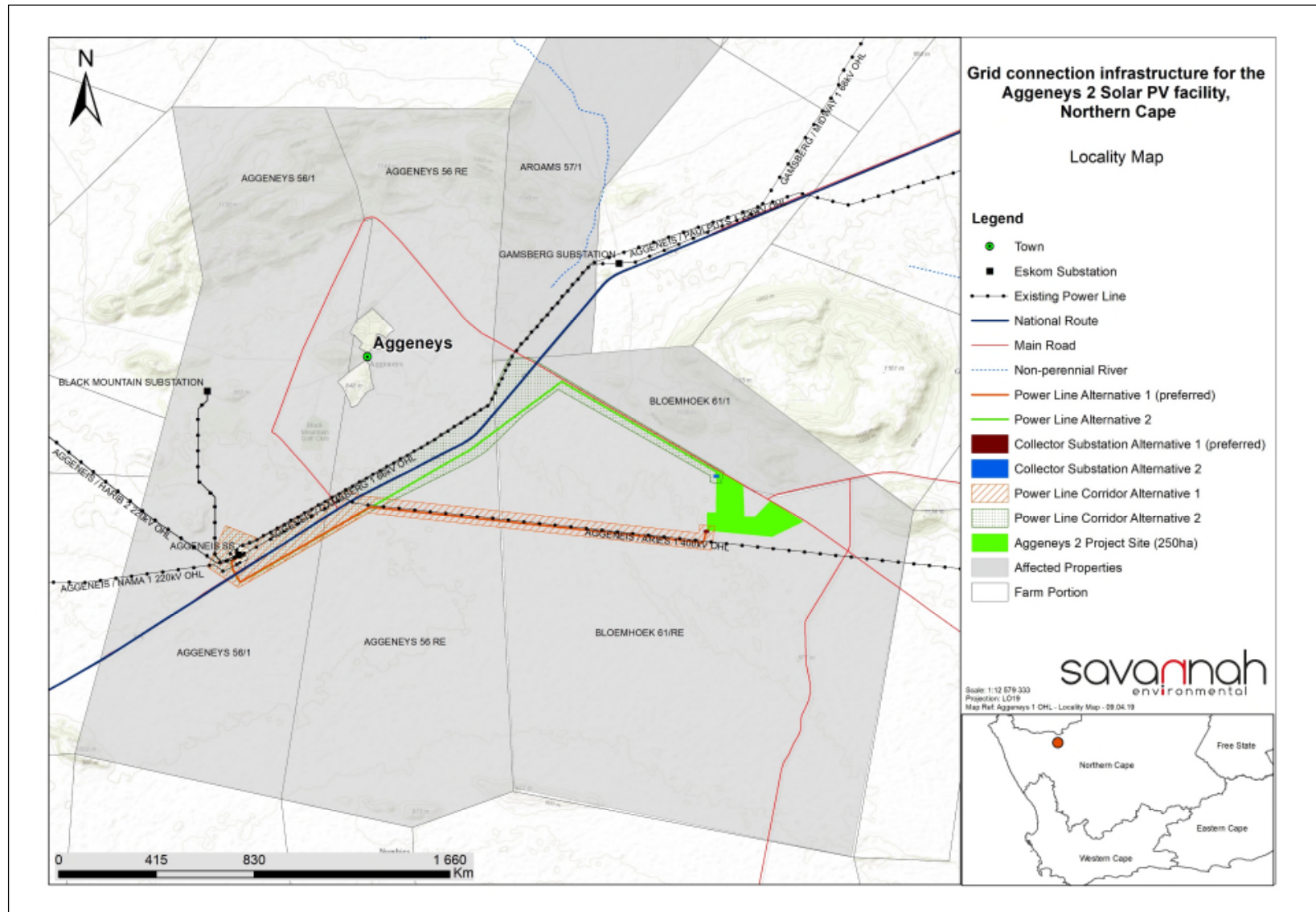


Figure 1.1: Locality map showing the assessed corridors (for both preferred and alternative options) proposed for the grid connection infrastructure

1.2 Requirements for an Environmental Impact Assessment Process

The construction and operation of the grid connection infrastructure is subject to the requirements of the EIA Regulations, 2014 (as amended), published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. The NEMA is the national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation.

In terms of the EIA Regulations of 2014 (as amended on 07 April 2017) promulgated under Sections 24 and 24D of the NEMA, various aspects of the project are listed as activities that may have a detrimental impact on the environment. The main listed activity triggered by the development of the grid connection infrastructure is Activity 11(i) of Listing Notice 1 (GNR327 of the EIA Regulations, 2014 (as amended)), which relates to the development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts³.

Due to the triggering of Activity 11(i) of Listing Notice 1, of the EIA Regulations, 2014 (as amended), a BA process must be undertaken in order to obtain Environmental Authorisation for the construction and operation of the grid connection solution for the Aggeneys 2 solar PV facility. The application for authorisation for this project is therefore required to be supported by a BA process.

The assessed corridor falls within a Strategic Transmission Corridor (i.e. the northern corridor), and within the Springbok REDZ, gazetted on 16 February 2018 (GN R113 and GN R114). These areas are considered to be of strategic importance to the rollout of large-scale electricity transmission and distribution infrastructure in terms of the Strategic Integrated Project 10: Electricity Transmission and Distribution. Developments proposed within a strategic transmission corridor require the undertaking of a BA process and include a decision-making timeframe of 57 days for the competent authority.

1.3 Overview of the Basic Assessment (BA) Process

A BA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues and allows for resolution of the issues reported on in the BA Report as well as dialogue with interested and affected parties (I&APs).

The BA process comprises one phase and involves the identification and assessment of environmental impacts through specialist studies, as well as public participation. The process followed in the BA involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative). This includes detailed specialist investigations and one round of public consultation. Following the public review period of the BA Report and Environmental Management Programme (EMPr), a final BA

³ Refer to Chapter 6 for a full list of Listed Activities applicable to the project.

Report and an EMPr is submitted to the Competent Authority, which includes the recommendations for practical and achievable mitigation and management measures for final review and decision-making.

The need to comply with the requirements of the EIA Regulations ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. Environmental issues are considered through specialist assessments in order to: test the environmental suitability of the assessed corridor for the grid connection solution, delineate areas of sensitivity within the assessed corridor, and ultimately to inform the placement of the grid connection infrastructure within the assessed corridor. Comprehensive, independent environmental studies are required in accordance with the EIA Regulations to provide the Competent Authority with sufficient information in order to make an informed decision.

In terms of GN R779 of 01 July 2016, the National Department of Environmental Affairs (DEA) has been determined as the Competent Authority for all projects that relate to the Integrated Resource Plan for Electricity (IRP) 2010 – 2030, and any updates thereto. Through the decision-making process, the DEA will be supported by the Northern Cape Department of Environment and Nature Conservation (DENC) as a commenting authority.

1.4 Objectives of the Basic Assessment Process

Appendix 1 of the EIA Regulations, 2014 (as amended), contains the objectives to be achieved through the undertaking of a BA process. The following objectives have been considered, undertaken and achieved through a consultative process within this BA Report for the grid connection infrastructure for the Aggeneys 2 solar PV facility:

- » The identification and consideration of the policies and legislative context associated with the location of the grid connection infrastructure, and the manner in which the proposed development complies with and responds to the relevant policies and legislative context.
- » The identification and consideration of feasible alternatives associated with the grid connection infrastructure for the Aggeneys 2 solar PV facility that relates to the specific proposed activity and the location of where the development is proposed.
- » The consideration of the need and the desirability of the grid connection infrastructure for the Aggeneys 2 solar PV facility considering the alternatives identified, including the desirability for the development within the assessed corridor.
- » The identification and consideration of the nature, consequence, extent, duration and probability of the impacts associated with the grid connection infrastructure, as well as the degree to which the impacts can be reversed, resulting in irreplaceable loss of resources and be avoided, managed or mitigated.
- » The motivation for the preferred corridor and the proposed activity.
- » Consideration and identification of the environmental sensitivities to provide input in terms of measures to avoid, manage and mitigate the impacts and the residual risks that need to be managed and monitored.

The release of the BA Report for a 30-day review period will provide stakeholders with an opportunity to review and provide input in terms of potential issues and concerns that may be associated with the establishment of the grid connection infrastructure. The final BA Report for submission to the DEA will consider and incorporate comments and responses raised during the review period of the BA Report. The DEA will

also consider these comments and responses in their decision-making of the application for Environmental Authorisation.

1.5 Details of the Environmental Assessment Practitioner and Expertise to conduct the BA process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), ABO Wind Aggeneys 2 PV (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd (Savannah Environmental) as the independent Environmental consultant to undertake the BA and prepare the BA Report for the grid connection infrastructure. Neither Savannah Environmental nor any of its specialists are subsidiaries of or are affiliated to ABO Wind Aggeneys 2 PV (Pty) Ltd. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed Aggeneys 2 solar facility, or its associated grid connection infrastructure.

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned), and is rated as a Level 2 Broad-based Black Economic Empowerment (B-BBEE) Contributor. The company was established in 2006 with a clear objective to provide services to the infrastructure development sector. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team that has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa and neighbouring countries. Strong competencies have been developed in project management of environmental processes, as well as strategic environmental assessment and compliance advice, and the assessment of environmental impacts, the identification of environmental management solutions and mitigation/risk minimising measures.

The Savannah Environmental team has considerable experience in environmental impact assessments and environmental management and has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa, including those associated with electricity generation and transmission.

The Savannah Environmental team in this project includes:

- » **Reuben Maroga** - the principal author of this report. He holds a Bachelor degree in Environmental Management and an Honours degree in Geology and has two years of experience in the environmental management field. His key focus is on undertaking environmental impact assessments, public participation, environmental management plans and programmes.
- » **Thalita Botha** - the co-author of this report. She holds a Bachelor degree with Honours in Environmental Management and has three years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects.
- » **Jo-Anne Thomas** is a Director at Savannah Environmental (Pty) Ltd and the registered EAP for the EIA for this project. Jo-Anne holds a Master of Science Degree in Botany (M.Sc. Botany) from the University of the Witwatersrand, and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP). She has over 20 years of experience in the field of environmental assessment and management and the management of large environmental

assessment and management projects. During this time she has managed and coordinated a multitude of large-scale infrastructure EIAs, and is also well versed in the management and leadership of teams of specialist consultants, and dynamic stakeholders. Jo-Anne has been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPs, environmental policy, strategy and guideline formulation, and integrated environmental management (IEM). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.

- » **Nicolene Venter** – Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

Curricula Vitae (CVs) detailing Savannah Environmental team's expertise and relevant experience are provided in **Appendix A**.

1.6 Details of the Independent Specialist Team

In order to adequately identify and assess potential impacts associated with the project, a number of specialists have been appointed as part of the project team, and have provided specialist input into this BA Report (refer to **Table 1.2**).

Table 1.2: Specialists which form part of the EIA project team

Company	Specialist Area of Expertise	Specialist Name
3Foxes Biodiversity Consulting	Ecology Impact Assessment	Simon Todd
3Foxes Biodiversity Consulting	Avifauna Impact Assessment	Eric Hermann
Savannah Environmental	Freshwater Features Impact Assessment	Shaun Taylor and Gideon Raath with an external review by Stephen Burton of SiVEST
Agriculture Research Council –Soil, Climate and Water	Soils and Agricultural Potential Impact Assessment	Garry Paterson
Environmental Planning and Design	Visual Impact Assessment	Jon Marshall
ASHA Consulting	Heritage and Palaeontological Impact Assessment	Jayson Orton
Natura Viva CC	Palaeontology Impact Assessment	John E. Almond
Neville Bews and Associates	Social Impact Assessment	Neville Bews

Curricula Vitae (CVs) detailing the specialist team's expertise and relevant experience are provided in **Appendix A**.

CHAPTER 2: PROJECT DESCRIPTION

This chapter provides an overview of the grid connection infrastructure for the Aggeneys 2 solar PV facility and details the project scope, which includes the planning/design, construction, operation and decommissioning activities required for the development.

2.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the proposed grid connection infrastructure is detailed in Chapter 1, Table 1.1 , as well as section 2.2.1 below.
3(c)(i)(ii) 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	A layout map illustrating the alternative corridors within which the grid connection infrastructure is proposed is included as Figure 2.2 .
3(d)(ii) a description of the scope of the proposed activity, including a description of the activities to be undertaken including associated structures and infrastructure	A description of the activities to be undertaken with the development of the grid connection infrastructure is included in Table 2.1 and Table 2.2 .

2.2 Nature and extent of the Grid Connection Infrastructure

ABO Wind Aggeneys 2 PV (Pty) Ltd proposes the construction and operation of a grid connection solution for the proposed Aggeneys 2 solar PV facility, Northern Cape. The grid connection infrastructure for Aggeneys 2 will include the development of a Collector Substation/Switching Station and a single-circuit power line (up to 220kV in capacity) to connect the Aggeneys 2 solar PV facility to the national grid. Other associated infrastructure includes access tracks/roads which will primarily be used to provide access to the power line and collector substation area. Two alternative corridors of up to 1km in width and up to 17km in length (known as the project development corridors) are assessed to allow for the optimisation of the grid connection infrastructure to accommodate the environmental sensitivities identified within the corridor.

The extent of the collector substation footprint is approximately 1.25ha, and the capacity of the substation will be up to 220kV. For the single-circuit power line, the height of the power line towers will be up to 40m and the servitude width up to 47m.

2.2.1. Project Site

The alternative project development corridors are indicated in **Figure 1.1** and include:

- » **Alternative 1:** A collector substation located adjacent to the facility substation in the south-eastern corner of the Aggeneys 2 PV facility project site, as well as a single-circuit power line up to 220kV and approximately 14km in length, connecting to the Aggeneis MTS. This corridor is located directly adjacent and parallel to the existing Aries-Aggeneys 400kV line. This is considered to be the preferred option from a technical perspective due to the fact that the power line is shorter compared to Alternative 2.
- » **Alternative 2:** A collector substation located adjacent to the facility substation within the northern portion of the PV facility site, as well as a single-circuit power line up to 220kV and approximately 17km in length connecting to the Aggeneis MTS. This is considered to be the alternative option from a technical perspective.

The assessed corridors traverse eight (8) affected properties:

- » The Remaining Extent of the Farm Bloemhoek 61
- » Portion 1 of the Farm Bloemhoek 61
- » Portion 2 of the Farm Bloemhoek 61
- » Portion 3 of the Farm Bloemhoek 61
- » The Remaining Extent of the Farm Aggeneys 56
- » The Remaining Extent of Portion 1 of the Farm Aggeneys 56
- » Portion 2 of the Farm Aggeneys 56
- » Portion 12 of the Farm Aggeneys 56
- » Portion 13 of the Farm Aggeneys 56
- » Portion 1 of the Farm Aroams 57

The grid connection infrastructure will be developed within the nominated preferred corridor. Access tracks/roads will be associated with the proposed new power line and where new access tracks/roads are required, these would be up to 6m in width.

2.2.2. Components of the Grid Connection Infrastructure

The proposed corridors are proposed to accommodate both the collector substation and the new overhead power line, as well as the associated infrastructure. The scope of works is proposed to include:

- » New Collector Substation/ Switching Station:
 - * Construction of a new platform with earth mat and civil works
 - * New 132kV or 220kV feeder bay/s and busbar/s complete with protection equipment
- » A new single circuit 132kV or 220kV overhead power line (OHL) between the existing Aggeneis MTS and new Collector Substation/ Switching Station, complete with structures, foundations, conductor, OPGW, fibre layout, insulation and assemblies.
- » Access tracks/roads up to 6m in width and 2km in length where required.
- » Existing Aggeneis MTS:
 - * Establish new 132kV or 220kV feeder bay/s within the existing HV yard at the Aggeneis MTS (inclusive of line bays, busbars, bussection and protection equipment)

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.1**.

Table 2.1: Confirmed details or dimensions of the proposed grid connection infrastructure⁴

Infrastructure	Footprint, dimensions and details
Corridor width (for assessment purposes)	Two alternative corridors (Alternative 1 and Alternative 2) of up to 1km in width are being assessed. The grid connection infrastructure will be constructed and operated within the nominated preferred alternative corridor.
Power line capacity	up to 220kV
Power line servitude width	Up to 47m
Length of the power line	Up to 17km
Height of the towers	Up to 40m. Power line towers (or pylons) are an average distance of 200m apart but can exceed 500m depending on the topography and terrain to be spanned.
Collector substation	The collector substation/switching station will be located directly adjacent and to the east of the on-site substation associated with the Aggeneys 2 solar PV facility.
Collector substation capacity	Up to 220kV
Substation footprint	1.25ha
Access roads/ tracks	Where new access roads/tracks are required, these would be up to 6m in width <u>and 2km in length where required.</u>

Table 2.2 provides the details regarding the requirements and the activities to be undertaken during the grid connection infrastructure development phases (i.e. construction phase, operation phase and decommissioning phase).

⁴ The confirmed details and dimensions of the grid connection infrastructure was assessed as part of the independent specialist studies.

2.2.3 Project Development Phases associated with the Grid Connection Infrastructure

Table 2.2: Details of the grid connection infrastructure development phases (i.e. construction, operation and decommissioning)

<u>Construction Phase</u>	
	<ul style="list-style-type: none"> » Duration of the construction phase is expected to be up to 12 months. » Create direct construction employment opportunities. Up to 130 employment opportunities will be created during the construction phase. » No on-site labour camps. Employees to be accommodated in nearby towns such as Aggeneys, and transported to and from the site on a daily basis. » Overnight on-site worker presence would be limited to security staff. » Construction waste will be stored on site and waste removal and sanitation will be undertaken by a sub-contractor or the municipality. » Negligible water will be required for the construction phase and potable needs. If required, water will be sourced from the municipality or private sources.
Construction sequence	<p>Overhead power lines are constructed in the following simplified sequence:</p> <ul style="list-style-type: none"> » Step 1: Surveying of the development area and negotiating with affected landowners; » Step 2: Final design and micro-siting of the infrastructure based on geotechnical, topographical conditions and potential environmental sensitivities; obtain required environmental permits (such as biodiversity permits, heritage permits & WUL/GA); » Step 3: Vegetation clearance and construction of access roads/tracks (where required); » Step 4: Construction of tower foundations; » Step 5: Assembly and erection of infrastructure on site; » Step 6: Stringing of conductors; » Step 7: Rehabilitation of disturbed areas; » Step 8: Continued maintenance. <p>The final definition of the centre line for the power line and coordinates of each bend in the line (if applicable) will be determined on receipt of an environmental authorisation of the assessed corridor by the competent authority and after negotiations with landowners and final environmental and technical surveys⁵.</p> <p>Substations are constructed in the following simplified sequence:</p>

⁵ The start, middle and end coordinates of the nominated preferred alternative corridor is included in **Appendix L**.

	<ul style="list-style-type: none"> » Step 1: Conduct geotechnical investigations to determine founding conditions; » Step 2: Conduct a site survey; » Step 3: Vegetation clearance and construction of access road; » Step 4: Site grading and levelling; » Step 5: Construction of foundations; » Step 6: Import of collector substation components; » Step 7: Construction of collector substation; » Step 8: Rehabilitation of disturbed area and protection of erosion sensitive areas; and » Step 9: Testing and commissioning. <p>The footprint of the collector substation may include administrative buildings required for the operation and management of the collector substation.</p>
Activities to be undertaken	
Conduct surveys prior to construction	<ul style="list-style-type: none"> » Including, but not limited to: a geotechnical survey, site survey (including the location of the collector substation and each power line tower position) and confirmation of the power line servitude, and all other associated infrastructure.
Establishment of access roads	<ul style="list-style-type: none"> » Access roads/tracks to be established within the servitude (underneath or adjacent to the final confirmed power line route) for construction and/or maintenance activities required. » Access roads/tracks will be established as construction commences at the various locations within the servitude. » Existing access roads will be utilised where possible to minimise impact, and upgraded where required. » New access roads/ tracks will be up to 6m in width for access to the collector substation and will be limited to jeep tracks elsewhere.
Undertake site preparation	<ul style="list-style-type: none"> » Including the clearance of vegetation at the substation, power line tower positions, the establishment of access roads/tracks and excavations for foundations. » Stripping of topsoil at the substation, tower footprint areas and along access roads to be stockpiled, backfilled, removed from the site and/or spread on site. » To be undertaken in a systematic manner to reduce the risk of the exposed ground being subjected to erosion. » Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required) along the final power line route and within the collector substation footprint.
Establishment of laydown areas and batching plant on site	<ul style="list-style-type: none"> » A laydown area for the storage of grid infrastructure components, including the civil engineering construction equipment. » The laydown area will also accommodate building materials and equipment associated with the construction of buildings. » No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas. » A temporary concrete batching plant of 50m x 50m in extent to facilitate the concrete requirements for grid infrastructure foundations. Other options include the use of mobile batching plants that allow for <i>in situ</i> batching of concrete.
Undertake site rehabilitation	<ul style="list-style-type: none"> » Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed. » On commissioning, access points to the site that will not be required for the operation phase will be closed and prepared for rehabilitation.

Operation Phase

- » Duration will be ~20 years, or longer as needed for the operation of the PV facility.
- » Requirements for security and maintenance of the grid connection infrastructure.
- » Employment opportunities relating mainly to operational activities and maintenance. Very limited employment opportunities will be available⁶.
- » Current land-use activities, i.e. grazing, can continue in the areas adjacent to the infrastructure.

Activities to be undertaken

Operation and Maintenance	<ul style="list-style-type: none"> » Part-time security and maintenance staff, especially for the collector substation. » Disposal of waste products (e.g. oil) in accordance with relevant waste management legislation. » On-going rehabilitation of those areas which were disturbed during the construction phase. » During this operation phase vegetation within the power line servitude (up to 47m), and around the collector substation will require management only if it impacts on the safety and operational objectives of the project. » The maintenance of the grid connection infrastructure will be the responsibility of the holder of the Environmental Authorisation.
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Decommissioning Phase

Requirements	<ul style="list-style-type: none"> » Decommissioning of the grid connection infrastructure at the end of its economic life. » The expected lifespan of approximately 20 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
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Activities to be undertaken

Site preparation	<ul style="list-style-type: none"> » Confirming the integrity of access to the grid connection infrastructure to accommodate the required equipment. » Mobilisation of decommissioning equipment.
Disassemble components and rehabilitation	<ul style="list-style-type: none"> » The grid connection infrastructure components will be disassembled, and reused and recycled (where possible). » Where components cannot be reused or recycled these will be disposed of in accordance with the regulatory requirements at the time of decommissioning. » Disturbed areas, where infrastructure has been removed, will be rehabilitated, if required and depending on the future land-use of the affected areas and the relevant legislation applicable at the time of decommissioning.

⁶ It must be noted that ownership of the substation and power line will be transferred to Eskom following the completion of construction. The operation and maintenance of the line will be undertaken by Eskom.

It is expected that the areas affected by the collector substation and associated infrastructure will revert back to its original land-use (i.e. primarily sheep farming and grazing) once the Aggeneys 2 solar PV facility has reached the end of its economic life and all infrastructure has been decommissioned. Sheep farming and grazing will continue along the power line route during the operation phase.

CHAPTER 3: ALTERNATIVES

This Chapter provides an overview of the various alternatives considered for the grid connection infrastructure for Aggeneys 2 solar PV facility as part of the BA Process.

This Chapter of the final BA Report includes the following information required in terms of Appendix 1:

Requirement	Relevant Section
(g) a motivation for the preferred site, activity and technology alternative;	Motivation for the preferred site (i.e. development corridors), activity and technology alternative is included in section 3.1.
(h)(i) details of all the alternatives considered;	The details of all alternatives considered are included in section 3.1.2.
(h)(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.	A motivation for not considering any alternative development locations is included in section 3.1.2.
(h)(xi) a concluding statement indicating the preferred alternatives, including the preferred location of the activity	A concluding statement indicating the preferred alternatives, including the preferred location of the activity is included in section 3.1.2.

3.1. Alternatives Considered during the BA Process

In accordance with the requirements of Appendix 1 of the 2014 EIA Regulations (GNR 326), a BA Report must contain a consideration of alternatives including site (i.e. development footprint), activity, technology and site access alternatives, as well as the “do-nothing” alternative. Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors.

The DEA Guideline for determining alternatives states that the key criteria for consideration when identifying alternatives are that they should be “practicable”, “feasible”, “relevant”, “reasonable” and “viable”. Essentially there are two types of alternatives:

- » Incrementally different (modifications) alternatives to the project.
- » Fundamentally (totally) different alternatives to the project.

In this instance, 'the project' refers to a collector substation and overhead power line, both with a capacity of up to 220kV, and associated infrastructure proposed to be developed by an Independent Power Producer (IPP) and intended to connect the Aggeneys 2 solar PV facility to the national grid.

3.1.1. Consideration of Fundamentally Different Alternatives

Fundamentally different alternatives are usually assessed at a strategic level and, as a result, project-specific EIAs are limited in scope and ability to address fundamentally different alternatives. As no technological alternatives exist for the distribution of electricity, no fundamentally different alternatives can be considered for the proposed grid connection infrastructure.

3.1.2. Consideration of Incrementally Different Alternatives

Incrementally different alternatives relate specifically to the project under investigation. "Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives for:

- » The location where the activity is proposed to be undertaken.
- » The type of activity to be undertaken.
- » The design or layout of the activity.
- » The technology to be used in the activity.
- » The operational aspects of the activity.

In addition, the option of not implementing the activity (i.e. the "do-nothing" alternative) must also be considered.

These alternatives are discussed under the respective sub-headings below. The alternatives proposed for the development of the grid connection infrastructure for Aggeneys 2 have been assessed at the same level.

3.1.2.1. Location Alternatives

In May 2018, ABO Wind Aggeneys 2 PV (Pty) Ltd commissioned Savannah Environmental to undertake a high-level environmental screening study for a broader study area of approximately 72 309.26ha in extent (an area of 25.89km x 28.08km). The screening site (i.e. broader study area) was identified by ABO Wind as having the potential for the installation of photovoltaic panels (PV panels) on the basis of the various technical criteria including the solar resource available in the area, accessibility of the study area, accessibility to the Eskom grid and the local site characteristics and topography.

Following the high-level screening assessment, a focus area within the broader study area was identified by the developer for the construction and operation of a solar PV facility on the Remaining Extent of the Farm Bloemhoek 61. The screening assessment identified areas of environmental sensitivity within the Remaining Extent of the Farm Bloemhoek 61, which include, but are not limited to the Haramoep and Black Mountain Mine Nature Reserve, the Kamiesberg Bushmanland Augrabies NPAES⁷, and the Koa River Channel, which is considered as the main habitat of the Red Lark species, which is a threatened bird species.

The identification of the grid connection infrastructure for the Aggeneys 2 solar PV facility was informed by the closest and most feasible grid connection point into the national grid, consultation with Eskom network planners and the consideration of the routing of other similar infrastructure in the area. Through this process, two grid connection infrastructure alternatives for the Aggeneys 2 facility were identified as follows:

⁷ National Protected Areas Expansion Strategy.

- » **Alternative 1:** A collector substation located adjacent to the facility substation in the south-eastern corner of the Aggeneys 2 PV facility project site, as well as a single-circuit power line up to 220kV and approximately 14km in length, connecting to the Aggeneis MTS. This corridor is located directly adjacent and parallel to the existing Aries-Aggeneys 400kV line. This is considered to be the preferred option from a technical perspective due to the fact that the power line is shorter compared to Alternative 2.
- » **Alternative 2:** A collector substation located adjacent to the facility substation within the northern portion of the PV facility site, as well as a single-circuit power line up to 220kV and approximately 17km in length connecting to the Aggeneis MTS. This is considered to be the alternative option from a technical perspective.

The placement of the alternative corridors adjacent and parallel to linear infrastructure such as power lines and roads provides an opportunity for the consolidation of similar infrastructure within the area, and the clustering of associated impacts to the environment. This may lessen the negative environmental and social impacts associated with the development of the grid connection infrastructure.

The specific characteristics considered, and the results thereof, are discussed in the sections below. The developer considered that should these characteristics not be favourable for the development of the grid connection infrastructure, then some limitations and challenges may be expected.

- » *Land Availability and Land Use* – In order to develop the grid connection infrastructure, sufficient space and access to land between the Aggeneys 2 solar PV site and the Aggeneis MTS (and along the identified corridors) is required. The land use along the alternative corridors mainly includes agriculture (i.e. grazing) and mining activities, however, the corridors do not infringe on sections of land currently being mined (that is, there is no conflict of surface rights).
- » *Access to the National Grid* – The developer has consulted with Eskom regarding the grid connection options in the area. All options considered are direct overhead lines to Aggeneis Substation, being either 132kV or 220kV in capacity.
- » *Geographical and topographical considerations* – The terrain traversed by the identified corridor is fairly flat, providing good conditions for power line construction.
- » *Consideration of sensitive environmental features* – Through the assessment of two corridors within which the grid connection infrastructure can be placed, each much larger than required for a servitude of <50m, an opportunity has been created by the Applicant for the avoidance of sensitive environmental features and areas. The consideration of a broader corridor enables avoidance of the environmental sensitivities, thereby ensuring that the grid connection infrastructure can be appropriately placed without resulting in an unacceptable environmental impact. This consideration is in line with the mitigation strategy and enables the achievement of the objectives of the mitigation hierarchy (i.e. avoid, minimise, mitigate). This application of the mitigation strategy will result in the identification of the optimised placement of the grid connection infrastructure within the preferred alternative corridor.

The grid connection infrastructure will be developed within a servitude to be negotiated within the nominated preferred corridor.

3.1.2.2. Design and Layout Alternatives

The design of the substation and power line is required to conform to Eskom's technical standards as it forms part of the national electricity supply network and must fit in with the existing network systems, technology and infrastructure. The broader corridors being assessed within this BA allow for the avoidance of identified environmental sensitivities through the appropriate placement of the substation and power line footprints/servitudes within the nominated preferred corridor.

3.1.2.2. Technology Alternatives

No technology alternatives exist for the distribution of electricity. Therefore, no technology alternatives are being assessed as part of this BA process.

3.1.3 The 'do-nothing' Alternative

The 'do-nothing' alternative is the option of not constructing the grid connection infrastructure for the Aggeneys 2 solar PV facility. Should this alternative be selected, there would be no environmental impacts or benefits as a result of construction and operation activities associated with the proposed grid infrastructure (i.e. Aggeneys 2 will not be able to evacuate the generated power into the national grid). The 'do-nothing' alternative has been assessed as part of the BA process Phase (refer to **Chapter 8** and **Chapter 10** of this final BA Report).

CHAPTER 4: REGULATORY AND PLANNING CONTEXT

This chapter provides insight into the policy and legislative context within which the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility is located, and documents the manner in which the development of the grid connection infrastructure complies with and responds to these policies and legislation.

4.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(e)(i) 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	Chapter 4 as a whole provides an overview of the policy and legislative context which is considered to be associated and relevant to the development of the grid connection infrastructure. The regulatory and planning context has been considered at an international, national, provincial and local level.
3(e)(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools, frameworks and instruments.	Tables 4.1, 4.2, 4.3 and 4.4 illustrate the compliance of the proposed grid connection infrastructure with the legislation, policies, plans, guidelines, tools, frameworks and instruments.

4.2. Strategic Electricity Planning in South Africa

The regulatory hierarchy of policy and planning documentation that support the development of a project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. These policies are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the development of the grid connection infrastructure.

At **National Level**, the main regulatory agencies are:

- » *Department of Environmental Affairs (DEA)*: DEA is responsible for environmental policy and is the controlling authority in terms of NEMA and the 2014 EIA Regulations (GNR 326). As per GNR 779 of 01 July 2016, DEA is the Competent Authority and is charged with making a decision regarding the granting of the relevant EA for this project based on its association with the proposed Aggeneys 2 solar PV facility.
- » *South African Heritage Resources Agency (SAHRA)*: SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- » *Department of Water and Sanitation (DWS)*: DWS is responsible for effective and efficient water resources management to ensure sustainable economic and social development. DWS is also responsible for evaluating and issuing licenses pertaining to water use (i.e. Water Use Licenses (WULs) and/or registration of General Authorisations (GAs)).

- » *Department of Agriculture, Forestry and Fisheries (DAFF)*: DAFF is the custodian of South Africa's agricultural, forestry, and fishery resources and is primarily responsible for the formulation and implementation of policies governing the Agriculture, Forestry and Fisheries Sector. DAFF is also responsible for the issuing of permits for the disturbance or destruction of protected tree species.
- » *Department of Mineral Resources (DMR)*: Approval from DMR will be required to use land surface contrary to the objects of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) in terms of Section 53 of the Act. In terms of the MPRDA approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that may occur on site.
- » *Department of Rural Development and Land Reform (DRDLR)*: DRDLR is dedicated to the social and economic development of rural South Africa, and is responsible for providing a framework for rural development.
- » *South African National Roads Agency Limited (SANRAL)*: SANRAL is responsible for the regulation and maintenance of all national roads and routes.

At the **Provincial Level**, the main regulatory agencies are:

- » *Northern Cape Department of Environment, and Nature Conservation (DENC)*: DENC is the Commenting Authority for the project, and is also responsible for issuing any biodiversity and conservation-related permits. DENC's involvement relates specifically to sustainable resource management, conservation of protected species and land care.
- » *Northern Cape Department of Roads and Public Works (NCDRPW)*: NCDRPW is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
- » *Ngwao Boswa Kapa Bokone (NBKB)*: NBKB, the Northern Cape Provincial Heritage Resources Authority is responsible for the identification, conservation and management of heritage resources, as well as commenting on heritage related issues within the Province.

At the **Local Level**, the local and district municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Northern Cape Province, both the local and district municipalities play a role. The local municipality is the Khâi-Ma Local Municipality which forms part of the Namakwa District Municipality. In terms of the Municipal Systems Act (No. 32 of 2000) it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

4.3. Policy and Planning Considerations at National, Provincial and Local Levels

National policies and plans adopted by South Africa that are considered to be relevant to the development of the grid connection infrastructure have been summarised in **Table 4.1**.

Table 4.1: National policies, plans and legislation relevant to the grid connection infrastructure

Policy, Plan or Legislation	Is the development of the grid connection infrastructure aligned with this policy, plan or legislation?
The National Energy Act (2008)	Yes. One of the objectives of the Act is to promote the diversity of the supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources and states that provision must be made for increased generation and consumption of renewable energies. The development of the grid connection infrastructure associated with the proposed Aggeneys 2 solar PV facility, enables the evacuation of renewable

Policy, Plan or Legislation	Is the development of the grid connection infrastructure aligned with this policy, plan or legislation?
	power into the national grid and thereby promotes diversity of supply of energy and the source of supply, in line with the Act's objectives.
White Paper on the Energy Policy of South Africa, 1998	Yes. The South African Energy Policy of 1998 identifies five key objectives, namely increasing access to affordable energy services, improving energy sector governance, stimulating economic development, managing energy-related environmental impacts and securing supply through diversity. In order to meet these objectives, South Africa needs to optimally use available energy resources. The development of the grid connection infrastructure will enable the contribution, albeit only to a limited extent, to the achievement of the five objectives of the Energy Policy of the country.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	Yes. This White Paper fosters the uptake of renewable energy in the economy and has a number of objectives that need to be met, including that equitable resources are invested in renewable technologies. South Africa is also endowed with renewable energy resources that can be sustainable alternatives to fossil fuels. The development of additional renewable energy projects (including the Aggeneys 2 solar PV facility and the associated grid connection infrastructure) will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix. The development of the grid connection infrastructure enables the evacuation of the generated power into the national grid and thereby enables the use of renewable energy technologies for the country.
The Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended	Yes. The Act establishes a national regulatory framework for the electricity supply industry of the country and introduces the National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The developer of the grid connection infrastructure will have to ensure compliance with this Act for the distribution of the generated power into the national grid.
Renewable Energy Policy in South Africa	Yes. Support for the Renewable Energy Policy is guided by a rationale that South Africa has a very attractive range of renewable energy resources, particularly solar and wind, and that renewable applications are, in fact, the least cost energy service in many cases from a fuel resource perspective (i.e. the cost of fuel in generating electricity from such technology); more so when social and environmental costs are taken into account. However, the National Energy Policy acknowledges that the development and implementation of renewable energy applications have been largely neglected in South Africa. Challenges regarding the implementation of renewable energy have been identified. Through the development of renewable energy projects (including the Aggeneys 2 solar PV facility and the associated grid connection infrastructure), additional renewable energy will be made available which will assist with the further growth and development of the renewable energy sector.
National Development Plan (NDP)	Yes. The NDP aims at eliminating poverty and reducing inequality by 2030 and identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy. The plan also sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation: coal will contribute proportionately less to the primary-energy needs, while gas and renewable energy resources – especially wind, solar and imported hydroelectricity – will play a much larger role. Through the development of renewable energy projects (including the Aggeneys 2 solar PV facility and the associated grid connection infrastructure) additional renewable energy will be available which will assist in expanding the renewable energy sector of the

Policy, Plan or Legislation	Is the development of the grid connection infrastructure aligned with this policy, plan or legislation?
	country and add to the diversification of the energy mix, which is moving away from coal and towards the use of gas and renewable energy.
Integrated Energy Plan (IEP)	Yes. The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. Eight key objectives were identified which relate mainly to the security, cost, access, diversity, efficiency, impact in terms of emissions, conservation and social benefits in terms of energy planning. The IEP recognises the potential of renewable energy for power generation. With the additional renewable energy to be generated by the Aggeneys 2 solar PV facility and to be evacuated to the national grid via the proposed grid connection infrastructure, a contribution to this objective will be made. Also, with the development of the Aggeneys 2 solar PV facility and the grid connection infrastructure, the eight key objectives in terms of energy planning will be met, even if only to a limited extent.
Integrated Resource Plan (IRP) 2010 - 2030	Yes. The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 constitutes a subset of the IEP and is South Africa's national electricity plan. The document outlines the proposed generation new-build fleet for South Africa. The adopted 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 IRP essentially drives the assortment of energy to be implemented for South Africa which is known as the energy mix of the country, considering various generation technologies. The plan includes 17.8GW of renewables, 9.6GW of nuclear; 6.25GW of coal, and approximately 8.9GW of other generation sources such as hydro, and gas. The development of the proposed grid connection infrastructure for the Aggeneys 2 solar PV facility has the potential to evacuate up to 100MW(AC) of solar energy into the national grid, which will support the Government's target for electricity generated by solar energy facilities.
Strategic Integrated Projects (SIP)	<p>Yes. In 2010, a National Development Plan was drafted to address socio-economic issues affecting development in South Africa. These issues were identified and placed under 18 different Strategic Integrated Projects (SIPs) to address the spatial imbalances of the past by addressing the needs of the poorer provinces and enabling socio-economic development. The development of the grid connection infrastructure will support the Strategic Integrated Projects within one SIP, which relates to the development of the associated infrastructure. This is known as SIP 10 – electricity transmission and distribution for all.</p> <p>In support of SIP 10, the Department of Environmental Affairs undertook a Strategic Environmental Assessment (SEA) which aims to provide guidance for the efficient and sustainable expansion of strategic electricity grid infrastructure in South Africa. This SEA identified the optimal location for strategic corridors where transmission infrastructure expansion is needed to enable the balancing of future demand and supply requirements while minimising negative impacts on the environment. These areas are referred to as Power Corridors and were gazetted within GNR113 of February 2018. The identified alternative corridors proposed for the development of the grid connection infrastructure are located within the Northern Transmission Corridor and the project is therefore considered to be in line with national planning in this regard.</p>
New Growth Path (NGP) Framework, 2010	Yes. The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020. With economic growth and employment creation as the key indicators identified in the NGP. To achieve this, the government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa

Policy, Plan or Legislation	Is the development of the grid connection infrastructure aligned with this policy, plan or legislation?
	and globally, and to develop a policy package to facilitate employment creation in these areas. The Aggeneys 2 solar PV facility, as well as the proposed grid connection infrastructure, will assist with the creation of both temporary and permanent employment opportunities during the construction and operation phases, which will contribute, albeit to a limited extent, to the economy and sustainable growth.
National Climate Change Response Strategy	Yes. This strategy aims to address issues identified as priorities for dealing with climate change in the country. The focus of the strategy is adapting to climate change; developing a sustainable energy programme; adopting an integrated response by the relevant government departments; compiling inventories of greenhouse gases; accessing and managing financial resources; and research, education, and training. The development of the grid connection infrastructure will enable additional uptake of renewable energy into the national grid which will reduce the need for the use of coal as an energy resource and thereby assist in addressing climate change and global warming.
Climate Change Bill, 2018	Yes, with limited relevance. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The bill aims to provide for the coordinated and integrated response to climate change and its impacts, provide effective management of inevitable climate change impacts and to make a fair contribution to the global effort to stabilise greenhouse gas concentrations. The grid connection infrastructure relates only to the evacuation of renewable energy into the national grid, and would therefore not result in the generation or release of emissions during its operation.

4.3.1. Policy and Planning at a Provincial Level

Policies and plans have been adopted by the Northern Cape Province for the management of the area and are considered to be relevant to the development of the grid connection infrastructure. **Table 4.2** provides a summary of the relevant provincial plans and policies.

Table 4.2: Provincial policies and plans relevant to the grid connection infrastructure

Policy or Plan	Is the development of the grid connection infrastructure aligned with this policy or plan?
Northern Cape Provincial Spatial Development Framework (PSDF), 2012	Yes. The PSDF seeks to advance the establishment of renewable energy supply schemes within the Province and identifies that the Northern Cape holds a potential comparative advantage due to the high solar irradiance which could be a source of renewable energy, specifically for sustainable electricity production. The PSDF also aims for renewable energy sources to constitute 25% of the Province's energy production capacity by 2020. The REIPPPP focus on Northern Cape Provincial Report Volume 1 (June 2017) indicates that the Northern Cape Province has contributed 16 991GWh actual energy to the national grid which amounts to approximately 42% of the renewable energy contribution to the grid. Of this 42%, 13% (i.e. 958 GWh) was generated by wind energy facilities and 73% (i.e. 5 218 GWh) was generated by solar energy facilities. With the developed and proposed independent power producer capacity (including the Aggeneys 2 solar PV facility and the proposed grid connection infrastructure), the Province will produce more than 100% of its own electrical power needs from renewable energy resources (although this energy will be fed into the national grid).

4.3.2. Policy and Planning on a District and Local Level

Strategic policies at the district and local level have similar objectives for the respective areas, namely the delivery of basic services, including the provision of electricity. The development of the proposed grid connection infrastructure is considered to align with the aims of these policies.

Table 4.3 provides a summary of the district and local level policies and plans considered to be relevant to the development of the grid connection infrastructure.

Table 4.3: District and local policies and plans relevant to the grid connection infrastructure

Policy or Plan	Is the development of the grid connection infrastructure aligned with this policy or plan?
Namakwa Municipality District Rural Development Plan (RDP), 2017	Yes. Renewable energy developments are considered to be development priorities within the RDP. The need to evaluate localisation possibilities for all renewable energy technologies is emphasised in the Plan. The development of renewable energy projects (including the proposed grid connection infrastructure) will contribute to the achievement of the need for the development of renewable energy developments within the Province.
Namakwa Municipality District Integrated Development Plan (IDP), 2017 - 2022	Yes. The plan identifies the need for support to the local municipalities to deliver basic services such as water, sanitation, housing, electricity and waste management. The IDP also seeks to establish good governance by enforcing the climate change response plan. The development of the grid connection infrastructure may contribute to the delivery of basic services, however only to a limited extent. The proposed Aggeneys 2 solar PV facility the associated grid infrastructure will contribute to the application of the climate change response plan through zero production of greenhouse gas emissions during the operation of the facility.
Khâi-Ma Municipality Local Integrated Development Plan (2012-2017)	<p>The Vision set for the Khâi-Ma Local Municipality is "Creating an economically viable and fully developed municipality, which enhances the standard of living of all the inhabitants/ community members of the Khâi-Ma Local Municipality through good governance, excellent service delivery and sustainable development. Simply put, the vision is "Improved and sustainable standard of living for all". Linked to the Vision is the Mission statement, which is the "Provision of transparent, accountable and sustainable service delivery".</p> <p>The IDP identifies a number of Key Performance Areas (KPA) identified by communities during Phase 1 of the IDP Process. The KPAs that are relevant to the proposed project include: KPA 1: Service Delivery and Infrastructure Development; and KPA 2: Local Economic Development.</p> <p>The priority issues identified in the IDP that are relevant to the project and are linked to the KPAs include lack of Basic Services (KPA 1); Poverty and Unemployment (KPA 2); Lack of sport and recreational facilities and services (KPA 1); and Lack of sufficient and proper health services (HIV/AIDS) (KPA 1).</p> <p>Some of the key social challenges identified by the community during the IDP process include an increase in drug abuse, increase in young children (under 10 years) actively abusing alcohol, increase in teenage pregnancies, increase in crime linked to alcohol and drug abuse, high levels of youth unemployment, an increase in the prevalence of HIV & Aids</p> <p>The renewable energy sector is also recognised as a key sector. The IDP notes that a number of new opportunities have opened up for the Namakwa area since the need to facilitate the generation of sustainable energy was introduced in South Africa by Eskom and the South African government. The IDP notes that there are a number of solar projects</p>

Policy or Plan	Is the development of the grid connection infrastructure aligned with this policy or plan?
	proposed in the area and that the economic benefits from these projects are eagerly anticipated.

CHAPTER 5: NEED AND DESIRABILITY

One of the requirements of Appendix 1 of the EIA Regulations, 2014, as amended, is to motivate for “*the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location*”. The need and desirability of a development need to consider whether it is the right time and place for locating the type of land-use / activity being proposed within the proposed location.

This Chapter provides an overview of the anticipated suitability of the grid connection infrastructure for the Aggeneys 2 solar PV facility being developed at the preferred location from a national, regional, and site-specific perspective. It provides an overview of the need and desirability, and perceived benefits of the project specifically.

5.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.	The need and desirability of the grid connection infrastructure are described in this chapter.

5.2. Need and Desirability of the Proposed Project

The grid connection infrastructure will facilitate the transmission of the electricity generated by the proposed Aggeneys 2 solar PV facility into the national grid and is considered essential infrastructure to the Aggeneys 2 solar PV facility. Therefore, the need for the grid connection infrastructure is directly linked to the need and desirability of the proposed Aggeneys 2 solar PV facility, which is aligned with national and regional policies and plans. This can be summarised as follows⁸:

- » The need for the country to respond to international commitments regarding climate change and reduction in carbon emissions.
- » The need at a national level to diversify the power generation technology mix to include up to 17.8GW of renewables, as defined in the Integrated Resource Plan (IRP), 2010 (as discussed in detail in **Chapter 4**).

⁸ Note that the need and desirability of the Aggeneys 2 solar PV facility has been considered in detail within a separate Basic Assessment Report.

- » The need to align development with the requirements of the National Development Plan in order to address the identified socio-economic issues affecting development in South Africa.
- » The need for sustainable development at a Provincial level, including the need to utilise its extensive resources for the benefits of the local area.
- » The identification of renewable energy developments as one of the development priorities within the Namakwa District Municipality Rural Development Plan (RDP) (2017).

5.3. Receptiveness and Desirability of the identified Alternative Corridors to develop the Grid Connection Infrastructure

The feasibility of the identified alternative corridors for the development of the grid connection infrastructure also provides an indication of the desirability of the development within the area. The section below provides a description of the specific considerations that contribute to the desirability of the two identified corridors.

The identified alternative corridors being assessed for the development of the grid connection infrastructure displays characteristics which contribute to the overall desirability. These include:

- » *Land Availability and Land Use* – In order to develop the grid connection infrastructure, sufficient space and access to land between the Aggeneys 2 solar PV facility site and the Aggeneis MTS (and along the identified corridors) is required. The affected properties associated with the project provides sufficient space for the consideration of the proposed power line corridors within which the proposed collector substation (1.25ha) and single-circuit power line (up to 47m servitude) can be developed. The corridors fall outside of the urban edge of the surrounding towns on privately-owned properties currently used for agricultural practises, with some mining activities being undertaken within the surrounding area. As far as could be ascertained, the affected farm portions have not been considered for alternative land use such as urban development or crop production. The corridors do not infringe on sections of land currently being mined (that is, there is no conflict of surface rights).
- » *Access to the National Grid* – The developer has consulted with the Eskom regarding the grid connection options in the area. All alternatives considered are direct overhead lines to Aggeneis MTS, being either 132kV or 220kV in capacity.
- » *Geographical and topographical considerations* - The terrain traversed by the identified corridors is fairly flat, providing good conditions for power line construction. The terrain on the site of the proposed substation is also considered to be technically suitable for the construction of the substation.
- » *Consideration of sensitive environmental features* – Through the assessment of two alternative corridors within which the grid connection infrastructure can be constructed, each much larger than required for the servitude, an opportunity has been created by the Applicant for the avoidance of sensitive environmental features and areas. The consideration of a broader corridor enables avoidance of the environmental sensitivities, thereby ensuring that the grid connection infrastructure can be appropriately placed without resulting in an unacceptable environmental impact. This consideration is in line with the mitigation strategy and enables the achievement of the objectives of the mitigation hierarchy (i.e. avoid, minimise, mitigate). This application of the mitigation strategy will result in the identification of the optimised placement of the grid connection infrastructure within the preferred alternative corridor.

- » *Planning* – From a planning perspective, the proposed grid connection infrastructure is considered to be appropriately located as it is located within the northern corridor of the Strategic Transmission Power Corridors (refer to **Figure 5.1**).

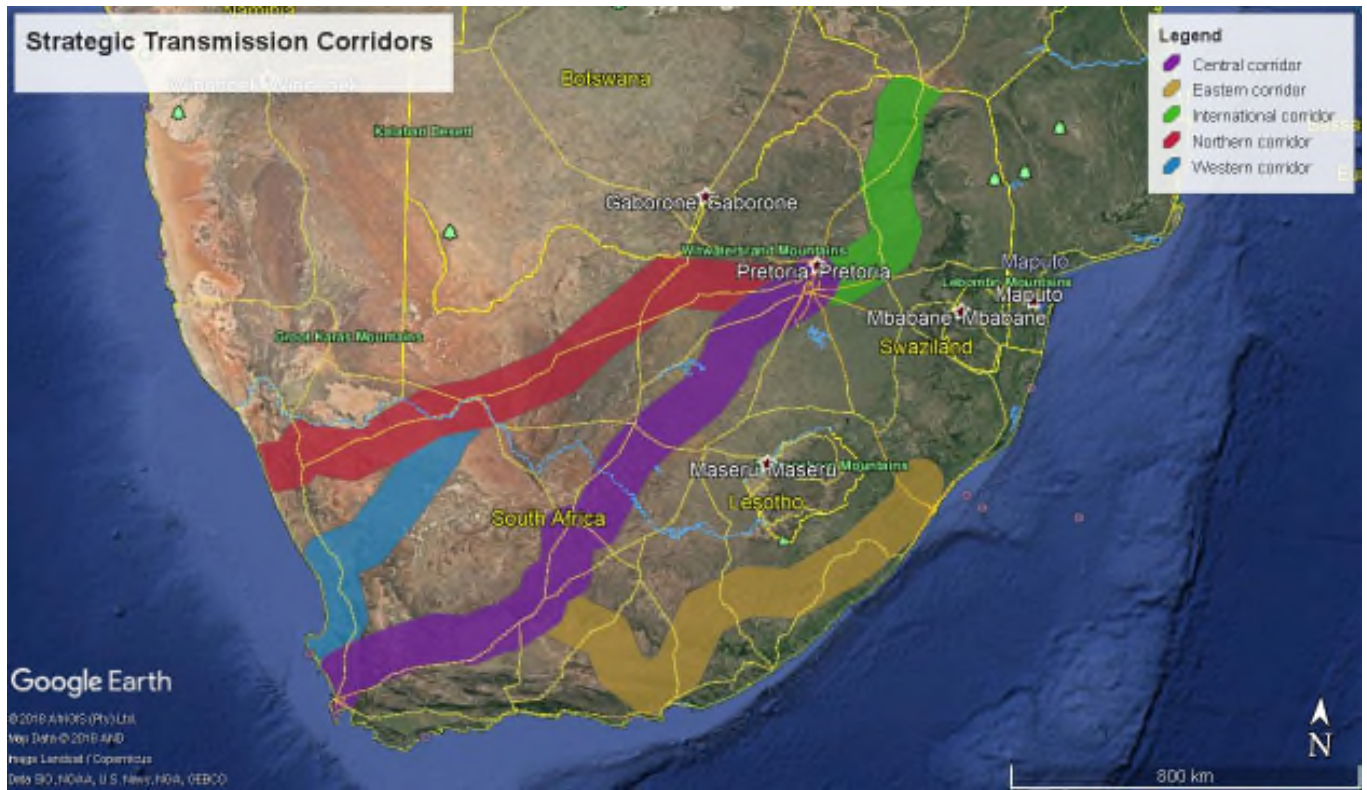


Figure 5.1: Strategic Power Corridors identified as the optimal locations where power infrastructure expansion is needed to enable the balancing of future demand and supply requirements while minimising negative impacts on the environment

CHAPTER 6: APPROACH TO UNDERTAKING THE BASIC ASSESSMENT PROCESS

In terms of the EIA Regulations of December 2014 published in terms of NEMA (Act No. 107 of 1998) as amended, the construction and operation of the grid connection infrastructure for the Aggeneys 2 solar PV facility is a listed activity requiring environmental authorisation. Due to the triggering of Activity 11(i) of Listing Notice 1, of the EIA Regulations, 2014 (as amended), a BA process must be undertaken in support of the application for authorisation.

The BA process aims at identifying and describing potential environmental issues associated with the development of the proposed substation and power line and associated infrastructure⁹. In order to ensure that a comprehensive assessment is provided to the competent authority and I&APs regarding the impacts of the proposed infrastructure, detailed independent specialist studies were undertaken as part of the BA process. In addition, a comprehensive consultation process has been commenced, and include I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, ward councillors and other key stakeholders. This chapter serves to outline the process that was followed during the BA process.

6.1 Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA Report includes the following information required in terms of Appendix 1: Content of the BA Report:

Requirement	Relevant Section
3(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for.	All listed activities triggered as a result of the development of the grid connection infrastructure have been included in section 6.2, Table 6.1 . The specific project activity relating to the relevant triggered listed activity has also been included in Table 6.1 .
3(h)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	The details of the public participation process undertaken for the grid connection infrastructure has been included and described in section 6.3.2.
3(h)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	All comments raised during the 30-day review period of the BA Report and through consultation with I&APs will be included as part of a Comments and Responses report being submitted as part of the final BA Report to DEA for decision-making.
3(h)(vi) 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.	The methodology used to assess the significance of the impacts of the grid connection infrastructure has been included in section 6.4.

⁹ Aggeneys 2, the solar PV facility associated with the grid connection infrastructure, is assessed as part of a separate Basic Assessment process.

Requirement	Relevant Section
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	The assumptions and limitations of the BA process being undertaken for the grid connection infrastructure are included in section 6.5.

6.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to the grid connection infrastructure as identified at this stage in the process are described in more detail under the respective sub-headings.

6.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant EA.

The need to comply with the requirements of the EIA Regulations published under NEMA ensures that developers are provided with the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project.

The BA process being conducted for the grid connection infrastructure is being undertaken in accordance with Section 24 (5) of NEMA. Section 24 (5) of NEMA pertains to Environmental Authorisations (EAs) and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

Table 6.1 details the listed activities in terms of the EIA Regulations of December 2014 (as amended) that apply to the grid connection infrastructure, and for which an Application for Environmental Authorisation has been submitted. The table also includes a description of the specific project activities which relate to the applicable listed activities.

Table 6.1: Listed activities as per the EIA regulations that are triggered by the grid connection infrastructure.

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
GN 327, 08 December 2014 (as amended on 07 April 2017)	11 (i)	<p>The development of facilities or infrastructure for the transmission and distribution of electricity -</p> <p>(i). outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p> <p>The grid connection infrastructure will include the construction and operation of a collector substation and a single-circuit power line (up to 220kV in capacity) to facilitate the connection of the Aggeneys 2 solar PV facility to the national grid.</p>
GN 327, 08 December 2014 (as amended on 07 April 2017)	19	<p>The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.</p> <p>The development of grid connection infrastructure will require the removal or moving of soil within a watercourse during the construction of the infrastructure. Ephemeral watercourses have been identified within the project development corridors and the removal or moving of ~10m³ of soil will be required.</p>
GN 327, 08 December 2014 (as amended on 07 April 2017)	27	<p>The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.</p> <p>The development of the collector substation will require the clearance of indigenous vegetation present of ~1.25ha in extent.</p>
GN 327, 08 December 2014 (as amended on 07 April 2017)	28(ii)	<p>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</p> <p>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.</p> <p>The total area of land to be developed for the collector substation is larger than 1 hectare and is currently used for agricultural purposes.</p>
GN 324, 08 December 2014 (as amended on 07 April 2017)	4(g)(ii) (bb)(<u>ee</u>)	<p>The development of a road wider than 4 meters with a reserve less than 13.5 meters (g) in the Northern Cape (ii) outside urban areas (bb) in National Protected Areas Expansion Strategy Focus Areas; and in (<u>ee</u>) <u>Critical biodiversity areas</u>.</p> <p>The grid connection infrastructure will require the development of access roads/tracks with a width of between 4 and 8m and with a length of 2km where required. The study area is located outside of urban areas and within the Kamiesberg Bushmanland Augrabies National Protected Areas Expansion Strategy (NPAES) area and within a Critical Biodiversity Area (CBA).</p>

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
GN 324, 08 December 2014 (as amended on 07 April 2017)	10(g) (ii) (iii) (bb)	<p>The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic meters in the (g) Northern Cape, (ii) in areas within a watercourse or wetland; or within 100 meters from the edge of a watercourse or wetland; and (iii) outside urban areas, (bb) in National Protected Areas Expansion Strategy Focus Areas.</p> <p>The grid connection infrastructure will require the storage and handling of dangerous goods for the construction and operation of the substation. Containers with a combined capacity of no more than 80m³ will be required. Ephemeral watercourses have been identified within the project development corridors and storage of dangerous goods will be located within 100m of the watercourses. The study area is located within the Kamiesberg Bushmanland Augrabies National Protected Areas Expansion Strategy (NPAES) area.</p>
GN 324, 08 December 2014 (as amended on 07 April 2017)	14(ii) (a) (c) (g) (ii) (bb) (ff)	<p>The development of (ii) infrastructure or structures with a physical footprint of 10 square meters or more, where such development occurs (a) within a watercourse, or (c) within 32 meters of a watercourse, measured from the edge of a watercourse, in (g) the Northern Cape, (ii) outside urban areas, in (bb) National Protected Areas Expansion Strategy Focus Areas and <u>(ff) Critical biodiversity areas or ecosystem services areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</u></p> <p>The development of the grid connection infrastructure will require the construction of infrastructure (i.e. access roads/tracks) within or within 32m of ephemeral watercourses identified within the project development corridors. The project development corridors are located within the Northern Cape, outside urban areas and within the Kamiesberg Bushmanland Augrabies National Protected Areas Expansion Strategy (NPAES) area. A section of the development corridors is located within a Critical Biodiversity Area (CBA).</p>

6.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e. the Regional DWS). Water use is defined broadly and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 6.2 lists Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a GA or in the form of a WUL. The table also includes a description of those project activities that relate to the applicable Water Uses.

Table 6.2: List of Water Uses published under Section 21 of NWA, as amended.

Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse. Ephemeral watercourses traverse/are located within the project development corridors.
	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. Ephemeral watercourses traverse/are located within the project development corridors.

In the event that the flow of water in the ephemeral watercourses is affected and the bed, banks or course characteristics are altered, application would need to be made for a WUL in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GNR 267), or a GA registered in accordance with the requirements of Revision of General Authorisation. The process of applying for a WUL or GA registration will only be completed once a positive EA has been received and the solar facility project (and associated grid connection infrastructure) is selected as a Preferred Bidder. This is in line with the requirements of the DWS.

6.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

- 1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –
- a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
 - b. the construction of a bridge or similar structure exceeding 50m in length;
 - c. any development or other activity which will change the character of a site –
 - i). exceeding 5 000m² in extent; or
 - ii). involving three or more existing erven or subdivisions thereof; or
 - iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of a development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the authority of the relevant resource with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed grid connection infrastructure, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668).

6.3 Overview of the Basic Assessment Process for the grid connection infrastructure for Aggeneys 2

Key tasks undertaken for the BA included:

- » Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- » Submission of the completed Application for Environmental Authorisation to the competent authority (i.e. DEA) in terms of Regulations 5 and 6 of the EIA Regulations, 2014 (GNR 326), as amended.
- » Undertaking a public participation process in accordance with Chapter 6 of GNR326, and the Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa (hereinafter referred to as "the Guidelines") in order to identify issues and concerns associated with the proposed project.
- » Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR326), as amended.
- » Preparation of a BA report and EMPr in accordance with the requirements of Appendix 1 and Appendix 4 of GNR326.
- » 30-day public and authority review period of the BA report.
- » Compilation of a C&R report detailing the comments raised by I&APs, addressing these comments in detail and finalisation of the BA report.
- » Submission of a final BA report to the DEA for review and decision-making.

The tasks are discussed in detail in the sub-sections below.

6.3.1. Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

In terms of GN R779 of 01 July 2016, the National Department of Environmental Affairs (DEA) has been determined as the Competent Authority for all projects which relate to the Integrated Resource Plan for Electricity (IRP) 2010 – 2030, and any updates thereto. Through the decision-making process, the DEA will be supported by the Northern Cape Department of Environment and Nature Conservation (DENC) as a commenting authority.

Consultation with the regulating authorities (i.e. DEA and DENC) as well as with all other relevant Organs of State will continue throughout the BA process. To date, this consultation has included the following:

- » Submission of the project notification letters and application form for Environmental Authorisation to the DEA and DENC.
- » Submission of the BA report for review and comment by:
 - * The competent and commenting authorities.
 - * State departments that administer laws relating to a matter affecting the environment relevant to an application for Environmental Authorisation.
 - * Organs of State that have jurisdiction in respect of the activity to which the application relates.

A record of all authority correspondence undertaken during the BA process is included in **Appendix B** and **Appendix C**.

6.3.2. Public Participation Process

Public Participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GNR 326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GNR 326) (as amended) and is being followed for this proposed project.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the BA process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the BA process in the following ways:

During the BA process:

- » provide an opportunity to submit comments regarding the project;
- » assist in identifying reasonable and feasible alternatives;
- » contribute relevant local information and knowledge to the environmental assessment;
- » allow registered I&APs to verify that their comments have been recorded, considered and addressed, where applicable, in the environmental investigations;
- » foster trust and co-operation;
- » generate a sense of joint responsibility and ownership of the environment; and
- » comment on the findings of the environmental assessments.

During the decision-making phase:

- » to advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process, therefore, aims to ensure that:

- » Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review.
- » The information presented during the public participation process is presented in such a manner, i.e. local language and technical issues, that it avoids the possible alienation of the public and prevents them from participating.
- » Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.

- » Various ways are provided to I&APs to correspond and submit their comments i.e. fax, post, email.
- » An adequate review period is provided for I&APs to comment on the findings of the BA Report.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, as amended, the following key public participation tasks have been undertaken:

- » Fix a notice board at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- » Give written notice to:
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to an alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to an alternative site where the activity is to be undertaken;
 - (iv) 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;
 - (v) the municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
 - (vii) any other party as required by the competent authority.
- » Place an advertisement in one local newspaper.
- » Open and maintain a register of I&APs and Organs of State.
- » Release a BA Report for a 30-day review period.
- » Prepare a Comments and Responses (C&R) report which documents the comments received on the BA process and the responses provided by the project team.

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations, 2014 (as amended), the following summarises the key public participation activities conducted to date.

i. Stakeholder identification and Register of Interested and Affected Parties

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
- (a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
 - (b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
 - (c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs were identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the greater study area and a registration process involving the completion of a reply form. Key stakeholders and affected and surrounding landowners were also identified and registered on the project database. Other stakeholders were required to formally register their interest in the project. An initial list of key stakeholders identified and registered is listed in **Table 6.3**.

Table 6.3: List of Stakeholders identified for the inclusion in the project database during the public participation process for the grid connection infrastructure for Aggeneys 2

Organs of State
National Government Departments
Department of Agriculture, Forestry and Fisheries (DAFF)
Department of Energy (DoE)
Department of Environmental Affairs (Biodiversity & Conservation Directorate)
Department of Mineral Resources (DMR)
Department of Rural Development and Land Reform (DRDLR)
Department of Water and Sanitation (DWS)
Government Bodies and State-Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
Air Traffic and Navigation Services (ATNS)
Provincial Government Departments
Northern Cape Department of Agriculture
Northern Cape Department of Environment and Nature Conservation (DENC)
Northern Cape Department of Roads and Public Works
Ngwao Boswa Kapa Bokone (NBKB)
Local Government Departments
Namakwa District Municipality
Khâi-Ma Local Municipality
Key Stakeholders
BirdLife South Africa
Endangered Wildlife Trust (EWT)
Wildlife and Environment Society of South Africa (WESSA)
Landowners
Affected landowners, tenants and occupiers
Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014 (as amended), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names, contact details and addresses of:

- » all persons who requested to be registered on the database in writing and disclosed their interest in the project;
- » all Organs of State which hold jurisdiction in respect of the activity to which the application relates;
- » all persons identified and approached through networking or a chain referral system to identify any other stakeholder (i.e. ratepayers associations); and
- » all persons who submitted written comments or attended meetings during the public participation process.

I&APs were encouraged to register their interest in the BA process from the onset of the project, and the identification and registration of I&APs was on-going for the duration of the BA process. The database of I&APs was updated throughout the BA process and will act as a record of the I&APs involved in the public participation process.

ii. Advertisements and Notifications

- 40.(2)(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.
- 40.(2)(b) Giving written notice, in any of the manners provided for in section 47D¹⁰ 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 and to any alternative site where the activity is to be undertaken;
 - (ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
 - (iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (iv) The municipality which has jurisdiction in the area;
 - (v) Any organ of state having jurisdiction in respect of any aspect of the activity; and
 - (vi) Any other party as required by the competent authority.
- 40.(2)(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;
- 40.(2)(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
- 40.(2)(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 –
- (i) Illiteracy;

¹⁰ Section 47D of NEMA pertains to the delivery of documents, and states that:

- (1) A notice or other document in terms of this Act or a specific environmental management Act may be issued to a person –
- (a) By delivering it by hand;
 - (b) By sending it by registered mail –
 - (i) To that person's business or residential address; or
 - (ii) In the case of a juristic person, to its registered address or principal place of business;
 - (bA) By faxing a copy of the notice or other document to the person, if the person has a fax number;
 - (bB) By e-mailing a copy of the notice or other document to the person, if the person has an e-mail address; or
 - (bC) By posting a copy of the notice or other document to the person by ordinary mail, if the person has a postal address;
 - (c) Where an address is unknown despite reasonable enquiry, by publishing it once in the Gazette and once in a local newspaper circulating in the area of that person's last known residential or business address.
- (2) A notice or other document issued in terms of subsection (1)(b), (bA), (bB), (bC) or (c) must be regarded as having come to the notice of the person, unless the contrary is proved."

- (ii) Disability; or
- (iii) Any other disadvantage.

The BA process was announced with an invitation to the Organs of State, potentially affected and neighbouring landowners and the general public to register as I&APs and to actively participate in the process. This was achieved via the following:

- » Compilation of a background information document (BID) (refer to Appendix C3) providing technical and environmental details on the project and how to become involved in the BA process. The BID was distributed to identified stakeholders and I&APs. The BID was also available electronically on the Savannah Environmental website (<http://www.savannahsa.com/public-documents/energy-generation>).
- » Site notices were placed on 10 April 2019 announcing the BA process at visible points along the boundary of the development corridors, in accordance with the requirements of the EIA Regulations. Photographs and the GPS coordinates of the site notices are contained in Appendix C2.
- » BA process notification letters announcing the BA process, notifying Organs of State, potentially affected and neighbouring landowners, as well as registered stakeholders/I&APs of the grid connection infrastructure, providing background information of the project and inviting I&APs to register on the project's database, were distributed via email on **08 April 2019**. The evidence of the distribution of the process notification letters is contained in Appendix C of this final BA Report.
- » A newspaper advert was placed in the Gemsbok Newspaper announcing the BA process and inviting comments on the BA Report on 24 April 2019 prior to the commencement of the 30-day public review period. The details of the newspaper advert placement are included in Appendix C2 of the final BA Report.
- » The final BA Report for review was made available for review by I&APs for a 30-day review period from 02 May 2019 to 03 June 2019. CD and hard copy versions of the BA Report were circulated to Organs of State via courier at the commencement of the review period. The BA Report was also available on the Savannah Environmental website. The evidence of distribution of the BA Report is be included in the final BA Report, which will be submitted to the DEA.

iii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the greater study area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities have been and will continue to be provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

Table 6.4: Public involvement for the grid connection infrastructure for Aggeneys 2

Activity	Date
Distribution of the process notification and stakeholder reply form announcing the BA process and inviting I&APs to register on the project database.	08 April 2019
Placement of site notices on-site and in public places.	10 April 2019
Distribution of the BID	08 April 2019
Distribution of notification letters announcing the availability of the BA Report for review for a 30-day public review and comment period. These letters were distributed to Organs of State, Government Departments,	30 April 2019

Activity	Date
Ward Councillors, landowners within the greater study area (including neighbouring landowners) and key stakeholder groups.	
Advertising of the availability of the BA Report for a 30-day review period in Gemsbok newspaper.	24 April 2019
The 30-day review period for the BA Report for comment.	02 May 2019 – 03 June 2019 (considering public holidays and national voting day)
Focus Group Meetings: <ul style="list-style-type: none"> » Affected Landowners; » Adjacent Landowners; » Authorities and Key Stakeholders (including organs of state, local municipality and community-based organisations) 	<u>16 May 2019</u>
On-going consultation (i.e. telephone liaison; e-mail communication) with all I&APs	Throughout BA Report 30-day review period

The purpose of the abovementioned meetings was to engage with key stakeholders to ensure that key requirements/comments are noted and addressed as part of the BA process. Records of all consultation undertaken are included in **Appendix C**.

iv. Registered I&APs entitled to Comment on the BA Report and Plans

- 43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.
- (2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.
- 44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.
- (2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –
- (a) A lack of skills to read or write;
 - (b) Disability; or
 - (c) Any other disadvantage;
- Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database have been notified by means of a notification letter (e-mail and registered mail) of the release of the BA Report for a 30-day public review period, invited to provide comment on the BA Report, and informed of the manner in which, and timeframe within which such comment must be made. The notification was distributed prior to the commencement of the 30-day review period, on 30 April 2019.

v. Identification and Recording of Comments

Comments raised by I&APs over the duration of the BA process are synthesised into a Comments and Responses (C&R) report which is included in **Appendix C8** of the final BA Report. The C&R report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised during the public participation process.

The C&R report consists of written comments received.

Meeting notes were drafted of all the meetings conducted during the BA Report 30-day review period and are included in **Appendix C7**. The key issues emanating from the public participation process are summarised below in **Table 6.4**.

Summary of main issues raised by I&APs	Summary of response from EAP
<p><u>The DEA indicated that the total length of the access roads/tracks in section 5, page 6 of 30 of the application was not provided. The Department requested that such information be included in the amended application form which should be submitted to the Department with the final BA Report.</u></p>	<p><u>The EAP acknowledged the comment and an amended application form indicating the total length of the access/track roads required by the applicant has been included in the application form submitted to the Department with the final BA Report.</u></p>
<p><u>The DEA also noted that section 7, page 12 of 30 of the application form listed Activity 14 (ii) (a) (c) (ii) (bb) and the portion of the activity description relates to sections of the power line corridors which are located within a Critical Biodiversity Area (CBA). However, the applicable sub-activity that relates to a CBA, sub-activity (ff) was not included in the listed activity applied for. The Department requested that this sub-activity be included in the amended application form.</u></p>	<p><u>The application form submitted to the Department with the final BA Report includes the correct listed activities applicable to the project description of the grid connection infrastructure for the Aggeneys 2 solar PV facility.</u></p>
<p><u>The DEA further requested that a sensitivity map inclusive of the CBAs as illustrated in the Northern Cape Critical Biodiversity Areas map.</u></p>	<p><u>A sensitivity map inclusive of the CBAs as shown in the Northern Cape Critical Biodiversity Areas map is included in Appendix L of the final BA Report.</u></p>
<p><u>Mr Simphiwe Masilela of the Air Traffic Services (ATNS) indicated that the proposed grid connection corridors fall in close vicinity to the Aggeneys Air Strip (FAAG), which is within the boundaries of the ICAO Annex 14 Surfaces associated with the airport. Further, he indicated that ATNS would conduct a formal assessment to determine whether the development of the grid connection infrastructure for the Aggeneys 1 solar PV facility would affect the line of sight in any way. In addition, Mr. Masilela further indicated that this assessment may include a glint and glare impact assessment which will be done in accordance with SACAA requirements.</u></p>	<p><u>The EAP acknowledged the comment from Mr Masilela. The final BA Report of the Aggeneys 1 solar PV facility submitted to the Department of Environmental Affairs on 31 May 2019 includes a detailed and ground-visual impact assessment which indicated that the glint and glare impacts of the solar PV facility would be of a low significance following the implementation of the recommended mitigation measures. Furthermore, the comment was forwarded to the applicant for consideration.</u></p>

6.4 Assessment of Issues Identified through the BA Process

Issues identified as requiring investigation, as well as the specialist consultants involved in the assessment of these impacts are indicated in **Table 6.5** below.

Table 6.5: Specialist consultants appointed to evaluate the potential impacts associated with the grid connection infrastructure for Aggeneys 2

Specialist Name	Specialist Company	Specialist Area of Expertise	Appendices
Simon Todd	3Foxes Biodiversity Consulting	Ecology Impact Assessment.	Appendix D
Eric Hermann	3Foxes Biodiversity Consulting	Avifauna Impact Assessment	Appendix E
Shaun Taylor Gideon Raath	Savannah Environmental Peer reviewed by Steven Burton of SiVEST	Freshwater Impact Assessment	Appendix F
Garry Paterson	Agriculture Research Council –Soil, Climate and Water	Soils and Agricultural Potential Impact Assessment	Appendix G
Jon Marshall	Environmental Planning and Design	Visual Impact Assessment	Appendix H
Jayson Orton and John E. Almond	ASHA Consulting and Natura Viva CC	Heritage Impact Assessment (including the Palaeontology Impact Assessment)	Appendix I
Neville Bews	Neville Bews and Associates	Social Impact Assessment	Appendix J

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the grid connection infrastructure. Issues were assessed in terms of the following criteria:

- » The **nature**, a description of what causes the effect, what will be affected, and how it will be affected;
- » The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high);
- » The **duration**, wherein it is indicated whether:
 - * The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - * The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - * Medium-term (5–15 years) – assigned a score of 3;
 - * Long term (> 15 years) - assigned a score of 4;
 - * Permanent - assigned a score of 5.
- » The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - * 0 is small and will have no effect on the environment;
 - * 2 is minor and will not result in an impact on processes;
 - * 4 is low and will cause a slight impact on processes;
 - * 6 is moderate and will result in processes continuing but in a modified way;
 - * 8 is high (processes are altered to the extent that they temporarily cease);
 - * 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
 - * Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
 - * Assigned a score of 2 is improbable (some possibility, but low likelihood);
 - * Assigned a score of 3 is probable (distinct possibility);
 - * Assigned a score of 4 is highly probable (most likely);
 - * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- » The **status**, which is described as either positive, negative or neutral;
- » The degree to which the impact can be reversed;

- » The degree to which the impact may cause irreplaceable loss of resources;
- » The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S = (E+D+M) P$; where

S = Significance weighting.

E = Extent.

D = Duration.

M = Magnitude.

P = Probability.

The **significance weightings** for each potential impact are as follows:

- » **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area);
- » **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated);
- » **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

As the Applicant has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations, 2014 (as amended)), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. An Environmental Management Programme (EMPr) is included as **Appendix K**.

6.5 Assumptions and Limitations of the BA Process

The following assumptions and limitations are applicable to the studies undertaken within this BA process:

- » All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- » It is assumed that the alternative corridors identified by the developer represent a technically suitable site for the establishment of the grid connection infrastructure for Aggeneys 2, which is based on the design undertaken by technical consultants for the project.
- » This report and its investigations are project-specific, and consequently, the environmental team did not evaluate any other power generation alternatives.

Refer to the specialist studies in **Appendices D – J** for specialist study specific limitations.

6.6 Legislation and Guidelines that have informed the preparation of this Basic Assessment Report

The following legislation and guidelines have informed the scope and content of this BA Report:

- » National Environmental Management Act (Act No. 107 of 1998);

- » EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended in GNR R326 in Government Gazette No 40772 of April 2017);
- » Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations; and
- » International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Table 6.6 provides an outline of the legislation permitting requirements applicable to the grid connection infrastructure as identified at this stage in the project process.

Table 6.6: Applicable Legislation, Policies and/or Guidelines associated with the development of the grid connection infrastructure for Aggeneys 2

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	<p>In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that:</p> <p><i>“Everyone has the right –</i></p> <ul style="list-style-type: none"> » <i>To an environment that is not harmful to their health or well-being, and</i> » <i>To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</i> <ul style="list-style-type: none"> * <i>Prevent pollution and ecological degradation,</i> * <i>Promote conservation, and</i> * <i>Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”</i> 	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right, however, implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the “right to an environment clause” includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No 107 of 1998) (NEMA)	<p>The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326).</p> <p>In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p> <p>A Basic Assessment Process is required to be undertaken for the proposed project.</p>	<p>DEA – Competent Authority</p> <p>Northern Cape DENC – Commenting Authority</p>	The listed activities triggered by the proposed project have been identified and are being assessed as part of the BA process currently underway for the grid connection infrastructure. The BA process will culminate in the submission of a final BA Report to the competent authority in support of the Application for Environmental Authorisation.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Environmental Management Act (No 107 of 1998) (NEMA)	<p>In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.</p> <p>In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically and to consider the cumulative effect of a variety of impacts.</p>	DEA Northern Cape DENC	While no permitting or licensing requirements arise directly by virtue of the proposed grid connection infrastructure, this section finds the application through the consideration of potential cumulative, direct, and indirect impacts.
Environment Conservation Act (No. 73 of 1989) (ECA)	<p>The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces.</p> <p>The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties.</p> <p>In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).</p>	DEA Northern Cape DENC Khâi-Ma Local Municipality	Noise impacts are expected to be associated with the construction phase of the project. Considering the location of the project site in relation to residential areas and provided that appropriate mitigation measures are implemented, construction noise is unlikely to present a significant intrusion to the local community. There is, therefore, no requirement for a noise permit in terms of the legislation.
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use), is permissible	Regional Department of Water and Sanitation	Ephemeral watercourses are present within the project development corridors, as

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>under a GA, or if a responsible authority waives the need for a licence.</p> <p>Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.</p> <p>Consumptive water uses may include taking water from a water resource (Section 21(a)), and storing water (Section 21(b)).</p> <p>Non-consumptive water uses may include impeding or diverting of flow in a watercourse (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).</p>		<p>identified within the Freshwater Impact Assessment (Appendix F).</p> <p>Where development activities impede or divert the flow of water in a watercourse, or alter the bed, banks, course or characteristics of watercourse, Section 21(c) and 21(i) of the NWA would be triggered, and the project proponent would need to apply for a WUL or register a GA with the DWS.</p>
<p>Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)</p>	<p>In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.</p> <p>Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.</p>	<p>Department of Mineral Resources</p>	<p>Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the grid connection infrastructure, and as a result, a mining permit or EA is not required to be obtained.</p> <p>In terms of Section 53 of the MPRDA, approval is required from the Minister of Mineral Resources to ensure that the proposed grid connection infrastructure does not sterilise a mineral resource that</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			might occur in the project development corridors.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	<p>The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribes the general measures for the control of dust in all areas and provide a standard for acceptable dustfall rates for residential and non-residential areas.</p> <p>In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme.</p> <p>Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.</p>	Northern Cape DENC / Namakwa District Municipality	In the event that the construction of the grid connection infrastructure results in the generation of excessive levels of dust the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed. However, with mitigation measures implemented, construction of the grid connection infrastructure is not anticipated to result in significant dust generation.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	<p>Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance.</p> <p>Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites.</p> <p>Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority.</p> <p>Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority</p>	<p>South African Heritage Resources Agency</p> <p>Ngwao Boswa Kapa Bokone (NBKB)</p>	A full Heritage Impact Assessment (HIA) (with fieldwork) has been undertaken as part of the BA process (refer to Appendix I of this BA Report). No heritage resources were identified within the assessed project development corridors, although several isolated flaked stone artefacts made in quartz and quartzite can be expected to occur, but they are of no consequence and are attributed to background scatter. From a palaeontological perspective, the area is underlain by Late Caenozoic superficial sediments such as wind-blown sands as well as alluvial and sheetwash gravels. These surface sediments are

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>and furnish it with details regarding the location, nature, and extent of the proposed development.</p> <p>Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.</p>		<p>generally of low to very low palaeontological sensitivity.</p> <p>Should a heritage resource be impacted upon, a permit may be required from SAHRA or Ngwao Boswa Kapa Bokone (NBKB) in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668). This will be determined once the final location of the grid connection infrastructure within the project development corridors has been determined.</p>
<p>National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM: BA)</p>	<p>Section 53 of NEM: BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process.</p> <p>Three government notices have been published in terms of Section 56(1) of NEM: BA as follows:</p> <ul style="list-style-type: none"> » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). <p>It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National</p>	<p>DEA Northern Cape DENC</p>	<p>Under NEM: BA, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species.</p> <p>No species of conservation concern were identified within the project development corridors, and the species present are restricted to more widespread species. The abundance of plant species of conservation concern within the project development corridors is low and no significant impacts on such species can be expected (Ecological Impact Assessment included as Appendix D).</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM: BA)</p>	<p>list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).</p> <p>Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM: BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out.</p> <p>Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).</p>	<p>DEA Northern Cape DENC</p>	<p>Restricted Activities and the respective requirements applicable to persons in control of different categories of listed invasive species are contained within the Alien and Invasive Species Regulations (GNR 598) published under NEM: BA, together with the requirements of the Risk Assessment to be undertaken.</p>
<p>Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)</p>	<p>Section 05 of CARA provides for the prohibition of the spreading of weeds.</p> <p>Regulation 15 of GNR 1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur.</p> <p>Regulation 15E of GNR 1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.</p>	<p>Department of Agriculture, Forestry and Fisheries (DAFF)</p>	<p>CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented.</p> <p>The permission of DAFF will be required if the grid connection infrastructure requires the draining of vleis, marshes or water sponges on land outside urban areas. However, this is not anticipated to be relevant to the project.</p> <p>In terms of Regulation 15E (GNR 1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods:</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			<ul style="list-style-type: none"> » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation (4). » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
<p>National Forests Act (No. 84 of 1998) (NFA)</p>	<p>According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734.</p> <p>The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any</p>	<p>DAFF</p>	<p>A licence is required for the removal of protected trees. It is, therefore, necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the project development corridors that cannot be reasonably avoided for the submission of relevant permits to authorities prior to the disturbance of these individuals.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>other manner acquire or dispose of any protected tree, except under a licence granted by the Minister".</p>		<p>The Ecological Impact Assessment undertaken as part of the BA Report included a site visit which allowed for the identification of any protected tree species that may require a license in terms of the NFA within the project development corridors (refer to Appendix D of this BA Report).</p> <p>No NFA-protected tree species were identified within the project development corridors.</p>
<p>National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)</p>	<p>Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it.</p> <p>Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.</p>	<p>DAFF</p>	<p>While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the grid connection infrastructure, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and personnel for firefighting purposes.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>Hazardous Substances Act (No. 15 of 1973) (HAS)</p>	<p>This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <ul style="list-style-type: none"> » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>	<p>Department of Health (DoH)</p>	<p>It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the Department of Health (DoH).</p>
<p>National Environmental Management: Waste Act (No. 59 of 2008) (NEM: WA)</p>	<p>The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. 	<p>DEA – hazardous waste</p> <p>Northern Cape DENC – general waste</p>	<p>No listed activities are triggered by the grid connection infrastructure and therefore no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>In terms of the Regulations published in terms of NEM: WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented. 		
<p>National Road Traffic Act (No. 93 of 1996) (NRTA)</p>	<p>The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.</p> <p>Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.</p> <p>The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions,</p>	<p>SANRAL – national roads</p> <p>Northern Cape DoT</p>	<p>An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads (transport vehicles exceeding the dimensional limitations (length) of 22m). Depending on the trailer configuration and height when loaded, some of the on-site substation components may not meet specified dimensional limitations (height and width) and will thus require a permit.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.		
Provincial Policies / Legislation			
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	<p>This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project:</p> <ul style="list-style-type: none"> » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species; <p>The Act provides lists of protected species for the Province.</p>	Northern Cape Department of Environment and Nature Conservation (DENC).	<p>A collection/destruction permit must be obtained from Northern Cape Nature Conservation for the removal of any protected plant or animal species found on site.</p> <p>The Ecological Impact Assessment (Appendix D) identified widespread species such as the provincially protected <i>Boscia foetida subsp foetida</i>, and <i>Hoodia gordonii</i> within the project development corridors.</p> <p>The abundance of plant species of conservation concern within the project development corridors is low and no significant impacts on such species can be expected.</p>

CHAPTER 7: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the local environment. This information is provided in order to assist the reader in understanding the possible effects of the project on the environment within which it is proposed to be developed. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the grid connection infrastructure for the Aggeneys 2 solar PV facility have been described. This information has been sourced from both existing information available for the area as well as collected field data by specialist consultants and aims to provide the context within which this BA process is being conducted.

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the final BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	<p>The environmental attributes associated with the project development corridors and the broader environment are described and considered within this chapter and include the following:</p> <ul style="list-style-type: none"> » The regional setting within which the project development corridors are located is described in section 7.2. » The climatic conditions of the area within which the project development corridors are located are discussed in section 7.3. » The biophysical characteristics of the project development corridors and the surrounding areas are described in section 7.4. This includes the topography and terrain, geology, soils and agricultural potential and the ecological profile of the project development corridors (i.e. vegetation, fine-scale habitats, critical biodiversity areas and broad-scale processes, freshwater features, terrestrial fauna and avifauna). » The heritage of the affected environment (including the archaeology, palaeontology and cultural landscape) is discussed in section 7.5. » The visual quality of the affected environment is discussed in section 7.6. » The social context within which the project development corridors is located is described in section 7.7.

A more detailed description of each aspect of the affected environment is included in the specialist reports contained within the **Appendices D - K**.

7.2. Regional Setting

The broader study area and the alternative corridors proposed for the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility is located within the northern portion and in close proximity to the northern boundary of the Northern Cape Province. The Province is situated in the north-western corner of South Africa and has a land area of 372,889 km², therefore occupying approximately 30% of South Africa's land area and making it the largest province in South Africa even though it has the smallest population.

Aggeneys is a mining town situated between Pofadder and Springbok in the north-western section of the Northern Cape Province. The town is located in the Khâi-Ma Local Municipality and within the greater Namakwa District Municipality. The alternative corridors proposed for the grid connection infrastructure falls within ward 4 of the Khâi-Ma Local Municipality. A regional map of the study area and the corridors is provided in **Figure 7.1**. Khâi -Ma Local Municipality is a Category B municipality. The seat of the municipality is Pofadder, which is located ~ 50km north-east of the corridor. The towns located within the municipal area include Aggeneys, Pella, Pofadder, Onseepkans and Witbank. Farming settlements are also located within the municipal area, which includes Dwagga Soutpan, Vrugbaar, Raap-en-Skraap and Klein Pella. The municipal area is characterised by vast tracts of flat, undeveloped land and arid Karoo landscape, with scattered mountainous areas and inselbergs, as well as ephemeral rivers.

The town of Aggeneys is located to the west of the project development corridors and is the closest town. This mining town is largely restricted to service employees of the mining operations in the immediate area. Other towns within the surrounding area of the project development corridors include Pella, located ~ 36km to the north, Pofadder, located ~50km to the north-east, Steinkopf, located ~115km to the west, and Springbok, located ~ 104km to the south-west. Aggeneys includes a primary and secondary school, police station, clinic, golf course and tarred airstrip.

The Black Mountain Mining company is located within the town of Aggeneys and the residents of Aggeneys are predominantly employees of the Black Mountain Mine. The mine comprises two shafts, known as the Deep and Swartberg Shafts. The mine produces copper, lead, zinc and silver.

The identification of the grid connection infrastructure for the Aggeneys 2 solar PV facility was informed by the closest and most feasible grid connection point into the national grid, consultation with Eskom network planners and the consideration of the routing of other similar infrastructure in the area. Through this process, two grid connection infrastructure alternatives for the Aggeneys 2 solar PV facility were identified as follows:

- » **Alternative 1:** A collector substation located adjacent to the facility substation in the south-eastern corner of the Aggeneys 2 PV facility project site, as well as a single-circuit power line of up to 220kV and approximately 13km in length, connecting to the Aggeneys MTS. This corridor is located adjacent and parallel to the existing Aggeneys – Aries 400kV line. This is considered to be the preferred option from a technical perspective due to the fact that the power line is shorter compared to Alternative 2.
- »
- » **Alternative 2:** A collector substation located adjacent to the facility substation, as well as a single-circuit power line of up to 220kV and approximately 17km in length connecting to the Aggeneys MTS. This is considered to be the alternative option from a technical perspective.

The project development corridors are also located within the Springbok Renewable Energy Development Zone (REDZ) and the Northern Transmission Corridor. These are geographical areas of strategic importance for the development of large scale solar photovoltaic and wind energy development activities, and grid connection infrastructure. They have been earmarked by Government for the development of renewable energy facilities and grid connection infrastructure projects within South Africa. This will result in the development of multiple renewable energy developments (including solar PV facilities) and grid connection infrastructure projects being developed within the Aggeneys area, which will ultimately lead to a concentrated node of renewable energy facilities.

Access to Aggeneys and the project development corridors is via the national road, N14. The town of Aggeneys is located to the north of the N14 and the project development corridors, whereas the Aggeneys 2 solar PV facility is located to the east of the town. The Loop 10 gravel road provides direct access to the project development corridors and is located parallel to the northern boundary of the Alternative 2 grid connection corridor.

The grid connection infrastructure will be connected to the Aggeneis Main Transmission Substation (MTS), which is located approximately 13km south-west of the Aggeneys 2 solar PV facility, with the Aggeneis/Aries 400kV, Aggeneis/Harib 220kV and the Aggeneis/Nama 220kV overhead power lines running from and into the substation. In terms of Eskom's 2019-2028 Transmission Development Plan (TDP), the document currently stipulates the following planned grid infrastructure roll-outs for the Aggeneis MTS:

- » TDP scheme "Gromis-Nama-Aggeneis 400kV lines (IPP)": Gromis-Nama 400 kV line.
- » TDP scheme "Aggeneis-Paulputs 2nd 220 kV line": Aggeneis-Paulputs 2nd 220 kV line (built at 400 kV).
- » TDP scheme "Aggeneis strengthening 1 (IPP)": Aggeneis 400/132 kV transformation strengthening 1 (IPP).

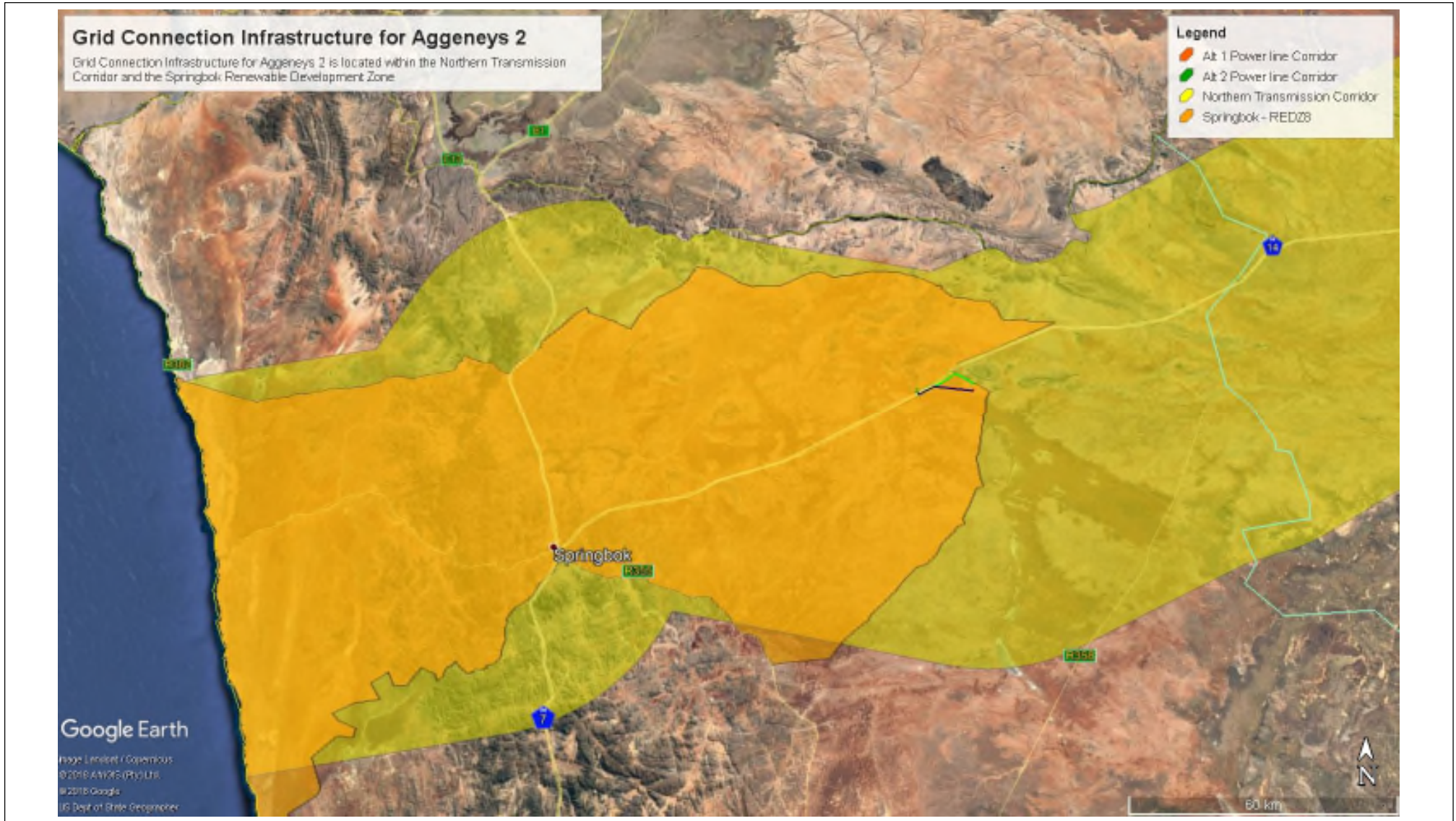


Figure 7.1: Map indicating the regional setting of the grid connection infrastructure corridors for the Aggeneys 2 solar PV facility

7.3. Climatic Conditions

Aggeneys receives about 34mm of rain annually, with most of the rainfall occurring mainly during autumn. The area receives the lowest rainfall (0mm) in December and the highest (9mm) in March. The average midday temperatures for Aggeneys range from 17.7°C in July to 31.6°C in January. The region experiences the lowest temperatures during July when the temperature drops to 3°C on average during the night. Refer to **Figures 7.2, 7.3 and 7.4.**

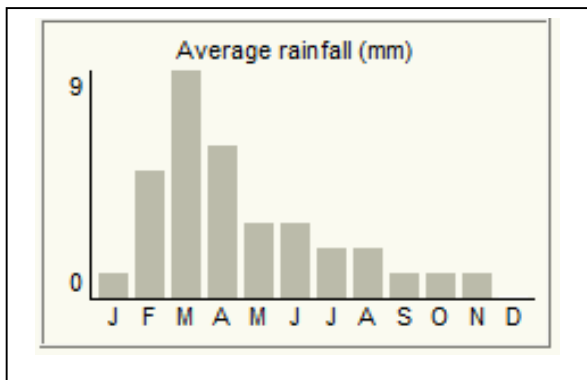


Figure 7.2: Average rainfall of Aggeneys, Northern Cape

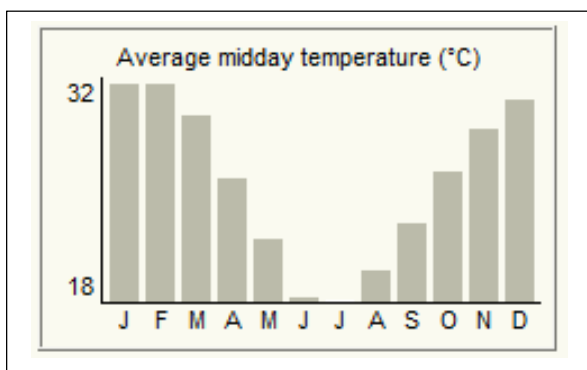


Figure 7.3: Average midday temperature of Aggeneys, Northern Cape

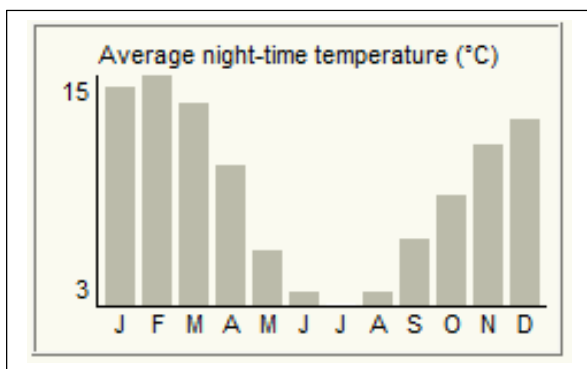


Figure 7.4: Average night-time temperature of Aggeneys, Northern Cape

7.4. Biophysical Characteristics of the Study Area

7.4.1. Topography, Terrain and Land Use

The project development corridors are located south of the Kalahari Basin. The landscape is sparsely vegetated and covered by pale red aeolian sands of the Quaternary Gordonia Formation (Kalahari Group).

The Orange River flows from north-west to south-east approximately 37km north of the project development corridors. The Orange River is a major regional river system that receives its source from the mountains on the western edge of Lesotho and is joined by the Vaal and flows into the sea on the West Coast where it forms the border between South Africa and Namibia.

The project development corridors are located within a broad valley that drains towards the Orange River. The corridors are set at an elevation of 840 m – 870m above mean sea level (amsl). The valley floor surrounding the project site is incised by a number of shallow watercourses that drain towards the Orange River. These watercourses are non-perennial and only run for short periods of time during and after summer and autumn rains. The surface terrain in this region is predominantly sandy to gravelly and traversed by a number of very shallow, intermittently-flowing drainage lines (also known as ephemeral watercourses). The Koa River Palaeovalley traverses the project development corridors in an east-west direction and is located outside and to the south of the Aggeneys 2 solar PV facility project site.

Most of the project development corridors and the surrounding areas comprise fairly flat-lying terrain between inselbergs or isolated steep rocky outcrops. The inselbergs in the vicinity of the project development corridors are concentrated to the north-east, where they form the upper valley slopes and ridgelines. Immediately to the north of the project development corridors, a large rocky outcrop (Gamsberg) rises to approximately 1100 m amsl.

There are also two isolated areas of rocky outcrops within the valley floor to the south of the corridors. These include small changes in elevation within the generally flat landscape and scattered inselbergs.

7.4.2. Geology, Soils and Agricultural Potential

Geological Setting of the Corridors

The geology of the Aggeneys region consists of scattered basement inliers on the southern margins of the Ghaamberg which are composed of a variety of resistant-weathering igneous and high-grade metamorphic rocks - mainly gneisses, schists, quartzites and amphibolites - of Late Precambrian (Mokolian / Mid-Proterozoic) age. These ancient basement rocks, which underlie the project development corridors are assigned to the Namaqua-Natal Province and are approximately one to two billion years old. The latter portions of the area, including those located within the project development corridors, are underlain by a spectrum of mostly unconsolidated superficial sediments of Late Cenozoic age. These include Quaternary to Recent sands and gravels of probable braided fluvial (alluvial fan) or sheet wash origin, as well as a veneer of down washed surface gravels and colluvial (rocky scree) deposits. The alluvial and colluvial sediments are locally overlain, and perhaps also underlain, by unconsolidated aeolian (i.e. wind-blown) sands of the Gordonia Formation (Kalahari Group) that are Pleistocene to Holocene in age. Orange-hued linear sand dunes with northwest-southeast trending crests are well seen in the Koa River Palaeovalley area. All these superficial sediments can be broadly subsumed into the Late Cretaceous to Recent Kalahari Group.

The Koa River Palaeovalley is an important Cenozoic geological feature in the Aggeneys area. It represents a defunct south bank tributary of the River Orange of Neogene / Late Tertiary (Miocene – Pliocene) age that fed into the palaeo-Orange River near Henkries. The palaeovalley traverses and is located south of the project development corridors. The palaeovalley is marked by intermittent pans and a veneer of orange-brown Kalahari wind-blown sands.

Soils and Agricultural Potential of the Grid Connection Infrastructure Corridors

The project development corridors are underlain by Quaternary sediments, mostly sandy. Dunes also occur in the landscape. The project development corridors overlap and are covered by two (2) land types, which include (Figure 7.5):

- » Af21 and Af26 – high base status with red soils and dunes

Table 7.1 below provides the details of the soils and land types present within the project development corridors.

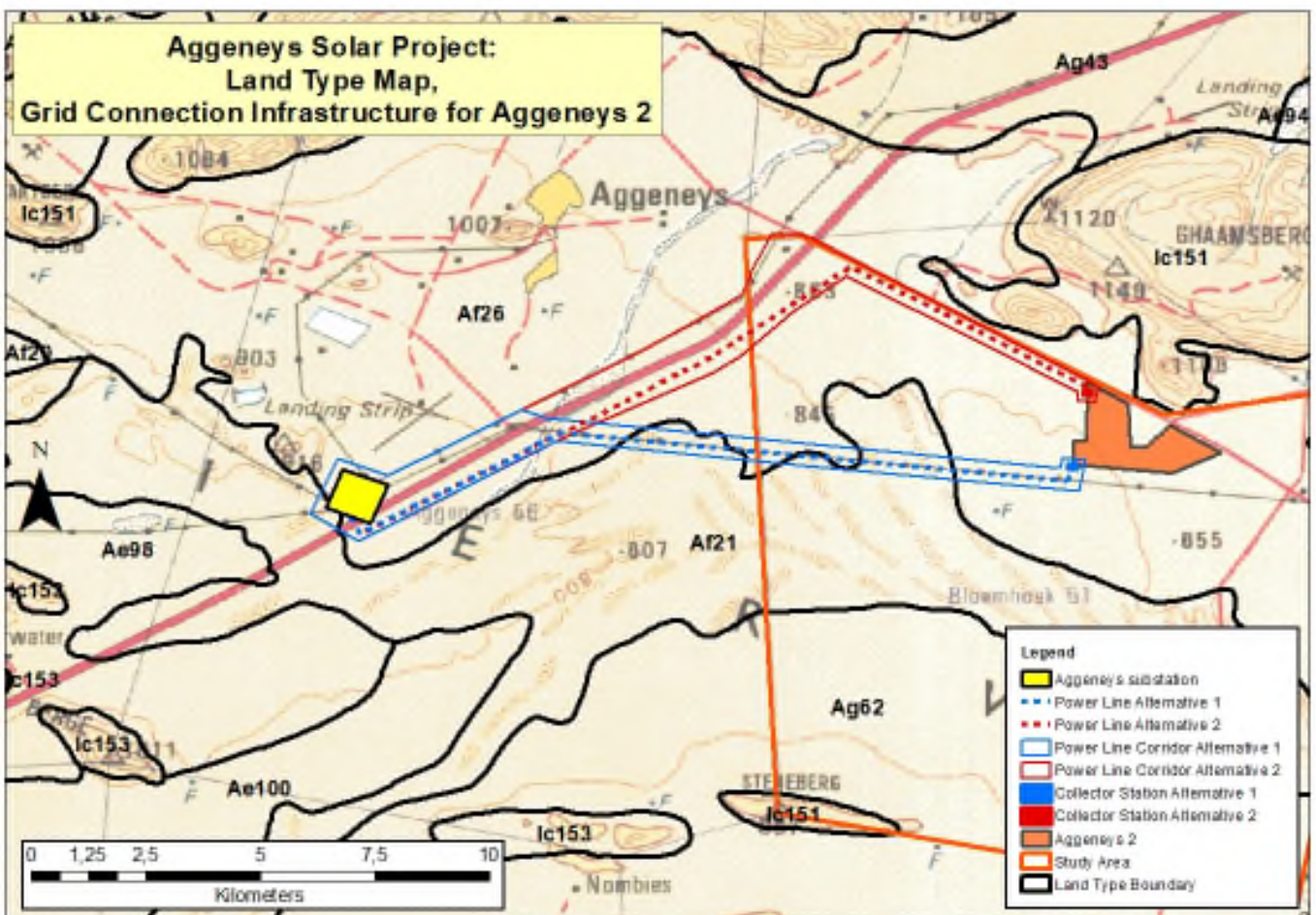


Figure 7.5: Land types present within in the project development corridors for the Aggeneys 2 solar PV facility. The project development corridors overlap as they approach the Aggeneys MTS.

Table 7.1: Details of the soils and land types present within the project development corridors for the Aggeneys 2 solar PV facility.

Land Type	Dominant Soils	Depth (mm)	Percent of land type	Characteristics	Agricultural Potential (%)
Af21	Hutton 31	>1200	75%	Red, sandy, structureless dune soils	High: 0.0 Mod: 0.0
	Hutton 32/35	300-700	16%	Red, sandy, structureless soils, on calcrete/dorbank	Low: 100.0
Af26	Hutton 30/31	>1200	63%	Red, sandy, structureless soils, occasional dunes	High: 0.0 Mod: 0.0
	Fernwood 21	>1200	17%	Grey, sandy, structureless soils	Low: 100.0

The entire extent of the project development corridors is located within land type Af21 and Af26, which consists largely of deep, red structureless soils. However, possibly due to the location of the project development corridors at the foot of the rocky hills to the north, the presence of much shallower soils was confirmed, with soils classified as belonging to the Garies (orthic topsoil on red apedal subsoil on cemented dorbank) and Knervlakte (orthic topsoil on cemented dorbank) forms, with depths of less than 450 mm. Some outcrops of gravel and dorbank were also observed at the surface.

There are no high potential soils present within the project development corridors and the soils are of moderate potential at best due mainly to a combination of the shallow depth and the sandy texture which will lead to rapid water infiltration and the soils drying out. In addition, the low rainfall in the area means that there is little potential for rain-fed arable agriculture in the area. Arable production would, therefore, be possible only by irrigation, and no indications of any irrigated areas within, and surrounding the project development corridors, can be identified.

In general, the soils that do occur within the project development corridors are suited for extensive grazing at best and furthermore the grazing capacity of the area is very low, at around 26-40 ha/large stock unit.

The soils present within the project development corridors are not considered susceptible to erosion by water. However, if the vegetation cover is disturbed (for example by overgrazing and construction activities) and considering the sandy nature of the topsoils, as well as the dry climate, there is a significant possibility of removal of some or all of the topsoil by wind action.

7.4.3. Ecological Profile of the Broader Study Area and the Project Development Corridors

i. Broad-Scale Vegetation Patterns

According to the national vegetation map, both development corridors are restricted to the Bushmanland Sandy Grassland vegetation type (**Figure 7.6**). However, according to unpublished 2016 Vegmap, the area has been reclassified as falling within the Bushmanland Arid Grassland vegetation type. It is only the middle section of the Alternative 1 corridor that runs through the northern extent of the Koa River Valley and which can be considered to represent the Bushmanland Sandy Grassland vegetation type.

Bushmanland Sandy Grassland occurs in the surrounds of Aggeneys and the largest intact patch of this vegetation type fills the shadow valley of the intermittent Koa River south-east and west of Aggeneys

(Mucina & Rutherford 2006), in close proximity to the project development corridors. The vegetation consists of dense, sandy grassland with dominant white grasses (*Stipagrostis*, *Schmidtia*) and abundant drought-resistant shrubs, and the geology consists of mostly Quaternary sediments (sand, calcrete). Typically, the surface is covered by red sands >300mm deep, forming dunes in places (Mucina & Rutherford 2006). The vegetation is Least Threatened with a target for the conservation of 21% (Mucina & Rutherford 2006).

The Bushmanland Arid Grassland vegetation type is an extensive vegetation type and is the second most extensive vegetation type in South Africa, occupying an area of 45 478 km². It is associated largely with red-yellow apedal (without structure), freely drained soils, with a high base status and mostly less than 300mm deep. Due to the arid nature of the unit, which receives between 70mm and 200mm annual rainfall, it has not been significantly impacted by intensive agriculture and more than 99% of the original extent of the vegetation type is still intact. Mucina and Rutherford (2006) list six (6) endemic species for the vegetation type, which relatively a low number is given the extensive nature of the vegetation type. Although a description of the dominant and characteristic species associated with this vegetation type is provided in Mucina and Rutherford (2006), this is not repeated here, as the actual vegetation type observed within the project development corridors and the broader study area is described below. Taking into consideration the extent of the Bushmanland Arid Grassland vegetation type, the development of the grid connection infrastructure would not have a significant impact on the extent of the intact habitat of this vegetation type.

Although there is a variety of other vegetation types in the area, these are outside the project development corridors and would not be directly affected by the development of the grid connection infrastructure.

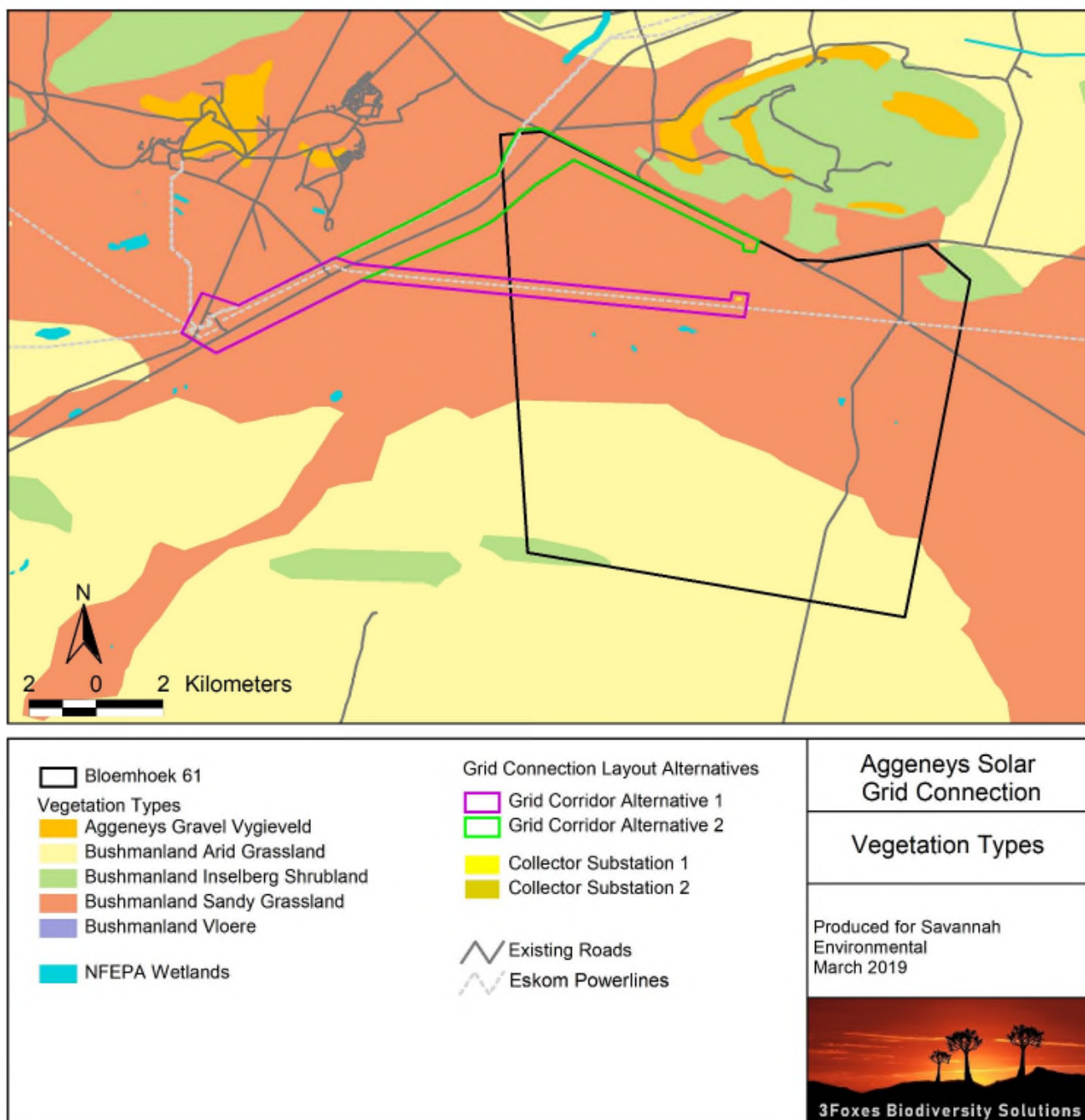


Figure 7.6: Broad-scale overview of the vegetation in and around the Aggeneys 2 solar PV grid connection infrastructure development corridors. The vegetation map is an extract of the national vegetation map as produced by Mucina and Rutherford (2006/2012), and also includes drainage lines and wetlands delineated under the NFEPA assessment (Nel et al. 2011). Although the map indicates that both corridor alternatives fall within the Bushmanland Sandy Grassland vegetation type, this is not correct and the majority of the vegetation along the routes rather consists of Bushmanland Arid Grassland.

ii. Habitats and plant communities

The habitats present along the project development corridor alternatives are described and illustrated below. These include habitats that are not directly within the project development corridors. These are

included in the BA Report to provide the broader context of the project development corridors and place the affected area within the correct context of the surrounding landscape.

Bushmanland Sandy Grassland Dunes

The middle section of the Alternative 1 corridor traverses the northern extent of the dune field associated with the Koa River Valley. Dominant species include grasses such as, *Stipagrostis ciliata*, *S.brevifolia*, *Cladoraphis spinosa*, *Leucophrys mesocoma* and *Brachiaria glomerata*; shrubs such as *Phaeoptilum spinosum*, *Rhigozum trichotomum* and *Hermannia gariepina* and forbs such as *Limeum sulcatum*, *Requienia sphaerosperma*, *Sesamum capense*, *Tribulis cristatus*, *Citrullus lanatus*, *Asparagus retrofractus* and *Gisekia pharnacioides var pharnacioides*. The dune habitat as shown by **Figure 7.7** below is considered to be a sensitive area that is not suitable for development, firstly due to the general sensitivity of the habitat to disturbance and secondly, this area is known as the habitat for the Red Lark endangered species. Although this area is considered to be more sensitive in comparison to the grassy plains, there already is an existing power line (i.e. the Aggeneys – Aries 400kV) running through this area, and the construction of additional grid connection infrastructure adjacent to the existing power line would require relatively little additional disturbance.



Figure 7.7: The red dunes along the Alternative 1 corridor are considered relatively sensitive to disturbance. The existing Aggeneys – Aries 400kV power line running through this area makes this corridor a viable option for the development of grid connection infrastructure.

Rocky Outcrop

A small outcrop (**Figure 7.8**) is located to the east of the Aggeneys 2 solar PV facility, as well as inselbergs and smaller koppies to the north of the Alternative 2 corridor. The small outcrop and inselbergs area are considered to be of a higher sensitivity compared to the majority of the surrounding plains in the area due to their high levels of biodiversity. Therefore, no grid infrastructure development should occur within this habitat.



Figure 7.8: The small rocky outcrop located to the east of the Aggeneys 2 solar PV project site

Sandy Plains

The area between the deep sands of the Koa River Valley along the Alternative 1 corridor, and the shallow pediments that occur around the base of the Gamsberg and adjacent inselbergs north of the Alternative 2 corridor, is associated with a band of shallow, coarse red sands dominated by perennial grass with scattered shrubs (**Figure 7.9**). This habitat is apparent within the extremes of the Alternative 1 corridor, as well as within the entirety of the Alternative 2 corridor. Dominant plant species include the grasses, *Stipagrostis ciliata*, *S.obtusa*, *S.anomala* and *Aristida adscenionis*, and low woody shrubs such as *Hermannia spinosa*, *Lycium cinereum*, *Salsola rabieana*, *Asparagus capensis*, *Galenia africana*, *Melolobium candicans*, *Eriocephalus spinescens*, *Zygophyllum retrofractum*, *Pteronia glomerata*, *Rhigozum trichotomum* and *Aptosimum spinescens*. The abundance of listed or protected species within this habitat is low and apart from a low density of *Hoodia gordonii*, no other significant plant species are present.



Figure 7.9: The open plains around the project development corridors are dominated by a sparse vegetation cover of perennial grasses with scattered woody shrubs.

Gravel Plains

The area within the Alternative 2 corridor, especially where the corridor runs along the Loop 10 gravel road is typified by shallow soils which overlie ferricrete which is often exposed. This habitat is further characterised by a low vegetation cover (**Figure 7.10**), with large area bare where ferricrete is exposed. The areas of exposed ferricrete may contain species of concern such as *Conophytum* or *Lithops* species.

iii. Listed Plant Species

Although there are a large number of listed and protected plant species known from the wider area, these are associated with specific habitats and vegetation types outside of the project development corridors (**Figure 7.11**). The Gamsberg, as well as the other massifs and hills in the area generally contain a high abundance of species of concern, and these are often associated with the Aggeneys Gravel Vygieveld vegetation type or specific habitats such as quartzite outcrops and gravel plains. Within the project development corridors, no such habitats were observed to occur and species of conservation concern present are restricted to more widespread species such as the provincially protected *Boscia foetida subsp foetida*, and *Hoodia gordonii*. The areas of exposed ferricrete frequently contain species of concern such as various *Lithops* and *Conophytum*, and *Lithops julii subsp. fulleri* was observed adjacent to the Loop 10 gravel road (**Figure 7.11**). This area has however been demarcated as high sensitivity and the sensitive area can be easily avoided by the power line footprint areas. Overall, the abundance of species of concern within the project development corridors is low and no significant impacts can be anticipated from the development of the grid connection infrastructure.



Figure 7.10: An area of low vegetation cover, typical of the gravel plain habitat near the northern boundary of the Aggeneys 2 solar PV facility.



Figure 7.11: *Lithops julii subsp fulleri* was observed on the gravel plains near to the Loop 10 road.

iv. Critical Biodiversity Areas (CBA) and Broad-Scale Processes

An extract of the Northern Cape Critical Biodiversity Areas (CBAs) map for the project development corridors is illustrated below in **Figure 7.12**. The project development corridors lie within an Ecological Support Area (ESA), which are areas identified as important buffer areas for CBAs or which may be important for ecological processes such as landscape connectivity.

The Koa River Valley with dunes along the Alternative 1 corridor is classified as CBA 2, and so is the area west of the N14 where the alternative corridors overlap. The area associated with gravels of quartz along the Alternative 2 corridor near the Loop 10 gravel road is classified as a CBA 1 due to the high biodiversity value and presence of species of concern within this habitat type.

The footprint of the grid connection infrastructure would, however, be low, and the positioning of the power line pylons adjacent to the existing Aggeneys – Aries 400kV line, and the Loop 10 gravel road areas would reduce the overall impact of the proposed grid connection infrastructure. This is not seen as a significant threat to CBAs provided the recommended mitigation measures are implemented during the construction phase of the development.

The project development corridors are located within one of the Northern Cape Protected Area (NC-PAES) focus areas, and a CBA 2 area. However, the footprint of the grid connection infrastructure within these areas (i.e. CBAs and NCPAES) is low. Due to the small footprint and the fact that the alignments are along with existing disturbances (i.e. existing power lines and roads), the power line would not significantly impact the affected NC-PAES areas and the availability of habitat in the area.

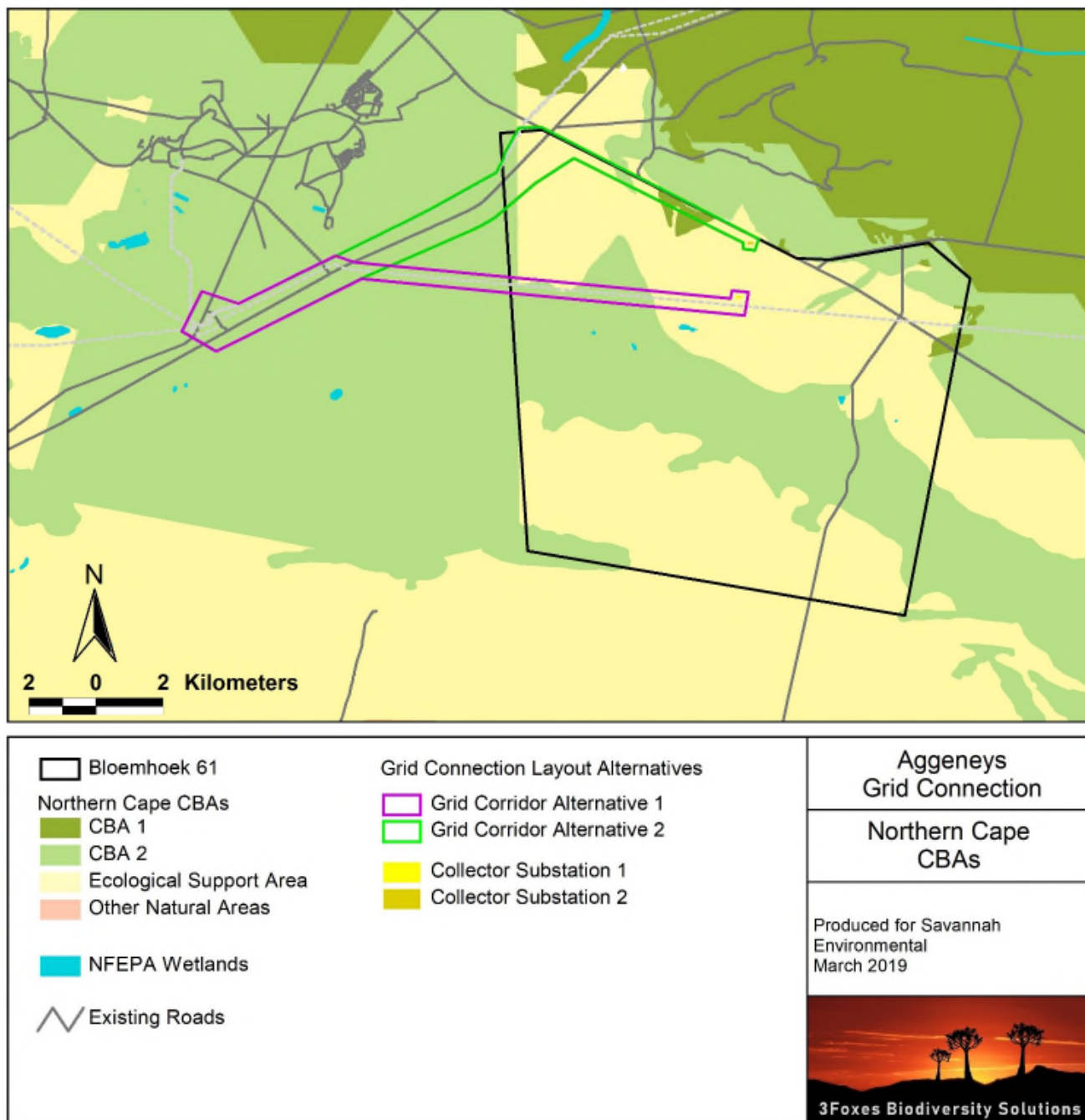


Figure 7.12: Northern Cape Critical Biodiversity Areas map for the study area, showing that the project development corridors for the grid connection infrastructure fall to a large extent within areas that are classified as CBA 2 or an ESA.

v. Terrestrial Fauna

Mammals

The mammalian community within the project development corridors is likely to be of moderate to low diversity. Although more than 50 species of terrestrial mammals are known from the wider area, the extent and habitat diversity of the project development corridors are too low to support a very wide range of

mammals. Species that can be confirmed present in the area include Caracal, Black-backed Jackal, African Wildcat, Cape Fox, Chacma Baboon, Rock Hyrax, South African Ground Squirrel, Steenbok, Duiker, Springbok, Gemsbok, Cape Porcupine, Yellow Mongoose, Cape Grey Mongoose, Small-spotted Genet, Striped Polecat, Cape Hare, Springhare, Aardvark, Aardwolf and Round-eared Elephant Shrew.

Species associated with the rocky outcrops of the area include Rock Hyrax, Klipspringer, Pygmy Rock Mouse, Namaqua Rock Mouse and Western Rock Elephant Shrew. The open plains that characterise the project development corridors are likely to be dominated by species associated with the open hard or sandy ground such as various gerbils including the Hairy-footed Gerbil, Cape Hare, Steenbok, Cape Fox, Bat-eared Fox, Aardvark and Aardwolf. There are also burrows of Ground Squirrels and Yellow Mongoose present and these appear to be the most common fauna within the project development corridors. There are no areas of particular significance for mammals at the site as the habitat is repetitive and broadly homogenous.

Two listed species may occur in the area, the Black-footed Cat *Felis nigripes* (Vulnerable) and Leopard *Panthera pardus* (Vulnerable). Given the extremely low cover at the project development corridors, it is not likely that Leopard is present within the affected area. The habitat is however broadly suitable for the Black-footed Cat, which favours a mix of open and more densely vegetated areas. This species is however widely distributed across the arid and semi-arid areas of South Africa and the development corridors would not amount to a significant amount of habitat loss for this species.

Reptiles

Although reptile diversity in the broader area is high with as many as 60 species known from the area, only a fraction of this is likely to be present within the project development corridors. A large proportion of the reptiles of the area consist of species associated with the inselbergs and rocky hills along the Orange River and would not occur on the open plains characteristic of the project development corridors. More typical plains species are likely to dominate the project development corridors such as Verroxx's Tent Tortoise *Psammobates tentorius verroxii*, Namaqua Sand Lizard *Pedioplanis namaquensis*, Spotted Desert Lizard *Meroles suborbitalis*, Southern Rock Agama *Agama atra* and Plain Sand Lizard *Pedioplanis inornata*.

There are no specialised reptile habitats within the project development corridors, which are restricted to the open plains habitat that is widespread in the area.

Amphibians

Only eight frog species are known from the area around the project development corridors and even this is a gross overestimate of the number of amphibian species likely to be present. There are few freshwater features present and only species able to live independently of water will be present within the project development corridors. As such the only species likely to be present within the project development corridors would be the Karoo Toad *Vandijkophrynus garipeensis*. Given the very low likely abundance of amphibians within the project development corridors, impacts on amphibians are likely to be local in extent and of low significance.

vi. Avifauna

Avian Microhabitats

Two avifaunal microhabitats were identified within the project development corridors, and are directly associated with two vegetation types. The Bushmanland Arid Grassland vegetation type represents the plains habitat, while the Bushmanland Sandy Grassland represents the dune habitat. The Bushmanland Sandy Grassland is restricted to the Alternative 1 corridor, while the plain habitat occurs across the rest of the project development corridors. Albeit not within the project development corridors, the inselbergs represent the Bushmanland Inselberg Shrubland vegetation type, which is an important feature for avifauna in the area as it provides different vegetation and habitat structure, nesting sites for large raptors such as Verreaux's Eagle *Aquila verreauxii*.

Species Diversity

The bird assemblage recorded within the project development corridors is typical of the Nama-Karoo bioregion. An approximate total of 105 bird species have been recorded within the area and surrounds, of which 54 species were observed. Eight of these are Red-listed while a further four are Near-threatened. One species (Red Lark) is endemic to South Africa, while fourteen species are near-endemic. Twelve species are listed as biome-restricted, which include a number of lark species in particular. Numerous others that have been recorded are arid-zone species, which follow either resident or nomadic life strategies.

A total of 38 bird species were recorded with 31 and 28 species recorded in winter and summer respectively, within the project development corridors. Small passerines species made up the majority (ca. 70%) of the species detected, compared to non-passerines. Significantly more species and birds were detected in winter compared to summer, with the total bird abundance being five times greater. The good veld conditions that prevailed during winter (June 2018) resulted in numerous nomadic species being attracted to the area, whereas the arid conditions in late summer (March 2019) resulted in many of these species being almost entirely absent. This illustrates the extremes in bird abundances that occur within the area depending on local conditions and the corresponding response by nomadic bird species.

The four most abundant species recorded during winter were all highly nomadic passerine species, of which the most abundant was the Grey-backed Sparrow-lark *Eremopterix verticalis*, with 10.8 birds/km being detected. These highly nomadic species are known to respond to rainfall events, becoming entirely absent again during unfavourably dry periods. The second and third most abundant species were Lark-like Bunting *Emberiza impetuani* and Stark's Lark *Spizocorys starki*, with 4.5 and 4.1 birds/km, respectively. The fourth most abundant species was the Black-eared Sparrow-lark *Eremopterix australis*, with 2.8 birds/km detected. All these species exhibited dramatically reduced numbers during the summer survey.

The Red Lark was detected at a rate of 0.53 birds/km in winter and 0.68 birds/km in summer, although considering that it was only recorded in the dune habitat and not within the plains habitat, this relative abundance is rather unrepresentative of the species. In winter Red Larks were recorded on six (6) of the 30 transects, with a total of 16 sightings, and exclusively within the dune habitat and adjacent sandy flats (located outside of the project development corridors) characterised by red sands, tall grasses, and interspersed tall shrubs. In summer, Red Larks were recorded on seven (7) of the 19 transects (12 sightings), all within the same dune habitat as in winter. This suggests that the species is common within the dune habitat, but mainly absent from the plains habitat of the project development corridors.

Other biome-restricted species which occurred within the project development corridors include Tractrac Chat, Sociable Weaver *Philetairus socius*, Karoo Chat *Cercomela schlegelii*, and Karoo Long-billed Lark *Certhilauda subcoronata*. However, most of these species were marginal to the project development

corridors being recorded in the Bushmanland Arid Grassland. Species such as Ludwig's Bustard *Neotis ludwigii*, Black-eared Sparrowlark, Black-headed Canary *Serinus alario* and Stark's Lark are nomadic and therefore only occur in good numbers when conditions are favourable.

Red-listed species

A total of nine red-listed non-passerine species have been reported for the area during SABAP 1 and the SABAP 2 period. Of these, seven (7) are listed as threatened and two (2) as Near-Threatened. The most important of these include Martial Eagle *Polemaetus bellicosus* (Endangered), Ludwig's Bustard *Neotis ludwigii* (Endangered) and Verreaux's Eagle *Aquila verreauxii* (Vulnerable), all of which are considered to have local populations of moderate importance. These species are considered to be prone to collisions with grid connection infrastructure, hence they may be susceptible to increased developments of grid infrastructure in the area which involve the erection of power lines. Ludwig's Bustard and Martial Eagle were both seen foraging within the project development corridors, while a Verreaux's Eagle was seen directly adjacent to the project development corridors. An adult Martial Eagle was also seen roosting on the pylon structure of the large existing power line that traverses the project development corridors during both the winter and summer field survey.

Two separate Martial Eagle nests were located on pylons to the west and east of the project development corridors. A Secretary bird *Sagittarius serpentarius* nest is also known from the project development corridors area and is located approximately 1.5km north of the Alternative 1 corridor (**Figure 7.13**).



Figure 7.13: Location of two Martial Eagle nests (orange markers) and one Secretary bird nest (blue marker) in relation to the proposed project development corridors, Alternative 1 (black), and Alternative 2 (blue).

The Haramoep and Black Mountain Important Bird Area (IBA) occurs to the west of the project development corridors. The presence of this IBA highlights the need to investigate the cumulative impact of grid connection infrastructure in the surrounding area.

The project development corridors are not located within a Coordinated Avifaunal Roadcounts (CAR) route or within a Coordinated Waterbird Counts (CWAC) wetland area.

vii. Freshwater Features

Seven ephemeral¹¹ depression wetlands were identified, ground-truthed and delineated in the field, of which three (3) ephemeral wetlands were identified directly within the Alternative 1 corridor. No wetlands were discovered within the Alternative 2 development corridor. However, four (4) other ephemeral wetlands were identified outside the proposed development corridors but within 500m away from the Alternative 1 development corridor. Although vegetation and soil indicators for these wetlands are weak, they were regarded as complete wetlands fulfilling a wetland function within the landscape, and are thus considered to have an elevated sensitivity. The wetlands shared similar geomorphological features and ranged in size from 0.1 to 6.6ha. The shapes of the wetlands also varied from circular/oval-shaped to kidney-shaped wetlands. Furthermore, twenty-three (23) ephemeral watercourses and two (2) large ephemeral watercourses were identified. The ephemeral watercourses originate from culverts under the Loop 10 road (**Figure 7.14**), located north of the Alternative 2 corridor, and drain through the area. The watercourses are located in the Orange River Primary Catchment, and in Quaternary Catchment D82C. The watercourses are also located in the Orange Water Management Area (WMA). Refer to **Figure 7.14**.

The present ecological state of the ephemeral wetlands was assessed to be Class B (largely natural) ephemeral depression wetland systems. The Class B rating is expected to gradually deteriorate over time with further overgrazing and the consequent change in surface roughness.

Table 7.2 provides the details of the topography, soils and materials and riparian vegetation associated with the ephemeral watercourses.

¹¹ Ephemeral water features flow for very short periods following rainfall. Outside of these rainfall periods, the surface remains dry.

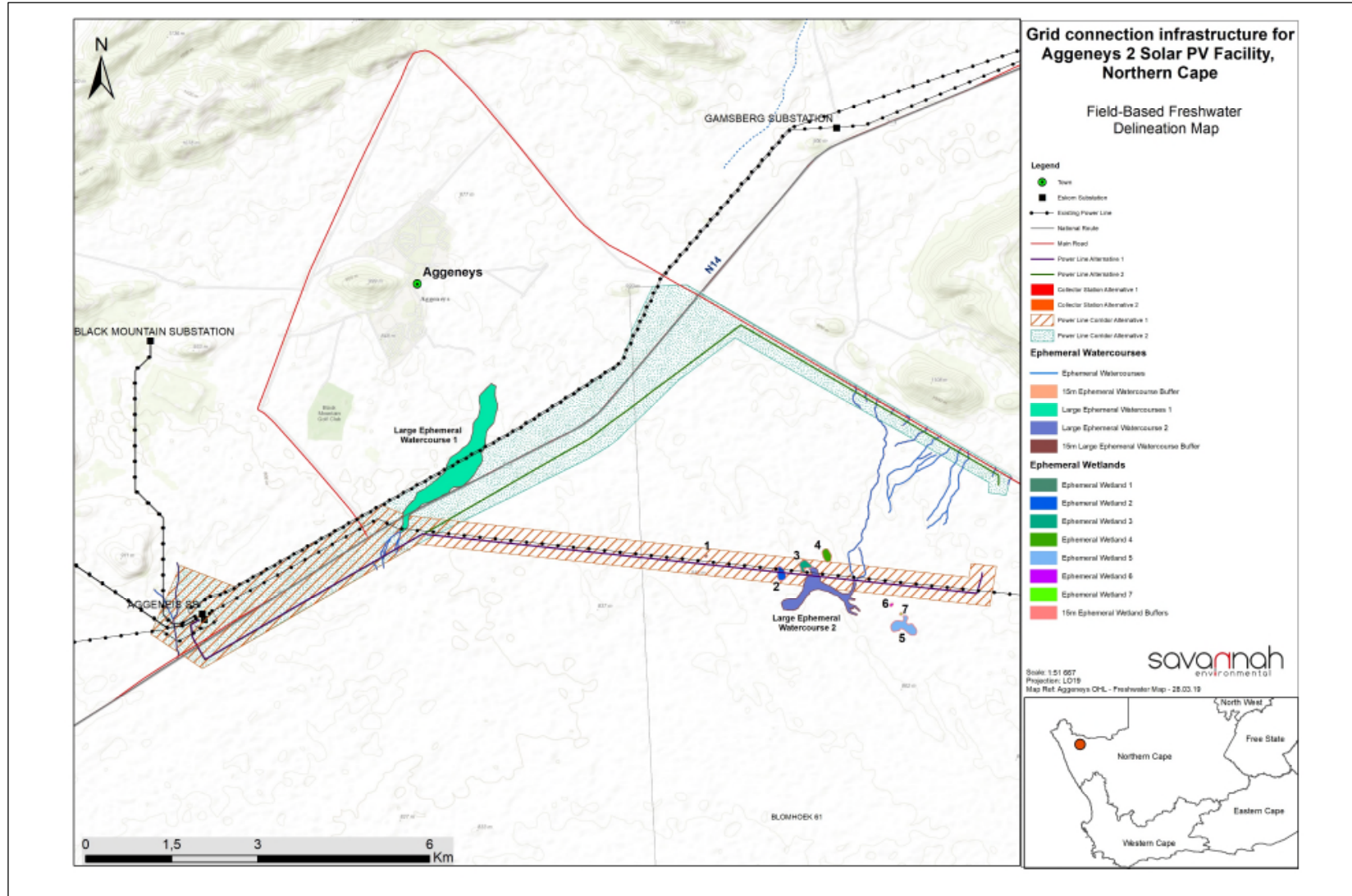





Figure 7.14: Freshwater delineation map of the ephemeral watercourses overlain with the proposed grid connection infrastructure

Table 7.2: Details of the ephemeral watercourses located within the proposed corridors.

	Description of the detail	Photograph
<p>Topography associated with the watercourses</p>	<p>Twenty-three (23) ephemeral watercourses and seven (7) ephemeral depression wetlands that were identified within the proposed corridors can be classified as Lower Foothill Rivers in terms of the national classification system. The ephemeral watercourses emanated from culverts under the Loop 10 road north of the Alternative 2 corridor, which allows water run-off from the inselbergs north of the corridor to drain through onto the Aggeneys 2 solar PV project site. As a consequence of the flat terrain, the ephemeral watercourses become very diffuse before disappearing into the landscape altogether along the length of the watercourse. Minor topographical incisions as a result of water erosion create the channel form for the ephemeral watercourses, which are relatively shallow (<0.5m) and narrow (~1-5m).</p>	
<p>Alluvial soils and deposited materials</p>	<p>Given the arid nature of the climate in the region, the hydrological regime (frequency and duration of flow) of the watercourses are typically ephemeral, flowing only after rainfall events for very short-lived periods (hours to a few days). The limited vegetation cover and exposed nature of the soils means that sediment is transported from the surrounding catchment into the watercourses, making flows relatively turbid (thick sediment-laden). As a result, alluvial deposits are apparent in the dry watercourse beds when not inflow. The alluvial deposits included fine to sandy grain sediments, as well as coarse-grained calcareous materials. The watercourses can be described as a Section B channel type, given that the section of the particular reach of the watercourses is in a zone of the fluctuating water table and will only have base flow at any point in the channel when the saturated zone is in contact with the channel bed. The base flow is however intermittent, with the flow at any point in the channel dependent on the current height of the water table. The gradient of the channel bed is however flat enough for deposition of material to take place.</p>	

	Description of the detail	Photograph
Riparian vegetation	<p>The basal cover could be described as predominantly grassland vegetation, with some scrubland vegetation species also present. The grassland appeared to consist of a mix of graminoid species consisting mainly of <i>Stipagrostis sp.</i> and <i>Schmidtia sp.</i> The scrubland vegetation species observed was mainly <i>Boscia foetida subsp. Foetida</i>, <i>Lycium cinereum</i>, <i>Pappea capensis</i>, <i>Phaeoptilum spinosum</i> and <i>Rhigozum sp.</i> Overall, the vegetation condition appeared to be disturbed as a result of grazing impacts from livestock on the property.</p>	

7.5. Integrated Heritage including Archaeology, Palaeontology and the Cultural Landscape

7.5.1 Heritage and the cultural landscape

The area around the project development corridors is very minimally developed with few traces of anthropogenic interventions. The most visually dominant anthropogenic activity, however, is the mining occurring at Gamsberg, just to the north. Several power lines and substations occur in the broader area. These together result in a modern cultural landscape that is far more dominant than the ephemeral traces of historical or prehistoric occupation of the landscape. This does not take away from the potential historical importance of the area surrounding Gamsberg, especially if the massacre mentioned below is indeed proven to have occurred at Gamsberg. This part of the landscape may, therefore, be associated with living heritage.

There are unconfirmed historical reports that a massacre of Bushmen may have occurred in a kloof of the Gamsberg but surveys have failed to yield any evidence of this. Morris (2013) seems confident of this event, however, and suggests that the kloof at the south-eastern edge of the inselberg was the location where the killing occurred.

7.5.2. Archaeology

Archaeological remains were found to be very rare. Isolated flaked stone artefacts made in quartzite can be expected to occur widely, but are of no consequence and are attributed to background scatter. They are likely a mix of Pleistocene and Holocene-aged materials. An isolated lower grindstone found to be lying upside down (**Figure 7.15**) and two other fragments were found along or very close to the Alternative 1 corridor. Grindstones are known to occur on their own and are more often than not found upside down. Without associated finds, they are assumed to have just been left because they were too heavy and/or cumbersome to continue carrying. Approximately, 500m to the south of the Alternative 1 corridor, an ephemeral artefact scatter was found along the edge of a pan at waypoint 188. The scatter included a grindstone, two quartz flakes and two ostrich eggshell fragments. It was located on very loose wind-blown sand which indicates that there is a possibility that other artefacts might be buried beneath the surface.



Figure 7.15: The isolated lower grindstone found at waypoint 187.

Graves

No sign of any graves was identified within the project development corridors, however, approximately 900m to the east of the project development corridors, two likely graves were found alongside a small rocky hill at waypoints 191 (**Figure 7.16**) and 193 (**Figure 7.17**). Both were oriented in an east-west direction. Their age is unknown but they may well relate to the early colonial period.



Figure 7.16: The likely grave found at waypoint 191.



Figure 7.17: The likely grave found at waypoint 193.

Built environment

No built heritage resources occur within the corridors. The nearest building of any sort is a labourer's cottage of unknown age some 4.5 km to the east of the Alternative 1 corridor.

7.5.3. Palaeontology

Almond (2018) finds that the corridors are underlain by Late Cenozoic superficial sediments that are generally of low to very low palaeontological sensitivity. These sediments include wind-blown sands and alluvial and sheetwash gravels. The sands are red Kalahari sands of the Gordonia Formation (to the south of the project site), while the gravels that underlie the site are derived from the local igneous and metamorphic basement rocks. Examination of a borrow pit alongside the Loop 10 gravel road showed that these gravels continue to at least 2m depth in this area, although they would very likely thin towards the southwest, away from the hills.

7.6. Visual Quality

Landscape character

Landscape character is defined as "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another". The landscape surrounding the corridors is arid, comprising relatively flat drainage plains with inselbergs or rocky outliers such as the Aggeneys Mountains, Black Mountain and Gamsberg rising above wide plains.

Areas to the south of the corridors appear relatively natural, while to the north, east and west there are extensive areas of mining. The small town of Aggeneys lies north east of the project development corridors.

Landscape Character is a composite of a number of influencing factors including:

- » Landform and drainage;
- » Nature and density of development; and
- » Vegetation patterns.

Landform and drainage

Most of the area surrounding the project development corridors consist of fairly flat-lying terrain between inselbergs or isolated steep rocky outcrops. The inselbergs in the vicinity of the project development corridors are concentrated to the north, north-west and north-east, where they form the upper valley slopes and ridgelines. Immediately to the north and north-west, a large rocky outcrop (Gamsberg) rises to approximately 1100m amsl.

The corridors are located within a broad valley that drains towards the Orange River. The corridors are set at an elevation of 840m – 870m above mean sea level (amsl).

This landform is likely to have a number of implications for visibility of the grid connection infrastructure:

- » Given the limited extent of the grid connection infrastructure, the small changes in elevation within the generally flat landscape could help provide screening of the grid connection infrastructure or could open up views over the pylons; and
- » The scattered inselbergs and particularly the Gamsberg will provide screening for the proposed grid connection infrastructure.

Nature of development and land uses

The landcover can be divided into the following types:

» *Natural Area*

The main landcover type surrounding the project development corridors is a natural area. This area is likely to be used largely for stock rearing and low-intensity grazing. As this has not resulted in mass clearance of vegetation, the majority of the area retains a relatively natural appearance. Situated within this landcover are occasional homesteads that are scattered sparsely throughout the area. The low density of development is no doubt a product of the low agricultural potential/carrying capacity of the area.

» *Urban development*

Urban development in the small town of Aggeneys, includes housing, sports grounds and commercial uses. Particularly within the well-established areas of these settlements, streets are relatively broad and are lined with street trees. Gardens generally have mature woody ornamental plants. The density of development and the extent of vegetation is likely to serve to screen most external views from the urban area.

» *Degraded areas*

Degraded areas are also evident, which appears to be associated with mining.

» *Mining*

Mine development includes a mine located close and to the west of Aggeneys and the Black Mountain Gamsberg Mine which is an open-pit zinc mine located close and to the north of the project development corridors.

Vegetation Patterns

The majority of the landscape is covered by low sparse grass and herbaceous vegetation. During much of the year, this vegetation lies dormant and is brown due to lack of water. However, during Summer and Autumn rains, the landscape rapidly becomes green and colourful as plants use this period to regenerate and reproduce.

While there are obvious botanical differences, in terms of visual considerations all vegetation types are relatively low in nature and are comprised largely of grass species. They are, therefore, unlikely to provide significant visual absorption capacity (VAC) and will contribute to an open landscape character within which long distance views are possible.

The uniformity of the vegetation cover and its transformation after rain is a major constituent of the current landscape character. Major disturbance of this could have implications for landscape character.

In addition to taller woody vegetation occurs in limited areas including:

- » The town of Aggeneys where the dense tree and shrub planting has occurred around houses and on the town's golf course;
- » Homesteads around which trees and tall woody vegetation has been allowed to develop. This vegetation often contrasts with the surrounding barren landscape making the location of homesteads obvious from a distance. It can also provide a degree of shelter and screening for the immediate area around buildings; and
- » Water points for livestock that are spotted around local farms. Water is generally provided by wind pumps to a surface trough for animals. The availability of water has allowed trees and tall woody vegetation to develop. This also has the benefit of providing shelter and shade for livestock. The contrast between these vegetation and surrounding areas makes the location of water points obvious from a distance.

Visual receptors

Visual Receptors are defined as "individuals and / or defined groups of people who have the potential to be affected by the proposal".

Area receptors

Within the vicinity of the project development corridors, the only potential area receptor is the urban area of Aggeneys. Residential areas associated with this use are likely to be the most sensitive to possible changes in outlook associated with the grid connection infrastructure. However, due to the already highly industrialised landscape around the settlement associated with the mining in the area, it is unlikely that residents would object unless the development is likely to significantly increase existing impacts.

Linear receptors

Linear receptors include:

- » The N14 runs within the project development corridors proposed for the grid connection infrastructure. As this route carries a high proportion of recreational and tourism related traffic, it is considered sensitive to potential change in outlook.
- » An un-surfaced local road (i.e. the Loop 10 gravel road), runs within the northern boundary of the Alternative 2 corridor. This road joins the N14 approximately 4.8km to the north-west of the Alternative 2 collector substation area. While it is un-surfaced, it serves as the only east-west route in the region, linking a number of regional routes all of which run in a general north-south direction. This road runs for more than 200 km. In this distance there appear to be few settlements or farmsteads that are served by it. It is likely that it is used mainly by local people and mining operators. However, it is also likely to be used by more adventure-minded tourists.

Point receptors

Four homesteads have been identified within the approximate limit of visibility of the grid connection infrastructure corridors. These are likely to be used by local stock farmers who probably will be more concerned with the productivity of the land rather than the outlook. Should any of these homesteads be used for tourism-related activities, this will increase sensitivity to landscape change.

The closest homestead is approximately 4.2km from the Alternative 1 and Alternative 2 corridors.

7.7 Social Context

The project development corridors are located within the Khâi-Ma Non-Urban (NU) area and are situated approximately 3km south-west of the town of Aggeneys. The demographic data pertaining to Khâi-Ma Non-Urban area, listed as Main Place 368002 from Census 2011, is included in **Table 7.3**.

Table 7.3: Demographic data pertaining to Khâi-Ma Non-Urban area

Geographic area	15 754.25 km ²	
Population	2 148 people	
Population density	0.14/km ²	
Households	995	
Household density	0.06/km ²	
Gender	People	Percentage
Male	1 337	62.24%
Female	811	37.76%
Population Group	People	Percentage
Black African	1 077	50.14%
Coloured	809	37.66%
White	214	9.96%
Other	42	1.96%
Indian or Asian	5	0.23

The dependency ratio, which indicates the burden placed on the working population who support children under 15 years and people over 65 years, is lower in Khâi-Ma Local Municipality at 45.7 than it is across the District and Province, which have respective dependency ratios of 51.2 and 55.7. Between 2001 and 2011 the Northern Cape had a population growth of 1.44% compared to the Namakwa district with a population growth of 0.69% and Khâi-Ma with a growth rate of 0.83% over the same period.

In 2011, the unemployment rate was highest across the Northern Cape at 27.4% and lowest across the Namakwa District at 20.1%. The Khâi-Ma Local Municipality had an unemployment rate of 22.1% over the same period. Regarding youth unemployment, at 34.5%, it is highest across the Province and lowest within the Khâi-Ma Local Municipality at a rate of 23.6%. The Namakwa District has a youth unemployment rate of 25.4%. At 3.9%, a lower percentage of the population of Khâi-Ma Local Municipality, aged 20 years and older, has no schooling when compared across the Province (11.3%) and District (6.6%).

Khâi-Ma Local Municipality has a marginally smaller average household size at 3.3 and a lower percentage of female-headed households at 34.8% when compared across the Provincial and District levels. In respect of dwelling types, 86.1% of dwellings in Khâi-Ma Local Municipality are of a formal type and 46.6% of all dwellings in the area are either owned or are being paid off.

CHAPTER 8: ASSESSMENT OF IMPACTS

This chapter serves to assess the significance of the positive and negative environmental impacts (direct and indirect) expected to be associated with the grid connection infrastructure for the Aggeneys 2 solar PV facility.

This assessment has considered the construction of grid connection infrastructure within an up to 1km wide and 17km long corridor. The grid connection infrastructure will comprise the following key infrastructure and components:

- » A new Collector Substation/ Switching Station:
 - * Construction of a new platform with earth mat and civil works
 - * New 132kV or 220kV feeder bay/s and busbar/s complete with protection equipment
- » A new single circuit 132kV or 220kV OHL between the existing Aggeneis MTS and a new Collector Substation associated with the Aggeneys 2 solar PV facility, complete with structures, foundations, conductor, fibre layout, insulation and assemblies.
- » Access roads up to 6m in width and 2km in length, where required.
- » Works within the existing Aggeneis MTS HV yard:
 - * Establish new 132 or 220kV feeder bay/s within the existing HV yard at the Aggeneis Main Transmission Substation (MTS) (inclusive of line bays, busbars, bussection and protection equipment)

Two grid connection infrastructure alternatives for the Aggeneys 2 facility are assessed within this report (refer to **Figure 8.1**):

- » **Alternative 1:** A collector substation located adjacent to the facility substation in the south-eastern corner of the PV facility project site, as well as a single-circuit power line of up to 220kV and approximately 14km in length, connecting to the Aggeneis MTS. This is considered to be the preferred option from a technical perspective due to the collector substation being adjacent to the technically preferred on-site substation associated with the PV facility, and the power line is shorter in length compared to Alternative 2. The corridor is up to 1km in width and located directly adjacent to and parallel to the Eskom Aries-Aggeneys 400kV line and the N14.
- » **Alternative 2:** A substation located adjacent to the facility substation, as well as a single-circuit power line of up to 220kV and approximately 17km in length, connecting to the Aggeneis MTS. This is considered to be the alternative option from a technical perspective. The corridor is up to 1km in width and follows road infrastructure for the majority of its length.

A comparative assessment of the alternatives for the project is undertaken as part of the impact assessment in order to identify the preferred alternatives from an environmental perspective.

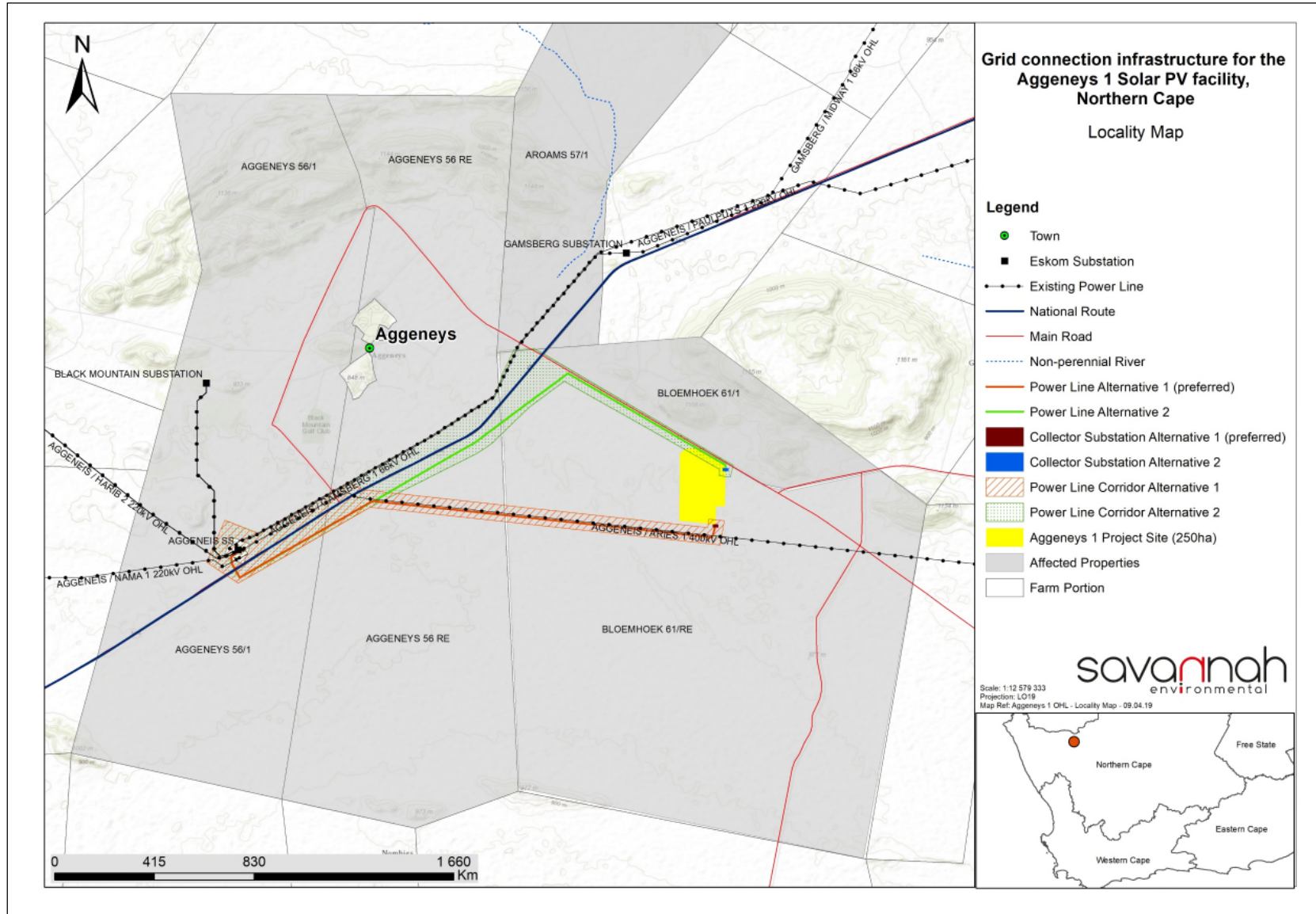


Figure 8.1: Map illustrating the corridors assessed for the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility, which includes the two collector substation locations and the power line route alternatives

The development of the grid connection infrastructure for the Aggeneys 2 solar PV facility will comprise the following phases:

- » *Pre-Construction and Construction* – will include pre-construction surveys; site preparation; establishment of access roads (where required), laydown area, the collector substation and power line infrastructure; construction of foundations involving excavations; the transportation of components/construction equipment to site, manoeuvring and operating vehicles for unloading and installation of equipment; laying cabling; and commissioning of new equipment and site rehabilitation. The construction phase for the grid connection infrastructure for Aggeneys 2 is estimated at 12 months.
- » *Operation* – will include the operation of the power line and the collector substation, which will include evacuating electricity from the Aggeneys 2 solar PV facility into the national grid. The operation phase of the grid connection infrastructure is expected to be approximately 20 years (with maintenance).
- » *Decommissioning* – depending on the economic viability and Eskom's plans for the collector substation, the length of the operation phase may be extended beyond a 20 year period. This would also require the extension of the operation phase for the grid infrastructure. At the end of the project's life, decommissioning will include site preparation, disassembling of the components of the grid connection infrastructure, clearance of the relevant infrastructure at the collector substation and along with the power line servitude, and rehabilitation. Note that impacts associated with decommissioning are expected to be similar to those associated with construction activities. Therefore, these impacts are not considered separately within this chapter.

Environmental issues associated with construction and decommissioning activities may include, among others, threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna and avifauna, impacts to sites of heritage value, soil erosion and loss of agricultural land, and nuisance from the movement of vehicles transporting equipment and materials.

Environmental impacts associated with the operation phase include visual impacts, night-time lighting impacts, habitat alteration and impacts to fauna and avifauna, and potential invasion by alien and invasive plant species.

8.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the final BA Report includes the following information required in terms of Appendix 1: Content of the BA Report:

Requirement	Relevant Section
3(h)(v) the impacts and risks identified 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 impacts and risk associated with the development of grid connection infrastructure for the Aggeneys 2, solar PV facility including the nature, significance, consequence, extent, duration and probability of the impacts and the degree to which the impact can be reversed and cause an irreplaceable loss of resources are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3, 8.8.3, 8.9.3 and 8.10.3.
3(h)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the	The positive and negative impacts associated with the development of the grid connection infrastructure for the

Requirement	Relevant Section
geographical, physical, biological, social, economic, heritage and cultural aspects	Aggeneys 2 solar PV facility are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3, 8.8.3, 8.9.3 and 8.10.3.
3(h)(viii) the possible mitigation measures that could be applied and the level of residual risk.	The mitigation measures that can be applied to the impacts associated with the grid connection infrastructure for the Aggeneys 2 solar PV facility are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3, 8.8.3, 8.9.3 and 8.10.3.
3(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 (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) 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,.	A description of all environmental impacts identified for the grid connection for the Aggeneys 2 solar PV facility during the BA process and the extent to which the impact significance can be reduced through the implementation of the recommended mitigation measures provided by the specialists are included in sections 8.3.2, 8.4.2, 8.5.2, 8.6.2, 8.7.2, 8.8.2, 8.9.2 and 8.10.2.
3(j) an assessment of each identified potentially significant impact and risk, including (i) cumulative impacts, (ii) the nature, significance and consequences of the impact and risk, (iii) the extent and duration of the impact and risk, (iv) the probability of the impact and risk occurring, (v) the degree to which the impact and risk can be reversed, (vi) the degree to which the impact and risk may cause irreplaceable loss of resources and, (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	An assessment of each impact associated with the development of the grid connection infrastructure of the Aggeneys 2 solar PV facility, including the nature and significance, the extent and duration, the probability, the reversibility, and the potential loss of irreplaceable resources, as well as the degree to which the significance of the impacts can be mitigated are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3, 8.8.3, 8.9.3 and 8.10.3.
3(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.	Mitigation measures recommended by the various specialists for the reduction of the impact significance are included in sections 8.3.3, 8.4.3, 8.5.3, 8.6.3, 8.7.3, 8.8.3, 8.9.3 and 8.10.3.

8.2. Quantification of Areas of Disturbance within the Corridors

Site-specific impacts associated with the construction and operation of the grid connection infrastructure for the Aggeneys 2 solar PV facility relate to the direct loss of vegetation and species of special concern, disturbance of animals and loss of habitat, and impacts on soils. In order to assess the impacts associated with the grid connection infrastructure for the Aggeneys 2 solar PV facility, it is necessary to understand the extent of the affected corridors. In this regard, the following is relevant:

- » The collector substation will occupy an area of up to 1.25ha in extent.
- » The overhead power line will be constructed within a servitude of up to 47m in width over a distance of up to 17km. Tower footprints for single-pole structures are typically 1m² in extent, and towers are typically placed 200m apart.

8.3. Potential Impacts on Ecology (Ecology, Flora and Fauna)

Potential ecological impacts resulting from the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility will stem from a variety of different activities and risk factors associated with the pre-construction, construction, operation and decommissioning phases and would include impacts on vegetation and protected plant species, direct faunal impacts and impacts on CBAs and broad-scale

ecological processes. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D** for more details).

8.3.1 Results of the Ecological Impact Assessment

The development footprint of the Aggeneys 2 grid connection infrastructure is restricted to low and moderate sensitivity habitat associated with Bushmanland Arid Grassland and Bushmanland Sandy Grassland vegetation types. There are no highly sensitive features within the development footprint that cannot be avoided. As such, there are no impacts associated with both corridors that cannot be mitigated to a low level. Although cumulative impacts in the wider Aggeneys area are currently on the increase due to the expansion of the mine at Black Mountain and the proliferation of solar PV facilities in the area, these still occupy a small proportion of the wider area and the contribution of the current development to cumulative impact would be low and is considered acceptable. In terms of the two assessed corridor alternatives, these are considered largely similar and while both routes are considered acceptable, Alternative 1 is considered the preferred alternative as it is shorter and runs adjacent to an existing power line (i.e. the Aggeneys – Aries 400kV power line). There are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding.

Figure 8.2 below illustrates the ecological sensitivity associated with the grid connection corridors for the Aggeneys 2 solar PV facility. Furthermore, both collector substation location alternatives are located within areas considered to be of a low ecological sensitivity.

8.3.2 Description of Ecological Impacts

The following potential impacts have been identified and are considered to be relevant to the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility.

Impacts on vegetation and protected plant species

Several protected species occur within the project development corridors and would be impacted by the proposed development. Vegetation clearing during construction will lead to the loss of currently intact habitat within the proposed development footprint and is an inevitable consequence of the proposed development. As this impact is certain to occur it will be assessed for the construction phase as this is when the impact will occur, although the consequences will persist for a long time after construction.

Direct faunal impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction as well as operation and this impact will, therefore, be assessed for the construction phase and operational phase.

Impact on CBAs and broad-scale ecological processes

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the presence of a number of other renewable energy and mining developments in the area, this is a potential cumulative impact of the development that is assessed.

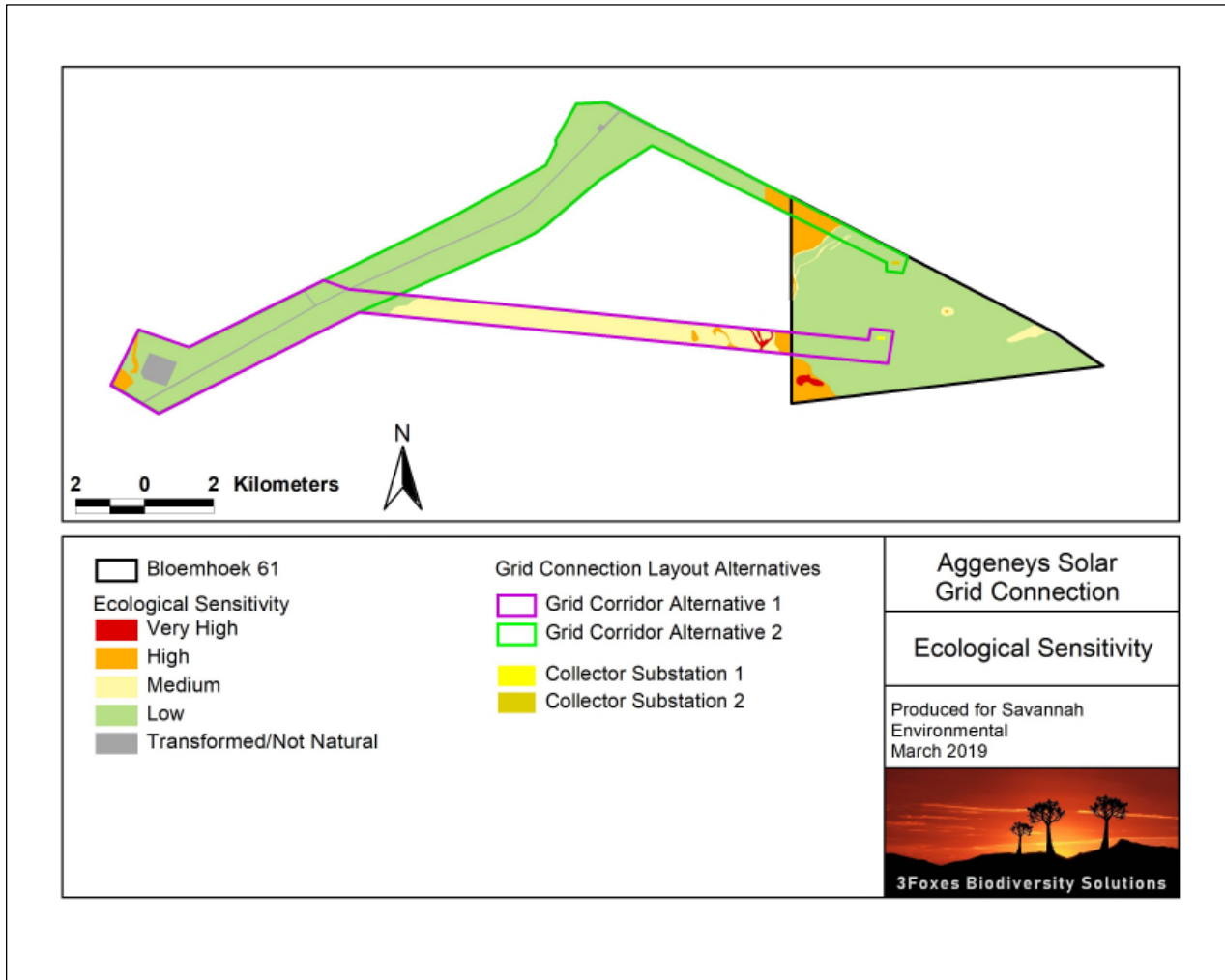


Figure 8.2: Ecological sensitivity map of the Aggeneys 2 grid connection corridors.

8.3.3 Impact tables summarising the significance of impacts on ecology during construction and operation (with and without mitigation)

The impacts assessed below apply to the grid connection alternatives proposed and assessed for the grid connection infrastructure for the Aggeneys 2 solar PV facility.

Planning and Construction Phase Impacts

Nature: *Impacts on vegetation and listed or protected plant species due to construction activities*

Impacts on vegetation will occur due to disturbance and vegetation clearing associated with the construction of the grid connection infrastructure. In addition, there will be some loss of individuals of protected plant species.

	Alternative 1		Alternative 2	
	Without mitigation	With mitigation	With mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long term (3)	Long-term (4)	Long-term (3)
Magnitude	Low (4)	Low (3)	Low (4)(4)	Low (3)
Probability	Definite (5)	Highly likely (4)	Definite (5)	Highly Likely (4)
Significance	Medium (40)	Low (28)	Medium (45)	Low (28)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Moderate	High	Moderate	High
Irreplaceable loss of resources?	Low	Low	Low	Low
Can impacts be mitigated?	This impact cannot be well mitigated because the loss of vegetation and any individuals of protected species is unavoidable and is a certain outcome of the development of the grid connection infrastructure.			
Mitigation:				
<ul style="list-style-type: none"> » Pre-construction walk-through of the substation and power line final layout in order to locate species of conservation concern that can be translocated as well as comply with the Northern Cape Nature Conservation Act and DENC permit conditions. » Search and rescue for identified species of concern before construction. » Vegetation clearing to commence only after walk-through has been conducted and necessary permits obtained. » Pre-construction 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, remaining within demarcated construction areas etc. » Contractor's Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities within sensitive areas. » 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. » Temporary laydown areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use. 				
Residual Impacts:				
As the loss of currently intact vegetation is an unavoidable consequence of the grid connection infrastructure, the habitat loss associated with the grid connection infrastructure remains a moderate residual impact even after mitigation and avoidance of more sensitive areas.				

Nature: Direct faunal impacts due to construction activities

Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. Due to noise and operation of heavy machinery, the faunal disturbance will extend well beyond the grid connection infrastructure and extend into adjacent areas. This will, however, be transient and restricted to the construction phase.

	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Short-term (1)	Short-term (1)	Short-term (1)	Short-term (1)
Magnitude	Medium (5)	Low (3)	Medium (5)	Low (3)
Probability	Highly Probable (4)	Probable (3)	Highly Probable (4)	Probable (3)

Significance	Low (28)	Low (15)	Low (28)	Low (15)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	Moderate	Moderate
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	Although noise and disturbance generated at in the vicinity of the final grid connection servitude during construction are largely unavoidable, impacts such as those resulting from the presence of construction personnel at the site can be readily mitigated.			
Mitigation:				
<ul style="list-style-type: none"> » All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition. » Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified environmental officer. » All construction vehicles should adhere to a low-speed limit (30km/h for max for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. » All hazardous materials should be stored in an appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » If trenches need to be dug for electrical cabling or another purpose, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches that are standing open should have places where there are soil ramps allowing fauna to escape the trench. 				
Residual Impacts:				
It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.				

Operation Phase Impacts

Nature: <u>Faunal impacts due to operation</u>				
The operation and presence of the grid connection infrastructure may lead to disturbance or persecution of fauna within or adjacent to the power line corridor.				
	Alternative 1		Alternative 2	
	Without mitigation	With mitigation	With mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Minor (2)	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)	Probable (3)	Improbable (2)
Significance	Low (27)	Low (14)	Low (27)	Low (14)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	Moderate	Moderate
Irreplaceable loss of resources?	No	No	No	No
Can impacts be mitigated?	To a large extent, but some low-level residual impact due to noise and human disturbance during maintenance is likely.			
Mitigation:				
<ul style="list-style-type: none"> » Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. » If the substation site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects. 				

- » All hazardous materials should be stored in an appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- » All vehicles accessing the site should adhere to a low-speed limit (30km/h max for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises.
- » If the substation or other components are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks.

Residual Impacts:

Disturbance from maintenance activities will occur at a low level with the result that disturbance would be largely restricted to the site.

Nature: *Habitat degradation due to erosion and alien plant invasion.*

The disturbance created during construction will leave the affected areas vulnerable to erosion and alien plant invasion for several years into the operational phase.

	Alternative 1		Alternative 2	
	Without mitigation	With mitigation	With mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Medium-term (2)	Short-term (1)	Medium-term (2)	Short-term (1)
Magnitude	Medium (4)	Low (2)	Medium (4)	Low (2)
Probability	Likely (4)	Likely (3)	Likely (4)	Likely (3)
Significance	Low (28)	Low (12)	Low (28)	Low (12)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Medium	High	Medium	High
Irreplaceable loss of resources?	Moderate	Low	Moderate	Low
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.			

Mitigation:

- » There should be annual monitoring for erosion and alien problems along the power line route.
- » All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
- » There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area.
- » Alien management at the site should take place according to the Alien Invasive Management Plan.
- » Regular (annual) monitoring for alien plants during operation to ensure that no alien invasive problems have developed as a result of the disturbance, as per the Alien Management Plan for the project.
- » Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present.

Residual Impacts:

Some erosion and alien plant invasion is likely to occur even with the implementation of control measures but would have a low impact if effectively managed.

Decommissioning Phase Impacts

Nature: *Habitat degradation due to erosion and alien plant invasion*

The disturbance created during construction will leave the affected areas vulnerable to erosion and alien plant invasion for several years into the operational phase.

	Alternative 1		Alternative 2	
	Without mitigation	With mitigation	With mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Medium-term (2)	Short-term (1)	Medium-term (2)	Short-term (1)
Magnitude	Medium (4)	Low (2)	Medium (4)	Low (2)
Probability	Likely (4)	Likely (3)	Likely (4)	Likely (3)
Significance	Low (28)	Low (12)	Low (28)	Low (12)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Medium	High	Medium	High
Irreplaceable loss of resources?	Moderate	Low	Moderate	Low
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.			

Mitigation:

- » Erosion management should make provision for monitoring of the site for at least 5 years after decommissioning.
- » All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
- » There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area.
- » Alien management at the site should take place according to the Alien Invasive Management Plan. This should make provision for alien monitoring and management for at least 5 years after decommissioning.
- » Regular (annual) monitoring for the alien plant during operation to ensure that no erosion problems have developed as a result of the disturbance, as per the Alien Management Plan for the project.
- » Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present.

Residual Impacts:

Some erosion and alien plant invasion is likely to occur even with the implementation of control measures but would have a low impact if effectively managed.

Impact Nature: *Disturbance, noise and the operation of heavy machinery.*

Due to disturbance, noise and the operation of heavy machinery, faunal disturbance due to decommissioning will extend beyond the footprint and impact adjacent areas to some degree. This will, however, be transient and restricted to the period while machinery is operational. In the long term, decommissioning should restore the ecological functioning and at least some habitat value to the affected areas.

	Alternative 1		Alternative 2	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Short-term (1)	Short-term (1)	Short-term (1)	Short-term (1)
Magnitude	Low (4)	Low (3)	Low (4)	Low (3)
Probability	Probable (4)	Probable (3)	Probable (4)	Probable (3)
Significance	Low (24)	Low (12)	Low (24)	Low (12)
Status	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceable loss of resources	No	No	No	No

Can impacts be mitigated?	Although the noise and disturbance generated at the site during decommissioning are probably largely unavoidable, this will be transient and ultimately the habitat should be restored to something useable by the local fauna.
Mitigation	<ul style="list-style-type: none"> » All personnel should undergo environmental induction with regards to fauna and, in particular, awareness about not harming or collecting species such as snakes, tortoises and owls, which are often persecuted out of superstition. » Any fauna threatened by the decommissioning activities should be removed to safety by an appropriately qualified environmental officer. » All vehicles should adhere to a low-speed limit to avoid collisions with susceptible species such as snakes and tortoises. » All hazardous materials should be stored in the appropriate manner to prevent contamination of the site and ultimately removed from the site as part of decommissioning. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » The site should be rehabilitated with locally occurring species to restore ecosystem structure and function.
Cumulative Impacts	During the decommissioning, the associated disturbance would contribute to cumulative fauna disturbance and disruption in the area, but this would be transient and not of long-term impact.
Residual Risks	Although some components of disturbance cannot be avoided, no significant residual impacts are likely.

8.3.4 Comparative Assessment of Alternatives

Both on-site substation locations are situated on very plains habitat. As a result, there are no specific preferences with regards to the two substation alternatives. The direct and indirect impacts associated with both alternatives will be similar. Both alternatives are located within a relatively uniform habitat type with no identified sensitive ecological features and, as such, both alternatives will have low ecological impacts.

Considering the above, the technically preferred alternative is nominated as the preferred alternative for the on-site substation location, which is Alternative 1.

Aspect: Ecology		
On-site Substation	Alternative 1 (technically preferred)	Alternative 2
	<ul style="list-style-type: none"> » Low impact » Low ecological sensitive area » Acceptable » Preferred due to technical considerations 	<ul style="list-style-type: none"> » Low impact » Low ecological sensitive area » Acceptable

8.3.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of ecological impacts of Aggeneys 2 can be reduced to low, with only one impact being of a medium significance following the implementation of the mitigation measures. From the outcomes of the ecological assessment, it is concluded that the development of the solar PV facility and associated infrastructure is acceptable. On-site mitigation is viewed as the most practical and appropriate action, and viable options for reducing the overall impact of the development is detailed below:

- » Pre-construction walk-through of the facility's final layout in order to locate species of conservation concern that can be translocated as well as comply with the Northern Cape Nature Conservation Act and DENC permit conditions.
- » Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.
- » Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified environmental officer.
- » If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects.
- » If the facility is to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside as is the case on the majority of already constructed PV plants.
- » Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. This should make provision for annual monitoring and rehabilitation.
- »

8.4. Potential Impacts on Avifauna

The significance of the impacts on avifauna expected with the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility has been assessed as medium to low, depending on the impact being considered, with the implementation of mitigation measures. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E** for more details).

8.4.1 Results of the Avifauna Impact Assessment

The dune habitat to the south and west and located outside of both corridors are considered to be of very high avifaunal sensitivity, as this supports a healthy resident population of the Vulnerable Red Lark *Calendulauda burra*. The species is mainly susceptible to impacts associated with habitat transformation and degradation. The plains habitat along the remainder of the Alternative 1 as well as the entirety of the Alternative 2 corridor does not currently support any Red Lark species based on field surveys undertaken, and because it is widely distributed, it is considered to have low sensitivity. There are parts of the plains habitat that are considered to be of a medium to high sensitivity, due to the presence of greater structural diversity and habitat availability (i.e. the presence of *Boscia* trees), and the presence of previously used raptor nests in *Boscia* trees, and traversing drainage lines.

There are no highly sensitive habitats within both corridors that are considered as a no-go area from an avifaunal perspective (refer to **Figure 8.3**). Much of the sensitivity within the corridors are considered to be of low or medium sensitivity, albeit the Alternative 1 skirts the northern margin of the dune habitat, which is

of high sensitivity, however, the vulnerable Red Lark species in this area are not susceptible to collisions with power lines. However, the Alternative 2 corridor traverses a plains habitat, which is an extensive vegetation type and supports mainly species with wide distributions such as the collision-prone Ludwig Bustard *Neotis ludwigii* species. Therefore, since the collision-prone Ludwig Bustard species may be more common in the plains habitat, there is a greater possibility of the species being susceptible to collisions with the power line within the Alternative 2 corridor. Therefore, from an avifaunal perspective, the Alternative 1 corridor is the preferred alternative due to its short length, and because no avian species that are susceptible to collisions with power lines are anticipated within the corridor.

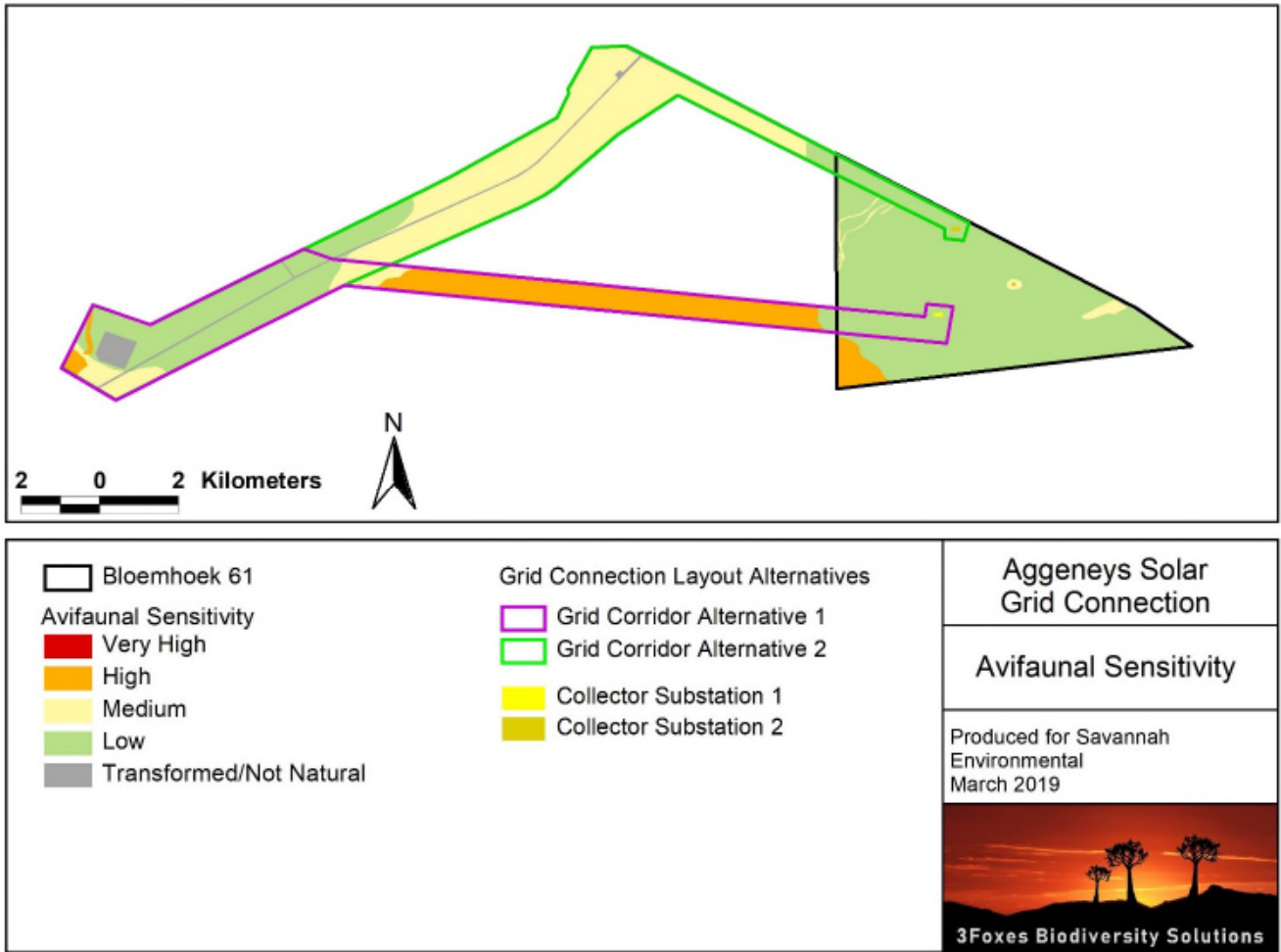


Figure 8.3: Avifaunal sensitivity map for the grid connection corridors for the Aggeneys 2 solar PV facility.

8.4.2 Description of Avifaunal Impacts

The following potential avifauna impacts are expected to occur during the pre-construction, construction and operation phases:

Planning & Construction Phase

- » Direct avifaunal impacts during the construction phase, as a result of habitat loss and disturbance.

- » Direct avifaunal impacts during the construction phase, as a result of collisions, electrocution and disturbance.

Operation Phase

- » Direct avifaunal impacts during the construction phase, as a result of collisions, electrocution and disturbance.

Decommissioning Phase

- » The decommissioning phase will result in disturbance and loss of avifaunal microhabitats due to removal and clearing of the pylons, substation areas and associated infrastructure. Disturbances will be caused by increased traffic of vehicles, and particularly heavy machinery used for clearing the infrastructure.

8.4.3 Impact tables summarising the significance of impacts on avifauna during construction and operation (with and without mitigation)

Construction Phase Impacts

Nature: <u>Direct avifauna impacts during construction</u>				
Direct avifaunal impacts during construction are expected to occur. These include habitat loss and disturbance due to vegetation clearing and the operation of heavy machinery in the project development corridors and the increased human presence.				
	Alternative 1		Alternative 2	
	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)	Short-term (2)	Short-term (2)
Magnitude	Medium (5)	Medium (5)	Medium (6)	Medium (6)
Probability	High Likely (4)	Probable (3)	Highly Likely (4)	Probable (3)
Significance	Medium (32)	Low (24)	Medium (36)	Medium (30)
Status	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceable loss of resources	Low	Low	Low	Low
Can impacts be mitigated?	Although there will be some habitat loss that cannot be well mitigated, impacts on avifauna will be transient and of low magnitude during construction.			
Mitigation:				
<ul style="list-style-type: none"> » Pre-construction walk-through of the grid connection infrastructure corridor to identify areas of avifaunal sensitivity such as raptor nests in the vicinity of the corridor. » Prior to construction, the design and layout of the grid connection infrastructure must be endorsed by members of the Eskom-EWT Strategic Partnership, taking into account the mitigation guidelines recommended by Birdlife South Africa (Jenkins et al., 2017; Jenkins et al., 2016). » Only power line and substation structures that are considered safe for birds should be erected to avoid the electrocutions of birds (particularly large raptors) perching or attempting to perch. Where necessary, deterrent devices such as bird guards should be mounted on relevant parts of the pylons to further reduce the possibility of electrocutions. » The route that the power line will follow should be the shortest distance possible across an area where collisions are expected to be minimal, or follow existing power lines (as with Alternative 1), and be marked with bird diverters to make the lines as visible as possible to collision-susceptible species. Recommended bird diverters such as brightly coloured 'aviation' balls, thickened wire spirals, or flapping devices that increase the visibility of the lines should be fitted where considered necessary (collision hot-spots). 				

- » The potential to 'stagger' the position of the power line pylons in relation to existing telephone or power line poles/pylons should be investigated, as this may assist in increasing the visibility of power lines to large flying birds such as bustards, which may regularly fly through the area.
- » All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting or hunting ground-dwelling species (e.g. bustards, korhaans, thick-knees and coursers), and owls, which are often persecuted out of superstition.
- » This induction should also include awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.
- » All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.
- » The use of laydown areas within the footprint of the development corridor should be used where feasible, to avoid habitat loss and disturbance to adjoining areas.
- » The red sand dunes to the south and west of the Alternative 1 corridor should be considered a no-go area apart from where there are already existing access roads through this area.
- » All building waste produced during the construction phase should be removed from the development corridor and be disposed of at a designated waste management facility. Similarly, all liquid wastes should be contained in appropriately sealed vessels/ponds within the footprint of the development, and be disposed of at a designated waste management facility after use. Any liquid and chemical spills should be dealt with accordingly to avoid contamination of the environment. Any avifauna threatened by the construction activities should be removed to safety by an appropriately qualified environmental officer or specialist.
- » If lights are to be used at night for ensuring that infrastructure on site is lit, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects. The use of lighting at night should be kept to a minimum, so as not to unnecessarily attract invertebrates to the substation and possibly their avian predators, and to minimise disturbance to birds flying over the facility at night.
- » All vehicles (construction or other) accessing the site should adhere to a low-speed limit (40km/h max) to avoid collisions with susceptible avifauna, such as nocturnal and crepuscular species (e.g. nightjars, thick-knees and owls) which sometimes forage or rest on roads, especially at night.
- » No construction activity should occur near active raptor nests should these be discovered prior to or during the construction phase. If active nests are discovered near construction areas, these should be reported to the ECO and should be monitored until the birds have finished nesting and the fledgelings have left the nest.
- » If holes or trenches need to be dug for cables or pylons, these should not be left open for extended periods of time as ground-dwelling avifauna or their flightless young may become entrapped therein. Holes should only be dug when they are required and should be used and filled shortly thereafter.

Residual Impacts:

The loss of habitat associated with the grid connection corridor is an unavoidable consequence of the power line and substation construction and remains a residual impact even after mitigation and avoidance of more sensitive areas. Although the sensitivity of the affected habitat is high for the dune habitat, the overall residual impact on avifaunal habitat loss remains low due to the footprint to be occupied by the grid connection infrastructure, while the power line will not pose a threat to the Red Lark species. Although the use of power line structures that are considered safe for large birds will contribute to reducing the potential impacts of the power line, future collisions with power line will remain a risk. This can be reduced further by 'staggering' the pylons in relation to existing pylons during construction so that the profile of the power line will be more visible to flying birds.

Operation Phase Impacts

Nature: Avifauna impacts due to operational activities

Avifaunal impacts due to operational activities are expected to include collisions with the pylons, electrocution and disturbance.

	Alternative 1		Alternative 2	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)

Magnitude	Moderate (5)	Low (4)	Moderate (6)	Low (4)
Probability	High Likely (4)	High Likely (4)	Highly Likely (4)	Probable (3)
Significance	Medium (40)	Low (27)	Medium (44)	Low (27)
Status (Positive or Negative)	Negative	Negative	Negative	Negative
Reversibility	High/Medium	High/Medium	High/Medium	High
Irreplaceable loss of resources	Low	Low	Low	Low
Can impacts be mitigated?	To a large extent although bird flappers and other bird diverters are not 100% effective and so there would still be some residual impact.			
Mitigation:				
<ul style="list-style-type: none"> » Regular monitoring of power lines should be undertaken to detect bird carcasses, to enable the identification of any areas of high impact to be marked with bird diverters. » Any movements by vehicle and personnel should be limited to within the footprint of the power line servitude, substation and other associated infrastructure, especially during routine maintenance procedures. » Any raptor nests that are discovered on the power line structures should be reported to the environmental manager, while utmost care should be taken to not disturb these nests during routine maintenance procedures. 				
Residual Impacts:				
Deterrent devices such as bird guards to reduce electrocutions, and flight diverters to reduce the risk of collisions with power lines and substations are not 100% effective and some residual impact is likely to occur.				

Decommissioning Phase Impacts

Nature: Avifaunal impacts due to decommissioning activities				
The decommissioning phase will result in some disturbance and loss of avifaunal microhabitats due to removal and clearing of pylons, substation areas and associated infrastructure. Disturbances will be caused by increased traffic of vehicles, and particularly heavy machinery used for clearing the infrastructure.				
	Alternative 1		Alternative 2	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Short term (2)	Short term (2)	Short term (2)	Short term (2)
Magnitude	Moderate (4)	Low to Moderate (3)	Moderate (4)	Low to Moderate (3)
Probability	Definite (5)	Definite (5)	Definite (5)	Definite (5)
Significance	Medium (35)	Medium (30)	Medium (35)	Medium (30)
Status	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	Moderate	Moderate
Irreplaceable loss of resources	Low	Low	Low	Low
Can impacts be mitigated?	Disturbance impact can be mitigated to an extent as it will be transient and have no long term impact.			
Mitigation:				
<ul style="list-style-type: none"> » All infrastructure should be removed from the development corridor and be disposed of in the appropriate manner. » All waste produced during decommissioning must be disposed of at a designated waste management facility. » Environmental induction for all personnel on site to ensure that basic environmental principles are adhered to, and awareness about not harming or hunting ground-dwelling species (e.g. bustards, korhaans, thick-knees and coursers), and owls, which are often persecuted out of superstition. » All vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed in undisturbed natural areas outside of the decommissioning area. » All construction vehicles should adhere to a low-speed limit (40km/h on site) to avoid collisions with susceptible species such nocturnal and crepuscular species (e.g. nightjars, thick-knees and owls) which sometimes forage or rest along roads. 				

- » Any avifauna threatened by the activities should be removed to safety by the ECO or appropriately qualified environmental officer.
- » If holes or trenches need to be dug, these should not be left open for extended periods of time as ground-dwelling avifauna or their flightless young may become entrapped in them. Holes should only be dug when they are required and should be used and filled shortly thereafter.
- » No activity should occur near to active raptor nests should these be discovered prior to or during the decommissioning phase. If there are active nests near the decommissioning areas, these should be reported to the ECO and should be monitored until the birds have finished nesting and the fledgelings left the nest.
- » All disturbed and cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area.

Residual Impacts:
 Disturbance during the decommissioning phase is an unavoidable consequence but will have a low residual impact with implementation of the recommended mitigation measures. The sensitivity of the affected habitat is however low and the overall residual impact on avifaunal habitat loss remains low.

8.4.4 Comparative Assessment of Alternatives

There are no highly sensitive habitats within both corridors that are considered as a no-go area from an avifaunal perspective. However, the Alternative 1 corridor is considered the preferred alternative as it has the shortest route to the Aggeneys MTS, and only traverses the northern margin of the dune habitat (i.e. an area of high sensitivity) along an existing power line corridor. It is therefore expected to have the least impact, considering that the Alternative 2 corridor has a longer route and will only run parallel with an existing power line along the N14 road for the final portion of the corridor. It is therefore likely that the Alternative 1 corridor would generate the least impact on the avifauna, provided suitable mitigation measures are employed during the construction and operation of the grid connection. The difference in impacts between the two options is however small and both are considered potentially acceptable.

Considering the above, the technically preferred alternative, i.e. Alternative 1, is nominated as the preferred alternative for the on-site substation location.

Aspect: Avifauna		
Power line & Collector Substation	Alternative 1 (technically preferred)	Alternative 2
	<ul style="list-style-type: none"> » Low impact » Low avifauna sensitive area » Preferred 	<ul style="list-style-type: none"> » Low impact » Low avifauna sensitive area » Acceptable

8.4.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of avifauna impacts associated with the grid connection infrastructure for the Aggeneys 2 solar PV facility will be medium to low, depending on the impact being considered. Areas of medium and high sensitivity have been identified within the proposed corridors.

From the outcomes of the avifauna assessment, it is concluded that the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility and associated infrastructure is acceptable and impacts on avifauna are managed by taking the following into consideration:

- » The route that the power line will follow should be the shortest distance possible across an area where collisions are expected to be minimal, or follow existing power lines (as with Alternative 1), and be

marked with bird diverters to make the lines as visible as possible to collision-susceptible species. Recommended bird diverters such as brightly coloured 'aviation' balls, thickened wire spirals, or flapping devices that increase the visibility of the lines should be fitted where considered necessary (collision hot-spots).

- » Pre-construction environmental induction for all construction personnel regarding basic environmental principles.
- » The use of laydown areas within the footprint of the corridor should be used where feasible, to avoid habitat loss and disturbance to adjoining areas.
- » All construction vehicles should adhere to clearly defined and demarcated roads.
- » All construction vehicles should adhere to a low-speed limit (30km/h for heavy-duty vehicles and 30km/h for light-duty vehicles) to avoid collisions with susceptible species such nocturnal and crepuscular species, as well as reduce dust.
- » If holes or trenches are to be dug, these should not be left open for extended periods of time as ground-dwelling avifauna may become entrapped therein.
- » No construction activity should occur near active raptor nests should these be discovered prior to or during the construction phase.
- » ECO to monitor and enforce a ban on hunting and collecting of avifauna or their products (e.g. eggs and nestlings).

8.5. Potential Impacts on Freshwater Features

The majority of the impacts on freshwater features associated with the development would occur during the construction phase as a result of the disturbance associated with construction activities and the impacts thereof on the freshwater features present within the proposed corridors for the Aggeneys 2 solar PV facility grid connection infrastructure. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix F** for more details).

8.5.1 Results of the Freshwater Impact Assessment

Seven ephemeral¹² depression wetlands were identified, ground-truthed and delineated in the field, of which three (3) ephemeral wetlands were identified directly within the Alternative 1 corridor, and four (4) other ephemeral wetlands outside the Alternative 1 corridor, but within 500m of the regulated area of a watercourse. No wetland features were found within the Alternative 2 corridor.

Twenty-three (23) ephemeral watercourses and two (2) large ephemeral watercourses were identified within both corridors. The ephemeral watercourses originate from culverts under the Loop 10 gravel road (**Figure 8.5**) located to the north of the Alternative 2 corridor and drain through this area.

No watercourses were identified within the vicinity of either collector substation alternative site.

¹² Ephemeral water features flow for very short periods following rainfall. Outside of these rainfall periods, the surface remains dry.

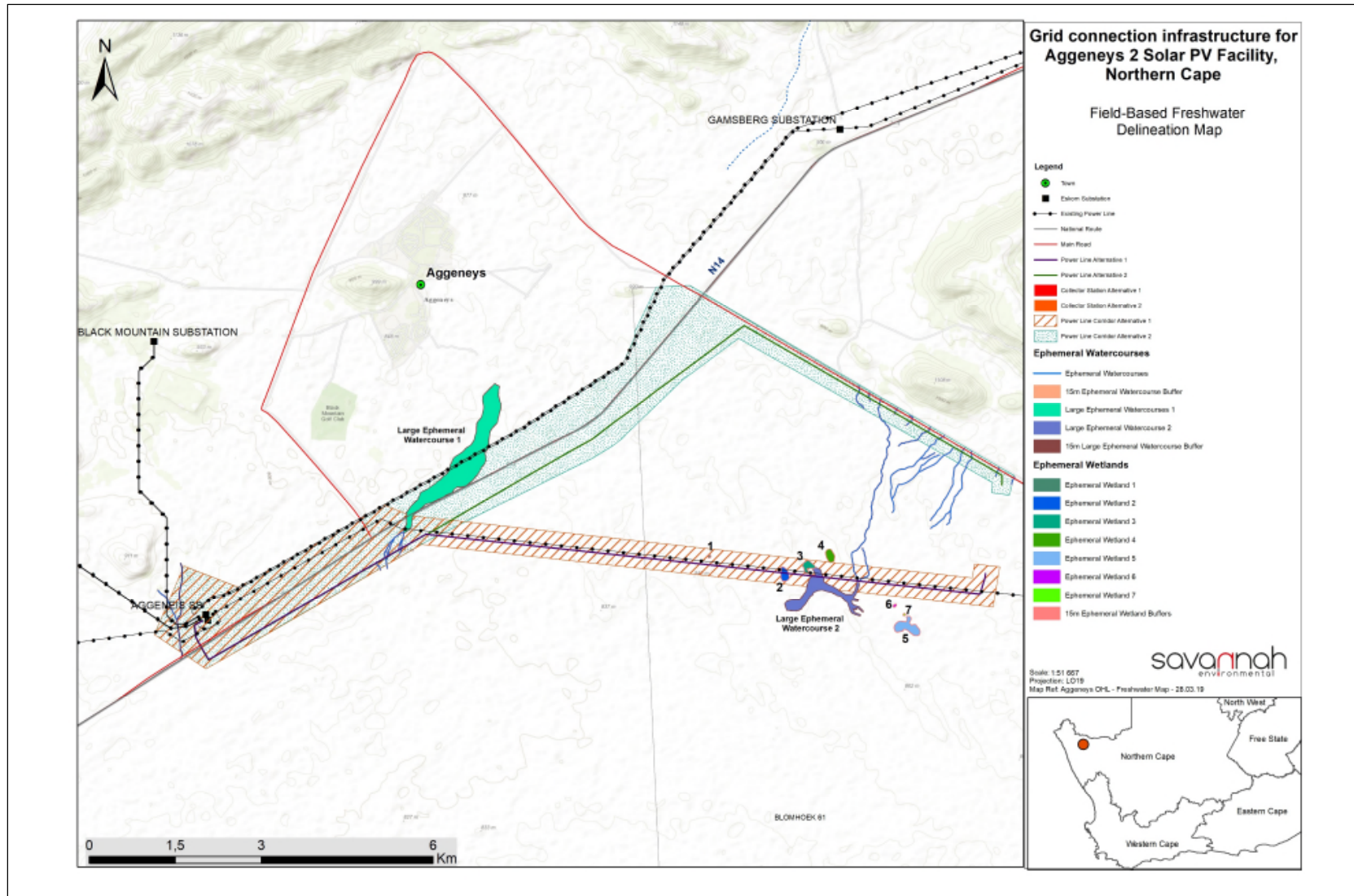


Figure 8.5: Freshwater delineation map of the ephemeral watercourses overlain with the proposed grid connection infrastructure corridors for the Aggeneys 2 solar PV facility

A buffer zone of 15m for the ephemeral watercourses is to be implemented. Given the nature and type of development, the footprint of the power line was deemed to be relatively minimal. In addition, the power lines are able to easily span any of the freshwater resources (wetland and watercourses). Taking into consideration the condition and functionality of the wetlands and watercourses identified, and the potential impacts anticipated, the following recommendations are made from a freshwater perspective:

- » No pylon towers are to be placed directly within the wetlands and watercourses or the associated buffer zones and are rather to be spanned across watercourses and the associated buffer zones.
- » Existing service roads and tracks are to be used where reasonable and feasible;
- » An alien invasive and control management plan is to be compiled for the construction and post-construction phases by a suitably qualified ecological specialist, and implemented accordingly so as not to affect the present ecological state of the wetlands and the ecological condition of the riparian habitat of the freshwater resources assessed; and
- » Prior to construction, a risk assessment is to be undertaken for the construction of a power line and access road (where applicable) through the wetlands and watercourses where required. This is to be undertaken to determine the need for appropriate water use licensing with the Department of Water and Sanitation for such activities.

8.5.2 Description of Freshwater Impacts

Potential impacts on the freshwater features would result from a variety of activities and risk factors associated with the construction and operation phases of the project.

During the construction phase the following impacts are expected to occur:

- » *Impacts on the vegetation of the ephemeral watercourses*
- » With the construction of the power lines, there may be degradation of vegetation in the wetlands and watercourses as a result of disturbance during construction. This may occur through the development of a new access road (minor 2-track dirt access road) or through vehicles utilising existing service roads or farm tracks through the wetlands and watercourses.
- » *Impacts on the water quality of the ephemeral watercourses*
- » Where the pylons are placed outside the wetlands, watercourses and the associated buffer zones, with excavations, there is a potential for sedimentation to enter the water courses via stormwater run-off. In addition to this, with the presence and potential movement of construction vehicles and associated machinery through wetlands and watercourses on existing service roads and farm tracks during the construction of the proposed power line, there is a potential for fuels and oil spills or leaks either directly into the watercourses or indirectly via stormwater run-off.
- » Lastly, sanitation will be required for workers during the construction phase. Temporary sanitation facilities are likely to be utilised. Spillages or leaks from temporary sanitation facilities may result during the construction phase, which can enter into the ephemeral watercourses directly or via stormwater run-off within the local catchment area.
- » *Impacts on the geomorphology of the ephemeral watercourses*
- » Use of existing service roads and farm tracks, or the development of a new minor 2-track dirt access road where access may not be readily available, are likely to be required for the construction of the power line through any wetlands or watercourses where these cannot be avoided. Compaction of the

bed of the ephemeral wetlands and watercourses due to the movement of vehicles is therefore likely to take place.

During the operation phase the following impacts are expected to occur:

- » *Vehicle movement in the watercourses during monitoring*
- » Vehicle movement through the ephemeral wetlands and watercourses via service roads created during the construction phase (or pre-existing access roads), as well as farm tracks are likely to be required during the operation phase. This activity may be associated with impacts to the wetlands and watercourses in terms of compaction and possible soil erosion.

During the decommissioning phase, the same potential impacts identified in the construction phase can be associated with the decommissioning of the power line and associated collector substation but in reverse order. The same impacts, significance ratings and mitigation measures are applicable. Therefore, decommissioning impacts in terms of freshwater are not further considered.

8.5.3 Impact tables summarising the significance of impacts on freshwater features during construction and operation (with and without mitigation)

Construction Phase Impacts

Nature: <i>Potential impacts associated with vegetation clearance in the watercourses</i>		
Clearance of vegetation associated with the ephemeral watercourses during the construction phase.		
	Without mitigation	With mitigation
Extent	Project site (1)	Project site (1)
Duration	Very short-term (1)	Very short-term (1)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	Medium (32)	Low (24)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> » Vehicle movement within the wetlands and watercourses must be minimised, and existing service roads utilised where practical and feasible. » No blading or scraping is to be employed for new access road construction. New access roads are to be created by recurring use in order to allow remnant vegetation to rehabilitate naturally the following construction. Where required (i.e. where vegetation presents an obstacle), manual removal of vegetation using hand tools may be permitted; » Worker movement is to be limited to the servitude of the power lines being erected. Workers are not allowed outside of the servitude in the wetlands and watercourses during construction. » Workers are not allowed to destroy or harm wetland and riparian habitat vegetation where not absolutely required for the construction work. » No in-stream or riparian vegetation is to be removed where not absolutely required for the construction work. » The Environmental Officer (EO) must monitor vehicle movement and report any movement outside of the newly developed minor 2-track dirt access road, existing service roads or farm tracks. » No pylon towers are to be placed directly within the wetlands and watercourses or the associated buffer zones and are to be spanned across watercourses and the associated buffer zones. 		

<ul style="list-style-type: none"> » The power line is to avoid impacting on all freshwater resources as far as possible. » No construction in the watercourses is to take place over the two rain peak periods associated with the watercourses (i.e. during November & between February - March). This will avoid impacts to vegetation when growth is stimulated by the rains and will also avoid impacts to flow, as construction will be limited to periods when the watercourses are likely to be dry. This will also limit disturbance to the potential occurrence of red data avifaunal species and other charismatic species that may inhabit the freshwater resources during this time. » Although no alien species were noted during the assessment, it is good practice to ensure that an alien invasive and control management plan is to be formulated and implemented to prevent any encroachment of alien invasive species into the area.
<p>Residual Impacts: No residual impacts are expected after the implementation of mitigation measures.</p>

<p>Nature: <i>Potential impacts associated with water quality in the wetlands and watercourses</i> Sedimentation of watercourses due to increased run-off and clearance of vegetation in the immediate catchment area from construction excavation. Oil and fuel leaks and spills directly in the wetlands and watercourses or indirectly entering freshwater systems via stormwater run-off. Temporary sanitation facilities may leak into the ephemeral wetlands and watercourses.</p>		
	Without mitigation	With mitigation
Extent	Project site (1)	Project site (1)
Duration	Very short-term (1)	Very short-term (1)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	Low (24)	Low (12)
Status (positive or negative)	Negative	Negative
Reversibility	Possible	Possible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> » Where pylons are placed in close proximity to the buffer zone of the freshwater resources, the soil stockpile areas need to be temporarily bunded using an appropriate structure (i.e. silt nets, sandbags, pegged wooden planks) until construction is complete at each point. » No pylon towers are to be placed directly within the wetlands and watercourses or the associated buffer zones, and power lines are to be spanned across watercourses and the associated buffer zones. » All vehicles and machinery must be maintained regularly and checked for leaks before being allowed to move within the service roads and farm tracks (existing or developed). Should leaks be detected, the relevant vehicles and machinery must be repaired before being allowed to operate within the power line servitude. » No storage of fuels, oils or any other hazardous substance is allowed directly in the wetlands and watercourses or within 100m from any wetland or watercourse. » General storage of fuels, oils and any other hazardous substances must be contained in bunded areas. » Emergency oil spill kits must be available should a spill occur. » Temporary sanitation may not be placed directly or within 100m of any wetland or watercourse. » Temporary sanitation facilities must be regularly checked for leaks and spillages, and repaired where any leakages are detected before being allowed for use in the power line servitude. » Temporary sanitation facilities must be cleaned regularly to ensure they stay within capacity. 		
<p>Residual Impacts: No residual impacts are expected after the implementation of mitigation measures.</p>		

Operation Phase Impacts

<p>Nature: <i>Potential impacts associated with vehicle movement in the wetlands and watercourses.</i></p>

Soil compaction of the bed of the ephemeral watercourses are expected with the movement of vehicles through the ephemeral watercourses during the operation and maintenance phase.		
	Without mitigation	With mitigation
Extent	Project site (1)	Project site (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (36)	Low (28)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> » Vehicle movement through the wetlands and watercourses during monitoring and maintenance is to be limited to existing tracks or project service tracks. » All service roads and farm tracks through watercourses used during monitoring and maintenance are to be monitored for erosion annually during the operation phase. 		
Residual Impacts:		
No residual impacts are expected to occur after the implementation of mitigation measures.		

8.5.4 Comparative Assessment of Alternatives

Two alternative power line corridors and associated collector substations have been proposed including Alternative Power Line Corridor 1 and 2, and the associated Alternative Collector Substations 1 and 2. A comparative assessment of each alternative is provided below, providing reasons for the selection of the preferred alternative.

Aspect: Freshwater		
Power line and Collector Substation	Alternative 1 (technically preferred)	Alternative 2
	<ul style="list-style-type: none"> » Impacts can be mitigated or avoided during the construction phase » No freshwater resources within the development footprint of the collector substation. » Freshwater resources within the corridor can be avoided. » Acceptable » Preferred due to technical constraints, and because potential impacts on the wetlands and watercourses can be mitigated or avoided. 	<ul style="list-style-type: none"> » Impacts can be mitigated or avoided during the construction phase » No freshwater resources within the development footprint of the collector substation. » Freshwater resources within the corridor can be avoided. » Acceptable » Least preferred due to technical constraints, however, potential impacts on the wetlands and watercourses can be mitigated or avoided

Based on the information in the comparative assessment of both corridors above, Alternative 1 and 2 power line corridors and collector substation alternatives are both viewed as acceptable, with Alternative 1 being the preferred Alternative.

8.2.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts on freshwater features for grid connection infrastructure for the Aggeneys 2 solar PV facility can be reduced to low. From the outcomes of the studies undertaken, it is concluded that the development of the grid connection infrastructure for the solar PV facility is acceptable subject to the recommendations made by the specialist. On-site mitigation is viewed as the most practical and appropriate action, and viable options for reducing the overall impact of the development on these areas are detailed below:

- » No pylon towers are to be placed directly within the wetlands and watercourses or the associated buffer zones and are rather to be spanned across watercourses and the associated buffer zones.
- » Existing service roads and tracks are to be used where reasonable and feasible;
- » An alien invasive and control management plan is to be compiled for the construction and post-construction phases by a suitably qualified ecological specialist, and implemented accordingly so as not to affect the present ecological state of the wetlands and the ecological condition of the riparian habitat of the freshwater resources assessed; and
- » Prior to construction, a risk assessment is to be undertaken for the construction of a power line through the wetlands and watercourses where required. This is to be undertaken to determine the need for appropriate water use licensing with the Department of Water and Sanitation for such activities.

8.6. Assessment of Impacts on Soil and Agricultural Potential

The impact of the grid connection infrastructure for the Aggeneys 2 solar PV facility on the soils and agricultural potential, has been assessed as low with the implementation of the recommended mitigation measures. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix G**).

8.6.1 Results of the Soil Impact Assessment

The entire extent of the corridors is located within land type Af21 and Af26, which consists largely of red and deep sandy soils. There are no high potential soils present within both corridors, and the soils are of moderate potential at best due mainly to a combination of the shallow depth and the sandy texture which will lead to rapid water infiltration and the soils drying out.

In addition, the low rainfall in the area means that there is little potential for rain-fed arable agriculture in the area. Arable production would, therefore, be possible only by irrigation, and no indications of any irrigated areas within, and surrounding the corridors, can be identified.

In general, the soils that do occur within the study area are suited for extensive grazing at best and furthermore the grazing capacity of the area is very low, at around 26-40 ha/large stock unit.

The soils present in the corridors are not considered susceptible to erosion by water. However, if the vegetation cover is disturbed (for example by overgrazing and construction activities) and considering the sandy nature of the topsoils, as well as the dry climate, there is a significant possibility of removal of some or all of the topsoil by wind action.

8.6.2 Description of Soil and Agricultural Potential Impacts

Two impacts have been identified to be associated with the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility from a soil perspective:

» *Loss of agricultural land*

In most environmental investigations, the major impact on the natural resources of the corridors would be the loss of potential agricultural land due to the installation of the power line and construction of the collector substation and associated infrastructure. However, in this instance, this impact would be of extremely limited significance and would be local in extent, if at all.

» *Soil erosion*

In this area, the sandy soils, coupled with the dry climate, means that a possible impact would be the increased risk of wind erosion of the topsoil when vegetation cover is removed or disturbed. This would be especially relevant for the construction of the access road and the collector substation.

The main impact would be due to the construction-related activities for the power line, collector substation and connecting infrastructure (i.e. access road), and also during the operation phase of the grid infrastructure, especially when maintenance is being undertaken on the grid infrastructure.

8.6.3 Impact tables summarising the significance of impacts on Soil and Agricultural Potential during construction and operation (with and without mitigation)

Nature: <u>Loss of potentially productive agricultural land</u>		
The loss of productive agricultural land could potentially occur during the construction phase.		
	Without mitigation	With mitigation
Extent	Low (1)	Low (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	Low (27)	14 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
» Minimise the footprint of construction as much as possible.		
Residual:		
The residual impacts is likely to be low, since the implementation of the appropriate mitigation measures will enable more or less complete rehabilitation during and after the life of the project.		

Nature: <u>Increased soil erosion hazard by wind</u>		
Increased soil erosion is expected to occur due to the disturbance of the soil as a result of and during the construction and operation phase (i.e. maintenance on the power line)		
	Without mitigation	With mitigation
Extent	Medium (3)	Low (1)
Duration	Permanent (5)	Short-term (2)
Magnitude	High (8)	Minor (2)

Probability	Highly probable (4)	Improbable (2)
Significance	High (64)	Low (10)
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	Very possible	No
Can impacts be mitigated?	Yes	
Mitigation:		
» Minimise the footprint of construction as much as possible. » Where soil is removed/disturbed, ensure it is stored for rehabilitation and re-vegetated as soon as possible. » Implement all appropriate soil conservation measures, including contouring, culverts etc. (for road construction), geotextiles and slope stabilisation (for all infrastructure).		
Residual:		
If mitigation is not carried out, long-term wind erosion, with results such as loss of valuable topsoil, may occur.		

8.6.4 Comparative Assessment of Alternatives

No high potential soils or productive cultivated areas occur within power line corridors or within the two collector substation location alternatives. The placement of the grid infrastructure within the Alternative 2 corridor (the least preferred from a technical perspective) is considered favourable from a soils and agricultural potential perspective. This is due to the fact that within this corridor, there is a lesser occurrence of dunes, which could lead to increased levels of wind erosion, especially in the long term.

Aspect: Soils and Agricultural Potential		
Power line & Collector Substation	Alternative 1	Alternative 2
	» Possible impacts, as this corridor is closer to the dune area. » Least preferred from a soils perspective, due to the sensitive dune habitat area located within this corridor, which could lead to increased levels of wind erosion, especially in the long term. » Acceptable	» Negligible impact » Preferred, as it contains a limited occurrence of dune areas »

8.6.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the grid connection infrastructure for Aggeneys 2 is expected to have a low impact on soils and agricultural potential. From the outcomes of the study undertaken, it is concluded that the grid connection infrastructure can be developed and impacts on soils managed by taking the following into consideration:

- » Implement all appropriate soil conservation measures, including contouring, culverts etc. (for road construction), geotextiles and slope stabilisation (for all infrastructure).

8.7. Assessment of Impacts on Heritage Resources

No significant impacts to palaeontological and heritage resources are expected to occur for the two proposed alternative corridors, primarily because of the very low probability of artefacts or fossils actually

occurring within the corridors. If impacts do occur, they would be during the construction phase with no impacts possible during the other phases. Possible impacts during the construction phase include impacts on artefacts and/or fossils during the excavation of foundations for the pylons and collector substation. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix I**).

8.7.1 Results of the Heritage Impact Assessment (including archaeology and palaeontology)

No heritage resources of a high significance were identified within the Alternative 1 and 2 grid connection corridors, albeit several isolated stone artefacts of a low significance attributable to background scatter were noted along with the waypoints 189 and 190 (refer to **Appendix 2** of the Heritage Impact Assessment).

The area around the corridors is very minimally developed with few traces of anthropogenic interventions. The most visually dominant anthropogenic activity, however, is the mining occurring at Gamsberg, just to the north. Several power lines and substations occur in the broader area. These together result in a modern cultural landscape that is far more dominant than the ephemeral traces of historical or prehistoric occupation of the landscape. This does not take away from the potential historical importance of the area surrounding Gamsberg. This part of the landscape may, therefore, be associated with living heritage.

Archaeological remains were found to be very rare. Isolated flaked stone artefacts made in quartz and quartzite were noted from time to time (less than 10 artefacts), but are of no consequence and are attributed to background scatter.

No sign of any graves was identified in the proposed corridors, however, approximately 900m to the east of the corridor, two likely graves were found alongside a small rocky hill. No built heritage resources occur in the corridors.

The corridors are underlain by Late Caenozoic superficial sediments that are generally of low to very low palaeontological sensitivity. These sediments include wind-blown sands and alluvial and sheetwash gravels.

8.7.2 Description of the Heritage Impacts

Impacts to heritage (including archaeology and palaeontology) will occur mainly during the construction phase of the power line and collector substation. The potential impacts expected to occur include impacts to paleontological resources, impacts to archaeological resources and graves and impacts to the cultural landscape. These are described below.

» *Impacts on palaeontological resources*

No significant impacts to palaeontological resources are expected, primarily because of the very low probability of fossils actually occurring. If impacts did occur, they would be during the construction phase with no impacts possible during later phases. Rescue of fossils discovered during construction through the implementation of a chance finds procedure would slightly reduce the potential magnitude of impacts, but this makes little difference to the overall assessment. It should be noted that, although impacts with mitigation may still be negative, the possibility of positive impacts occurring does exist if workers are vigilant and protect fossils in situ so that the maximum amount of contextual information can be recorded when the fossil is rescued.

» *Impacts on archaeological resources and graves*

No significant impacts to archaeological resources are expected, primarily because of the very low probability of impacts on culturally significant sites. No significant sites were located within the corridors. The only possible impact of minor significance would be if people visited the rocky hills of the area and disturbed the archaeological features (including graves). The chance of this happening is rated as improbable, and with awareness training provided by the ECO/EO, this would become very improbable.

» *Impacts on the cultural landscape*

Impacts to the cultural landscape will occur but because of existing impacts (power lines, a substation and mining) in the area, this impact is not considered to be of great significance and is not a fatal flaw. The landscape is largely natural with anthropogenic features, aside from the modern ones, being poorly represented. Clustering of landscape impacts is generally preferred which means that this location, quite close to a large substation and mining area, is appropriate for electrical development. Only one potential issue has been identified and this relates to a possible San massacre site located some 5km to the east of the proposed corridors. Impacts of this cultural landscape element are unlikely to be significant due to distance and other closer and more significant disturbances. There are no practical mitigation measures to screen the proposed power line and substation and the significance, therefore, remains the same before and after mitigation.

8.7.3 Impact tables summarising the significance of impacts on heritage resources related to the grid infrastructure corridors during construction (with and without mitigation)

Only construction phase impacts on heritage resources are expected to occur.

Nature: <i>Potential impacts on palaeontological resources</i>		
Fossils may be impacted during any excavation work for foundations or electrical cabling.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (1)
Probability	Very improbable (1)	Very improbable (1)
Significance	Low (8)	Low (7)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:		
» Implement a chance fossil find procedure to ensure recovery of isolated fossils found during construction.		
Residual:		
It is never possible to locate and rescue all isolated fossils, especially when they are likely to be extremely sparse. Even with some fossils rescued there will always be some loss.		

Nature: <i>Impacts to archaeological resources and graves</i>		
Archaeological stone artefacts and/or graves may be impacted during excavation work for pylon and/or collector substation foundations or during the construction of the collector substation access road.		
	Without mitigation	With mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Minor (1)

Probability	Improbable (2)	Very improbable (1)
Significance	Low (16)	Low (7)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:		
» Ensure that the rocky hills in the area with their archaeological features (including graves) are not disturbed. » Report any dense concentrations of artefacts seen during construction activities (although the chances of such material being present are virtually zero).		
Residual:		
No sampling of archaeological resources has been suggested because they have insufficient cultural value. As such, the few isolated artefacts present would be lost. This is of no consequence.		

Nature: <i>Impacts on the cultural landscape</i>		
The cultural landscape would be impacted through the addition of electrical/industrial infrastructure to a landscape that is generally natural and rural in character.		
	Without mitigation	With mitigation
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (3)	Minor (2)
Probability	Definite (5)	Definite (5)
Significance	Medium (45)	Medium (40)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation:		
» Ensure that best practice measures such as minimising the area of disturbance and rehabilitating (where appropriate) timeously are implemented.		
Residual:		
Because it is not possible to screen the power line and collector substation, there will always be a residual impact but, due to the existing visual impacts in the area, this is not considered significant.		

8.7.4 Comparative Assessment of Alternatives

The two corridor alternatives have no specific impacts associated with them. Both alternatives are considered to be acceptable and the impacts associated with both locations are regarded as identical.

Considering the above, the technically preferred alternative, Alternative 1 is nominated as the preferred alternative as it is located further from the N14 and has a slightly smaller impact magnitude.

Aspect: Heritage		
Power line & Collector Substation	Alternative 1 (technically preferred)	Alternative 2
	» No impact » Preferred due to technical considerations	» No impact » Acceptable

8.7.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of impacts of the grid connection infrastructure for the Aggeneys 2 solar PV facility will be low or medium, depending on the impact being considered. From the outcomes of the heritage assessment, it is concluded that the development of the power line, collector substation and associated infrastructure is acceptable.

The following recommendations need to be implemented as part of the development:

- » Monitoring would be required to ensure that the small rocky hill and associated no-go area to the east of the corridors remains undisturbed throughout the duration of the construction phase.
- » If any change in the corridor occurs, then an archaeologist should be consulted for an opinion on whether a survey is required.
- » If any archaeological or palaeontological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.
- » Implement a chance fossil find procedure to ensure recovery of isolated fossils found during construction.

8.8. Assessment of Visual Impacts

Negative impacts on visual receptors will occur during the undertaking of construction activities and the operation of the grid connection infrastructure for the Aggeneys 2 solar PV facility. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix H**).

8.8.1 Results of the Visual Impact Assessment

The fact that the terrain is relatively flat will mean that the grid connection infrastructure is likely to be viewed in profile by all identified receptors within the area. Due to the corridor for Alternative 1 running adjacent to existing power line servitudes for its entire length, it is likely to have a low impact in terms of intensifying the visual influence of electrical infrastructure within the developed landscape character area.

However, the corridor for Alternative 2 is aligned away from the existing power line servitudes. Due to this, the development of grid connection infrastructure within this corridor will extend the visual influence of electrical transmission infrastructure into new areas. This impact will most probably be more significant than Alternative 1, however, the level of impact is assessed as low because the corridor has been affected by views from other developments.

The surrounding landscape has been shown to generally have a relatively low level of visual absorption capacity. This means that relatively unbroken views of the grid connection infrastructure for the Aggeneys 2 solar PV facility are likely to be possible.

Due to its tourism importance, the N14 is likely to be one of the most sensitive visual receptors. The grid connection corridor for Alternative 1 only affects the N14 for 8km from the connection point at the Aggeneys MTS, and because the character of view within this section of the road is already heavily influenced by the power lines, the visual impact of the Alternative 1 corridor on the N14 is assessed as having a low significance.

The Alternative 2 grid connection corridor affects approximately 16.2km of the N14. Nearly 10km of the character views from the road is lightly impacted by power lines. The remaining portion along the N14 is heavily impacted. Therefore, tourists using the N14 are likely to experience the visual impacts of Alternative 2, which has been assessed as having a medium significance in comparison to Alternative 1.

The collector substation alternative locations are unlikely to have a contribution to the visual impacts as they are located further away from the N14.

The Alternative 1 grid connection infrastructure corridor is aligned away from the Loop 10 gravel road. Therefore, the corridor will have little influence on the view from the road due to the distance, and screening provided by the Aggeneys 2 solar PV facility. The impact is assessed as having a low significance.

The Alternative 2 grid connection infrastructure corridor runs along the Loop 10 gravel road for approximately 6.3k and will affect views of up to 11.3km. The collector substation within this corridor is also located in close proximity to the gravel road and will have a direct visual impact on the road. The visual impact for Alternative 2 from the Loop 10 road is assessed as having a medium significance.

Due to the fact that the majority of adjacent land is subject to mining, there are very few homesteads in the area. The nearest homestead is approximately 4.2km to the south of the eastern boundary of the corridors. This homestead appears to be unoccupied. Views from this structure are already impacted by the existing Aggeneys-Aries 400kV power line which is located approximately 250m from the building. Due to the distance and the existing visual impact, the visual impacts from both corridors are assessed as having a low significance.

The proposed corridors are likely to have an impact on the southern edge of the settlement areas in Aggeneys, as the view from the Aggeneys settlement is already being affected heavy industry, as well as large scale electrical transmission infrastructure, which includes high voltage (HV) power lines and the Aggeneys MTS infrastructure. The views from the edge of the settlement are largely screened by vegetation in the area, and the likely impact on views from the settlement was assessed as low for both Alternative 1 and 2 corridors. Due to the distance of the collector substation areas from the settlement, no impact is expected from this area.

The Zone of Theoretical Visibility maps for both Alternative 1 and 2 are illustrated in **Figure 8.6** and **8.7**.

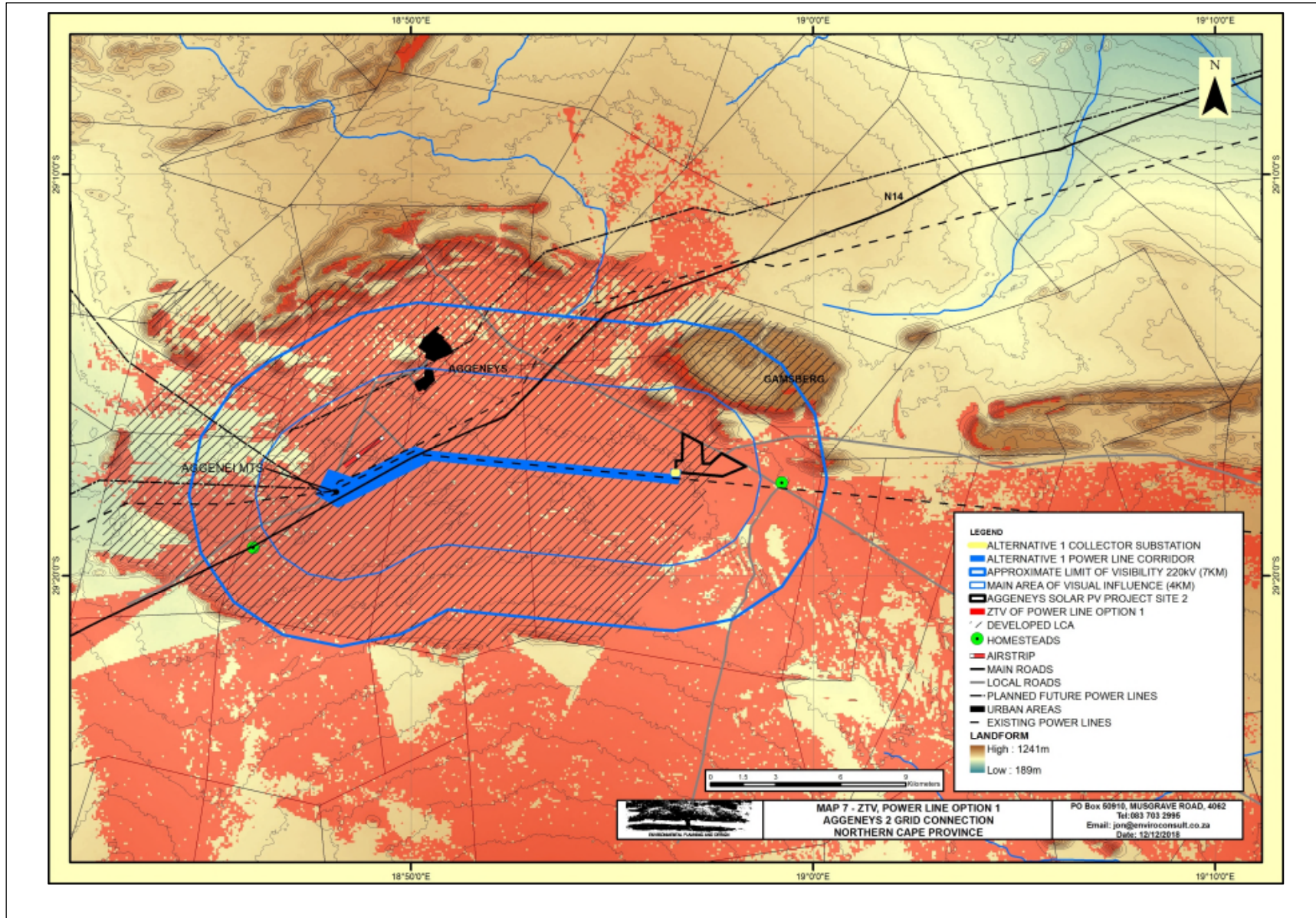


Figure 8.6: Zone of Theoretical Visibility for the grid connection infrastructure associated with the Alternative 1 corridor.

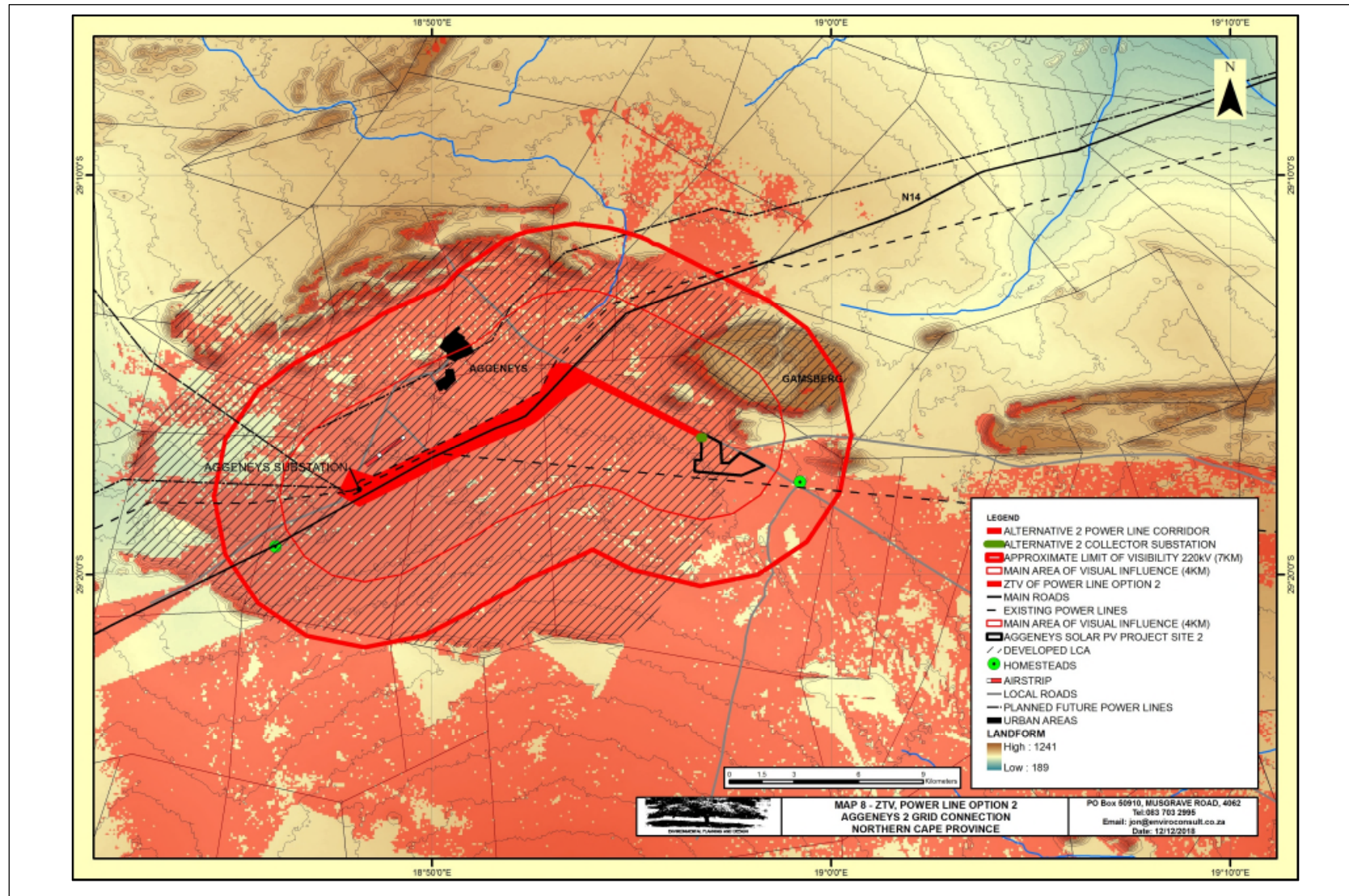


Figure 8.7: Zone of Theoretical Visibility for the grid connection infrastructure associated with the Alternative 2 corridor.

8.8.2 Visual Assessment

Visual impacts will occur during the construction and operation of the grid connection infrastructure for the Aggeneys 2 solar PV facility. The following potential visual impacts are assessed for the development of the grid connection infrastructure.

- » The proposed development could change the general landscape character.
- » The proposed development could change the character of the landscape as seen from the N14.
- » The proposed development could change the character of the landscape as seen from the un-surfaced local road (i.e. Loop 10 Road) that runs to the north of the Aggeneys 2 solar PV project site.
- » The proposed development could change the character of the landscape as seen from local homesteads.
- » The proposed development could change the character of the landscape as seen from local settlement areas.
- » The impact of the proposed development on views from the settlement of Aggeneys.

8.8.3 Impact table summarising the significance of visual impacts during construction and operation (with and without mitigation)

Nature: *Impact of the proposed development on the general landscape character*

Both proposed power line corridor alternatives will largely affect the Developed LCA. Within the Developed LCA however, there are areas where electrical infrastructure is more obvious than in others. The section of the un-surfaced road between the proposed Aggeneys 2 solar PV project and the N14 is a case in point, as electrical infrastructure is visible from this road but it is not obvious.

Electrical infrastructure is obvious from the section of the N14 between its junction with the un-surfaced road and the location that the existing 400kV Aggeneis – Aries power line joins the N14 but the scale is relatively small as larger power lines are some distance from the road.

Between the point that the existing Aggeneis – Aries power line joins the N14 and the Aggeneis MTS, larger infrastructure gradually converges and becomes far more obvious from the road.

The Alternative 2 corridor and the associated collector substation area affect a larger area in general. They also affect a section of the landscape that is currently relatively unaffected by electrical infrastructure development. This corridor is therefore likely to have a more significant impact than Alternative 1 and the associated collector substation area.

Due to the nature of the infrastructure and the fact that the majority of the affected area is also currently impacted by existing developments and future planned electrical infrastructure, the magnitude of the impact of both alternatives is assessed as minor to low, resulting in impacts associated with both alternatives of low significance. This rating of low significance is regardless of the technology alternative or route alternative selected.

	Without mitigation	With mitigation
Extent	Site and immediate surroundings (2)	Site and immediate surroundings (2)
Duration	Long term (4)	Long term (4)
Magnitude	Alternative 1 Minor (2)	Alternative 1 Small to Minor (1)
	Alternative 2 Minor to Low (3)	Alternative 2 Minor to Low (3)

Probability	Both Alternatives Probable (3)	Both Alternatives Probable (3)
Significance	Alternative 1 24 (Low)	Alternative 1 21 (Low)
	Alternative 2 Low (27)	Alternative 2 Low (27)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes to a small degree but it will not significantly affect the level of impact.	
Mitigation:		
<ul style="list-style-type: none"> » Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude to reduce the extent of a scarring effect in the landscape. » Ensure that vegetation is not unnecessarily removed during the construction period to ensure erosion control and to reduce the extent of a scarring effect in the landscape. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities. » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources. » Align the power line as far from roads as possible within the identified corridor to reduce the viewer incidence. 		
Residual Impacts:		
<ul style="list-style-type: none"> » Lack of rehabilitation on decommissioning could result in degraded areas. 		

Nature: Change in the character of the landscape as seen from the N14

The section of the N14 that will be affected by both alternatives runs through the Developed LCA.

Due to distance, the power lines will have the most significant influence on views from this receptor. The proposed alternative collector substation areas 1 and 2, being approximately 6.8km and 6.km from the N14, respectively, will have negligible influence.

Within the Developed LCA, there are areas where electrical infrastructure is more obvious than others. Electrical infrastructure is obvious from the section of the N14 between its junction with the Loop 10 gravel road and the location where the existing Aggeneis – Aries power line joins the N14, but the scale is relatively small as larger power lines are some distance from the road.

Between the point where the existing Aggeneis – Aries power line joins the N14 and the Aggeneis MTS, larger infrastructure gradually converges on the substation and becomes closer to and more obvious from the road.

Alternative 2 affects a larger section of the N14. It also affects a section of the landscape that is relatively unaffected by grid connection infrastructure developments to the north of the location where the existing Aggeneis – Aries power line joins the N14. This alternative is therefore likely to have a larger impact than Alternative 1.

	Without mitigation	With mitigation
Extent	Both Alternatives Site and immediate surroundings (2)	Both Alternatives Site and immediate surroundings (2)
Duration	Both Alternatives Long term (4)	Both Alternatives Long term (4)

Magnitude	Alternative 1 Minor (2)	Alternative 1 Minor (2)
	Alternative 1 Low (4)	Alternative 2 Low (4)
Probability	Both Alternatives Probable (3)	Both Alternatives Probable (3)
Significance	Alternative 1 Low (24)	Alternative 1 Low (24)
	Alternative 2 Medium (30)	Alternative 2 Medium (30)
Status (positive or negative)	Neutral – Negative The intensity of development within the Developed LCA is likely to intensify particularly in areas where development and particularly electrical infrastructure is not as obvious. Within these areas the impact is more likely to be seen as negative. In areas where electrical infrastructure is more pronounced particularly closer to the Aggeneis MTS the impact is less likely to be seen in a negative light.	Neutral
Reversibility	High	High
Irreplaceable loss of resources?	No irreplaceable loss.	No irreplaceable loss.
Can impacts be mitigated?	Yes to a small degree but it will not significantly affect the level of impact.	
Mitigation:		
<ul style="list-style-type: none"> » Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude. » Ensure that vegetation is not unnecessarily removed during the construction period. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities. » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources. » Align the power line as far from roads as possible within the identified corridor. 		
Residual Impacts:		
Lack of rehabilitation on decommissioning could result in degraded areas.		

Nature: Impacts of the power line on views from the local homesteads

There is only one homestead that could potentially be affected that is approximately 4.2km to the east of the eastern end of both corridors and collector substations areas. From this distance, the power lines and collector substations associated with both corridors are likely to be highly obvious.

Both alternatives will be viewed in the context of the Aggeneys 2 solar PV facility as well as the existing Aggeneis – Aries 400kV power line that is located within approximately 200m of the homestead and is highly obvious from the homestead.

The homestead does not appear to be inhabited, however, stock pens surrounding the building appear to be well used. It is likely therefore that the owners may be more concerned with agricultural production than aesthetics.

Taking into account the nature of the homestead and the nature of existing views, both alternatives will add to the existing visual influence of infrastructure, however, this additional impact is likely to be relatively small compared with existing and it is highly unlikely to impact current uses.		
	Without mitigation	With mitigation
Extent	Both Alternatives Immediate surroundings, (2)	Both Alternatives Immediate surroundings, (2)
Duration	Both Alternatives Long term, (4)	Both Alternatives Long term, (4)
Magnitude	Both Alternatives Minor (2)	
	Both Alternative Power Line Corridors Minor (2)	
Probability	All Power Line Alternatives Improbable, (2)	All Power Line Alternatives Improbable, (2)
Significance	Alternative 1 Low (16)	Alternative 1 Low (16)
	Alternative 2 Low (16)	Alternative 2 Low (16)
Status (positive or negative)	Neutral, due to distance, the relatively low level of impact and the likelihood that the homestead is uninhabited it is unlikely that the impact will be seen in a negative light.	Neutral
Reversibility	High	High
Irreplaceable loss of resources?	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes to a small degree but it will not significantly affect the level of impact.	
Mitigation:		
<ul style="list-style-type: none"> » Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude. » Ensure that vegetation is not unnecessarily removed during the construction period. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities. » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources. » Align the power line as far from roads as possible within the identified corridor. 		
Residual Impacts:		
Lack of rehabilitation on decommissioning could result in degraded areas.		

Nature: The impact of the proposed power line on views from the settlement of Aggeneys

Due to the density of development and vegetation within the settlement, the power line is only likely to be visible from the southern edge of Aggeneys.

At its closest, Alternative 1 is located approximately 2.6km from the settlement whereas Alternative 2 is located approximately 2.0km from the settlement. Both collector substation alternatives are located in excess of 10km from the settlement and are highly unlikely to be visible and will not have an impact. Alternative 2 also has a greater extent of the corridor that is likely to be visible as it runs along the N14 from north of the settlement to the south of the settlement. Alternative 1 joins the N14 south of the settlement and so is less visually exposed to the settlement.

<p>The landscape between Aggeneys and both power line corridor alternatives is already heavily impacted by the electrical infrastructure which means that the view from the urban edge is already highly industrialised. The addition of a new power line will slightly intensify this influence but given the distance, this is likely to be a relatively minor addition to an existing impact.</p> <p>Given that urban edge is more exposed to Alternative 2, this alternative is likely to have a marginally greater impact than Alternative 1.</p>				
	Without mitigation		With mitigation	
Extent	Both Alternatives Immediate surroundings, (2)		Both Alternatives Immediate surroundings, (2)	
Duration	Both Alternatives Long term, (4)		Both Alternatives Long term, (4)	
Magnitude	Both Alternatives Small to Minor (1)		Both Alternatives Small to Minor (1)	
	Both Power line Corridor Minor to Low (3)		Both Alternatives Minor to Low (3)	
Probability	Alternative 1 Improbable (2)	Alternative 2 Improbable (2)	Alternative 1 Improbable (2)	Alternative 2 Highly probable (4)
Significance	Alternative 1 Low (14)		Alternative 1 Low (14)	
	Alternative 2 Medium (36)		Alternative 2 Medium (36)	
Status (positive or negative)	Neutral to negative, due to the nature of the surrounding landscape which is heavily industrialised and the relatively insular nature of the settlement it is unlikely that the impact will be seen in a negative light.		Neutral – Negative	
Reversibility	High		High	
Irreplaceable loss of resources?	No irreplaceable loss of resources		No irreplaceable loss of resources	
Can impacts be mitigated?	Yes to a small degree but it will not significantly affect the level of impact.			
Mitigation:				
<ul style="list-style-type: none"> » Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude. » Ensure that vegetation is not unnecessarily removed during the construction period. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities. » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources. » Align the power line as far from roads as possible within the identified corridor. 				
Residual Impacts:				
Lack of rehabilitation on decommissioning could result in degraded areas.				

8.8.4 Comparative Assessment of Alternatives

The Alternative 2 corridor is located close to the Loop 10 road and will therefore have a higher visual influence on the travellers making use of the road than Alternative 1, which is located further south of the road. Alternative 1 is located approximately 2km from the road and is partially screened by the PV panel array of the Aggeneys 2 solar PV facility, and is therefore unlikely to be highly obvious. By comparison, the collector substation within the Alternative 2 corridor is located adjacent to the Loop 10 road, and the power

line would affect approximately 16.2km of the N14 and will be highly obvious.

Therefore, considering the above, Alternative 1 is considered as the preferred alternative from a visual perspective as it provides the opportunity to reduce the impacts on the road users to a lower and acceptable significance.

Aspect: Visual		
Power line & Collector Substation	Alternative 1 (technically preferred)	Alternative 2
	<ul style="list-style-type: none"> » Greater distance from the Loop 10 road » Lower significance » Preferred 	<ul style="list-style-type: none"> » Highly obvious from the Loop 10 road » Acceptable

8.8.5 Implications for Project Implementation

Overall, the significance of the visual impacts is expected to range from moderate to low, depending on the impact being considered, as a result of the generally undeveloped character of the landscape. From the outcomes of the visual assessment, it is concluded that the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility and associated infrastructure is acceptable. The following mitigation is possible:

- »
- » Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude.
- » Ensure that vegetation is not unnecessarily removed during the construction period.
- » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities.
- » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources.
- » Align the power line as far from roads as possible within the identified corridor.

8.9. Assessment of Social Impacts

Potential social impacts and the relative significance of the impacts associated with the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility are summarised below (refer to **Appendix J**). Both positive and negative social impacts are expected to occur with the development of the grid connection infrastructure for the solar PV facility.

8.9.1 Results of the Social Impact Assessment

It was identified that most social impacts associated with the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility will have a short term duration associated with the construction phase of the project. Of these impacts, all can be mitigated to acceptable levels and there are no fatal flaws associated with the construction of the project.

Although the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility is likely to change the sense of place of the area during the operation phase, it will also have significant benefits in respect of the supply of renewable energy into a grid system heavily reliant on coal-powered technology. In this sense, the project forms part of a national effort to reduce South Africa's carbon emissions and therefore carries with it a significant benefit.

Taking into consideration the two power line corridors and associated collector substation alternatives under consideration, Alternative 1 emerges as the preferred social alternative supported by the findings as outlined in the heritage and visual assessment. Notwithstanding this, however, no compelling socially based reason has emerged that would disregard the choice of Alternative 2 based on technical reasons or the findings of other specialist studies.

8.9.2 Description of Social Impacts

During the construction and operation phases of Aggeneys 2, both positive and negative impacts are expected to occur.

Negative impacts associated with the construction phase include:

- » Activities associated with construction; and
- » The presence of construction workers in the area.

Positive impacts associated with the construction phase include:

- » Job creation; and
- » The establishment of business opportunities and skills development.

Negative impacts associated with the operation phase include:

- » Impacts on the sense of place; and
- » Cultural Impacts.

Positive impacts associated with the operation phase includes:

- » Connecting the Aggeneys 2 solar PV facility to the national grid.

8.9.3 Impact tables summarising the significance of social impacts during construction and operation (with and without mitigation measures)

Construction Phase Impacts

Nature: <i>Activities associated with construction can result in safety, dust, noise and the disruption of daily living patterns.</i>
--

	Without mitigation	With mitigation
Extent	Local (2)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (24)	Low (21)
Status (positive or negative)	Negative	Negative
Reversibility	Yes, reversible	Yes, reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	No	
Mitigation:		
<ul style="list-style-type: none"> » Ensure all construction equipment and vehicles are properly maintained at all times. » Ensure that operators and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community. Place specific emphasis on the vulnerable sector of the population such as children and the elderly. » Ensure that fires lit by construction staff are only ignited in designated areas and that the appropriate safety precautions, such as not lighting fires in strong winds and completely extinguishing fires before leaving them unattended, are strictly adhered to. » Make staff aware of the dangers of fire during regular toolbox talks. » A grievance mechanism must be prepared and communicated to surrounding landowners and local communities, to ensure that the project proponent, EPC contractor, and sub-contractors remain responsible and accountable and to facilitate the identification and implementation of additional mitigation measures if required. » Where necessary training should be provided on the implementation of the grievance mechanism to ensure that those who are most likely to be affected by the project are suitably equipped in the mechanism of raising concerns and having these addressed. » Compile and implement a Fire Management and Emergency Preparedness Response Plan. » Apply appropriate dust suppression measures when necessary. » Ensure that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. » Ensure that, at all times, people have access to their properties as well as to social facilities. » Repair any damage caused to farm roads before completion of the construction phase. 		
Residual Impacts:		
It would be important to ensure that all excavations and construction sites are rehabilitated and made safe and that any damage caused to roads or properties is repaired before construction is completed.		

Nature: *Potential risk to communities, family structures and social networks in the area as a result of the influx of construction workers.*

	Without mitigation	With mitigation
Extent	Local (3)	Local (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status (positive or negative)	Negative	Negative
Reversibility	Yes, however not in respect of those who may contract HIV/AIDS.	
Irreplaceable loss of resources?	Yes, however not in respect of those who may contract HIV/AIDS.	
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> » Communicate, through Community Leaders and Ward Councillors, the limitation of opportunities created by the project to prevent an influx of job seekers. 		

- » Develop and implement a local procurement policy which prioritises 'locals first' to prevent the movement of people into the area in search of work.
- » Draw up a recruitment policy in conjunction with Community Leaders and Ward Councillors and ensure compliance with this policy.
- » All workers should carry identification cards and wear identifiable clothing.
- » Appoint a community liaison officer.
- » Encourage local people to report any suspicious activity associated with the construction site to the community liaison officer.
- » A grievance mechanism must be prepared and communicated to surrounding landowners and local communities, to ensure that the project proponent, EPC contractor and sub-contractors remain responsible and accountable. This will also facilitate the identification and implementation of additional mitigation measures if required.
- » Prevent loitering within the vicinity of the construction camp as well as construction sites by recruiting off-site via an offsite recruiting office/agent, whatever is most appropriate.
- » Ensure that an onsite HIV and AIDS policy are in place and that construction workers are exposed to a health and HIV/AIDS awareness educational programme within the first month of construction.
- » Provide voluntary and free counselling, free testing and condom distribution services to the workforce.

Residual Impacts:

The area currently has a very low HIV prevalence rate and an increase in this rate would have serious consequences that could last over an extended period. People contracting HIV and their families will suffer life-changing consequences.

Nature: *The stimulation of the local economy through the creation of employment and business opportunities and the opportunity for the development of skills in the area.*

	Without mitigation	With mitigation
Extent	Local (1)	Local (3)
Duration	Short-term (2)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	Low (28)	Medium (36)
Status (positive or negative)	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impacts be mitigated?	Yes	

Mitigation:

- » Where feasible, develop and implement a 'locals first' procurement policy to prevent the movement of people into the area in search of work.
- » Draw up a recruitment policy in conjunction with Community Leaders and Ward Councillors and ensure compliance with this policy.
- » Use local contractors wherever practical.
- » Where appropriate initiate training and skills development programmes aimed at locals prior to construction.
- » Ensure that women are employed and are provided with appropriate amenities.
- » Create a database of local BBBEE companies prior to construction through which services such as security, catering, waste collection amongst others will be supplied.
- » Ensure that a fair and equitable tender process is put in place prior to the commencement of construction and is closely adhered to.

Residual Impacts:

Enhanced skills and experience amongst the local community.

Operation Phase Impacts

Nature: <i>Benefit associated with connecting the Aggeneys 2 solar PV facility to the national grid and balancing the national energy mix through enhancing the supply of renewable energy.</i>		
	Without mitigation	With mitigation
Extent	Regional (4)	Regional (4)
Duration	Long-term (4)	Long-term (4)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Definite (5)
Significance	High (80)	High (80)
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Optimisation: » If the Aggeneys 2 solar PV facility is constructed then it would be necessary to construct the grid connection infrastructure		
Residual Impacts: Additional renewable energy facilities and associated infrastructure to supplement the national grid.		

Nature: <i>Transformation of the sense of place due to the nature of the project.</i>		
	Without mitigation	With mitigation
Extent	Regional (3)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate to High (7)	Moderate (6)
Probability	Definite (5)	Definite (5)
Significance	Medium (60)	Medium (55)
Status (positive or negative)	Negative	Negative
Reversibility	Difficult to reverse	Difficult to reverse
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated/enhanced?	Yes	
Mitigation: » Apply the mitigation measures suggested in the Visual Impact Assessment Report. » Whenever possible communicate the benefits associated with renewable energy to the broader community. » A Grievance Mechanism should be put in place and all grievances should be dealt with in a transparent manner. » The mitigation measures recommended in the Heritage Impact Assessment should be followed.		
Residual Impacts: With the construction of the two PV Plants and associated grid infrastructure (including the infrastructure assessed as part of this SIA) in the area and other similar facilities being planned and constructed in the province there is likely to be some change in respect of the sense of place of the broader area.		

Decommissioning Phase

Taking into consideration the time period to decommissioning, the uncertainty of what would exactly occur, and the significance of the impact in isolation, it would be rather meaningless to attach assessment criteria to decommissioning the grid connection infrastructure at this point.

8.9.5 Implications for Project Implementation

The significance of the positive impacts associated with the social aspects that will be affected by the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility, ranges from high to low (depending on the aspect being assessed) following the implementation of the mitigation measures recommended. These mitigation measures include:

- » A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills which they can use to secure jobs elsewhere post-construction.
- » A procurement policy promoting the use of local business must, where feasible, be put in place to be applied throughout the construction phase.
- » Establish a social responsibility programme either in line with the REIPPP BID guidelines or equivalent.
- » Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme.

The significance of the negative impacts associated with the social aspects that will be affected by the grid connection infrastructure for the Aggeneys 2 solar PV project ranges from low to medium with the implementation of the recommended mitigation measures. The mitigation measures include:

- » Appoint a community liaison officer to deal with complaints and grievances from the public.
- » A grievance mechanism must be prepared and communicated to surrounding landowners and local communities, to ensure that the project proponent, EPC contractor and sub-contractors remain responsible and accountable. This will also facilitate the identification and implementation of additional mitigation measures if required.
- » Ensure that an onsite HIV and AIDS policy is in place and that construction workers are exposed to a health and HIV/AIDS awareness educational programme within the first month of construction.
- » Develop and implement a local procurement policy which prioritises "locals first" to prevent the movement of people into the area in search of work.
- » Draw up a recruitment policy in conjunction with Community Leaders and Ward Councillors and ensure compliance with this policy.
- » Where necessary, training should be provided on the implementation of the grievance mechanism to ensure that those who are most likely to be affected by the project are suitably equipped in the mechanism of raising concerns and having these addressed.
- » Compile and implement a Fire Management and Emergency Preparedness Response Plan.
- » The developer and EPC Contractor must ensure that the roads utilised for construction activities are either maintained in the present condition or upgraded if damaged due to construction activities.
- » Regularly monitor the effect that the construction activities is having on public infrastructure and immediately report any damage to infrastructure to the appropriate authority.
- » Ensure that where communities' access is obstructed that this access is restored to an acceptable state.

8.11. Assessment of the 'Do Nothing' Alternative

The 'do-nothing' alternative (i.e. no-go alternative) is the option of not constructing the grid connection infrastructure for the Aggeneys 2 solar PV facility. Should this alternative be selected, there would be no environmental impacts on the proposed corridors since the proposed grid connection infrastructure would not be constructed.

CHAPTER 9: ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

The preceding impact assessment chapter has reported on the assessment of the impacts associated with the grid connection infrastructure for the Aggeneys 2 solar PV facility largely in isolation (from other similar developments). Chapter 8 concluded that the grid connection infrastructure for the Aggeneys solar PV facility may have effects (positive and negative) on natural resources, the social environment and on the people living in a project area.

This chapter assesses the potential for the impacts associated with the grid connection infrastructure for the Aggeneys 2 solar PV facility to become more significant when considered in combination with the other known or proposed grid connection infrastructure projects within the area.

9.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the final Basic Assessment Report includes the following information required in terms of Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(j)(i) an assessment of each identified potentially significant impact and risk, including cumulative impacts.	The cumulative impacts associated with the development of grid connection infrastructure for the Aggeneys 2 solar PV facility are included and assessed within this chapter.

9.1 Approach taken to Assess Cumulative Impacts

The cumulative impacts that have the potential to be compounded through the development of the grid connection infrastructure in proximity to other similar developments include impacts such as those listed below. The role of the cumulative assessment is to test if such impacts are relevant to the grid connection infrastructure:

- » Unacceptable loss of threatened or protected vegetation types, habitat or species through clearing, resulting in an impact on the conservation status of such flora, fauna or ecological functioning;
- » Unacceptable risk to freshwater features through disturbance associated with construction activities and increased runoff and erosion during the operation phase;
- » Unacceptable risk to avifauna through habitat loss, displacement and collision with the power line;
- » Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion;
- » Unacceptable loss of heritage resources (including palaeontological and archaeological resources);
- » Complete or whole-scale change in sense of place and character of an area and unacceptable visual intrusion; and
- » Unacceptable impact on socio-economic factors and components.

It is important to explore the potential for cumulative impacts as this will lead to a better understanding of these impacts and the potential for mitigation that may be required. The scale at which the cumulative impacts are assessed is important. For example, the significance of the cumulative impact on the regional

or national economy will be influenced by grid connection infrastructure development throughout South Africa, while the significance of the cumulative impact on visual amenity may only be influenced by grid connection infrastructure developments that are in close proximity to each other. For practical purposes, a sub-regional scale of 30km has been selected for this cumulative impact evaluation.

The identified corridors for the grid connection infrastructure for the Aggeneys 2 solar PV facility are located within a Renewable Energy Development Zone (REDZ) (i.e. the Springbok REDZ), and a Strategic Transmission Corridor (i.e. the Northern Transmission Corridor). These areas form part of the areas identified by the DEA as geographical areas of strategic importance for the development of commercial renewable energy developments (REDZ) and large scale grid infrastructure development projects (transmission corridors). Therefore these areas are considered as nodes for the development of renewable energy and grid infrastructure projects.

Figure 9.1 indicates the location of other known and viable (i.e. projects in process and with a valid Environmental Authorisation) solar energy developments and associated grid connection infrastructure, as well as existing grid infrastructure located within a radius of 30km from the proposed corridors. The renewable projects were identified using the Department of Environmental Affairs Renewable Energy Database and current knowledge of projects being proposed in the area. Details of these projects are provided in **Table 9.1**. All are at various stages of approval¹³. The potential for cumulative impacts is summarised in the sections that follow and has been considered within the specialist studies (refer to **Appendices D – J**).

¹³ Applications for Environmental authorisation for numerous grid connection and renewable energy projects have been undertaken within the area, however some of these applications have lapsed and are no longer considered to be valid and are therefore not considered as part of the cumulative impact assessment.

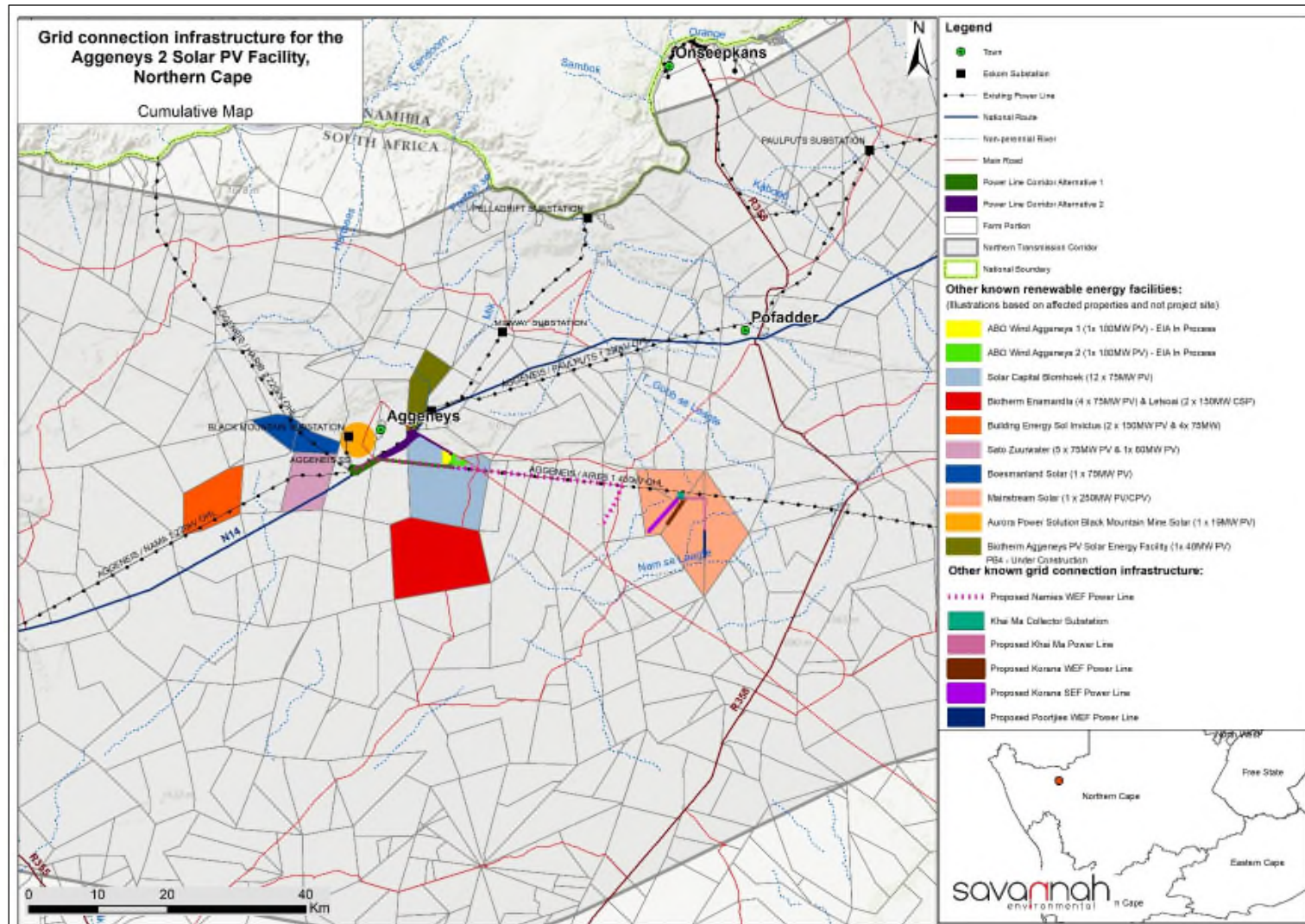


Figure 9.1: Identified renewable energy project associated with grid connection infrastructure located within a 30km radius of the Aggeneys 2 solar PV project site and grid connection corridors (This map indicates other known grid connection infrastructure based on public information that was available at the time the final BA Report was compiled).

Table 9.1: Grid connection infrastructure and renewable energy projects located within the broader area (within a 30km radius) of the project development corridors for the Aggeneys 2 solar PV facility.

Project Name	Location	Approximate distance from Aggeneys 2	Project Status
ABO Wind Aggeneys 2 (1 x 100MW PV)	Within the Remaining Extent of the Farm Bloemhoek 61	Directly adjacent and to the east of Aggeneys 2	In process
Solar Capital Blomhoek (12 x 75MW PV)	Within the Remaining Extent of the Farm Bloemhoek 61	Within the larger study area, within the southern section of the property	Approved
Biotherm Aggeneys PV Solar Energy Facility (1 x 40MW PV)	Within Portion 1 of the Farm Aroams 57	~5km to the north west	Preferred Bidder Round 4 (under construction)
Biotherm Letsoai (2 x 150MW CSP)	Located on the property directly south of the Remaining Extent of the Farm Bloemhoek 61	~15km to the south	Approved
Biotherm Enamandla (4 x 75MW PV)	Located on the property directly south of the Remaining Extent of the Farm Bloemhoek 61	~15km to the south	Approved
Building Energy Sol Invictus (2 x 150MW PV and 4 x 75MW PV)	Within Portion 5 of the Farm Ou Taaibosmond	~30km to the west	Approved
Sato Zuurwater (5 x 75MW PV and 1 x 60MW PV)	Within Portion 3 of the Farm Zuurwater 62	~20km to the west	Approved
Boesmanland Solar (1 x 75MW PV)	Within Portion 6 of the Farm Zuurwater 62	~15km to the west	Approved
Mainstream Solar (1 x 250MW PV/CPV)	Within Portion 2 of the Farm Namies South 212	~25km to the east	Approved
Aurora Power Solution Black Mountain Mine Solar (1 x 19MW PV)	Within Portion 1 of the Farm Aggeneys 65	~10km to the west	Approved

Existing power lines and substations in the area include:

- » Midway Substation;
- » Black Mountain Substation;
- » Paulputs Substation;
- » Aggeneis – Harib 220kV power line;
- » Aggeneis – Aries 220kV power line; and
- » The Aggeneis – Paulputs 220kV power line
- »

It should be noted that not all the renewable energy projects and associated grid infrastructure projects presently under consideration by various developers will be built for operation. Not all proposed developments will be granted the relevant permits by the relevant authorities (DEA, DOE, NERSA and Eskom) due to the following reasons:

- » There may be limitations to the capacity of the existing or future Eskom grid;
- » Not all applications will receive a positive environmental authorisation;

- » There are stringent requirements to be met by applicants in terms of the REIPPP Programme and a highly competitive process that only selects the most competitive projects;
- » Not all proposed renewable energy projects will be able to reduce the associated negative impacts to acceptable levels or be able to mitigate the impacts to acceptable levels (fatally flawed);
- » Not all proposed renewable energy projects will eventually be granted a generation license by NERSA and sign a Power Purchase Agreement with Eskom; and
- » Not all developers will be successful in securing financial support to advance their projects further.

As there is, therefore, a level of uncertainty as to whether all the above-mentioned renewable energy projects associated with grid connection infrastructure will be implemented, this results in it being difficult to quantitatively assess the potential cumulative impacts. The cumulative impacts of other known grid infrastructure and renewable energy projects in the broader area are qualitatively assessed in this Chapter. The following potential impacts are considered:

- » Cumulative impacts on ecological processes
- » Cumulative impacts on avifauna
- » Cumulative impacts on freshwater features
- » Cumulative impacts on soil and agricultural potential
- » Cumulative impacts on heritage resources
- » Cumulative visual impacts
- » Cumulative socioeconomic impacts

9.2 Cumulative Impacts on Ecological Processes

A reduced ability to meet conservation obligations and targets due to cumulative habitat loss, and an impact on CBAs and broad-scale ecological processes have been identified as the primary ecological impacts from a cumulative perspective (refer to **Appendix D**). Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the presence of a number of other renewable energy, grid connection infrastructure and mining developments in the area, these are potential cumulative impacts associated with the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility.

The ecological impacts associated with the grid connection infrastructure for the Aggeneys 2 solar PV facility will be of a medium to low significance, depending on the cumulative impact being considered. The contribution of the proposed project to cumulative impacts is however considered to be low.

Nature: <i>Reduced ability to meet conservation obligations and targets due to cumulative habitat loss</i>		
The development of the grid connection infrastructure for the Aggeneys 2 solar PV facility will contribute to cumulative habitat loss and other cumulative impacts in the wider Aggeneys area which may reduce the ability to meet the conservation obligations and targets.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Low (4)
Probability	Improbable (2)	Probable (3)

Significance	Low (16)	Medium (30)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	To some degree, but some residual habitat loss will persist.	
Mitigation:		
» Ensure that the fencing of the collector substation area and PV facility is friendly with fauna. This includes not having any electrified strands within 30cm of the ground as well as implementing a design that prevents fauna and avifauna from becoming trapped between the inner and outer layer of the fence as this has been demonstrated to be a common impact associated with existing infrastructure in this area.		
» Ensure that an alien management plan and erosion management plan are compiled and are effectively implemented within the corridors.		

Nature: <i>Negative impact on broad-scale ecological processes</i>		
Development of the grid connection infrastructure may impact on CBAs and broad-scale ecological processes such as the ability for fauna to disperse.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	Low (16)	Low (27)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Largely, although there will be some persistent habitat loss and disturbance.	
Mitigation:		
» Ensure that the mitigation hierarchy is applied with a particular emphasis on reducing the development footprint of the grid connection infrastructure, rehabilitating disturbed areas and minimising degradation around the servitude.		
Residual Risks:		
Once construction has been completed there would be little residual and persistent impact associated with the power line and collector substation.		

9.3 Cumulative Impacts on Avifauna

Cumulative impacts on avifauna have been identified (**Appendix E**) and include:

- » Impacts on avifaunal habitats, migration routes and nesting areas due to cumulative loss and fragmentation of habitat, as well as collisions and electrocutions along with the grid connection.

The cumulative avifauna impact, considering the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility, and other grid infrastructure and renewable energy projects within the surrounding area has a low to medium significance. The contribution of the proposed grid connection infrastructure to cumulative impacts is however considered to be low with the implementation of corridor Alternative 1 which follows an existing 400kV power line to the Aggeneys MTS.

Nature: *Impact on avifaunal habitats, migration routes and nesting areas due to cumulative loss and fragmentation of habitat, as well collisions and electrocutions along the grid connection*

	Alternative 1		Alternative 2	
	Overall impact of the proposed project considered in isolation	Overall impact of the proposed project and other projects in the area	Cumulative impact of the project and other projects in the area	Overall impact of the proposed project and other projects in the area
Extent	Local (1)	Local (2)	Local (1)	Local (2)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Moderate (5)	Low (4)	Moderate (6)
Probability	Improbable (2)	Probable (3)	Improbable (2)	Probable (3)
Significance	Low (18)	Medium (33)	Low (18)	Medium (33)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low	Low	Low
Can impacts be mitigated?	To some degree, but the majority of the long-term impact results from the presence of the power line and other developments in the area, which cannot be well mitigated.			
Mitigation:				
<ul style="list-style-type: none"> » Increased probability of bird collisions and electrocutions with new power lines may contribute to the cumulative impacts of the proposed development. However, considering that the proposed power line corridor (Alternative 1) follows an existing 400kV power line to the Aggeneys MTS, the potential impacts are not considered significantly accumulative. » Initiate increased monitoring along power line corridors in the area during periods when numbers of large nomadic species (e.g. Ludwig's Bustard) are highest, to determine any areas along the power lines where there are potentially high collision rates. Such areas should be fitted with bird diverters to reduce collisions rates. 				

9.4 Cumulative Impacts on Freshwater Features

The cumulative impacts to freshwater features would be as a result of the direct alteration and degradation of watercourses, as well as increased sedimentation associated with erosion (refer to **Appendix F**).

The cumulative impacts to freshwater features associated with the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility will be of a low significance.

Nature: *Potential cumulative impacts on the freshwater resources*

Indirect impacts due to catchment level changes to surface roughness, alteration of hydrology, as well as direct impacts related to physical alteration and degradation of freshwater resources in general.

	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (2)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Medium (33)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

<p>Mitigation¹⁴:</p> <ul style="list-style-type: none"> » Necessary precautions need to be undertaken to avoid impacting wetlands and watercourses both directly and indirectly as far as possible. Where this is not possible, impacts must be minimised as far as possible. » Necessary water use license or general authorisation from the Department of Water and Sanitation, as well as an environmental authorisation from the Department of Environmental Affairs (National or Provincial where applicable), must be obtained before any impact to wetlands and watercourses occur. » Prevent complete clearance of vegetation on project sites, to maintain some level of surface roughness to assist with control of increased run-off in the catchment to limit surface erosion or sheetwash. » Sedimentation preventative measures to be implemented to prevent sedimentation via run-off at a catchment level. » Erosion protection measures are to be implemented to wetlands and watercourses where required. » Ensure that all fuels, oils and hazardous substances are kept out of all wetlands and watercourses at a safe distance (i.e. 100m from any watercourse) and that storage areas are sufficiently bunded to prevent run-off containing substances entering wetlands and watercourses.
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9.5 Cumulative Impacts Soil and Agricultural Potential

Cumulative impacts from a soils perspective are related to an increase in the potential for wind erosion of disturbed areas within the area (refer to **Appendix G**).

The likelihood of cumulative impacts from wind erosion may be significant, if not mitigated. This is due to the increased disturbance of areas associated with numerous developments in the region.

When considering the other renewable energy developments and their associated grid infrastructure within the surrounding area, it is assumed that the impact of erosion and appropriate mitigation measures at a site-specific level for each of the facilities (as well as any grid connection infrastructure that may be required) has been considered and the mitigation measures recommended are sufficient for the management and mitigation of erosion. Therefore, considering that the impact of erosion at each facility will be low in extent, subject to the implementation of the recommended mitigation measures, and managed for each facility separately, the cumulative impact for erosion is considered to be low. Under these circumstances, the loss associated with erosion is therefore considered to be acceptable, without detrimental consequences.

If there is a large scale development of renewable energy facilities in the area, any failure to prevent wind erosion of topsoil on one project could lead to that material being deposited on any or all neighbouring properties.

Nature: <i>Cumulative impacts of the proposed development in terms of wind erosion.</i>		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Low (1)	Low (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)

¹⁴ Mitigation is assumed to be implemented by renewable energy and grid infrastructure projects in the surrounding area by default.

Significance	Low (10)	Low (12)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
<ul style="list-style-type: none"> » To minimise the footprint of construction as much as possible. » Where soil is removed/disturbed, ensure it is stored for rehabilitation and re-vegetated as soon as possible. » Implement all appropriate soil conservation measures, including contouring, culverts etc. (for road construction), geotextiles and slope stabilisation (for all infrastructure). » Ensure that equal responsibility and co-operation is accepted if more than one facility will be using the same access road, or if the possibility exists of sediment transfer (by wind or water) from one site to another. 		

9.6 Cumulative Impacts on Heritage (including archaeology and palaeontology)

Cumulative heritage impacts for the grid connection for the Aggeneys 2 solar PV facility could include widespread destruction of heritage resources and increased visual clutter in the natural and cultural landscape (refer to **Appendix I**).

Archaeological resources are the most common heritage resources on this landscape but, even so, are rare. They tend to occur in conjunction with water sources and rocky hills which are usually protected from impacts for other reasons (i.e. ecology, fresh water). This means that impacts tend to be minimal. The only significant archaeological sites known to have been impacted in the area are through mining within the Gamsberg Inselberg, although mitigation was conducted (Orton 2014). Other heritage resources, aside from the landscape itself, are sparse, and significant cumulative impacts are not expected to occur. Clustering of renewable energy facilities close to the mining area and Aggeneys MTS will reduce the impacts to the broader landscape. Cumulative impacts should have therefore no bearing on this project. The table below includes an assessment of the cumulative impacts for all heritage resources. Although the significance calculates to medium, this can be offset to a degree by the fact that the corridors lie within a REDZ area and a Strategic Transmission Corridor, which has been earmarked for renewable energy development and grid infrastructure projects. Therefore, many projects of this nature can be anticipated in this area. The indirect result is that heritage resources in other areas will have a far greater chance of being protected.

Nature: <i>Cumulative heritage impacts</i>		
The addition of multiple power lines and substations can result in widespread destruction of heritage resources and increased visual clutter in the natural and cultural landscape.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Improbable (2)
Significance	Low (21)	Low (14)
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation:		

- » Ensure that best practice measures such as minimising the area of disturbance and rehabilitating timeously (where appropriate) are implemented.

9.7 Cumulative Visual Impacts

Cumulative visual impacts associated with the development of grid connection infrastructure for the Aggeneys 2 solar PV facility include those impacts on the visual quality of the area associated with numerous power lines and substations in the area (refer to **Appendix H**). The area has already been impacted by grid infrastructure to some extent, with the presence of the Aggeneis MTS and associated high voltage lines being the most significant. The cumulative impact of the grid infrastructure for the Aggeneys 2 solar PV facility is expected to be low to medium, depending on the impact being considered. Cumulative impacts of all proposed and existing projects in the area are considered to be medium to high.

Nature: <u>Landscape Change</u>		
The proposed overhead power line and collector substation alternatives will mainly impact the Developed LCA. They will have a marginal influence on the more natural Rural LCA however, due to the nature of the existing industry in the area, existing electrical infrastructure has already heavily impacted the general area.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Both Alternatives Immediate surroundings, (2)	Both Alternatives Regional (3)
Duration	Both Alternatives Long term, (4)	Both Alternatives Long term (4)
Magnitude	Alternative 1 Minor(2) Alternative 2 Minor to low(3)	Both Alternatives Moderate to High (7)
Probability	Both Alternatives Probable, (3)	Both Alternatives Definite (5)
Significance	Alternative 1 Low(24) Alternative 2 Low(27)	Both Alternatives High (70)
Status (positive or negative)	Both Alternatives Negative	Both Alternatives Negative
Reversibility	Both Alternatives High	Both Alternatives High
Irreplaceable loss of resources?	Both Alternatives No irreplaceable loss.	Both Alternatives No irreplaceable loss.
Can impacts be mitigated?	Yes to a small degree but this will not have a significant effect.	Unknown
Mitigation:		
<ul style="list-style-type: none"> » Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude. » Ensure that vegetation is not unnecessarily removed during the construction period. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities. 		

- » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources.
- » Align the power line as far from roads as possible within the identified preferred corridor.

Nature: *Cumulative visual impacts from the N14 road*

The section of the N14 that will be affected by both alternatives runs through the Developed LCA. Due to distance, the alternative power line corridors will have the most significant influence on views from this receptor. The proposed Collector Substation alternatives 1 and 2 being approximately 6.8km and 6.0km respectively from the road will have negligible influence.

	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Both Alternatives Immediate surroundings, (2)	Both Alternatives Regional (3)
Duration	Both Alternatives Long term, (4)	Both Alternatives Long term (4)
Magnitude	Alternative 1 Minor(2) Alternative 2 Low(4)	Both Alternatives Moderate to High (7)
Probability	Both Alternatives Probable, (3)	Both Alternatives Definite (5)
Significance	Alternative 1 Low(24) Alternative 2 Medium(30)	Both Alternatives High (70)
Status (positive or negative)	Both Alternatives Negative	Both Alternatives Negative
Reversibility	Both Alternatives High	Both Alternatives High
Irreplaceable loss of resources?	Both Alternatives No irreplaceable loss.	Both Alternatives No irreplaceable loss.
Can impacts be mitigated?	Yes to a small degree but this will not have a significant effect.	Unknown

Mitigation:

- » Planning: Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude.
- » Ensure that vegetation is not unnecessarily removed during the construction period.
- » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities.
- » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources.
- » Align the power line as far from roads as possible within the identified corridor.

Nature: <i>Visual impacts from the Loop 10 gravel road</i>		
Views from the un-surfaced road are currently relatively un-affected by electrical infrastructure although overhead power lines become more obvious as the traveller approached the N14. The 400kV Aggeneis - Aries overhead power line also crosses the road to the east of the proposed Aggeneys 2 solar PV project. Both proposed power line corridor alternatives will largely affect the Developed LCA.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Both Alternatives Immediate surroundings, (2)	Both Alternatives Immediate surroundings (2)
Duration	Both Alternatives Long term, (4)	Both Alternatives Long term (4)
Magnitude	Alternative 1 Minor(2)	Alternative 1 Low(4)
	Alternative 2 Low(4)	Alternative 2 Low to moderate(5)
Probability	Both Alternatives Probable, (3)	Both Alternatives Probable, (3)
Significance	Alternative 1 Low(24)	Alternative 1 Medium(30)
	Alternative 2 Medium(30)	Alternative 2 Medium (33)
Status (positive or negative)	<p>The intensity of development within the Developed LCA is likely to intensify particularly in areas where development and particularly electrical infrastructure is not as obvious.</p> <p>The affected area is one of the areas within the study area that is least affected by development in general and particularly by electrical infrastructure.</p> <p>Alternative 1 is unlikely to be obvious from this road and so the impact is likely to have a neutral consequence.</p> <p>Alternative 2 is unlikely to be highly obvious from this road and so the impact is likely to have a negative consequence.</p>	<p>Alternative 1 Neutral</p> <p>Alternative 2 Negative</p>
Reversibility	High	High
Irreplaceable loss of resources?	No irreplaceable loss.	No irreplaceable loss.

Can impacts be mitigated?	Yes to a small degree but this will not have a significant effect.	Unknown
Mitigation:		
<ul style="list-style-type: none"> » Retain/re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude. » Ensure that vegetation is not unnecessarily removed during the construction period. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities. » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources. » Align the power line as far from roads as possible within the identified corridor. 		

Nature: <u>Cumulative impact of the proposed power line on views from the local homesteads</u>		
<p>Due to the fact that the local mine owns the majority of land in the area and probably due to the fact that the stock carrying capacity of the land is relatively low, there are very few homesteads in the area. There is only one homestead that could potentially be affected the alternatives under assessment which is approximately 4.2km to the east of the proposed Aggeneys 2 solar PV facility.</p>		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Both Alternatives Immediate surroundings, (2)	Both Alternatives Immediate surroundings,(2)
Duration	Both Alternatives Long term, (4)	Both Alternatives Long term,(4)
Magnitude	Alternative 1 Minor, (2)	Alternative 1 Moderate, (6)
	Alternative 2 Minor, (2)	Alternative 2 Moderate, (6)
Probability	Both Alternatives Improbable, (2)	Both Alternatives Definite,(5)
Significance	Alternative 1 Low, (16)	Alternative 1 High, (60)
	Alternative 2 Low, (16)	Alternative 2 High, (60)
Status (positive or negative)	<p>The intensity of development within the Developed LCA is likely to intensify particularly in areas where development and particularly electrical infrastructure is not as obvious.</p> <p>The affected area is one of the areas within the study area that is least affected by development in general and particularly by electrical infrastructure.</p>	Both Alternatives Negative

	<p>Alternative 1 is unlikely to be obvious from this road and so the impact is likely to have a neutral consequence.</p> <p>Alternative 2 is unlikely to be highly obvious from this road and so the impact is likely to have a negative consequence.</p>	
Reversibility	High	High
Irreplaceable loss of resources?	No irreplaceable loss.	No irreplaceable loss.
Can impacts be mitigated?	Yes to a small degree but this will not have a significant effect.	Unknown
<p>Mitigation:</p> <ul style="list-style-type: none"> » Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude. » Ensure that vegetation is not unnecessarily removed during the construction period. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities. » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources. » Align the power line as far from roads as possible within the identified corridor. 		

<p>Nature: <i>Cumulative impact of the proposed power line on views from the settlement of Aggeneys</i></p> <p>The landscape between Aggeneys and both power line corridors is already heavily impacted by electrical infrastructure. Due to the density of development and vegetation within the settlement, the power line is only likely to be visible from the southern edge of Aggeneys.</p>		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Both Alternatives Immediate surroundings, (2)	Both Alternatives Immediate surroundings,(2)
Duration	Both Alternatives Long term, (4)	Both Alternatives Long term, (4)
Magnitude	Alternative 1 Small to minor(1)	Alternative 1 Low to moderate, (5)
	Alternative 2 Minor (2)	Alternative 2 Low to moderate, (5)
Probability	Both Alternatives Improbable, (2)	Both Alternatives Probable, (3)
Significance	Alternative 1 Low(14)	Alternative 1 Moderate,(33)
	Alternative 2 Low(16)	Alternative 2 Moderate,(33)
Status (positive or negative)	The intensity of development within the Developed LCA is likely to intensify particularly in areas where development	Both Alternatives Negative

	<p>and particularly electrical infrastructure is not as obvious.</p> <p>The affected area is one of the areas within the study area that is least affected by development in general and particularly by electrical infrastructure.</p> <p>Alternative 1 is unlikely to be obvious from this road and so the impact is likely to have a neutral consequence.</p> <p>Alternative 2 is unlikely to be highly obvious from this road and so the impact is likely to have a negative consequence.</p>	
Reversibility	High	High
Irreplaceable loss of resources?	No irreplaceable loss.	No irreplaceable loss.
Can impacts be mitigated?	Yes to a small degree but this will not have a significant effect.	Unknown
<p>Mitigation:</p> <ul style="list-style-type: none"> » Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint/servitude. » Ensure that vegetation is not unnecessarily removed during the construction period. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities. » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources. » Align the power line as far from roads as possible within the identified corridor. 		

9.8 Cumulative Social Impacts

The potential for social cumulative impacts are likely to occur and includes both positive and negative impacts (refer to **Appendix J**). The significance of the negative impacts are medium to high, depending on the impact being considered. Positive cumulative impacts are of a high significance.

The negative cumulative impacts include an increased risk of HIV, transformation of the sense of place and disruptions to services, supplies and infrastructure.

<p>Nature: <i>Risk of HIV</i></p> <p>Increased risk of HIV and AIDS due to the influx of workers, job seekers and deliveries and availability of disposable income.</p>		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (4)	Regional (5)
Duration	Long-term (4)	Long-term (5)
Magnitude	Moderate to High (7)	Moderate to High (8)

Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (60)	High (72)
Status (positive or negative)	Negative	Negative
Reversibility	No	No
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:		
Mitigation can only be implemented on a regional basis and is not project specific.		
<ul style="list-style-type: none"> » Ensure that all companies coming into the area have and are implementing an effective HIV/AIDS policy. » Introduce HIV/AIDS awareness programs to schools and youth institutions. » Carefully monitor and report on the HIV status of citizens in the region. » Be proactive in dealing with an increase in the HIV prevalence rate in the area. 		
Residual impacts:		
The area currently has a very low HIV prevalence rate and an increase in this rate would have serious consequences that could last over an extended period. People contracting HIV and their families will suffer life-changing consequences.		

Nature: <i>Transformation of sense of place</i>		
Transformation of the sense of place due to the nature of the development.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (3)	Regional (4)
Duration	Long-term (4)	Long-term (5)
Magnitude	Moderate (5)	High (7)
Probability	Definite (5)	Definite (5)
Significance	Medium (60)	Medium (55)
Status (positive or negative)	Negative	Negative
Reversibility	Difficult to reverse	Difficult to reverse
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation:		
Mitigation measures can only be implemented on a regional basis and are not project specific.		
<ul style="list-style-type: none"> » Consider undertaking a cumulative impact assessment to evaluate the changes taking place across the area on a broader scale. » Form a regional workgroup tasked with addressing the effect of changes to the sense of place of the region. » Establish grievance mechanisms to deal with complaints associated with changes to the area. » Enlighten the public about the need and benefits of renewable energy. » Engage with the tourism businesses and authorities in the region to identify any areas of cooperation that could exist. 		

Nature: <i>Service, supplies and infrastructure</i>		
Disruptions of community facilities and infrastructure due to construction activities and an influx of workers and pressure on the supply of municipal services.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (2)	Regional (3)
Duration	Short-term (2)	Medium-term (3)
Magnitude	Moderate (6)	High (8)
Probability	Probable (3)	Probable (4)

Significance	Low (30)	Medium (56)
Status (positive or negative)	Negative	Negative
Reversibility	Yes, reversible	Yes, reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
Mitigation measures can only be implemented on a regional basis and are not project specific.		
» Engage with the municipal authorities to ensure that they are aware of the expansion planned for the area and the possible consequences of this expansion.		
» Ensure that local labour is recruited in respect of these developments in the area.		

The positive cumulative impacts include the positive economic impacts expected from a cumulative perspective.

Nature: <u>Socio-economy</u>		
Positive economic impacts in respect of the creation of jobs and business opportunities and a revenue source for local authorities.		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects in the area
Extent	Regional (4)	Regional (5)
Duration	Long-term (4)	Permanent (5)
Magnitude	Moderate (7)	Very High (9)
Probability	Highly probable (4)	Highly probable (4)
Significance	Medium (30)	High (76)
Status (positive or negative)	Positive	Positive
Reversibility	Yes, reversible	Yes, reversible
Irreplaceable loss of resources?	No	No
Can impacts be optimised?	Yes	
Optimisation:		
Optimisation measures can only be implemented on a regional basis and are not project specific:		
» Implement a training and skills development programme for locals.		
» Ensure that the procurement policy supports local enterprises.		
» Establish a social responsibility programme in line with the REIPPP.		
» Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme.		
» Ensure that any trusts or funds are strictly managed in respect of outcomes and funds allocated.		
Residual Impacts:		
Renewable energy projects are likely to have a significant amount and lasting effect on the security of electricity supply.		

9.9 Conclusion regarding Cumulative Impacts

The assessment of the cumulative impacts was undertaken through the consideration of the impacts for the grid connection infrastructure for the development of the Aggeneys 2 solar PV facility in isolation and in comparison to the cumulative impacts of other renewable energy and associated grid infrastructure developments in the broader area. Cumulative impacts are expected to occur with the development of the grid infrastructure throughout all phases of the project life cycle and within all areas of study considered as part of this BA Report.

The contribution of the project to the significance of the cumulative impacts is predominately low to medium, depending on the impacts being considered, with cumulative impacts on the social environment being high in some instances. A summary of the cumulative impacts is provided in **Table 9.2** below.

Table 9.2: Summary of the cumulative impact significance for the grid connection infrastructure for the Aggeneys 2 solar PV facility¹⁵.

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Low	Medium to low (depending on the impact being considered)
Avifauna	Low	Medium
Freshwater	Low	Medium
Soil and agricultural potential	Low	Low
Heritage (archaeology and palaeontology)	Low	Low
Visual	Low to Moderate	High
Social	Negative social impacts – Low, Medium to High or High (depending on the impact being considered)	Negative social impacts – Medium or High (depending on the impact being considered)
	Positive social impacts – Medium	Positive social impacts – High

The main aim for the assessment of cumulative impacts considering the grid connection infrastructure for the Aggeneys 2 solar PV facility is to test and determine whether the cumulative development will be acceptable within the landscape proposed for the development, and whether the cumulative loss, from an environmental and social perspective, will be acceptable without whole-scale change. The following can be concluded regarding the cumulative impacts of the grid connection for the Aggeneys 2 solar PV facility:

- » **Ecological processes:** Cumulative impacts on CBAs and broad-scale ecological processes will be of a medium to low significance. There will be no unacceptable loss of threatened or protected vegetation types, habitats or species due to the development of the proposed project and other renewable energy and associated grid infrastructure developments within the surrounding area.
- » **Avifauna:** Cumulative impacts as a result of the loss of unprotected vegetation types from the broader area which may impact avifauna habitat ranges from low to medium significance. There will be no unacceptable risk to avifauna or loss of avifauna habitats or species due to the proposed project and other solar PV facilities and associated grid infrastructure developments within the surrounding area.
- » **Freshwater features:** Cumulative impacts resulting in hydrological alterations in the catchment drainage and increased sedimentation and erosion will be of a low significance. There will be no unacceptable loss of freshwater features or resources due to disturbance associated with construction activities and increased runoff and erosion during the operation phase.

¹⁵ Significance ratings assume that mitigation as recommended is implemented

- » **Soils and Agricultural Potential:** Cumulative impacts in terms of soil erosion will be of a low significance. There will be no unacceptable loss of soil resources or increased soil erosion associated with the development of the proposed and other solar PV facilities and associated grid infrastructure developments within the surrounding areas.
- » **Heritage (including archaeology and palaeontology):** Cumulative impacts on heritage relate to the widespread destruction of heritage resources and increased visual clutter. The significance of the cumulative impact will be low. There will be no unacceptable loss of heritage resources associated with the proposed project and other solar PV facilities and associated grid infrastructure developments within the surrounding areas.
- » **Visual:** Cumulative visual impacts relate to change in the character of the landscape as seen from the N14 and the un-surfaced local road (i.e. Loop 10 road) that runs to the north of the Aggeneys 2 solar PV facility, cumulative impact on local homesteads, and settlements. The significance of the visual cumulative impacts will be low to high. There will be no unacceptable impact on the visual quality of the landscape associated with the proposed project and other solar PV facilities and associated grid infrastructure developments within the surrounding area.
- » **Social:** Both positive and negative social cumulative impacts have been identified. The positive impacts relate to positive economic impacts and the negative impacts relate to risk of HIV, the transformation of sense of place and disruptions of community facilities and infrastructure. There will be no unacceptable risk or impacts to the social aspects and characteristics of the town of Aggeneys with the development of the proposed project and other solar PV facilities and associated grid infrastructure developments within the surrounding area.

Based on the specialist cumulative assessment and findings, the development of the grid infrastructure for the Aggeneys 2 solar PV facility and its contribution to the overall impact of all solar PV facilities and associated grid infrastructure to be developed within a 30km radius, it can be concluded that the contribution of the project to cumulative impacts will be of a low to high significance depending on the impact being considered. There are, however, no impacts or risks identified to be considered as unacceptable with the development of the proposed project within the study area. In addition, no impacts that will result in whole-scale change are expected.

CHAPTER 10: CONCLUSIONS AND RECOMMENDATIONS

ABO Wind Aggeneys 2 PV (Pty) Ltd, a Special Purpose Vehicle (SPV), proposes the construction and operation of a grid connection solution for the proposed Aggeneys 2 solar PV facility¹⁶, in the Northern Cape. The grid connection infrastructure will comprise the following key infrastructure and components:

- » A new Collector Substation/ Switching Station:
 - * Construction of a new platform with earth mat and civil works.
 - * New 132kV or 220kV feeder bay/s and busbar/s complete with protection equipment.
- » A new single circuit 132kV or 220kV OHL between the existing Aggeneis MTS and a new Collector Substation associated with the Aggeneys 2 solar PV facility, complete with structures, foundations, conductor, fibre layout, insulation and assemblies.
- » Access tracks/roads up to 6m in width, where required.
- » Works within the existing Aggeneis MTS HV yard:
 - * Establish new 132 or 220kV feeder bay/s within the existing HV yard at the Aggeneis Main Transmission Substation (MTS) (inclusive of line bays, busbars, bussection and protection equipment).

Two alternative corridors of up to 1km in width and up to 17km in length (known as the project development corridors) have been assessed to allow for the optimisation of the grid connection infrastructure to accommodate the environmental sensitivities identified within the corridor.

The grid connection infrastructure will facilitate the transmission of the electricity generated by the proposed Aggeneys 2 solar PV facility into the national grid and is considered essential infrastructure to the Aggeneys 2 solar PV facility. The assessed project development corridors are located within the Springbok Renewable Energy Development Zone (REDZ), and within the northern corridor of the Strategic Transmission Corridors. The grid connection infrastructure will be developed within the nominated preferred corridor.

A summary of the recommendations and conclusions for the proposed project as determined through the BA process is provided in this Chapter.

10.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the final BA Report includes the following information required in terms of Appendix 1: Content of the BA Report:

¹⁶ This project comprises the development of a 100MW PV facility and is the subject of a separate Basic Assessment (BA) process.

Requirement	Relevant Section
3(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	A summary of the findings of the specialist studies undertaken for the grid connection infrastructure has been included in section 10.2.
3(l) an environmental impact statement which contains (i) a summary of the key findings of the environmental impact assessment, (ii) 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 (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	An environmental impact statement containing the key findings of the environmental impacts of the grid connection infrastructure has been included as section 10.6. An Environmental Sensitivity and Layout map of the grid connection infrastructure has been included as Figure 10.1 which overlays the development corridors with the environmentally sensitive features located within the development corridors. A summary of the positive and negative impacts associated with the grid connection infrastructure has been included in section 10.2.
3(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.	All conditions required to be included in the Environmental Authorisation of the grid connection infrastructure have been included in section 10.7.
3(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.	A reasoned opinion as to whether the grid connection infrastructure should be authorised has been included in section 10.7.

10.2. Evaluation of the grid connection infrastructure for the Aggeneys 2 solar PV facility

The preceding chapters of this report together with the specialist studies contained within **Appendices D-J** provide a detailed assessment of the potential impacts that may result from the development of the grid connection infrastructure. This chapter concludes the environmental assessment of the grid connection infrastructure by providing a summary of the results and conclusions of the assessment of the development footprint within the development corridor alternatives proposed for the grid connection infrastructure. In doing so, it draws on the information gathered as part of the BA process, the knowledge gained by the environmental specialists and the EAP, and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws were identified in the detailed specialist studies conducted, and no impacts of unacceptable significance are expected to occur with the implementation of the recommended mitigation measures. These measures include, amongst others, the avoidance of sensitive features and the undertaking of monitoring, as specified by the specialists.

The potential environmental impacts associated with the grid connection infrastructure identified and assessed through the BA process include:

- » Impacts on ecology, flora, fauna and freshwater features.
- » Impacts on avifauna.
- » Impacts to soils and agricultural potential.
- » Impacts on heritage resources, including archaeology and palaeontology.
- » Visual impacts on the area as a result of the facility.
- » Positive and negative socio- economic impacts.

10.2.1 *Impacts on Ecology*

The Ecological Impact Assessment (**Appendix D**) is based on the findings of two site visits undertaken in mid-winter (16 June 2018) and again in late summer (5 to 8 April 2019) and assessed the impact of the grid connection infrastructure on the sensitive ecological features present within the development corridors for the life-cycle of the project. The assessment identified impacts within the construction, operation and decommissioning phases of the project.

During the construction phase (and the decommissioning phase) the impacts include impacts on vegetation and listed or protected plant species and direct faunal impacts. The significance of the construction phase impacts will be low, following the implementation of the mitigation measures recommended by the specialist. No impacts of high significance were identified prior to the implementation of mitigation.

During the operation phase, the anticipated impacts include faunal impacts and habitat degradation due to erosion and alien plant invasion. The significance of the impacts for the operation phase will be low, following the implementation of the mitigation measures recommended by the specialist. No impacts of high significance were identified.

From the findings of the Ecological Impact Assessment, it can be concluded that no impacts of high ecological significance were identified that would hinder the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility. The proposed development is considered to be appropriate and acceptable from an ecological perspective and will not result in detrimental impacts to ecosystems and habitat features present within the development corridors and within the surrounding properties. The specialist has, therefore, indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

The nominated preferred development corridor alternative from an ecological perspective is Alternative 1, although both corridors are considered to be acceptable.

10.2.2 *Impacts on Avifauna*

The Avifauna Impact Assessment (**Appendix E**) is based on the findings of two site visits undertaken in mid-winter (26 to 28 June 2018) and again in late summer (20 to 22 March 2019). The avifauna impacts identified to be associated with the grid connection infrastructure will be negative and local in extent. The duration of the impacts will be long-term, for the lifetime of the grid connection infrastructure.

During the construction phase (and decommissioning phase) of the grid connection infrastructure, direct avifauna impacts include habitat loss and disturbance related to vegetation clearance, the operation of heavy machinery (noise) and increased human presence. The significance of the construction phase impacts will range from low to medium, with the implementation of the mitigation measures recommended by the specialist. No impacts of high significance are expected to occur during the construction phase of the grid connection infrastructure.

Impacts on avifauna during the operation phase of the grid connection infrastructure include collisions with the power line, electrocution and disturbance. The significance of the impacts will be low, with the

implementation of the recommended mitigation measures. No impacts of a high significance are expected to occur during the operation of the grid connection infrastructure.

From the results of the avifauna assessment, it can be concluded that the development corridors are considered to represent a broadly suitable environment for the location of the proposed grid connection infrastructure. Considering that the study area supports a typical bioregional avifaunal assemblage within an extensive vegetation type, and that there are no known breeding or roosting sites of red-listed priority species within the immediate vicinity, there are no impacts associated with the development that are considered to be of high residual significance and which cannot be mitigated to a low acceptable level. From the results of the avifauna impact assessment, it can be concluded that no fatal-flaws will be associated with the development of the grid connection infrastructure. Therefore the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility is considered to be acceptable from an avifaunal perspective.

The nominated preferred development corridor alternative from an avifauna perspective is Alternative 1, although both corridors are considered to be acceptable.

10.2.3 Impacts on Freshwater Features

The freshwater study (**Appendix F**) assessed the impact of the grid connection infrastructure on the freshwater features present within the development corridors for the life-cycle of the grid connection infrastructure.

During the construction phase, impacts include vegetation clearance in watercourses, impacts to water quality in the watercourses and wetlands and impacts associated with the movement of vehicles through watercourses and wetlands. The significance of the construction phase impacts will be low, following the implementation of the recommended mitigation measures by the specialist. No impacts of a high significance were identified prior to the implementation of mitigation.

During the operation phase, the impact relates to the movement of vehicles through watercourses and wetlands located within the development corridors. The significance of the impact will be low following the implementation of the mitigation measures by the recommended specialist. No impacts of high significance were identified for the project.

From the findings, it can be concluded that the development of the grid connection infrastructure will have an overall negative impact of low significance with the implementation of the recommended mitigation measures. The construction of the grid connection infrastructure for the Aggeneys 2 solar PV facility is therefore supported from a freshwater features perspective and considered acceptable subject to obtaining the necessary water use license or general authorisation from the Department of Water and Sanitation.

The nominated preferred development corridor alternative from a freshwater perspective is Alternative 1, although both corridors are considered to be acceptable.

10.2.4 Impacts on Soil and Agricultural Potential

The Soils and Agricultural Potential Impact Assessment (**Appendix G**) assessed the impact of the grid connection infrastructure on soil resources within the development corridors for the life-cycle of the project. Two impacts have been identified to be associated with the development of the grid connection infrastructure from a soils perspective. These impacts include the loss of potentially productive agricultural land through the installation of the power line and construction of the collector substation and associated infrastructure and increased wind erosion due to disturbance of the soil. Both impacts are expected to occur during the construction and operation phases. No fatal flaws have been identified from a soils and agricultural potential perspective and all impacts can be mitigated to be within low and acceptable levels of impact. Therefore, the development of the grid connection infrastructure is considered to be acceptable from a soils and agricultural perspective.

The nominated preferred development corridor alternative from a soils and agricultural potential perspective is Alternative 2, although both corridors are considered to be acceptable.

10.2.5 Impacts on Heritage Resources

The Heritage Impact Assessment (**Appendix I**) assessed the impact of the grid connection infrastructure on the heritage features (archaeology, palaeontology and heritage structures) present within the development corridors for the life-cycle of the project. The heritage impacts expected during the construction phase include impacts to palaeontological resources, archaeological resources and graves and impacts to the cultural landscape. There are no heritage resources of significance present within the development corridors, although several isolated stone artefacts attributable to background scatter were noted. Impacts to heritage resources were identified to be associated with grid connection infrastructure for the construction phase. No impacts are expected to occur during the operation phase of the grid connection infrastructure.

The significance of the impacts ranges from medium to low, with the implementation of the recommended mitigation measures. No impacts of high significance are expected, and the development of the grid connection infrastructure is considered to be acceptable from a heritage perspective.

The nominated preferred development corridor alternative from a heritage perspective is Alternative 1, although both corridors are considered to be acceptable.

10.2.6 Visual Impacts

The Visual Impact Assessment (**Appendix H**) identified negative impacts on visual receptors during the construction and the operation phase of the grid connection infrastructure development. The impacts include a change in the character of a relatively natural area, a change in the character of the landscape as seen from the N14, the Loop 10 road and local homesteads, a change in the landscape as seen from local settlement areas. The significance of the impacts ranges between medium and low with the implementation of the recommended mitigation measures. No impacts of a high significance are expected to occur.

The Visual Impact Assessment concluded that the development of the grid connection infrastructure will largely impact visually on an area where there currently is a strong influence of urban and urban fringe development and therefore changes to the landscape quality are unlikely to be problematic. In conclusion, the development of the grid connection infrastructure is considered to be acceptable from a landscape and visual impact perspective.

The nominated preferred development corridor alternative from a visual perspective is Alternative 1, although both corridors are considered to be acceptable.

10.2.7 Social Impacts

The Social Impact Assessment (**Appendix J**) identified that most social impacts associated with the development of the grid connection infrastructure will have a short term duration associated with the construction phase and long-term duration during the operation phase of the project. Both positive and negative impacts have been identified for both the construction and operation phases of the grid connection infrastructure.

During the construction phase, negative impacts include nuisance, dust and noise impacts, an influx of construction workers and job seekers to the area, disruption of daily living patterns and disruption of services supplied and impacts on infrastructure. The significance of the negative construction phase impacts is low with the implementation of recommended mitigation measures. The positive social impact associated with the construction of grid connection infrastructure includes positive economic impacts and the stimulation of the area's economy. The significance of the positive impacts will be medium with the implementation of the recommended enhancement measures.

Impacts associated with the operation of the grid connection infrastructure will be both positive and negative. The negative impacts are related to a transformation in the sense of place which has a medium significance, with the implementation of the recommended mitigation measures. The positive impacts associated with the operation of the grid connection infrastructure relate to the benefit associated with connecting the Aggeneys 2 solar PV facility to the national grid and balancing the national energy mix through enhancing the supply of renewable energy. The significance of the positive impacts will be high with the implementation of the recommended enhancement measures.

The nominated preferred development corridor alternative from a social perspective is Alternative 1, although both corridors are considered to be acceptable.

10.2.8 Assessment of Cumulative Impacts

The cumulative impacts of the grid connection infrastructure for the Aggeneys 2 solar PV facility and other known grid infrastructure and renewable energy projects in the broader area have been qualitatively assessed. There are twenty nine (29) similar proposed developments within a 30km radius, as well as a number of existing power lines and substations.

The identified corridors for the grid connection infrastructure for the Aggeneys 2 solar PV facility are located within a Renewable Energy Development Zone (REDZ) (i.e. the Springbok REDZ), and a Strategic Transmission Corridor (i.e. the Northern Transmission Corridor). These areas form part of the areas identified by the DEA as geographical areas of strategic importance for the development of commercial renewable energy

developments (REDZ) and large scale grid infrastructure development projects (transmission corridors). Therefore these areas are considered as nodes for the development of renewable energy and grid infrastructure projects.

Table 10.1 provides a summary of the findings of the cumulative impact assessment undertaken by the various specialists (refer to Chapter 9 for more details).

Table 10.1: Summary of the cumulative impact significance for the grid connection infrastructure

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Low	Medium to low (depending on the impact being considered)
Avifauna	Low	Medium
Freshwater features	Low	Medium
Soil and agricultural potential	Low	Low
Heritage (archaeology and palaeontology)	Low	Low
Visual	Low to Medium (depending on the impact being considered)	Medium to High (depending on the impact being considered)
Social	Negative social impacts – low, medium or high (depending on the impact being considered) Positive social impacts - high	Negative social impacts – medium or high (depending on the impact being considered) Positive social impacts - high

Based on the specialist cumulative assessment and findings regarding the development of the grid connection infrastructure and its contribution to the overall impact of all grid connection infrastructure for solar PV facilities to be developed within a 30km radius, it can be concluded that there are no impacts or risks identified to be considered as unacceptable with the development of the grid connection infrastructure within the surrounding area. In addition, no impacts that will result in whole-scale change are expected.

10.3. Environmental Sensitivity of the Identified Corridors

From the specialist investigations undertaken for the grid connection infrastructure, the following sensitive areas/environmental features have been identified and demarcated within the development corridors (refer to **Figure 10.1 and Figure 10.2, Appendix L**). These features would need to be considered by the developer for the location of the grid connection infrastructure within the nominated preferred alternative.

Sensitivity Rating	Sensitive areas / environmental features
Very High	» Several minor drainage features have been identified along the eastern section of Corridor Alternative 1 and along the northern boundary of Corridor Alternative 2. These features are considered to be of a very high ecological sensitivity. Due to the limited extent of these features, the power line would be able to span these features with minimal impact.
High	» Along Corridor Alternative 2, especially where it runs adjacent to the Loop 10 road, the soils are shallow and usually skeletal over ferricrete, which is often exposed. The vegetation cover in this area is usually low, with large bare areas where the ferricrete

	<p>is exposed. These gravel plains are of high ecological sensitivity. Areas of gravel plains have also been identified along the eastern section of Corridor Alternative 1.</p> <ul style="list-style-type: none"> » A small drainage feature located west of the Aggeneis MTS is considered to be of high avifauna and ecological sensitivity. » The red dunes along Corridor Alternative 1 are considered relatively sensitive to disturbance. These dunes are classified as a CBA 2 and also includes a small section adjacent to the southern boundary of the Aggeneis MTS. The dune habitat supports a healthy resident population of the Vulnerable Red Lark. The presence of an existing power line through this area makes Corridor Alternative 1 a more viable alternative. These dunes are considered to be of a high avifauna sensitivity and a medium ecological sensitivity. » The areas associated with quartz gravels (also classified as CBA2) along the Loop 10 gravel road within the Alternative 2 corridor are considered to be of high ecological sensitivity. » Seven (07) ephemeral depression wetlands in total were identified, of which three (03) ephemeral wetlands were identified directly within Corridor Alternative 1, and four (04) ephemeral wetlands outside of the proposed power line Corridor Alternative 1 but within 500m as per the regulated area of a watercourse (according to the National Water Act No. 36 of 1998). No ephemeral depression wetlands were found within the Alternative 2 corridor. The present Ecological Condition (EC) of the ephemeral wetlands was assessed to be Class B (largely natural) ephemeral depression wetland systems, whilst the EC of the riparian habitat of the ephemeral watercourses were collectively assessed as Class C moderately modified systems. The ephemeral depression wetlands are considered to be of high sensitivity from a freshwater perspective.
<p>Medium</p>	<ul style="list-style-type: none"> » Corridor Alternative 1 traverses an area of medium sensitivity where the corridor traverses the northern limit of the Koa River dune field. » The majority of Corridor Alternative 2 consists of a band of shallow, relatively coarse red sands dominated by perennial grasses with scattered shrubs. This sandy plain is considered to be of medium avifaunal sensitivity. A small section of Corridor Alternative 1 (where the corridor bends south-west) traverses these plains. » The area of quartz gravels along Corridor Alternative 2, near the Loop 10 gravel road is a CBA 1 area due to the high biodiversity value and presence of species of conservation concern within this habitat type. With proper avoidance, a significant impact on this habitat or species of concern would be unlikely. » Several ephemeral watercourse reaches were identified along the development corridors and are classified as Lower Foothill Rivers in terms of the national classification system. The ephemeral watercourses emanated from culverts under the Loop 10 road north of Corridor Alternative 2, which allows water run-off from the inselbergs north of the study area to drain through onto the development corridors. » A buffer zone of 15m for all the freshwater resources is to be implemented. Given the nature of the type of the proposed powerline development, the footprint of the power lines is relatively minimal and can easily span any of the freshwater resources (wetlands and watercourses). Importantly, no towers for the power lines are to be positioned in the freshwater resources to avoid any direct impacts. » Two large ephemeral watercourses were identified. As the watercourses are ephemeral, during times of flow it is likely to serve as an important migration route/breeding and feeding site for amphibians and waterfowl despite no species being identified on the day of the watercourse assessment. These watercourses are considered to be of a medium sensitivity from a freshwater perspective.

Low

- » Negligible sections of both project development corridors are located in areas of low sensitivity. The grid connection infrastructure, especially the collector substation areas, fall in areas of low sensitivity for both corridors. The Corridor Alternative 1 is the nominated alternative due to the shorter length of the corridor to the Aggeneis MTS.

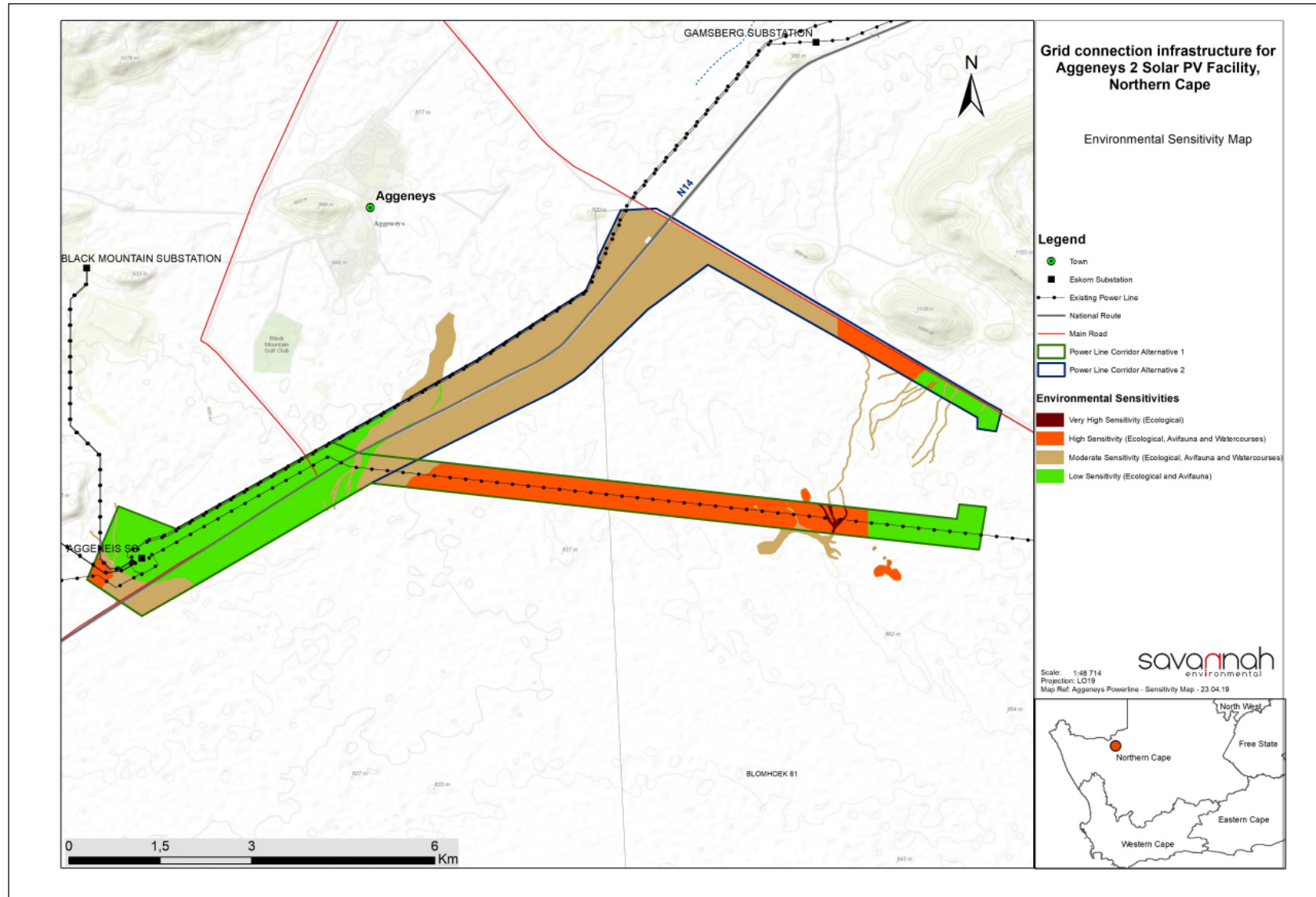


Figure 10.1: Environmental sensitivity map overlain with the development corridor alternatives considered for the grid connection infrastructure.

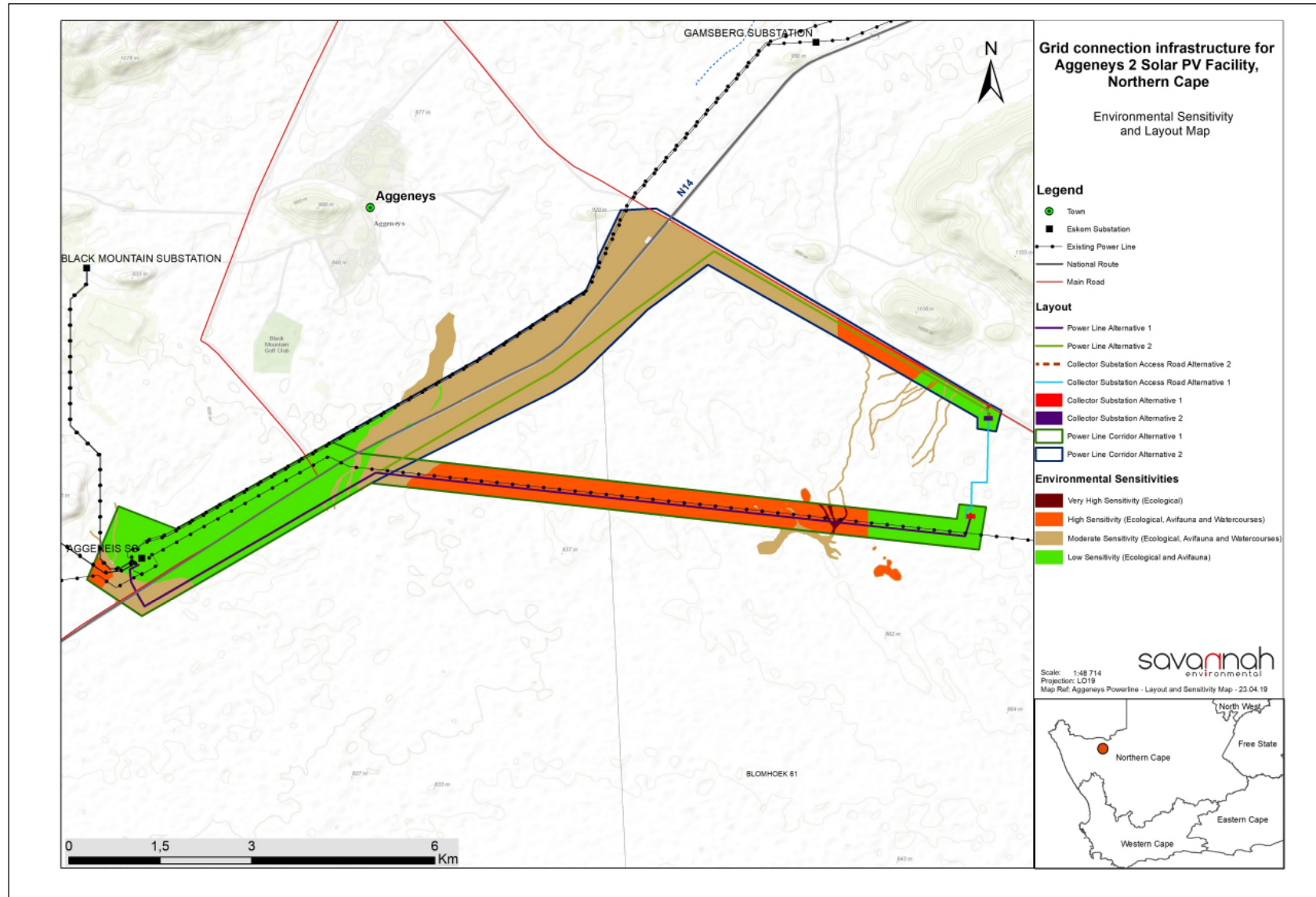


Figure 10.2: Environmental sensitivity map overlain with the grid connection infrastructure layout.

10.4. Assessment of Alternatives and the Identification of the Preferred Alternatives

As part of the BA process undertaken for the grid connection infrastructure, two feasible development corridor alternatives have been identified and assessed on the same level for the development (refer to Chapter 3 for more details). The assessment of the alternatives and the acceptability of the alternatives for implementation as part of the grid connection infrastructure for the Aggeneys 2 solar PV facility was considered by the specialists and was assessed comparatively as part of the impact assessment chapter (Chapter 8) of this BA Report. The development corridor alternatives assessed for the grid connection infrastructure include an assessment of two collector substation locations and two power line alignments as part of the development corridors, as described below.

» Alternative 1 (preferred from a technical perspective):

A collector substation located adjacent to the facility substation in the south-eastern corner of the PV facility project site, as well as a single-circuit power line up to 220kV and approximately 14km in length, connecting to the Aggeneis Main Transmission Substation (MTS). This corridor is located directly adjacent and parallel to the existing Aries-Aggeneys 400kV line. This is considered to be the preferred option from a technical perspective due to the fact that the power line is shorter compared to Alternative 2. The corridor is up to 1km in width and located directly adjacent to and parallel to the Eskom Aries-Aggeneys 400kV line and the N14.

» Alternative 2:

A collector substation located adjacent to the facility substation within the northern portion of the PV facility project site, as well as a single-circuit power line up to 220kV and approximately 17km in length connecting to the Aggeneis MTS. This is considered to be the alternative option from a technical perspective.

The alternative indicated as preferred in the description above is that which has been identified by the developer as being technically preferred. **Table 10.2** provides the results of the comparative assessment undertaken for the development corridor alternatives from an environmental perspective and identifies the preferred alternative for the grid connection infrastructure and the environmental acceptability thereof.

Table 10.2: Results of the comparative assessment undertaken for the development corridor alternatives proposed for the grid connection infrastructure and the identification of the preferred alternative from an environmental perspective¹⁷.

Specialist field	Development Corridor Alternative 1	Development Corridor Alternative 2
Ecology	Preferred	Acceptable
Avifauna	Preferred	Acceptable
Watercourses	Preferred	Least preferred but acceptable

¹⁷ In instances where all alternatives are acceptable, the technically preferred has been assigned as the preferred alternative from an environmental perspective.

Specialist field	Development Corridor Alternative 1	Development Corridor Alternative 2
Land use, soil and agricultural potential	Acceptable	Preferred
Heritage – Palaeontology and Archaeology	Preferred	Acceptable
Visual	Preferred	Acceptable
Social	Acceptable	Acceptable

Considering the above, the development corridor alternatives are considered to be acceptable from an environmental and social perspective and therefore both alternatives are considered to be acceptable as part of the development of the grid connection infrastructure. However, Corridor Alternative 1 (as the technically preferred alternative) is recommended as the preferred alternative for implementation.

10.5. Environmental costs of the grid connection infrastructure versus benefits of the grid connection infrastructure

Environmental costs (including those to the natural environment, economic and social environment) can be anticipated at a local and site-specific level, and are considered acceptable provided the mitigation measures as outlined in the BA Report and the EMP are implemented and adhered to. No fatal flaws have been identified. These environmental costs could include:

- » *A loss of biodiversity, flora and fauna due to the clearing of land for the construction and utilisation of land for grid connection infrastructure* - The cost of loss of biodiversity is considered to be limited due to the limited footprint of the development which will facilitate the placement of infrastructure within vegetation considered to be of a low sensitivity where possible.
- » *Visual impacts associated with the grid connection* - The development of the grid connection infrastructure is unlikely to have a visual impact past 7km, which will be of a medium-low significance with the implementation of the recommended mitigation measures. As the development of the grid connection infrastructure will largely impact visually on an area where there currently is a strong influence of urban and urban fringe development, changes to the landscape quality are unlikely to be problematic.
- » *Change in land-use and loss of land available for agricultural activities within the development footprint* - The environmental cost is anticipated to be very limited due to the fact that the development corridors do not impact on any areas of high agricultural potential, and that the grazing can continue within the power line servitude during the operation phase of the grid connection infrastructure.

Benefits of the grid connection infrastructure include the following:

- » The project will facilitate the connection of 100MW of renewable energy to the national grid. South Africa's per capita greenhouse gas emissions are amongst the highest in the world due to the reliance on fossil fuels. Aggeneys 2 solar PV facility will contribute to achieving goals for implementation of renewable energy and sustaining a 'green' economy within South Africa. Without the grid connection infrastructure, this will not be possible.
- » The project will result in important economic benefits at the local (specifically Aggeneys) and regional scale through job creation, income and other associated downstream economic development. These will persist during the preconstruction, construction, operation and decommissioning phases of the project.

- » The project indirectly contributes towards the Provincial and Local goals for the development of renewable energy as outlined in the respective IDPs.

The benefits of the grid connection infrastructure for the Aggeneys 2 solar PV facility are expected to occur at a national, regional and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure in the development corridors within areas considered to be acceptable for the proposed development, the benefits of the project are expected to outweigh the environmental costs of the grid connection infrastructure.

10.6. Overall Conclusion (Impact Statement)

The construction and operation of the grid connection solution for the proposed Aggeneys 2 solar PV facility in the Northern Cape has been proposed by ABO Wind Aggeneys 2 PV (Pty) Ltd. Technically viable development corridors within which this infrastructure could be developed were proposed by the developer and assessed as part of the BA process. The assessment of the development corridors (through the consideration of alternatives) was undertaken by independent specialists and their findings have informed the results of this BA Report.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the implementation of the grid connection infrastructure. The developer has proposed technically viable and suitable alternatives for the development corridor, which have been assessed as part of the independent specialist studies. Through this assessment, the preferred development corridor inclusive of the power line and collector substation has been identified and assigned as part of the preferred layout map for the grid connection infrastructure. The nominated preferred development corridor assessed through this BA process is considered as the most appropriate for the grid connection infrastructure and considered to be acceptable within all fields of specialist study undertaken for the project. All impacts associated with the project establishment within the preferred development corridor can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures. The layout overlain with the environmental sensitivities is included above as **Figure 10.2**. The preferred layout map (including the details of the project) is included as **Figure 10.3**.

Through the assessment of the development of the grid connection infrastructure within the study area, it can be concluded that the proposed project is environmentally acceptable (subject to the implementation of the recommended mitigation measures).

10.7. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the development corridors proposed by the developer, the avoidance of sensitive environmental features within the nominated preferred development corridor, as well as the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the development of the grid connection infrastructure for the Aggeneys 2 solar PV facility is acceptable within the landscape and can reasonably be authorised for the identified preferred alternatives (**Figure 10.3**).

The following infrastructure would be included within an authorisation issued for the project:

- » A new Collector Substation/ Switching Station located within Corridor Alternative 1:
 - * Construction of a new platform with earth mat and civil works.
 - * New 132kV or 220kV feeder bay/s and busbar/s complete with protection equipment.
- » A new single circuit 132kV or 220kV OHL between the existing Aggeneys MTS and a new Collector Substation associated with the Aggeneys 2 solar PV facility, complete with structures, foundations, conductor, fibre layout, insulation and assemblies. This power line is to be constructed within a servitude of up to 47m within Corridor Alternative 1.
- » Access tracks/roads up to 6m in width and 2km in length, where required.
- » Works within the existing Aggeneys MTS HV yard:
 - * Establish new 132 or 220kV feeder bay/s within the existing HV yard at the Aggeneys Main Transmission Substation (MTS) (inclusive of line bays, busbars, bussection and protection equipment).

The following key conditions would be required to be included within an authorisation issued for the grid connection infrastructure:

- » Corridor Alternative 1 is the nominated preferred alternative for the grid connection infrastructure.
- » All mitigation measures detailed within this final BA Report, as well as the specialist reports contained within **Appendices D to J**, are to be implemented.
- » The EMPr as contained within **Appendix K** of this BA Report should form part of the contract with the Contractors appointed to construct and maintain the grid connection infrastructure in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the infrastructure is considered key in achieving the appropriate environmental management standards as detailed for this project.
- » Following the final design of the grid connection infrastructure, a final layout must be submitted to DEA for review and approval prior to commencing with construction.
- » A pre-construction walk-through of the final power line alignment for species of conservation concern that would be affected and that can be translocated must be undertaken prior to the commencement of the construction phase.
- » Pre-construction walk-through of the power line route to identify areas of avifaunal sensitivity such as raptor nests in the vicinity of the line route.
- » Only power lines and substation structures that are considered safe for birds should be erected to avoid the electrocutions of birds (particularly large raptors) perching or attempting to perch. Where necessary, deterrent devices such as bird guards should be mounted on relevant parts of the pylons to further reduce the possibility of electrocutions.
- » Before construction commences individuals of listed species within the development footprint that would be affected, must be counted and marked and translocated, where deemed necessary by the ecologist conducting the pre-construction walk-through survey. Permits from the relevant provincial authorities, i.e. the Northern Cape Department of Environment and Nature Conservation (DENC), must be obtained before the individuals are disturbed.
- » The necessary water use license or general authorisation must be obtained from the Department of Water and Sanitation (DWS) for impacts to a watercourse and/or wetland prior to construction.

- » A chance finds procedure must be developed and implemented if archaeological or palaeontological resources are found. In the case where the proposed development activities bring these materials to the surface, work must cease and SAHRA must be contacted immediately.
- » The environmental authorisation sought through this application and BA process is for a 10-year period as the Aggeneys 2 solar PV facility would need to be selected as a Preferred Bidder by the Department of Energy (DoE).

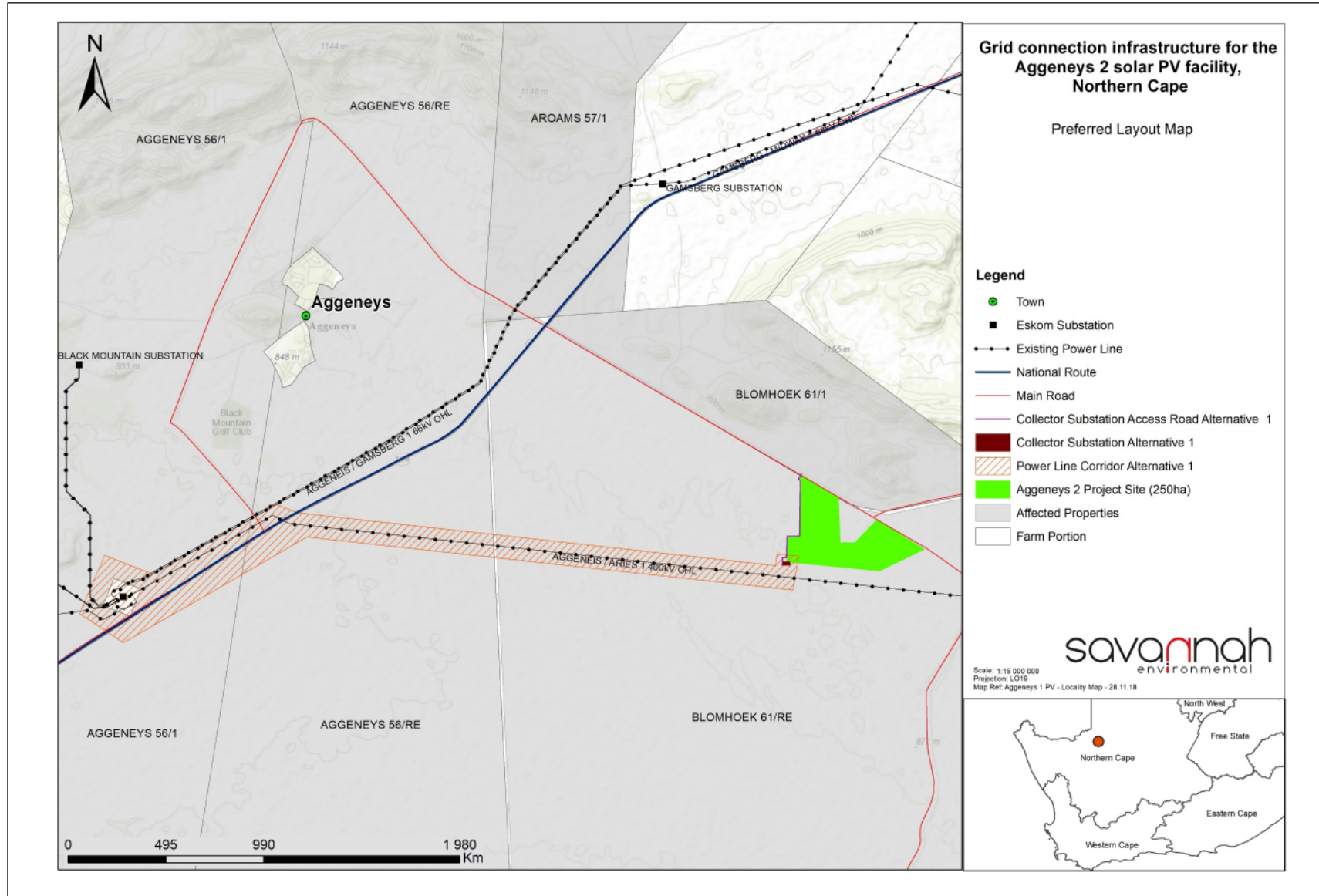


Figure 10.3: Final preferred layout map for the grid connection infrastructure, as was assessed as part of the BA process (A3 map included in **Appendix L**)

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