PROPOSED AGGENEYS 2 100 MW PV FACILITY, NORTHERN CAPE PROVINCE

BASIC SOCIAL IMPACT ASSESSMENT REPORT
APRIL 2019

Prepared by:

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DETAILS OF PROJECT

Report Title	:	Social Impact Assessment for the proposed Aggeneys 2 100 MW PV Facility Project, Northern Cape Province
Author	:	Dr Neville Bews
DEA Reference Number	:	
Project Developer	:	ABO Wind Aggeneys 2 PV (Pty) Ltd
Environmental Consultant	:	Savannah Environmental (Pty) Ltd
Report Date	:	April 2019
Status of Report	:	First Draft Report

EXECUTIVE SUMMARY

INTRODUCTION

ABO Wind Aggeneys 2 PV (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd to undertake the environmental impact assessment (EIA) for the Aggeneys 2 100 MW solar photovoltaic (PV) facility. Towards this end Savannah Environmental has appointed Dr Neville Bews & Associates (NBA) to provide specialist consulting services in respect of the social impact assessment (SIA) for the project.

APPROACH TO STUDY

Data was gathered through:

- The consideration of the project description provided by ABO Wind Aggeneys 2 PV (Pty) Ltd and Savannah Environmental (Pty) Ltd.
- The consideration of Statistics South Africa, Census 2011 and other relevant demographic data generated by Stats SA such as the Quarterly Labour Force Survey and Mid-year population estimates.
- Various discussions with the Environmental Impact Assessment Consultants.
- A literature review of various documents such as the relevant Municipal Integrated Development Plans (IDPs) and other specialist reports.
- A broader literature scan.

PROJECT DESCRIPTION

The Aggeneys 2 project is a 100 MW solar photovoltaic facility consisting of approximately 300 000 – 400 000 solar panels that will utilise fixed-tilt PV, single-axis tracking or double-axis tracking PV technology. The approximate height of these panels from ground level is 3.5 meters. The approximate surface areas to be covered by the facility and associated infrastructure are as follows:

- PV structures/modules up to ~233 ha
- Laydown area ~5 ha
- Internal roads ~10 ha
- Auxiliary buildings ~1 ha
- Substation up to ~1 ha.

It is estimated that construction will stretch over approximately 18 months and that the facility will have an operational lifespan of about 20 years.

The project is located on the Remaining Extent of Farm Bloemhoek 61 which falls within the Khâi-Ma Non-Urban area of the Khâi-Ma Local Municipality, Namakwa District, Northern Cape Province. The project also falls within the Renewable Energy Development Zone 8, Springbok and is in close proximity to Black Mountain Mine and the town of Aggeneys which services the mine.

IMPACTS IDENTIFIED

The social impacts associated with the project are as follows:

Construction Phase

Health and social wellbeing

- Annoyance, dust and noise
- Increase in crime
- Increased risk of HIV and AIDS
- Influx of construction workers and job seekers
- Hazard exposure.

Quality of the living environment

- Disruption of daily living patterns
- Disruptions of community facilities and infrastructure

Economic

Operational Phase

Quality of the living environment

- Transformation of the sense of place

Economic

Cumulative impacts

Health and social wellbeing

- Risk of HIV

Quality of the living environment

- Transformation of the sense of place;
- Service supplies and infrastructure

Economic

FINDINGS

In assessing the social impact of this proposed development it was found that, in respect of the energy needs of the country and South Africa's need to reduce its carbon emissions, the project is aligned with national, provincial and municipal policy.

With regard to the impacts associated with the project, it was established that most impacts apply over the short term to the construction phase of the project. Of these impacts, all can be mitigated to within tolerable ranges and there are no fatal flaws associated with the construction of the project. On this basis it is unlikely that any further social assessment would be necessary with the proviso that if any significant social issues arise at a later stage, that these be given the appropriate attention.

Although the project 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 thus carries a significant benefit.

Considering the two facility substation alternatives under consideration, facility substation Alternative 1 emerges as the preferred social alternative supported by the findings as outlined in the visual assessment.

Considering the impacts discussed above it is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those attached to the project. On a negative front there are two issues associated with developments in the region that are of most concern. The first of these issues is the change to the sense of place of an area. The second is the potential, through an influx of labour and an increase in transportation to constructions sites, of the risk for the prevalence of HIV to rise in an area that has the lowest HIV prevalence rate in South Africa. It is important that the relevant authorities recognise these issues and find ways of mitigating them to ensure that they do not undermine the benefit that renewable energy projects bring, both to the region as well as to the country as a whole. As these impacts are broad based in that they stretch across various developments in the area it is beyond the scope of a single project developer to address and would require attention on a regional and possibly a national basis.

Having carefully considered all the social impacts associated with the development of Aggeneys 2, it is likely that the benefits attached to the generation of renewable energy and local economic and social development will offset the negative impacts. On this basis the project is considered acceptable, subject to the implementation of the recommended mitigation measures.

PRE AND POST MITIGATION COMPARISON OF THE IMPACTS

Construction Phase					
Environmental parameter	**Issues**	**Rating prior to mitigation**	**Average**	**Rating post mitigation**	**Average**
Health & social wellbeing	Annoyance, dust and noise	-36		-28	
	Increase in crime	-36		-33	
	Increased risk of HIV and AIDS	-64		-60	
	Influx of construction workers and job seekers	-50		-45	
	Hazard exposure.	-55	**-48.2**	-50	**-43.2**
			Negative medium		Negative medium
Quality of the living environment	Disruption of daily living patterns	-44		-30	
	Disruptions of services, supplies and infrastructure	-33	**-33**	-30	**-30**
			Negative medium		Negative low/medium
Economic	Job creation and stimulus of local business opportunities.	30	**30**	44	**44**
			Positive low to medium		Positive medium
Operational Phase					
Environmental parameter	**Issues**	**Rating prior to mitigation**	**Average**	**Rating post mitigation**	**Average**
Quality of the living environment	Transformation of the sense of place	-65	**-65**	-60	**-60**
			Negative high		Negative moderate to high
Economic	Job creation and stimulus of local business opportunities.	39	**39**	60	**60**
			Positive medium		Positive high/medium
No-go Alternative					
No project		-75	**-75**	No mitigation measures	
			Negative high		
Cumulative Impacts					
		Overall impact of the project considered in isolation		**Cumulative impact of the project and other projects in the area**	
Environmental parameter	**Issues**		**Average**		**Average**
Health & social wellbeing	Risk of HIV	-60	**-60**	-72	**-72**
			Negative medium to high		Negative high
Quality of the living environment	Transformation of sense of place	-70		-85	
	Services, supplies & infrastructure	-30	**-50**	-56	**-70.5**
			Negative medium		Negative high
Economic	Economic	60	**60**	76	**76**
			Positive medium to high		Positive high

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LIST OF ABBREVIATIONS

AIDS	Acquired immunodeficiency syndrome
BID	Background Information Document
dB	Decibel
CSP	Concentrated Solar Power
DBSA	Development Bank of South Africa
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DM	District Municipality
EIA	Environmental Impact Assessment
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HIV	Human Immunodeficiency Virus
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IRP	Integrated Resource Plan
IRR	Issues Response Report
kV	Kilovolt
LM	Local Municipality
MW	Megawatt
NBA	Dr. Neville Bews & Associates
NEMA	National Environmental Management Act (No. 107 of 1998)
NERSA	The National Energy Regulator of South Africa
NGO	Non-Governmental Organisation
OHS	Occupational Health and Safety
PA	Per Annum (Yearly)
PGDS	Provincial Growth and Development Strategy
PPP	Public Participation Process
REIPPPP	Renewable Energy Independent Power Producer Procurement Program
SACPVP	South African Council for the Property Valuers Profession
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SDF	Spatial Development Framework

SIA	Social Impact Assessment
SIPs	Strategic Integrated Projects
SMME	Small Medium and Micro Enterprises
Stats SA	Statistics South Africa
STDs	Sexually Transmitted Diseases
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
WEF	Wind Energy Facility
WHO	World Health Organisation
WWF	World Wild Fund for Nature

QUALIFICATIONS AND EXPERIENCE OF SPECIALIST

Qualifications:

University of South Africa: B.A. (Honours) – 1984

Henley Management College, United Kingdom: The Henley Post-Graduate Certificate in Management – 1997

Rand Afrikaans University: M.A. (cum laude) – 1999

Rand Afrikaans University: D. Litt. et Phil. – 2000

Projects:

The Social Impact Assessment (SIA) for the Gautrain Rapid Rail Link; The impact assessment for the Australian – South African sports development programme; SIA for Kumba Resources, Sishen South Project; Evaluation of a Centre for Violence Against Women for The United Nations Office on Drugs and Crime; SIAs for the following Exxaro Resources Ltd.'s mines, Leeuwpan Coal Mine Delmas, Glen Douglas Dolomite Mine Henley-on-Klip, Grootegeluk Open Cast Coal Mine Lephalale; SIA for the South African National Road Agency Limited (SANRAL) on Gauteng Freeway Improvement Project; SIA for SANRAL on the N2 Wild Coast Toll Highway; Research into research outputs of the University for the University of Johannesburg; SIA for Waterfall Wedge housing and business development in Midrand Gauteng; SIA for the Environmental Management Plan for Sedibeng District Municipality; Social and Labour Plan for the Belfast Project on behalf of Exxaro Resources Ltd; SIA for the Transnet New Multi-Product Pipeline (Commercial Farmers) on behalf of Golder Associates Africa (Pty) Ltd; SIA for the Proposed Vale Moatize Power Plant Project in Mozambique on behalf of Golder Associates Africa (Pty) Ltd; SIA for Kumba Resources Ltd.'s proposed Dingleton Resettlement Project at Sishen Iron Ore Mine on behalf of Water for Africa (Pty) Ltd; SIA for Gold Fields West Wits Project for EcoPartners; SIA for the Belfast Project for Exxaro Resources Ltd; SIA for Eskom Holdings Ltd.'s Proposed Ubertas 88/11kV Substation on behalf of KV3 Engineers (Pty) Ltd; SIA for the Mokolo and Crocodile River (West) Water Augmentation Project for the Department of Water and Sanitation on behalf of Nemai Consulting and the Trans Caledonian Water Authority; Assisted Octagon Consulting with the SIA for Eskom's Nuclear 1 Power Plant on behalf of Arcus GIBB Engineering & Science. SIA for the 150MW Photovoltaic Power Plant and Associated Infrastructure for Italgest Energy (Pty) Ltd, on behalf of Kalahari Survey Solutions cc. SIA for Eskom Holdings Limited, Transmission Division's Neptune-Poseidon 400kV Power Line on behalf of Nemai Consulting. Ncwabeni Off-Channel Storage Dam for

security of water supply in Umzumbe, Mpumalanga. Social Impact assessment for Eskom Holdings Limited, Transmission Division, Forskor-Merensky 275kV ±130km Powerline and Associated Substation Works in Limpopo Province. Social impact assessment for the proposed infilling of the Model Yacht Pond at Blue Lagoon, Stiebel Place, Durban.ABC Prieska Solar Project; Proposed 75 MWp Photovoltaic Power Plant and its associated infrastructure on a portion of the remaining extent of ERF 1 Prieska, Northern Cape.Sekoko Wayland Iron Ore, Molemole Local Municipalities in Limpopo Province.Langpan Chrome Mine, Thabazimbi, Limpopo; Jozini Nodal Expansion Implementation Project, Mpumalanga, on behalf of Nemai Consulting; SIA for Glen Douglas Dolomite Burning Project, Midvaal Gauteng, on behalf of Afrimat Limited; SIA for Lyttelton Dolomite mine Dolomite Burning Project, Marble Hall Limpopo on behalf of Afrimat Limited; Tubatse Strengthening Phase 1 – Senakangwedi B Integration for Eskom Transmission on behalf of Nsovo Environmental Consulting; Department of Water and Sanitation, South Africa (2014). Environmental Impact Assessment for the Mzimvubu Water Project: Social Impact Assessment DWS Report No: P WMA 12/T30/00/5314/7. Umkhomazi Water Project Phase 1 – Raw Water Component Smithfield Dam - 14/12/16/3/3/3/94; Water Conveyance Infrastructure - 14/12/16/3/3/3/94/1; Balancing Dam - 14/12/16/3/3/3/94/2. Umkhomazi Water Project Phase 1 – Potable Water Component: 14/12/16/3/3/3/95. Expansion of Railway Loops at Arthursview; Paul; Phokeng and Rooiheuwel Sidings in the Bojanala Platinum District Municipality in the North West Province for Transnet Soc Ltd; Basic Social Impact Assessment for the Cato Ridge Crematorium in Kwazulu-Natal Province; SIA for the Kennedy Road Housing Project, Ward 25 situated on 316 Kennedy Road, Clare Hills (Erf 301, Portion 5); Eskom's Mulalo Main Transmission Substation and Power Line Integration Project, Secunda;

Regularly lecture in the Department of Sociology at the University of Johannesburg and collaborated with Prof.Henk Becker of Utrecht University, the Netherlands, in a joint lecture to present the Social Impact Assessment Masters course via video link between the Netherlands and South Africa. Presented papers on Social Impact Assessments at both national and international seminars. Published on both a national and international level.

Affiliation:

The South African Affiliation of the International Association for Impact Assessment.

Registered on the database for scientific peer review of iSimangaliso GEF project outputs.

DECLARATION OF INDEPENDENCE

I, Neville Bews, as authorised representative of Dr Neville Bews & Associates hereby confirm my independence as a specialist and declare that neither I nor Dr Neville Bews & Associates have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Dr Neville Bews & Associates was appointed as social impact assessment specialists in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for work performed, specifically in connection with the Social Impact Assessment for the proposed Aggeneys 2 x 100 MW Photovoltaic Plant Project, Northern Cape Province. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in my attached report.

02 April, 2019

1. INTRODUCTION

ABO Wind Aggeneys 2 PV (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd to undertake the environmental impact assessment (EIA) for the Aggeneys 2 100 MW solar photovoltaic (PV) facility, hereafter referred to as Aggeneys 2. Towards this end Savannah Environmental has appointed Dr. Neville Bews & Associates (NBA) to provide specialist consulting services in respect of the social impact assessment (SIA) for the project.

1.1. PURPOSE OF REPORT

The purpose of the report is to identify the social baseline conditions in which the proposed project will be developed and to acquire an understanding of the proposed project. Against this background, the primary objective was to identify the issues and concerns associated with the proposed Aggeneys 2 project and to identify, assess and propose mitigation measures for the likely social impacts that may occur as a result of the proposed project.

1.2. STRUCTURE OF REPORT

This specialist study is undertaken in compliance with Appendix 6 of 2014 EIA Regulations as amended. **Table 1** indicates how the requirements outlined in Appendix 6 of 2014 EIA Regulations as amended have been fulfilled in this report.

Table 1: Requirements in terms of Appendix 6 of 2014 EIA Regulations

Regulatory Requirements in terms of Regulation 32 of GN 543	Section of Report
(a) The person who prepared the report; and the expertise of that person to carry out the specialist study or specialised process.	Page xii – xiii
(b) a declaration that the person is independent	Page xiv
(c) an indication of the scope of, and the purpose for which, the report was prepared	Section 1: Page 1
(d) a description of the methodology adopted in preparing the report or carrying out the specialised process	Section: 1.4: Page 2-4
(e) a description of any assumptions made and any uncertainties or gaps in knowledge	Section: 1.5 Page 4-5
(f) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section: Sections: 5, 6, 7 & 8 Pages 27-59
(g) recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority	Section: 6, & 8 Pages 34-59
(h) a description of any consultation process that was undertaken during the course of carrying out the study	No desktop study undertaken
(i) a summary and copies of any comments that were received during any consultation process	No desktop study undertaken
(j) any other information requested by the competent authority.	No desktop study undertaken

1.3. TERMS OF REFERENCE

The terms of reference for this study are to undertake a basic social impact assessment in respect of the proposed Aggeneys 2 project and thus consider the effects that the project is likely to have on the social environment within which the project will be placed. Additionally to identify the potential social impacts that are likely to arise as a result of the project and to recommend appropriate mitigation measures for the management and enhancement of the identified impacts.

1.4. APPROACH TO STUDY

Data was gathered by means of the following techniques.

1.4.1. COLLECTION OF DATA

Data was gathered through:

- The consideration of the project description provided by ABO Wind Aggeneys 2 PV (Pty) Ltd and Savannah Environmental (Pty) Ltd.
- The consideration of Statistics South Africa, Census 2011 and other relevant demographic data generated by Stats SA such as the Quarterly Labour Force Survey and Mid-year population estimates.
- Various discussions with the Environmental Impact Assessment Consultants.
- A literature review of various documents such as the relevant Municipal Integrated Development Plans (IDPs) and other specialist reports.
- A broader literature scan.

1.4.2. IMPACT ASSESSMENT TECHNIQUE

The impact assessment technique, which is provided by the lead environmental consultant Savannah Environment, is as follows:

- The **nature**, which includes 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) or regional, and a value between 1 and 5 was assigned as appropriate (with 1 being low and 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 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), and 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 of 1 – 5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which is determined through a synthesis of the characteristics described above and can be assessed as low, medium or high.
- The **status**, which shall be 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** was then calculated by combining the criteria in the following formula:

S = (E+D+M)P

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).

1.5. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations apply in respect of this report.

1.5.1. ASSUMPTIONS

It is assumed that the technical information provided by the project proponent, ABO Wind Aggeneys 2 PV (Pty) Ltd as well as by the environmental consultant, Savannah Environmental, was credible and accurate at the time of compiling the report.

It is also assumed that the data provided by the various specialists as used in this report are credible and accurate.

1.5.2. LIMITATIONS

The demographic data used in this report was sourced from Statistics South Africa and is based on data gathered during Census 2011. This data is somewhat outdated but where possible is supplemented with the latest Stats SA's survey data such as the Mid-year population estimates and the Quarterly Labour Force Survey. The limitation of this is that this survey data is restricted to a provincial level and does not extend down to a municipal level.

2. PROJECT DESCRIPTION

The Aggeneys 2 project is a 100 MW solar PV facility consisting of approximately 300 000 – 400 000 solar panels that will utilise fixed-tilt PV, single-axis tracking or double-axis tracking PV technology. The approximate height of these panels from ground level is 3.5 meters. The approximate surface areas to be covered by the facility and associated infrastructure are as follows:

- PV structures/modules up to ~233 ha
- Laydown area ~5 ha
- Internal roads ~10 ha

- Auxiliary buildings ~1 ha
- Substation up to ~1 ha.

It is estimated that construction will stretch over approximately 18 months and that the facility will have an operational lifespan of about 20 years.

2.1. LOCATION

The project is located on the Remaining Extent of Farm Bloemhoek 61 which falls within the Khâi-Ma Non-Urban area of the Khâi-Ma Local Municipality, Namakwa District, Northern Cape Province, as illustrated in **Figure 1**. The project also falls within the Renewable Energy Development Zone (REDZ) 8, otherwise known as the Springbok REDZ, and is in close proximity to Black Mountain Mine and the town of Aggeneys which services the mine. The project layout is illustrated in **Figure 2**.

2.2. EIA ALTERNATIVES

Apart from the No-Go Alternative, no alternative locations, technology types or layouts are considered in respect of this project. The proposed PV technology is considered the most suitable by the project developer as it uses negligible water, has no effluent problems, is most cost competitive and has reduced visual impact compared to wind and concentrated solar power (CSP) technology

No site alternative is considered in this assessment. Two facility substations are under consideration for the project. Alternative 1 is located on the south eastern corner of the site, while Alternative 2 is located on the north east corner of the site adjacent to the un-surfaced local road.

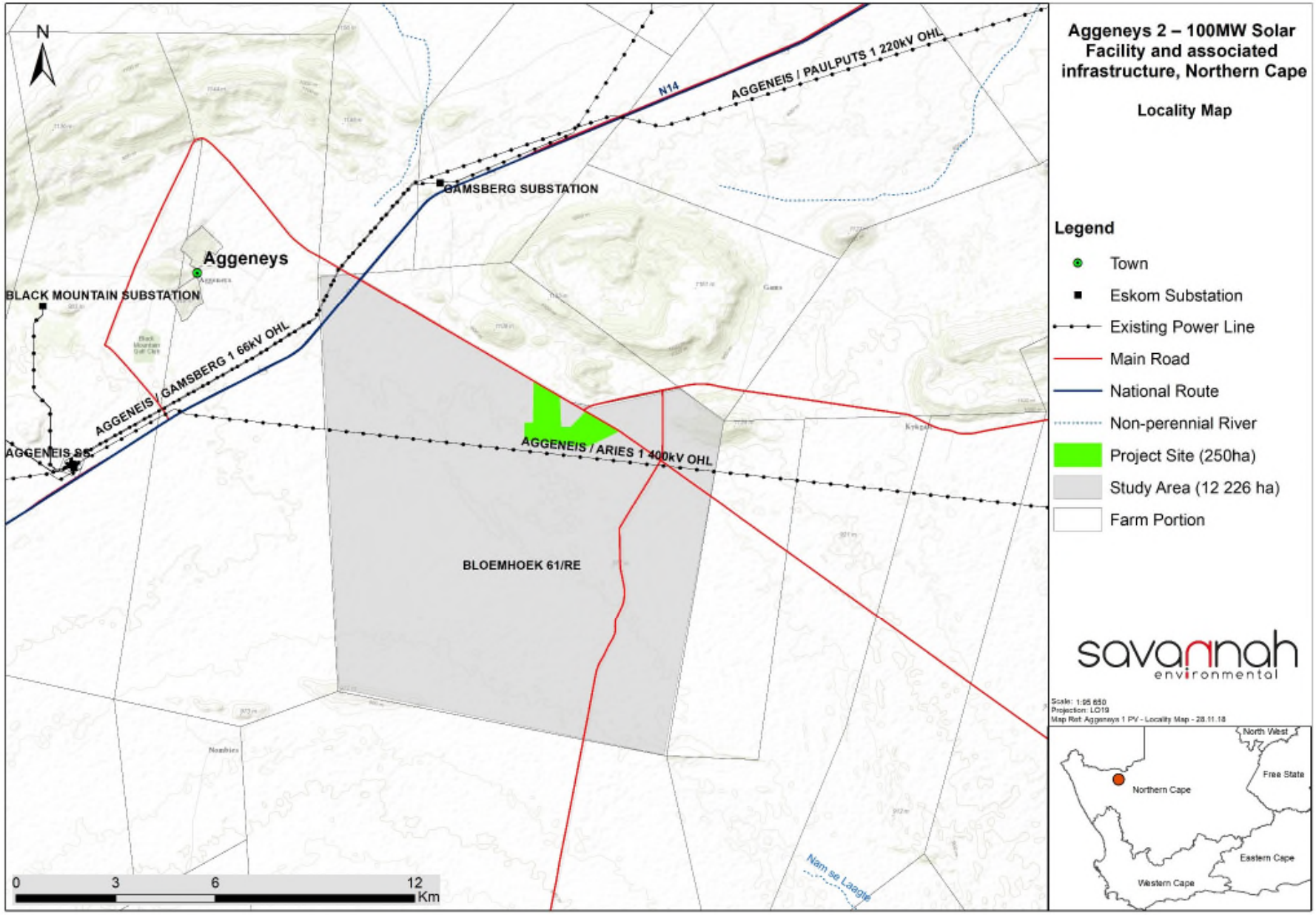


Figure 1: Location of Aggeneys 2 – 100 MW Facility and associated infrastructure

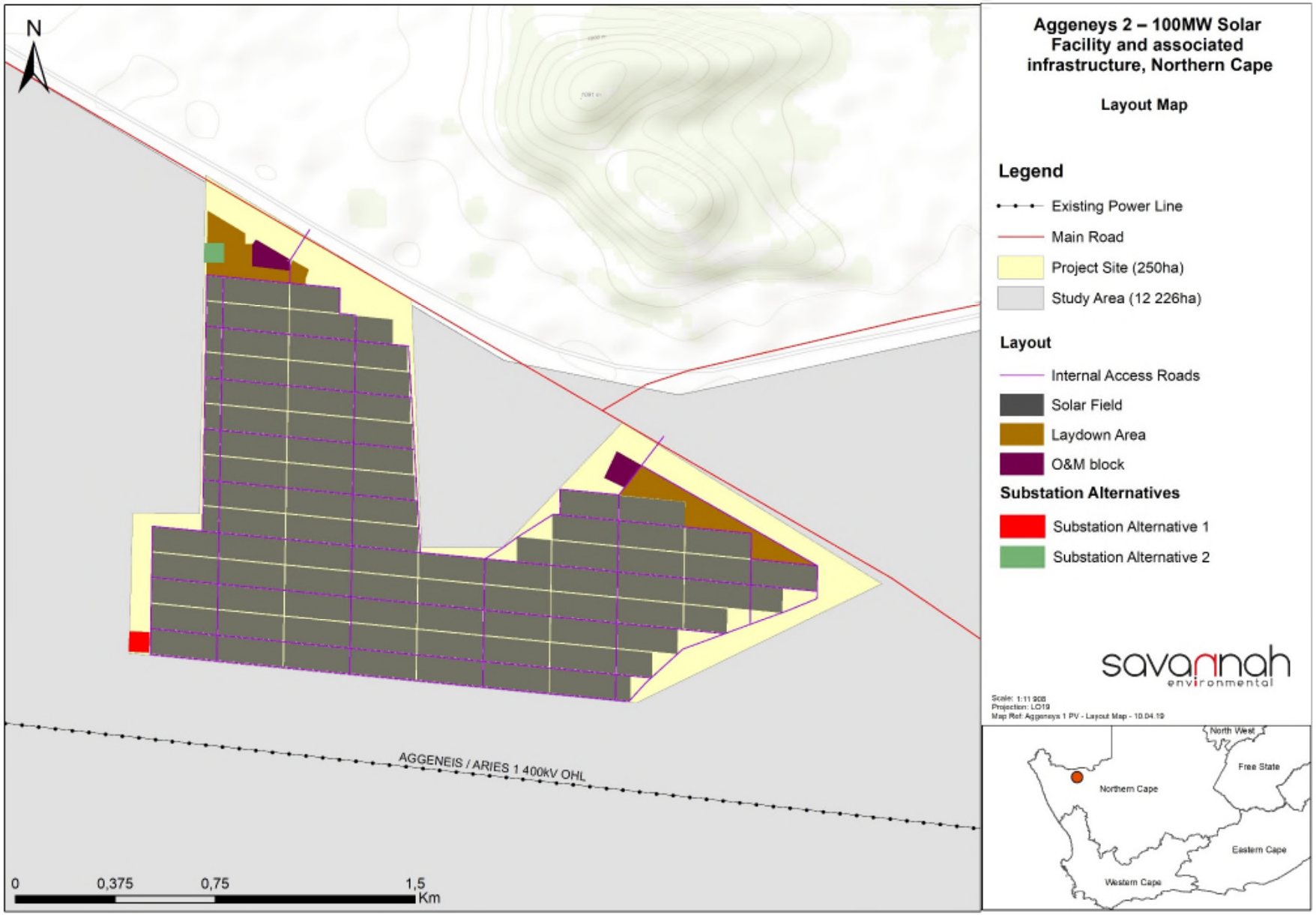


Figure 2: Aggeneys 2 layout map

2.2.1. NO-GO ALTERNATIVE

It is mandatory to consider the "no-go" alternative in the EIA process. The no-go alternative assumes that the site remains in its current state, i.e. there is no construction of the solar PV facility and associated infrastructure in the proposed project area and the status quo would remain in place.

3. APPLICABLE POLICY AND LEGISLATION

Legislation and policy serve to guide the authorities in undertaking and agreeing on projects that are in the interest of the country as a whole. Consequently, the fit of the project with the relevant national, provincial and municipal legislation and policy is an important consideration. In this respect the following legislation and policy is applicable to the project.

International

- Climate Change Action Plan, 2016-2020, World Bank Group (2016);
- Renewable Energy Vision 2030 – South Africa; World Wildlife Fund for Nature-SA (formerly World Wildlife Fund-SA) (2014);
- REthinking Energy 2017: Accelerating the global energy transformation. International Renewable Energy Agency, (2017);
- Renewable Energy Policies in a Time of Transition. International Renewable Energy Agency (2018);
- Global Warming of 1.5 °C. An IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Summary for Policymakers. Subject to copy edit: Intergovernmental Panel on Climate Change (2018).

National

- White Paper on the Energy Policy of the Republic of South Africa (1998)
- White Paper on Renewable Energy (2003)
- A National Climate Change Response Strategy for South Africa (2004)
- National Energy Act (2008)
- Integrated Resource Plan (IRP) for South Africa (2010-2030)
- The Environmental Impact Assessment and Management Strategy for South Africa (2014)

- Government Gazette Vol. 632; 16 February 2018 No. 41445. Department of Environmental Affairs, No. 114, Page No. 92 (2018)
- New Growth Path Framework (2010)
- The National Development Plan (2011)
- National Infrastructure Plan (2012).

Provincial

- Northern Cape Provincial Growth and Development Strategy (2004-2014)
- Northern Cape Province Twenty Year Review (2014)
- Northern Cape Climate Change Response Strategy
- Northern Cape Spatial Development Framework
- Northern Cape Department of Environment & Nature Conservation Annual Report (2016/17)
- Northern Cape Department of Economic Development & Tourism Annual Report (2017)
- Northern Cape State of the Province Address (2018).

District and local

- Namakwa District Municipality, Climate Change Vulnerability Assessment and Response Plan (Draft Version 4; 2017)
- Namakwa District Integrated Development Plan (Review 2018/19)
- Khâi-Ma Local Municipality Integrated Development Plan (2012/2017).

3.1. POLICY AND LEGISLATION FIT

Considering the nature and location of the project there is a clear fit with international, national, provincial and local, at both district and municipal levels, policy and legislation. For instance the World Wild Life Fund for Nature (WWF):

> "…*calls for a more ambitious plan, suggesting that the IRP* [Integrated Resource Plan for Electricity] *should provide for an 11-19% share of electricity capacity by 2030, depending on the country's growth rate over the next fifteen years*" (Sager, 2014, p. 5).

The issue of climate change is high on the agenda of all levels of government in South Africa with the Department of Environmental Affairs and Tourism indicating that:

> "*The efforts of all stakeholders will be harnessed to achieve the objectives of the Government's White Paper on Renewable Energy (2003) and the Energy Efficiency Strategy, promoting a sustainable development path through coordinated government policy* (Department of Environmental Affairs and Tourism, 2004, p. 23) "

DEAT goes further in specifically listing renewable energy sources, including solar power, wind power and biomass, as a tool in promoting mitigation against climate change.

In terms of the capacity determinations of the Minister of Energy, in consultation with the National Energy Regulator (NERSA), it has been established that South Africa required:

> "*14 725 MW of renewable energy (comprising of solar PV: 6 225 MW, wind: 6 360 MW, CSP: 1 200 MW, small hydro: 195 MW, landfill gas: 25 MW, biomass: 210 MW, biogas: 110 MW and the small scale renewable energy programme: 400 MW)*" (Independent Power Producer Office, 2018a, p. 5).

With the Northern Cape contributing 6 963 GWh in respect of solar PV (Independent Power Producers Procurement Office, 2018b, p. 3)

On 16 February, 2018 the boundaries of eight REDZ that are of strategic importance for large scale wind and solar photovoltaic for the country were gazetted (Government Gazette No. 41445, 2018). In respect of these zones the project the project falls within the REDZ 8 located in the Springbok region in the Northern Cape Province.

The Northern Cape Department of Economic Development and Tourism identifies six economic development opportunities, one of which is renewable energy, and states that:

> "*During the financial year* [2017/18] *the intension is to focus on additional opportunities such as, Renewable Energy, a focus area of the 9-Point Plan*" (Northern Cape Province. Department of Economic Development & Tourism, 2017, p. 10 & 15).

The importance of renewable energy facilities within the Northern Cape has been recognised in the province's Twenty Year Review 2014 where it is indicated that:

> "*The New Growth Path that was adopted by national government in 2010 identified the green economy as a new economic sector that will be key to the creation of jobs. The focus of the green economy is on renewable energy and the Northern Cape was identified as the solar hub of the country with a number of solar plants being established across the province*" (Northern Cape Province, 2014, p. 153).

On a municipal level support is also evident. In the Namakwa District Municipality Integrated Development Plan Revision 2018/2019 (Namakwa District Municipality, 2018, p. 19) it is stated that:

> "*Renewable energy is recently one of the cornerstones of the economy of the District and there needs to be engagement on National level to ensure that the District benefit from this resource*".

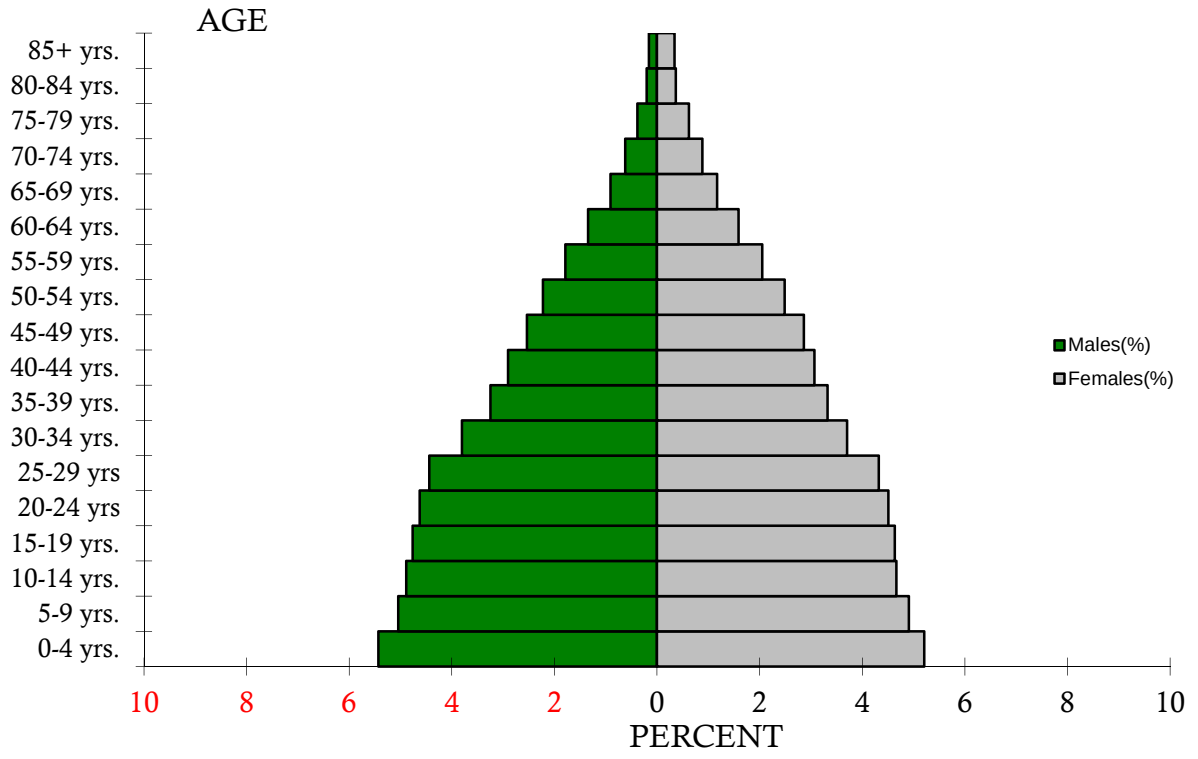
Considering the policy and legislation referred to above, the project is in-line with the plans key planning documentation as the project falls within one of the eight REDZ allocated by National Government. Notwithstanding this, however, the proviso that the project also conform to appropriate scale and form, particularly considering the cumulative impacts associated with such similar projects in the area, will need to be considered on a broader basis than can be done as far as this report is concerned. In this regard, attention will need to be given to the cumulative impacts at a later point in this report in as far as they relate to the social environment. In the following section a description of the affected environment is provided.

4. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The project falls within the Northern Cape Province, in close proximity of the town of Aggeneys and Black Mountain Mine, in the Namakwa District Municipality (DC6) and Khâi-Ma Local Municipality. The project footprint falls outside of the Statistic South Africa's Census 2011 designated Main Place 368006, Aggeneys and within the Khâi-Ma Non-Urban (NU) Main Place 368002. The demographics pertaining to these areas, as sourced from Statistics South Africa's Census 2011, are described below.

4.1. PROVINCIAL

The Northern Cape Province covers a geographical area of 372 889.36 km² and, according to Census 2011 (Statistics South Africa, 2011), had a population of 1 145 861 in 2011 thus giving it a population density of 3.07 people per km². In respect of age structure, 30.1% of the population of the Northern Cape are below 16 years while 64.2% are between 15 and 64 years of age and 5.7% are above 64 years. The population pyramid of the Northern Cape provinces is illustrated in **Figure 3**.



Source: (Statistics South Africa, 2011)

Figure 3: Population pyramid Northern Cape Province

According to the 2018 Mid-year population estimates (Statistics South Africa, 2018), the Northern Cape Province has the smallest population across all provinces in the country with an estimated population of 1 225 600 in 2018. As the Mid-year population estimates remain at a provincial level and are not projected to the district and local municipal levels, for comparative purposes, data gathered during Census 2011 will be used where appropriate notwithstanding it being rather outdated.

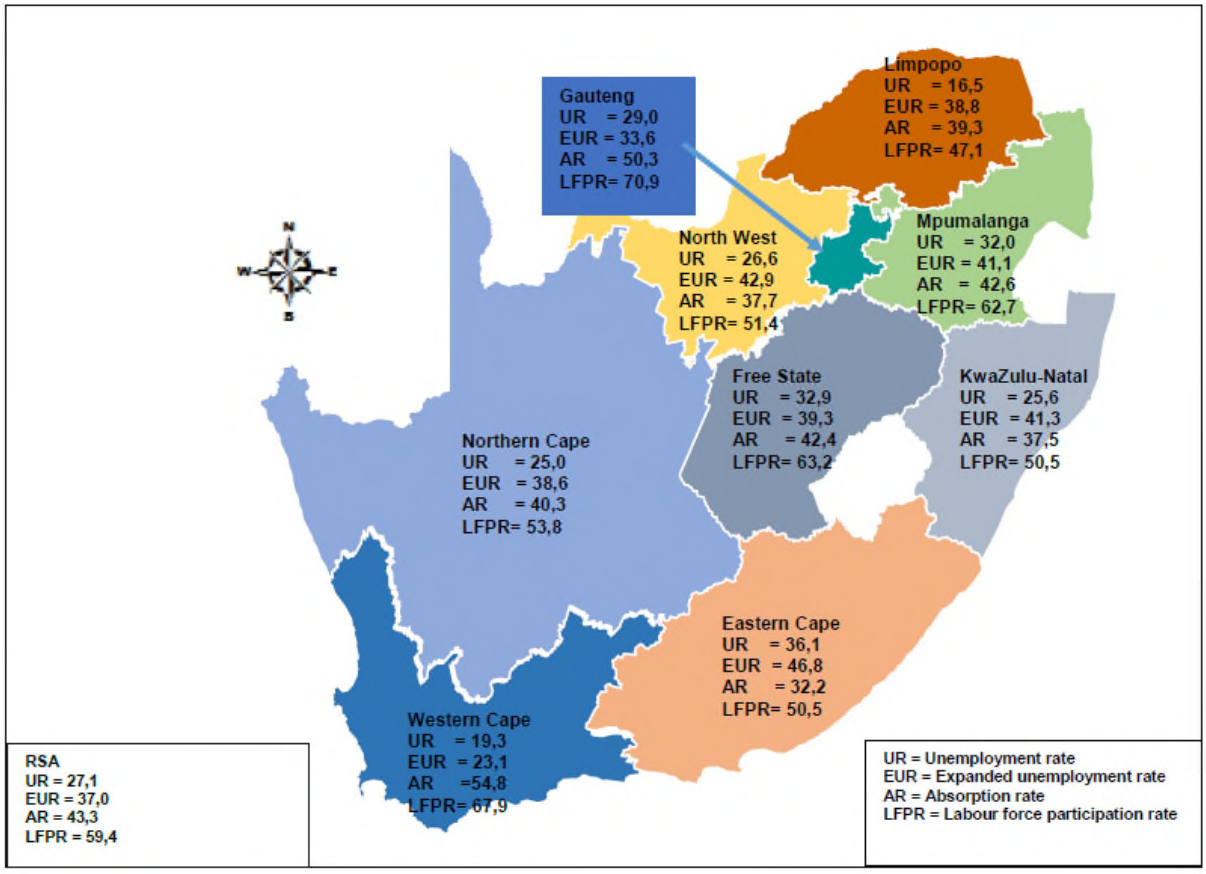
On this basis and in respect of population grouping, at 50.35%, the dominant population group in the Northern Cape is black African while at 53.8% Afrikaans is the dominant home language spoken across the province.

The dependency ratio of the Northern Cape, which indicates the burden placed on the population of working age, between 15 and 64 years, who support children under 15 years as well as people over 65 years, is 55.7 while the sex ratio, which measures the proportion of males to females, is 97.3 indicating a higher number of females within the province. Between 1996 and 2001 the population growth rate of the Northern Cape was -0.40% p.a. while between 2001 and 2011 it was 1.44% p.a.

In 2011 the official unemployment rate in the Northern Cape was 27.4% with the official unemployment rate amongst the youth, aged between 15 and 34 years, being 34.5%. In the 4th quarter of 2018 the official unemployment rate in the province had dropped to 25.0%. These figures must be considered with caution as the official unemployment rate is defined by Stats SA as follows:

> "***Unemployed*** *persons according to* ***Official definition*** *are those (aged 15–64 years) who:*
>
> *a) Were not employed in the reference week;* ***and***
>
> *b) Actively looked for work or tried to start a business in the four weeks preceding the survey interview;* ***and***
>
> *c) Were available for work, i.e. would have been able to start work or a business in the reference week;* ***or***
>
> *d) Had not actively looked for work in the past four weeks, but had a job or business to start at a definite date in the future and were available.*" (Statistics South Africa, 2019, p. 17).

Considering this, in the 4th Quarter of 2018 the unofficial employment rate in the province stood at 38.6%. During this period the labour absorption rate was 40.3% and the labour force participation rate was 53.8%. A summary of the labour market indicators illustrated on a comparative basis across South Africa is provided in **Figure 4**.



Source: (Statistics South Africa, 2019, p. 9)

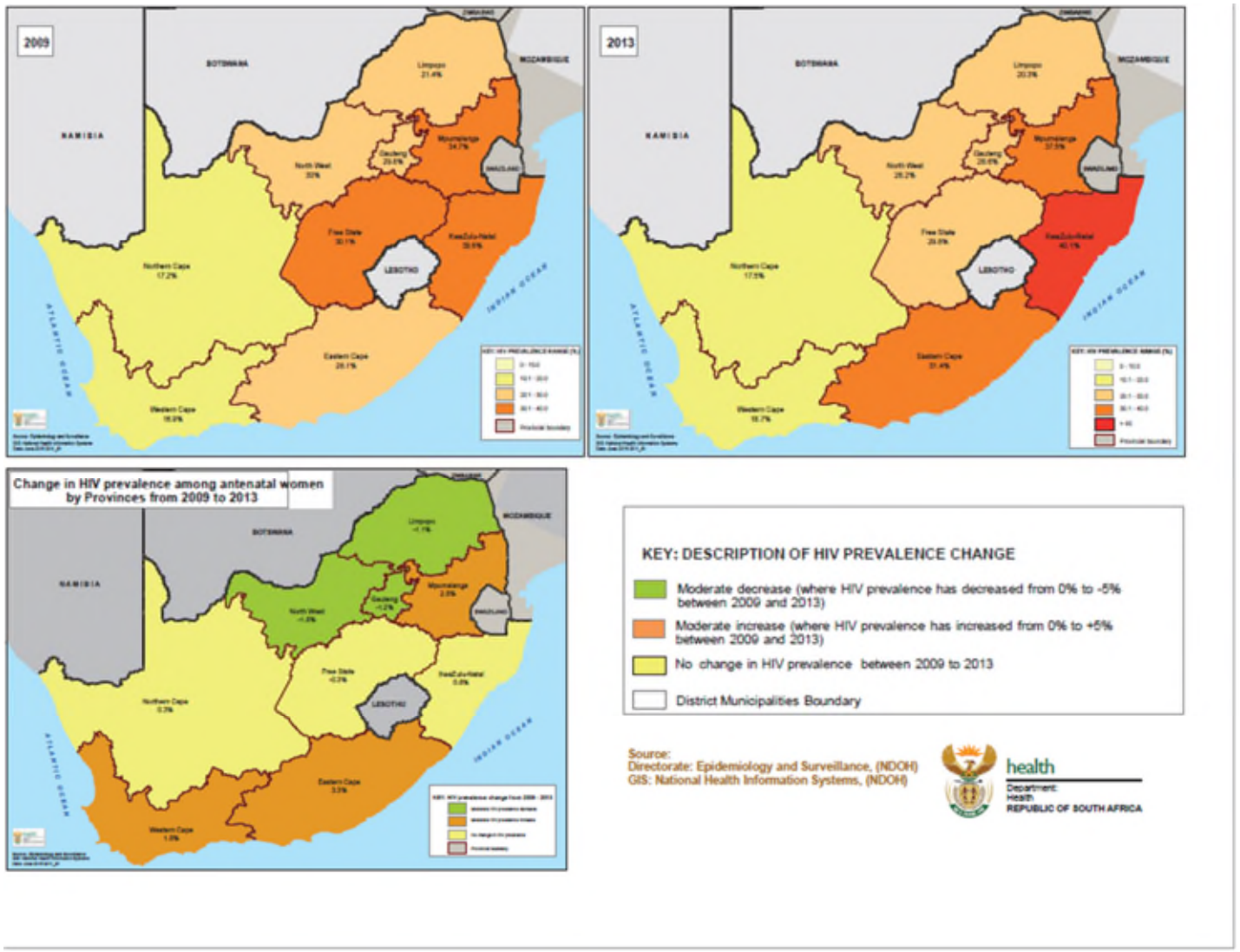
Figure 4: Labour market indicators 4th Quarter 2019

In respect of households, the 2011 Census indicated that there were 301 405 households in the Northern Cape with an average household size of 3.8. Of these households, 38.8% were female headed, 82.4% lived in formal dwellings and 55.1% either owning or paying off their dwelling.

Regarding household services in 2011, 60.1% of households in the province had flush toilets connected to the sewerage system while 64% had their refuse removed on a weekly basis. Piped water was delivered to 45.8% of households while 85.4% used electricity as a means of energy for lighting.

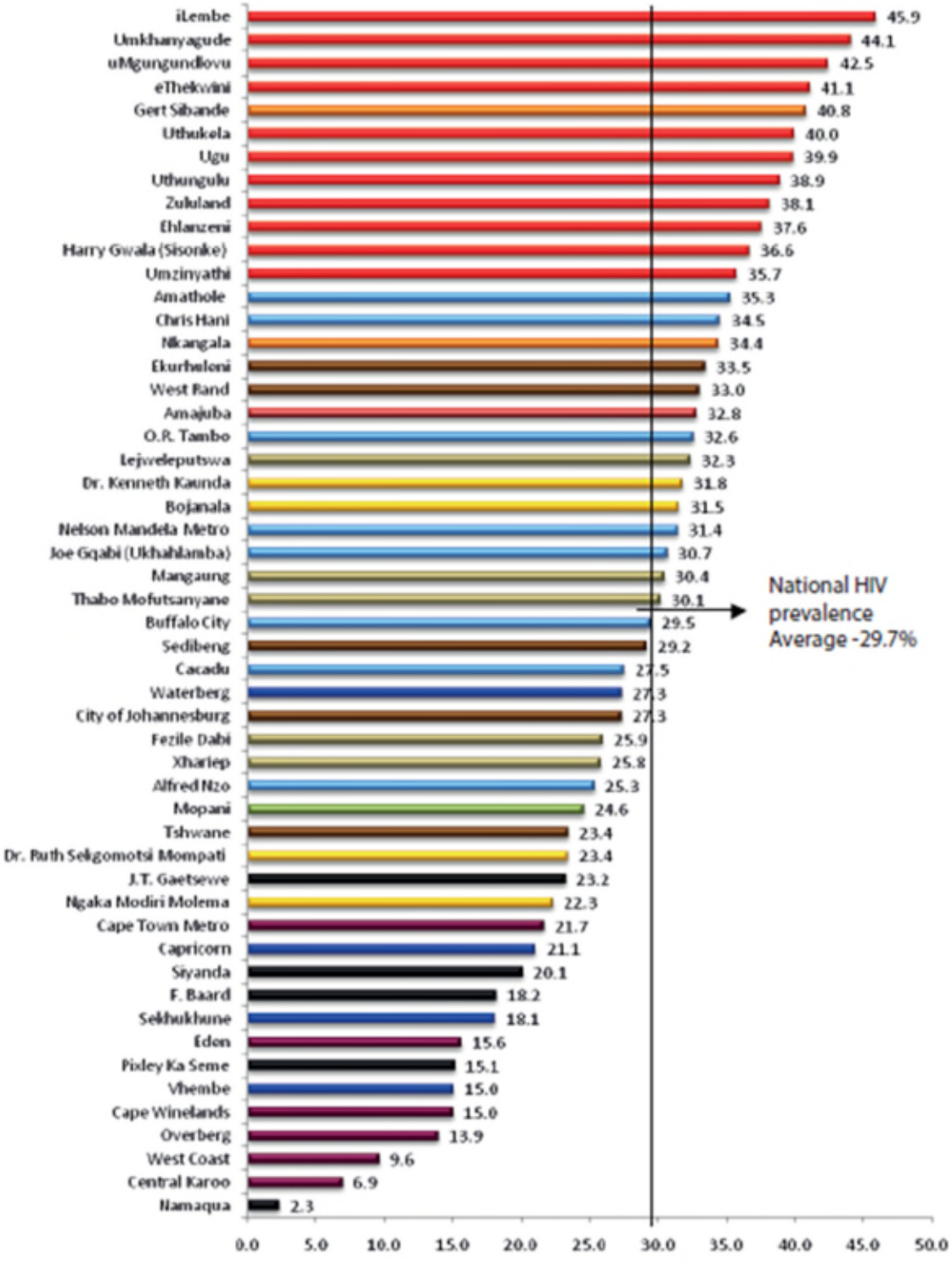
In 2013 the Northern Cape had the lowest HIV antenatal prevalence rate across South Africa at 17.5% followed by the Western Cape at 18.7%. At that point the highest level of HIV prevalence amongst antenatal women was in KwaZulu-Natal with a prevalence rate of 40.1% while the national rate was 29.7%. HIV prevalence amongst antenatal women across South Africa is illustrated in **Figure 5**.

The 2013 National Antenatal Sentinel HIV Prevalence Survey extended to the district level which indicated that the Namakwa District Municipality had the lowest level of HIV prevalence across the country at 2.3% followed by the Central Karoo District at 6.9%. Of the 52 districts surveyed the next four districts with the lowest levels were the West Coast at 9.6%; the Overberg at 13.9% and the Cape Winelands, together with the Vhembe district, both at 15.0%. Consequently, it is quite clear that the prevalence of HIV is extremely low in the area in comparison with the rest of South Africa as is clearly illustrated in **Figure 6**.



Source: (National Department of Health, 2015, p. 27)

Figure 5: HIV prevalence amongst antenatal women – South Africa 2009 – 2013



Source: (National Department of Health, 2015, p. 29)

Figure 6: HIV prevalence across the 52 districts – 2013

Attention is now turned towards the district and local municipalities which are compared together with the province in **Table 2** to **Table 5**.

4.2. MUNICIPAL

The project impacts the Namakwa District Municipality (DC6) and the Khâi-Ma Local Municipality (NC067). On a district level the Namakwa District Municipality covers an area of 126 836.34 km^2 and has a population of 115 842 people living within 33 845 households resulting in a population density of 0.91/km^2 and household density of 0.27/km^2. At a local municipal level Khâi-Ma Local Municipality covers a geographical area of 16 628.04 km^2 and, with a population of 12 465 people living within 3 796 households, has a respective population and household density of 0.75/km^2 and 0.23/km^2. In both the district and local municipalities there is a higher proportion of males to females, coloured people are the dominant population group and Afrikaans is the dominant home language. This data is presented in **Table 2** where it is compared on a provincial, district and local level.

On a political and administrative level, the Namakwa District Municipality, which is the largest district in the Northern Cape and has its political and administrative seat in the town of Springbok, comprises the following six local municipalities:

- Nama Khoi
- Hantam
- Khâi-Ma
- Kamiesberg
- Karoo Hoogland, and
- Richtersveld.

The basis of the Namakwa economy is agriculture and tourism.

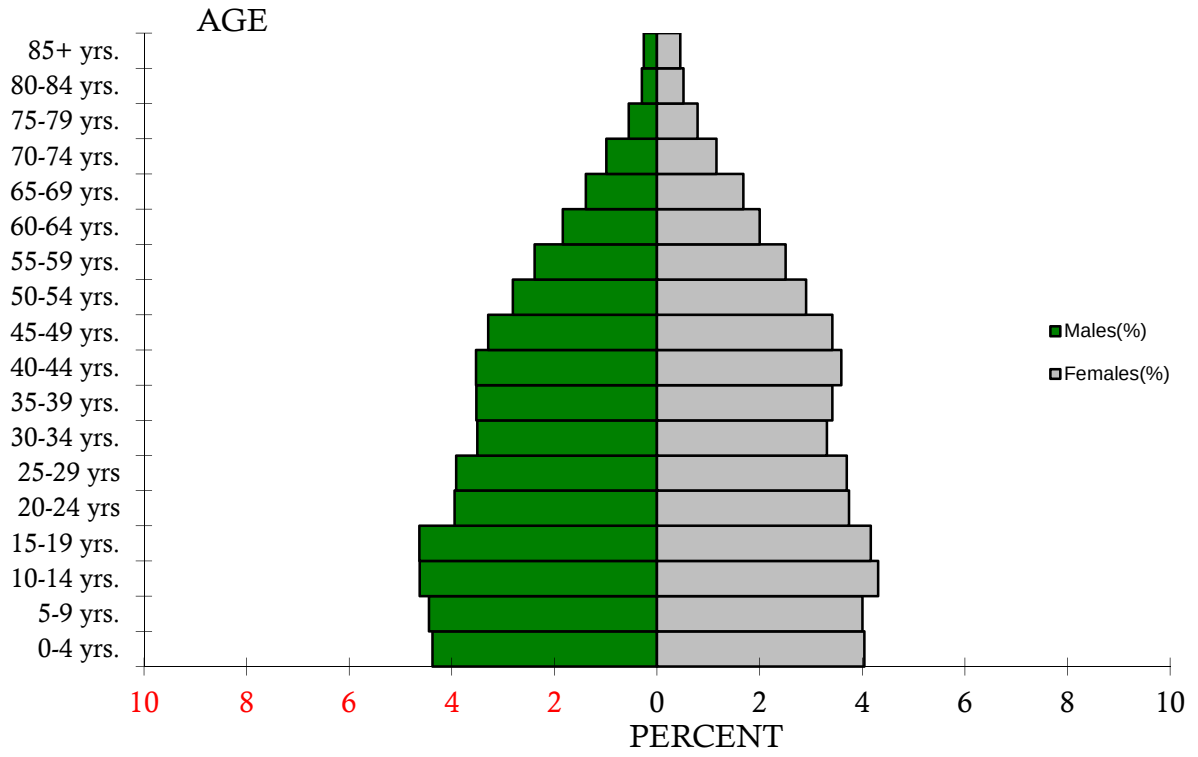
The Khâi-Ma Local Municipality, which accounts for some 12% of the geographical area of the district, has its political and administrative seat in Pofadder and includes the towns of Aggeneys, Pella and Pofadder as well as the agricultural settlements of Dwagga Soutpan, Vrugbaar, Raap-en-Skraap and Klein Pella. The main elements of the Khâi-Ma Local Municipality economy are also agriculture and tourism.

Table 2: Geographic and demographic data

	NORTHERN CAPE	DC6: Namakwa	NC067: Khâi-Ma Local Municipality
Geographical Area	372,889.36 km^2	126,836.34 km^2	16 628.04 km^2
Population	1,145,861	115,842	12,465
Households	301,405	33,856	3 796
Population Density	3.07/km²	0.91/km²	0.75/km²
Household Density	0.81/km²	0.27/km²	0.23/km²
Female	50.69%	49.70%	47.37%
Male	49.31%	50.30%	52.63%
Coloured	40.31%	83.18%	75.08%
Black African	50.35%	6.82%	17.61%
White	7.09%	8.73%	6.05%
Other	1.56%	0.74%	0.83%
Indian/Asian	0.68%	0.53%	0.44%
Home Language	Afrikaans 53.76%	Afrikaans 93.90%	Afrikaans 83.25%
	Setswana 33.08%	Setswana 1.71%	Setswana 10.94%
	isiXhosa 5.34%	isiXhosa 1.55%	isiXhosa 2.22%
	English 3.36%	English 1.22%	English 1.18%

Source: (Statistics South Africa, 2011)

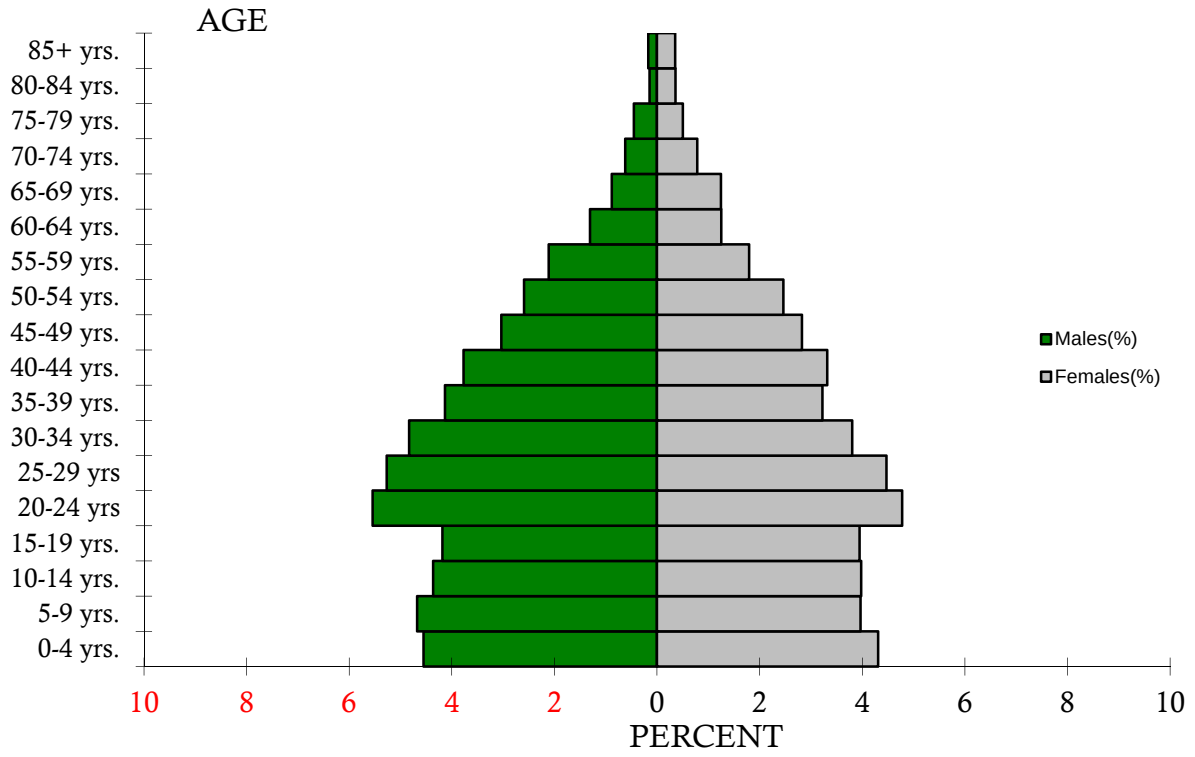
In the Namakwa district, which had a population of 115 842 people in 2011, 25.8% were under 16 years of age while 66.1% were between 15 and 64 years and 8.1% were over the age of 64. The population pyramid of Namakwa is represented in **Figure 7**



Source: (Statistics South Africa, 2011)

Figure 7: Population pyramid Namakwa

Of the population of 12 465 people in the Khâi-Ma Local Municipality, 25.9% were under 16 years of age in 2011 while 68.6% were between 15 and 64 years and 5.5% were over the age of 64 years. The population pyramid of Khâi-Ma is represented in **Figure 8**.



Source: (Statistics South Africa, 2011)

Figure 8: Population pyramid Khâi-Ma

The dependency ratio, which indicates the burden of support for children under 16 years and people over 64 years placed on the working population aged between 15–64 years, is lower in Khâi-Ma at 45.7 than it is across the district and province which have respective dependency ratios of 51.2 and 55.7. In respect of the sex ratio Khâi-Ma has a higher proportion of males to females at 111.1 compared to the district and province with respective sex ratios of 101.2 and 97.3. 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. This data is compared across the region in **Table 3**.

Table 3: Age structure, dependency ratio, sex ratio and population growth

Municipality	Age Structure						Dependency Ratio		Sex Ratio		Population Growth (% p.a.)	
	<15		15-64		65+		Per 100 (15-64)		Males per 100 females			
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
Northern Cape	32.1%	30.1%	62.5%	64.2%	5.4%	5.7%	60.1	55.7	93.7	97.3	-0.40	1.44
DC6: Namakwa	29.3%	25.8%	64.0%	66.1%	6.7%	8.1%	56.4	51.2	97.8	101.2	-0.27	0.69
NC067: Khâi-Ma	29.0%	25.9%	65.9%	68.6%	5.2%	5.5%	51.8	45.7	106.5	111.1	3.66	0.83

Source: (Statistics South Africa, 2011)

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 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, aged 20 years and older, has no schooling when compared across the province (11.3%) and district (6.6%). In respect of that proportion of the population who have obtained a matric and higher level of education, both the province and district fair better than the Khâi-Ma municipality as illustrated in **Table 4**.

Table 4: Labour market and education aged 20 +

Municipality	Labour Market				Education (age 20 +)					
	Unemployment Rate (official)		Youth Unemployment Rate (Official) 15-34 years		No Schooling		Matric		Higher Education	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
Northern Cape	35.6%	27.4%	44.1%	34.5%	19.3%	11.3%	15.8%	22.9%	5.9%	7.2%
DC6: Namakwa	28.5%	20.1%	37.7%	25.4%	11.5%	6.6%	15.5%	19.1%	5.8%	7.1%
NC067: Khâi-Ma	15.3%	22.1%	16.9%	23.6%	6.6%	3.9%	14.7%	18.5%	3.9%	5.4%

Source: (Statistics South Africa, 2011)

Data pertaining to household dynamics across the region is presented in **Table 5** which indicates that the 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 are of a formal type and 46.6% of all dwellings in the area are either owned or are being paid off.

Table 5: Household dynamics

Municipality	Household dynamics									
	Households		Average household size		Female headed households		Formal dwellings		Housing owned/paying off	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
Northern Cape	245,086	301,405	3.9	3.8	37.7%	38.8%	81.0%	82.4%	60.8%	55.1%
DC6: Namakwa	27,776	33,856	3.6	3.4	35.8%	36.6%	89.4%	93.8%	65.7%	60.1%
NC067: Khâi-Ma	2,803	3,796	3.5	3.3	34.8%	34.0%	79.2%	86.1%	60.7%	46.6%

Source: (Statistics South Africa, 2011)

4.3. PROJECT FOOTPRINT

At a footprint specific level the project is located within the Khâi-Ma Non-Urban (NU) area and is situated aproximately 10 km east south-east of the town of Aggeneys, as illustrated in **Figure 9**. The demographic data pertaining to Khâi-Ma NU, listed as Main Place 368002 from Census 2011, is as follows:

Geographic area = 15 754.25 km²
Population = 2 148 people
Population density = 0.14/km²
Households = 995
Household density = 0.06/km²

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%

First language	People	Percentage
Afrikaans	1 053	49.02%
Setswana	963	44.83%
Sesotho	32	1.49%
English	21	0.98%
SiSwati	19	0.88%
Other	15	0.70%
Sepedi	13	0.61%
isiNdebele	12	0.56%
isiXhosa	9	0.42%
isiZulu	5	0.23%
Sign language	4	0.19%
Tshivenda	1	0.05%

Other key data

Young (0-14)	8%
Working Age (15-64)	89,3%
Elderly (65+)	2,7%
Dependency ratio	11,9
Sex ratio	164,9
No schooling aged 20+	7,8%
Higher education aged 20+	3,6%
Matric aged 20+	14,6%
Average household size	2,1
Female headed households	19%
Formal dwellings	92,7%
Housing owned/paying off	7,9%
Flush toilet connected to sewerage	72,5%
Weekly refuse removal	36,8%
Piped water inside dwelling	32%
Electricity for lighting	79,4%.

Aggeneys, which is situated adjacent to the farm Bloemhoek 61 on which the project is located, as illustrated in **Figure 9**, is a mining town that was established in 1976 on the farm Aggeneys after which it was named. The town is located between Pofadder and Springbok in the Khâi-Ma Local Municipality. Demographic data in respect of Aggeneys Main Place 368006 from Census 2011 is as follows:

Geographic area = 205.68 km²

Population = 2 262 people

Population density = 11.0/km²

Households = 573

Household density = 2.79/km²

Gender	**People**	**Percentage**
Male	1295	57.25%
Female	967	42.75%
Population group	**People**	**Percentage**
Coloured	1397	61.76%
Black African	522	23.08%
White	323	14.28%
Indian or Asian	13	0.57%
Other	6	0.27%
First language	**People**	**Percentage**
Afrikaans	1681	81.44%
isiXhosa	213	10.32%
Setswana	69	3.34%
English	59	2.86%
isiZulu	14	0.68%
Sepedi	7	0.34%
Sesotho	7	0.34%
Other	6	0.29%
Sign language	3	0.15%
Tshivenda	2	0.10%
SiSwati	1	0.05%
Xitsonga	1	0.05%
Not applicable	198.	

Other key data

Young (0-14)	24,4%
Working Age (15-64)	74,5%
Elderly (65+)	1,1%
Dependency ratio	34,2
Sex ratio	133,9
No schooling aged 20+	0,7%
Higher education aged 20+	15,5%
Matric aged 20+	30,8%
Average household size	3,6
Female headed households	14,8%
Formal dwellings	98,6%
Housing owned/paying off	0,3%
Flush toilet connected to sewerage	99%
Weekly refuse removal	99,8%
Piped water inside dwelling	98,6%
Electricity for lighting	99,8%.

The project will affect the following property and neighbouring properties:

Affected property

- Bloemhoek 61 – RE/61

Neighbouring properties

- Aggeneys 56 – RE/56
- Aroams 57 – 1/57
- Bloemhoek 61 – 1/61
- Gams 60 – 1/60
- Achab 59 – RE/59
- Kykgat 87 – 1/87
- Hartenbeesvlei 86 – RE/86.

The affected and neighbouring properties are depicted in **Figure 9**.

With regard to crime in the area, the Aggeneys Precinct, under which the project falls, has a relatively low crime level with a total of 91 crimes having being reported within the precinct between 01 January and 31 December, 2018[1]. Over the same period 404 crimes were reported in the Pofadder and 145 in the Pella precincts.

[1] Crime Stats SA www.crimestatssa.com/precinct.php?id=640

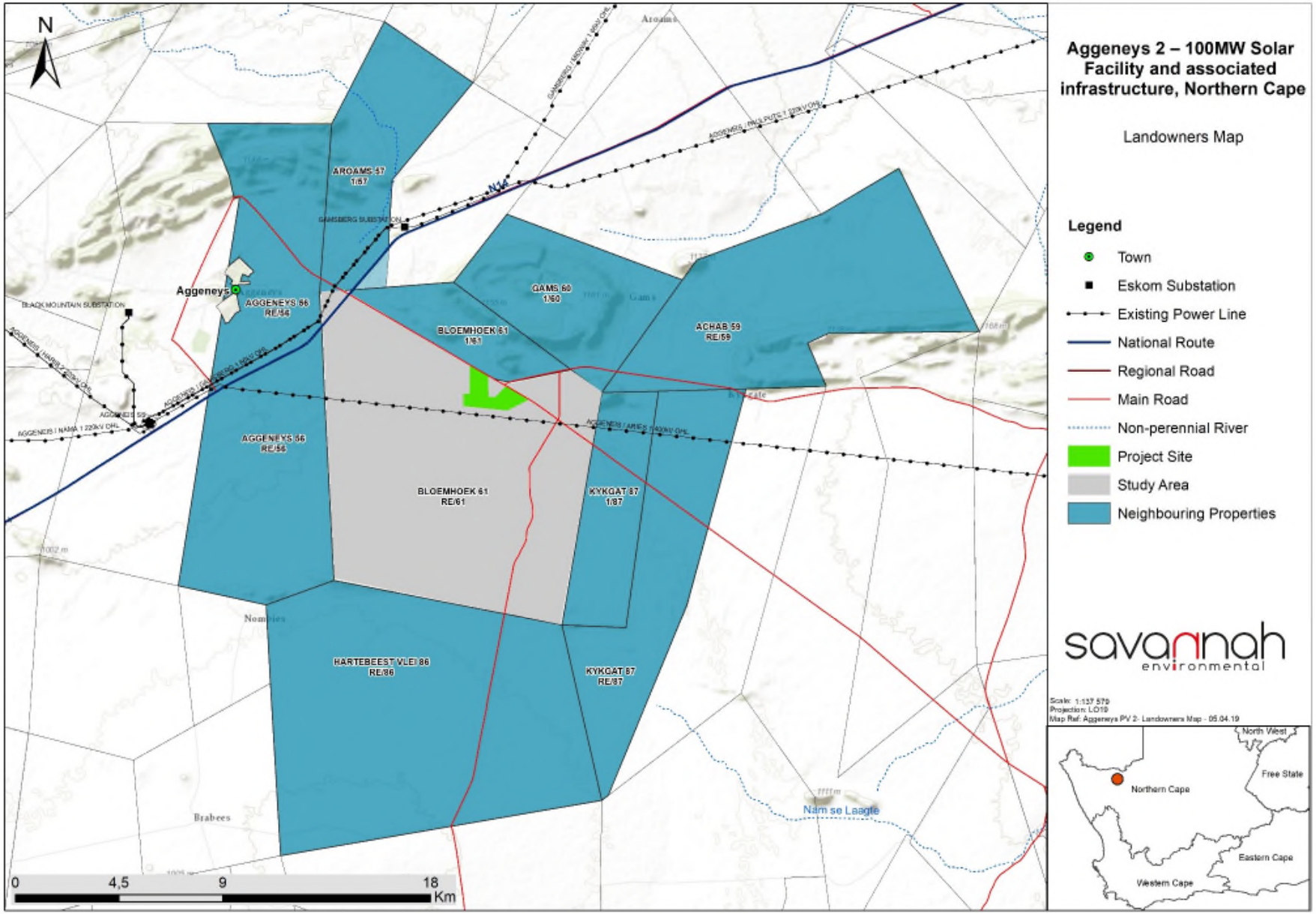


Figure 9: Affected and neighbouring properties Aggeneys 2

5. IDENTIFICATION OF POTENTIAL IMPACTS

The social impact variables considered across the project are in accordance with Vanclay's list of social impact variables clustered under the following main categories as adapted by Wong (Vanclay, 2002; Wong, 2013) and include:

1. Health and social well-being
2. Quality of the living environment (Liveability)
3. Economic
4. Cultural.

These categories are not exclusive and at times tend to overlap as certain processes may have an impact within more than one category.

5.1. HEALTH AND SOCIAL WELLBEING

The health and social wellbeing impacts related to the project include.

- Annoyance, dust and noise
- Increase in crime
- Increased risk of HIV and AIDS
- Influx of job construction workers and jobseekers
- Hazard exposure.

These impacts are addressed separately below.

5.1.1. ANNOYANCE, DUST AND NOISE

Annoyance, dust and noise will be evident during the construction phase of the project, as construction activities will result in disruptions and the generation of dust and noise from construction vehicles and equipment. Site specific activities such as site clearance and the deliveries of materials, equipment, plant and the transportation of the workforce along gravel access roads will generate the most dust and noise. Dust that accumulates on foliage and grasses that is used for grazing may result in the foliage and grasses becoming unpalatable for livestock and/or game. This may in turn have an effect on farming activities within the vicinity of the project site and along the access road over the construction period. This impact will negatively impact sensitive receptors situated within or in close proximity to the project site, and could also potentially impact surrounding land users. The impact of noise

and dust on surrounding land users and local farmsteads can be reduced to acceptable levels through the application of appropriate mitigation measures.

During the operation phase of the project far less disruptions, dust and noise are expected in the vicinity of the project site, however, along the gravel access road dust and noise can be generated by traffic travelling to and from the project site.

5.1.2. INCREASE IN CRIME

With the area being rather remote and sparsely populated, at 91 crimes committed in 2018, the Aggeneys Precinct[2] demonstrates a relatively low level of criminal activity between 2015 and 2018, with no stock theft being reported. The crime statistics for the precincts surrounding Aggeneys are as follows:

Springbok = 1,546

Pofadder = 400

Kamieskroon = 373

Garies = 248 and

Pella = 145,

indicating much higher crime levels.

Considering this and due to the remoteness of the project, any rise in criminal activities is likely to be perceived as significant by the local population. Consequently, it would be pertinent for the developers to ensure that a strategy is put in place through which any suspected criminal activities associated with the project are swiftly communicated and addressed. The construction phase is likely to be associated with a higher risk of criminal activities than would be the case during the operation phase of the project. In this sense it is often opportunistic crime, stock theft, the abuse of alcohol and relationship related crime that is associated with construction activities.

5.1.3. INCREASED RISK OF HIV AIDS

The area has the lowest HIV prevalence rate in the country with the Namakwa District Municipality having a prevalence rate of 2.3% followed by the Central Karoo District with a prevalence rate of 6.9%. The fact that sexually transmitted diseases tend to be spread by construction and transport workers, together with the high prevalence of HIV across the rest of South Africa, opens the area to a high risk of HIV and AIDS (Singh & Malaviya, 1994;

[2]According to Crime Stats SA as at 26 November, 2018 www.crimestatssa.com/precinct.php?id=640

Ramjee & Gouws, 2002; Meintjes, Bowen, & Root, 2007; World Bank Group, 2016; Bowen, Dorrington, Distiller, Lake, & Besesar, 2008; Bowen P. , Govender, Edwards, & Cattell, 2016; Kikwasi & Lukwale, 2017; Bowen P. , Govender, Edwards, & Lake, 2018). This risk is likely to be at its highest during the construction phase of the project as the construction workforce increases and material and equipment is delivered to site, but is most likely to subside during the operation phase.

Due to the low HIV prevalence in the area it is important that this issue be given serious attention, that the appropriate mitigation measures are implemented and that the situation is closely monitored throughout the construction and operation phases of the project. The risk of the spread of HIV is most prevalent on a cumulative basis and is addressed as such under Section 8: Cumulative Impacts.

5.1.4. INFLUX OF CONSTRUCTION WORKERS AND JOB SEEKERS

It is estimated that over the construction period, which will stretch over 12-18 months, the peak construction workforce will reach approximately 400 workers comprising of 60% low skilled, 25% semi-skilled and 15% skilled people. It is expected that most of these workers will be recruited locally dependent on the skills available within the local communities. The influx of workers could result in a disruption of existing social networks due to the formation of temporary relationships and could result in an increase in pregnancies which may place pressures on local family units. In addition, the arrival of construction workers and job seekers may result in the formation of subcultures that could manifest in antisocial behaviour which conflicts with the expectations of local communities. This may result in these local communities, who are accustomed to a quiet more rural environment, becoming dissatisfied with the neighbourhood. These disruptions are, however, more likely to occur in the nearby urban area as a result of workers seeking recreational activities. Due to population sparsity the risk to the families of local farm workers in the immediate vicinity of the site is likely to be relatively low.

During the operation phase of the project the workforce will comprise a maximum of ~60 workers all of whom will be accommodated off site. As a result, the risks associated with disruptions to social networks will be negligible over the operation phase of the project.

5.1.5. HAZARD EXPOSURE

The use of heavy equipment and vehicles and an increase in vehicle traffic within the vicinity of all construction sites will result in an increased risk to the personal safety of people and animals. Of particular concern are increased hazards faced by pedestrians, cyclists and motorists with emphasis on vulnerable groups such as children and the elderly. Excavation work and trenches also pose a hazard to the safety of people, particularly children and animals, who may fall into these works and may have difficulty in getting out. However, as the facility will be fenced, restricting public access, this will serve as mitigation against this risk. There will also be an increased risk of fires brought about as a result of construction workers lighting fires for warmth during cold periods. Nevertheless, with the recommended mitigation measures being successfully put in place this can be controlled.

5.2. QUALITY OF THE LIVING ENVIRONMENT

The following quality of the living environment impacts are related to the project.

- Disruption of daily living patterns
- Disruptions of services supplies and infrastructure
- Transformation of the sense of place.

5.2.1. DISRUPTION OF DAILY LIVING PATTERNS

Disruptions of daily living patterns due to an increase in traffic in the area, disrupted access to and out of neighbouring properties, and disturbance of agricultural activities are likely to be minimal and restricted to the construction phase of the project. These disruptions are only likely to be associated with the delivery of materials and machinery to site and the transportation of workers to and from site. Disruptions of daily living patterns are likely to be negligible during the operation phase of the project as these will be associated with maintenance and repair activities which will be far less frequent and intense than construction activities.

5.2.2. DISRUPTION OF SERVICES SUPPLIES AND INFRASTRUCTURE

An increase in the population of the area as a result of the workforce associated with the project has the potential to place pressure on existing community services supplies and infrastructure such as schools, health care facilities, access to water, electricity and sanitary services.

With the workforce associated with the construction phase peaking at 400 and the operation phase peaking at 60, of whom the majority will be locally recruited, it is unlikely that the project in isolation will have any significant effect on the available social and community infrastructure in the area. However, on a cumulative basis, with a further two PV facilities planned for the area there is likely to be a significant impact in this regard. This impact is dealt with in a cumulative context in greater depth below under section 8: Cumulative Impacts.

5.2.3. TRANSFORMATION OF THE SENSE OF PLACE

Within a social context a sense of place includes a wide range of criteria, all or some of which add meaning to a particular area for individuals and groups. These criteria may include the vista, geography, urban layout, flora and fauna, community, history and fragrance of a place amongst many others and are interpreted uniquely on an individual basis. Some individuals may embrace changes to the sense of place that others may reject and for some it may merely be a change in the demographics of an area that leaves them feeling threatened, vulnerable and insecure. Groups and group membership can help to reinforce the sense of place of an area and can also serve to reinforce fears and suspicions associated with pending changes to the sense of place. A sense of place has much to do with unique individual perceptions attached to the location and is subjective by nature.

One of these criteria is the visual aspect, which was the subject of the Visual Impact Assessment specialist report in which it is indicated that:

> "*The visual impact of the proposed project will be limited by both minor undulations in topography as well as the larger inselbergs that enclose the landscape to the north, south and east*." And in conclusion that:
> "*Because this development will largely impact visually on an area where there currently is strong influence of urban and urban fringe development, changes to the landscape quality are unlikely to be problematic.*
>
> *Identified visual impacts are generally assessed as low with the exception of impacts on the un-surfaced local road that runs immediately adjacent to the northern boundary of the proposed site. With appropriate setbacks, the selection of Substation Alternative 1 however, and due to the nature of traffic on this road, the impact significance with mitigation is likely to be low.*

> *Other key mitigation measures required to minimise visual impacts include the careful management of vegetation within and around the site.*
>
> *There is no reason from a landscape and visual impact perspective why the proposed development should not proceed* (Environmental Planning and Design, 2019, pp. 61 & 63-64).

Notwithstanding this, however, the issue regarding the sense of place is likely to remain controversial as a sense of place is personal and subjective with some accepting changes to the landscape in support of renewable energy while others may reject them (Farhar, Hunter, Kirkland, & Tierney, 2010; Carlisle, Kane, Solan, & Joe, 2014). In this regard the Khâi-Ma Local Municipality focuses on the vast tracts of open land and the inherent potential for eco-tourism and claims that:

> "*Khâi-Ma offers numerous tourism attractions like 4x4 trails, walking routes, mountain climbing, canoeing, the cathedral at Pella, a "Quiver " forest at Onseepkans and cultural heritage. And that [t]ourism*, *while limited at present, is viewed as the main growth point for the region in terms of its economic development. It is the main driver behind increasing marginalized towns' money supply.*" (Khâi-Ma Local Municipality, 2012, p. 53 & 61).

The towns of Pofadder, Onseepkans and Pella and the N14 Route are listed in the IDP as having potential as tourist attractions due to the pristine nature of the area. In this regard the significance of a sense of place is highest at a cumulative level and is addressed as such under section 8: Cumulative Impacts.

5.3. ECONOMIC

The project will lead to the creation of both direct and indirect employment opportunities, which will have a positive economic benefit within the region. In this regard, there are 400 direct jobs associated with the construction phase of the project and 60 with the operation phase. Of these jobs approximately 240 (60%) of the employment opportunities will be available to low skilled workers (construction labourers, security staff etc.), 100 (25%) to semi-skilled workers (drivers, equipment operators etc.) and 60 (15%) for skilled personnel (engineers, land surveyors, project managers etc.). The majority of the low and semi-skilled employment opportunities will be available to local residents in the area. The majority of the beneficiaries are likely to be historically disadvantaged members of the community. The operation phase will employ approximately 60 people full time for a period of up to 20 years.

Of this approximately 42 (70%) are low skilled, 15 (25%) are semi-skilled and 3 (5%) are skilled.

Apart from these jobs the project is also likely to stimulate the local economy and again this is likely to be most significant at a cumulative level. Nevertheless, there will be a significant economic contribution attached to Aggeneys 2. This contribution will be in the form of disposable salaries and the purchase of services and supplies from the local communities in and around the towns of Aggeneys, Pella and Pofadder. The capital expenditure during construction is estimated at R1,2 billion (2018 prices) however the capital expenditure over the operation phase of the project is not available yet.

Apart from job creation and procurement spend, the project is also likely to have broader positive socio-economic impacts as far as socio-economic development contributions are concerned. Although the developers do not currently have a corporate social responsibility plan in place, the intension is to comply with the REIPPPP BID guidelines or to put an equivalent plan in place. This will create an opportunity to support the local community over the life span of the operation phase of the project that will stretch over a 20-year period.

5.4. CULTURAL IMPACTS

At a social level it is likely that any cultural impacts would be associated with sensitive archaeological and/or heritage sites that may be found. In this regard, a Heritage Impact Assessment was undertaken in which it was recommended that:

> "*Because no significant impacts to heritage resources are expected, it is recommended that the proposed Aggeneys 2 – 100MW solar PV development and associated infrastructure be authorised. The following should be included as conditions of authorisation:*
>
> - *If any change in the footprint occurs, then an archaeologist should be consulted for an opinion on whether a survey is required; and*
> - *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* (ASHA Consulting (Pty) Ltd, 2019, p. 18)."

Due to the findings of the heritage specialist, the cultural impact will not be considered further in this report.

6. IMPACT ASSESSMENT

The impacts as they apply to both the construction and operation phases of the project will be assessed below and mitigation and optimisation measures will be suggested as is appropriate.

6.1. PLANNING AND DESIGN PHASE

An investigation was undertaken to assess the appropriate technologies available and photovoltaic technology was considered the most suitable since it uses negligible water, has no effluent problems, is the most cost competitive and has a reduced visual impact compared to wind and concentrated solar power technologies (see Section 2.2 EIA alternatives). Further to this, it is evident that the project is in-line with legislation and key planning and policy documentation. In this regard renewable energy facilities are supported on a national, provincial and municipal level (see section 3.1: Policy and legislation fit).

6.2. CONSTRUCTION PHASE

Most of the impacts discussed above apply over the short-term to the construction phase of the project and include:

- Annoyance, dust and noise
- Increase in crime
- Increased risk of HIV and AIDS
- Influx of construction workers and job seekers
- Hazard exposure
- Disruption of daily living patterns
- Disruptions to services supplies and infrastructure
- Economic
    - Job creation and skills development
    - Socio-economic stimulation.

Each of these impacts is assessed below with mitigation and optimisation measures being suggested in **Table 6** to **Table 13**.

Table 6: Annoyance, dust and noise

Nature: Annoyance, dust and noise generated through construction activities.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Medium (-36)**	**Low (-28)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated?	Yes	

Mitigation:

- Apply appropriate dust suppressant to gravel roads on a regular basis Ensure that vehicles used to transport sand and building materials are fitted with tarpaulins or covers.
- Ensure all vehicles are roadworthy and drivers are qualified and made aware of the potential noise and dust issues.
- Appoint a community liaison officer to deal with complaints and grievances from the public.

Cumulative impacts:

There are two adjoining PV Plants (including the facility assessed as part of this SIA) and associated power lines planned for the area, which will result in a cumulative impact. However, this cumulative impact should be limited as this impact is associated with the construction phase of the projects and is of a short-term duration.

Residual impacts:

There should be no residual impact associated with annoyance, dust and noise.

Table 7: Increase in crime

Nature: An increase in crime associated with the construction phase of the project.		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (7)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (-36)**	**Medium (-33)**
Status	Negative	Negative
Reversibility	Not certain	
Irreplaceable loss of resources	Could occur in some cases	
Can impacts be mitigated	To some extent	

Mitigation:

- All workers should carry identification cards and wear identifiable clothing.
- Fence off the construction site and control access to the site.
- Appoint an independent security company to monitor the site.
- 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.

Cumulative impacts:

With the two PV plants (including the facility assessed as part of this SIA) and associated infrastructure being constructed in the area there could be a cumulative impact associated with criminal activities.

Residual impacts:

- If crime levels do rise in the area it may take some time before they are restored to the previous low level due the capacity of the law enforcement authorities.
- Depending on the crimes committed, victims may suffer long-term effects as a result of their experience.

Table 8: Increased risk of HIV and AIDS

Nature: Increased risk of HIV and AIDS due to the influx of workers, job seekers and deliveries and availability of disposable income.		
	Without mitigation	**With mitigation**
Extent	Regional (4)	Regional (4)
Duration	Long-term (4)	Long-term (4)
Magnitude	High (8)	Moderate to High (7)
Probability	Highly probable (4)	Highly probable (4)
Significance	**High (-64)**	**Medium to high (-60)**
Status	Negative	Negative
Reversibility	No	
Irreplaceable loss of resources	Yes	
Can impacts be mitigated	Yes	

Mitigation:

- 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.
- Provide voluntary and free counselling, free testing and condom distribution services to the workforce.
- Where feasible extend the HIV/AIDS programme into the community with specific focus on schools and youth clubs.

Cumulative impacts:

The development of other facilities plus the two PV plants (including the facility assessed as part of this SIA) and associated infrastructure would increase the risk of HIV in the area and would need to be addressed.

Residual impacts:

The area currently has a very low HIV prevalence rate and any 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.

Table 9: Influx of construction workers and job seekers

Nature: Influx of construction workers and job seekers resulting in a temporary change in demographics		
	Without mitigation	**With mitigation**
Extent	Regional (2)	Regional (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Moderate (5)
Probability	Definite (5)	Definite (5)
Significance	**Medium (-50)**	**Medium (-45)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation:

- 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.

Cumulative impacts:

The impact of the two PV Plants (including the facility assessed as part of this SIA) together with the associated infrastructure will increase the number of workers and job seekers that will be active in the area.

Residual impacts:

With the mine being in the area it is possible that after construction has been completed some workers may remain in the hope that they will find employment at the mine which, if not carefully managed, may lead to the establishment of informal dwellings.

Table 10: Hazard exposure

Nature: Exposure to hazards associated with construction activities and the delivery of heavy machinery and equipment to site.		
	Without mitigation	**With mitigation**
Extent	Regional (2)	Regional (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (7)	Moderate (6)
Probability	Definite (5)	Definite (5)
Significance	**Medium (-55)**	**Medium (-50)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation:

- 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 tool box 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.

Cumulative impacts:

With both the PV Plants (including the facility assessed as part of this SIA) and associated infrastructure being built over the same period there is likely to be a significant cumulative effect in respect of hazard exposure and risk of fire.

Residual impacts:

It would be important to ensure that all excavations and construction sites are rehabilitated and made safe after construction to reduce the risk of residual impacts.

Table 11: Disruption of daily living patterns

Nature: Disruption of daily living patterns due to construction activities and deliveries of machinery and heavy equipment to site.		
	Without mitigation	**With mitigation**
Extent	Regional (2)	Regional (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (7)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium (-44)**	**Low (-30)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation:

- Ensure that, at all times, people have access to their properties as well as to social facilities.
- All vehicles must be road worthy and drivers must be qualified, obey traffic rules, follow speed limits and be made aware of the potential road safety issues.
- Heavy vehicles should be inspected regularly to ensure their road safety worthiness.
- 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.

Cumulative impacts:

With both the PV Plants (including the facility assessed as part of this SIA) and associated infrastructure being built over the same period it is possible that there will be an increase in the disruptions of living patterns, especially due to an increase in traffic.

Residual impacts:

Once construction ceases there are unlikely to be any residual impacts.

Table 12: Disruption of services supplies and infrastructure

Nature: Disruptions of community facilities and infrastructure due to construction activities and an influx of workers		
	Without mitigation	**With mitigation**
Extent	Regional (2)	Regional (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (7)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (-33)**	**Low (-30)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated?	Yes	

Mitigation:

- Regularly monitor the effect that the construction activities is having on public infrastructure and immediately report any damage to infrastructure to the appropriate authority.

Cumulative impacts:

With both the PV Plants (including the facility assessed as part of this SIA) and associated infrastructure being built over the same period there is likely to be a cumulative effect in respect of the disruption to community facilities and infrastructure.

Residual impacts:

As long as any damage to existing infrastructure is promptly repaired and most workers are recruited locally, there should not be any residual impacts.

Table 13: Economic

Nature: Positive economic impacts associated with job creation and stimulation of the local and regional economies.		
	Without optimisation measures	**With optimisation measures**
Extent	Regional (2)	Regional (2)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Moderate (7)
Probability	Probable (3)	Highly probable (4)
Significance	**Medium (30)**	**Medium (44)**
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be optimised	Yes	
Optimisation: • Local residents should be recruited to fill semi and unskilled jobs. • Women should be given equal employment opportunities and encouraged to apply for positions. • 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. • As far as possible local contractors that are compliant with Broad-Based Black Economic Empowerment (B-BBEE) criteria should be used.		
Cumulative impacts: When considered together the two PV Plants (including the facility assessed as part of this SIA) and associated infrastructure will have a positive cumulative economic impact on the region.		
Residual impacts: Skills development amongst local communities during the construction phase of the project could have a positive effect in respect of the employability of some people living within these communities.		

6.3. OPERATION PHASE

The social impacts that apply to the operation phase of the project are:

- Transformation of the sense of place and
- Economic.

These impacts are assessed below in **Table 14** and **Table 15** and mitigation and optimisation measure are suggested in each case.

Table 14: Transformation of the sense of place

Nature: Transformation of the sense of place due to the nature of the project.		
	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate to high (6)	Moderate(5)
Probability	Definite (5)	Definite (5)
Significance	**High (-65)**	**Moderate to high (-60)**
Status	Negative	Negative
Reversibility	Difficult to reverse	
Irreplaceable loss of resources	Yes	
Can impacts be mitigated	Yes	
Mitigation: • Apply the mitigation measures suggested in the Visual Impact Assessment Report. • Ensure that all affected landowners and tourist associations are regularly consulted. • 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.		
Cumulative impacts: With the construction of the two PV Plants (including the facility 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 a significant change in respect of the sense of place across the region.		
Residual impacts: The residual impact would be the long-term change in the sense of place of the area.		

Table 15: Economic

Nature: The creation of jobs, business opportunities and source of revenue for local authorities.		
	Without optimisation measures	**With optimisation measures**
Extent	Regional (3)	Regional (4)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Moderate (7)
Probability	Probable (3)	Highly probable (4)
Significance	**Medium (39)**	**Medium high (60)**
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be optimised	Yes	
Optimisation: • Implement a training and skills development programme for locals. • Ensure that the procurement policy supports local enterprises. • Establish a social responsibility programme either in line with the REIPPPP BID guidelines or equivalent. • 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.		
Cumulative impacts: The cumulative impacts of the two PV Plants (including the facility assessed as part of this SIA) could increase the economic benefits to the region.		
Residual impacts: The development of the local communities in respect of skills and economic support could extend over a prolonged period.		

Under the following section attention will be focused on the decommissioning phase of the project.

6.4. DECOMMISSIONING PHASE

If the project was to be completely decommissioned, the major social impacts likely to be associated with this would be the loss of jobs and revenue stream that stimulated the local economy and flowed into the municipal coffers. It is estimated that the project has a lifespan of approximately 20 years and there is the possibility that after this period the infrastructure will be upgraded and the project will be extended. Although the loss of a job is significant and can be devastating on an individual and family level, the total number of jobs under threat could be insignificant as the operational staff complement is estimated at 60 and some of these employees will be skilled and could find alternative employment.

Decommissioning will result in a limited number of jobs being created over a short period of time as components are dismantled and the site is cleared. Although positive, this will be a rather insignificant benefit considering the size of the project and the limited time period attached to decommissioning.

Considering 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 at this point. However, prior to decommissioning the following mitigation measures are suggested.

Decommissioning mitigation measures

- Ensure that a retrenchment package is in place.
- Ensure that staff have been trained in a manner that would provide them with saleable skills within the job market.
- Ensure that the site is cleared responsibly and left in a safe condition.

7. ASSESSMENT OF NO PROJECT ALTERNATIVE

The no project option would mean that the social environment is not affected as the status quo remains. In essence this means that none of the negative or positive impacts associated with the project will materialise. From a negative perspective there would be no job creation, no revenue streams into the local economy and municipal coffers and a lost opportunity to enhance the national grid with a renewable source of energy. Considering that Eskom's coal fired power stations are a huge contributor to carbon emissions, the loss of a chance to supplement the national grid through renewable energy would be significant at a national, if not global level. The Intergovernmental Panel on Climate Change (6 October 2018, p. 15) has warned that 2010 Co_2 emissions levels need to be reduced by 45% by 2030 and to zero by 2050. This basically means that the countries' heavy reliance on coal powered energy generation must be replaced with more environmentally friendly modes of energy generation. In this regard, the no-go alternative is assessed in **Table 16**. From a social perspective the implementation of the no project alternative is not preferable as it would compromise the opportunity to supplement the national grid with renewable energy and have regional economic benefits.

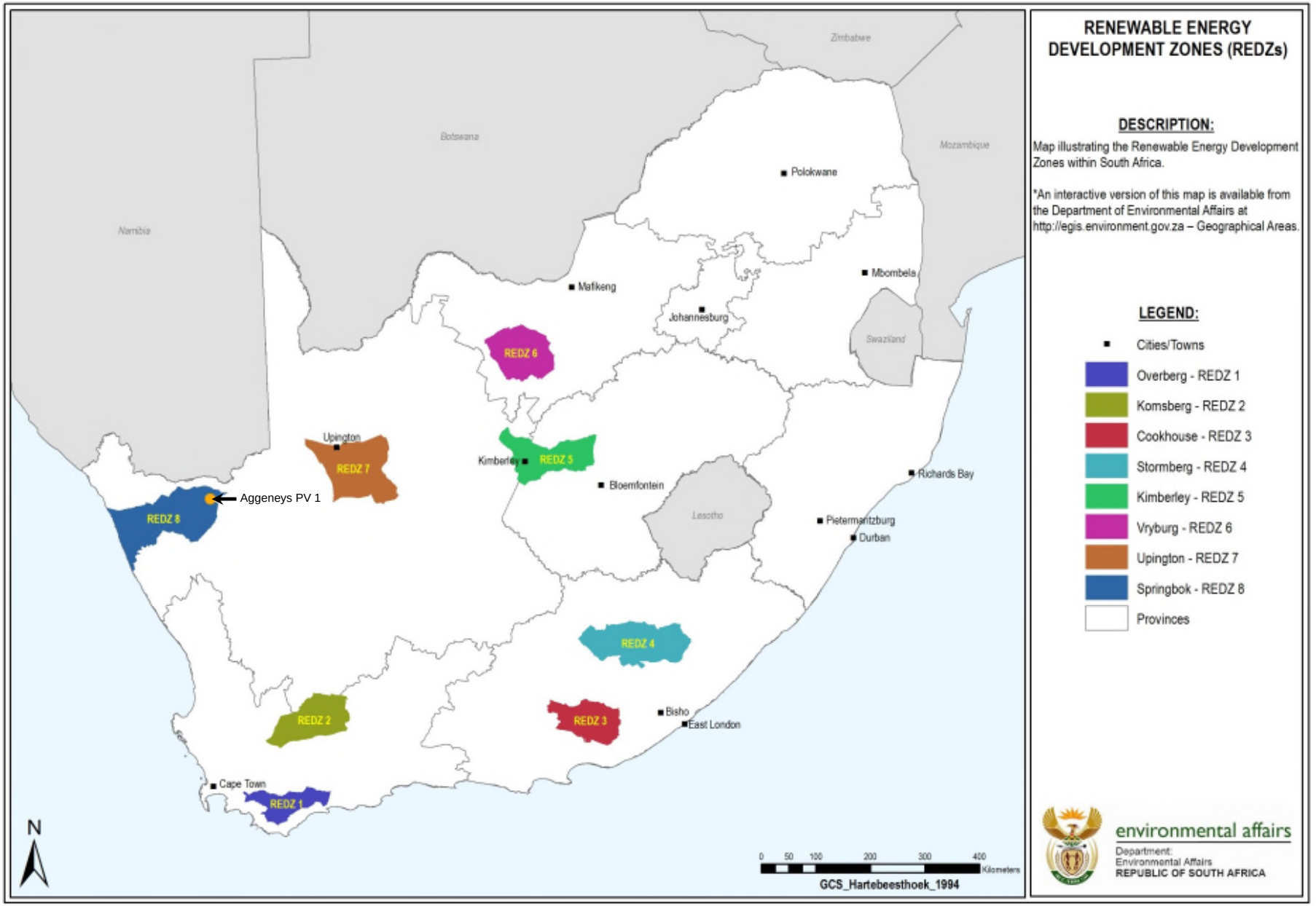
Table 16: No go Alternative

***Nature:* Implementation of the no project alternative**	
	Without mitigation
Extent	Regional = 5
Duration	Long-term = 4
Magnitude	Moderate = 6
Probability	Definite = 5
Significance	**High (-75)**
Status (positive or negative)	Negative
Reversibility	Yes
Irreplaceable loss of resources	Yes
Can impacts be optimised	No

8. CUMULATIVE IMPACTS

Over the last five years South Africa has experienced a proliferation in the number of renewable energy facilities being constructed across the country. Accordingly the government has identified eight Renewable Energy Development Zones (REDZs) and embarked on an initiative, the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), in an effort to channel private sector expertise and investment into grid-connected renewable energy in South Africa. This has resulted in many of these renewable energy facilities being clustered within or close to these REDZs, which in turn has resulted in a cumulative impact in and around these areas. In this regard the Northern Cape hosts the majority of these REDZs with two cross boarded regions as indicated below and illustrated in **Figure 10**. The location of the project is illustrated by the orange dot in REDZ 8 which is indicated in dark blue:

Zone	Cities/Towns	Province	Cross boarder
REDZ 1	Overberg	Western Cape	No
REDZ 2	Komsberg	Western Cape/Northern Cape	Yes
REDZ 3	Cookhouse	Eastern Cape	No
REDZ 4	Stormberg	Eastern Cape	No
REDZ 5	Kimberly	Free State/Northern Cape	Yes
REDZ 6	Vryburg	North West	No
REDZ 7	Upington	Northern Cape	No
REDZ 8	Springbok	Northern Cape	No.



Source: Department of Environmental Affairs

Figure 10: Renewable Energy Development Zones

On an area specific basis the following projects have been identified within the area surrounding the Aggeneys 2 project:

- ABO Wind Aggeneys 2 – 1 x 100 MW Solar PV Facility – EIA in process
- Solar Capital Blomhoek (16 x 75 MW PV)
- Biotherm Enamandla (4 x 75 MW PV) & Letsoai (2 x 150 MW CSP)
- Building Energy Sol Invictus (2 x 150 MW PV & 4 x 75 MW)
- Sato Zuurwater (5 x 75 MW PV)
- Boesmanland Solar (1 x 75 MW PV)
- Mainstream Solar (1 x 250 MW PV/CPV)
- Aurora Power Solution Black Mountain Mine Solar (1 x 19 MW PV)
- Biotherm Aggeneys PV Solar Energy Facility (1 x 40 MW PV) Preferred Bidder in REIPPPP Bid Window 4 – Under Construction.

The locations of these projects are illustrated in **Figure 11**.

The clustering of renewable energy projects within specific geographical zones has both advantages and disadvantages. Although there is an advantage in selecting the most suitable site in respect of negative environmental impact compared to potential yield, this comes with the more site specific disadvantage of cumulative impacts associated with a collection of facilities across a relatively small geographical area. In this respect the following more zone specific social issues need to be considered from a cumulative perspective:

- Risk of HIV
- Sense of place
- Service supplies and infrastructure and
- The economy.

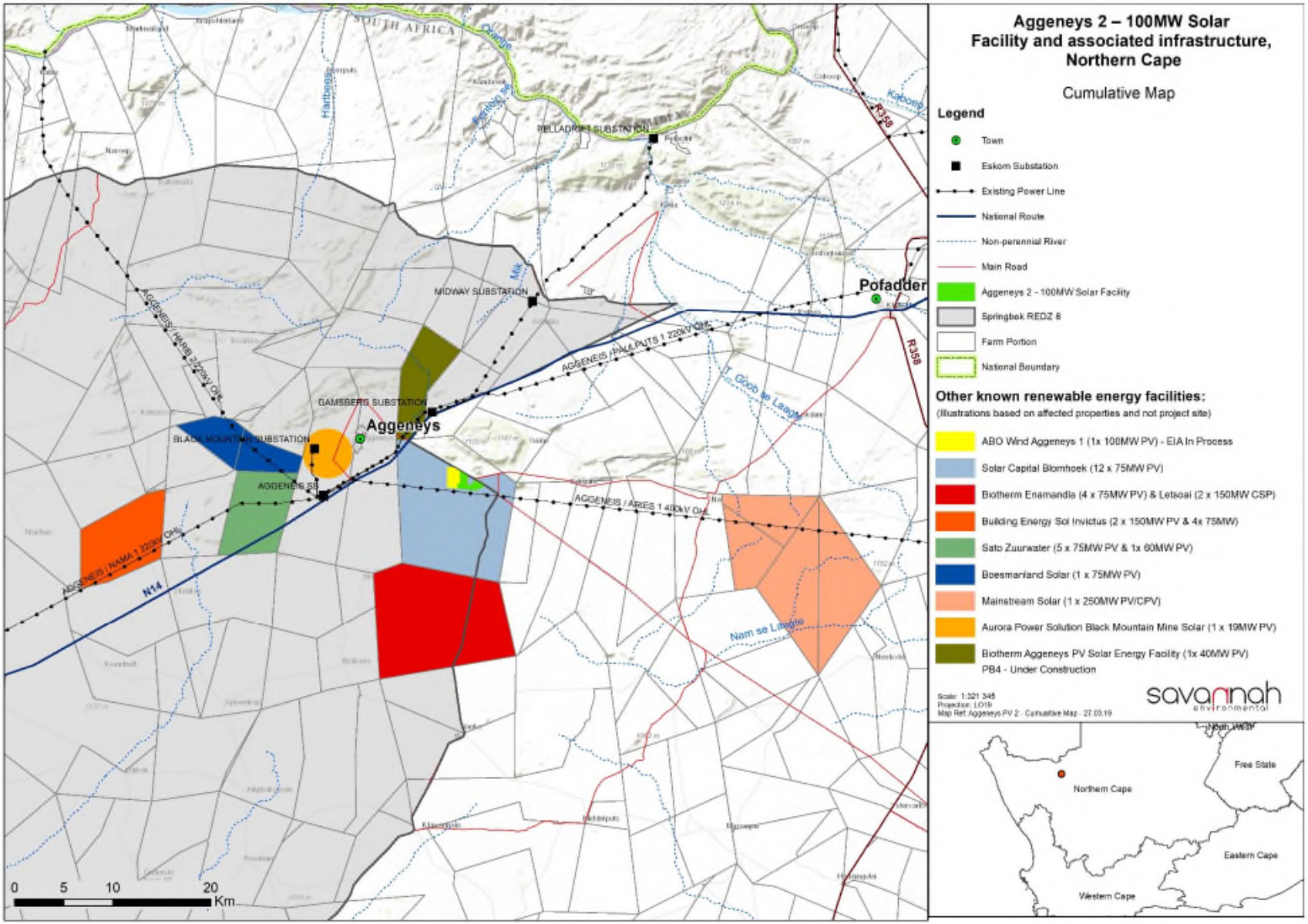


Figure 11: Proposed renewable energy developments within a ~50 km radius of site

8.1. RISK OF HIV[3]

With respective HIV prevalence rates of 18.7 and 17.5 percent, both the Western and Northern Cape provinces have the lowest HIV prevalence rates across the country. At a district level the Namakwa district has the lowest HIV prevalence rate in the country at 2.3%. The HIV prevalence rate in Namakwa is over twice as low as that in the Central Karoo which has the second lowest HIV prevalence rate in the country at 6.9%.

This figure is significantly low compared to other areas of the country which range from a rate of 20.3% in Limpopo and 40.1% in KwaZulu-Natal with the iLembe District Municipality having an HIV prevalence rate of 45.9% in 2013. Apart from the Western Cape, the other provinces sharing common borders with the Northern Cape Provinces all have relatively high HIV prevalence rates as indicated below:

North West = 28.2%
Free State = 29.8%;
Eastern Cape = 31.1%.

With the influx of labour, particularly following the construction of the various renewable energy and mining projects within the region, the risk of HIV infections in the area is likely to rise significantly. It is well documented on both an international and local basis that the construction industry carries a high level of HIV (Meintjes, Bowen, & Root, 2007; Bowen, Dorrington, Distiller, Lake, & Besesar, 2008; Wasie, et al., 2015; Bowen P. , Govender, Edwards, & Cattell, 2016; Kikwasi & Lukwale, 2017; Bowen P. , Govender, Edwards, & Lake, 2018) which can be spread amongst the local communities, particularly through the spread of prostitution that follows the availability of disposable income. It is also well documented on both an international and local level that HIV is also spread by truck drivers (Singh & Malaviya, 1994; Ramjee & Gouws, 2002; Strauss, et al., 2018) and there is likely to be an increase in truck drivers in the area as equipment and material is delivered to the various construction sites.

These issues associated with the area being extremely poor and the associated disposable income that will follow the construction workers and truck drivers to the area will heighten the risk of the spread of HIV infections across what is a rather remote region. In this regard The

[3] HIV prevalence rates are at 2013 figures based on The 2013 National Antenatal Sentinel HIV Prevalence Survey, South Africa.

World Bank (2009, pp. 367-368) had indicated a strong link between infrastructure projects and health as:

> "*Transport, mobility, and gender inequality increase the spread of HIV and AIDS, which along with other infectious diseases, follow transport and construction workers on transport networks and other infrastructure into rural areas, causing serious economic impacts.*"

8.2. SENSE OF PLACE

There is also a possibility that a proliferation of renewable energy facilities, particularly when considered in association with other industrial activities such as mining, will have a significant and negative cumulative social impact on the area (Khâi-Ma Local Municipality, 2012; Namakwa District Municipality, 2018). This is, however, a complex issue as there are varying opinions in respect of the aesthetic appearance of renewable energy projects, with some regarding them in a far more positive light than others may (Firestone, Bidwell, Gardner, & Knapp, 2018; Schneider, Mudra, & Kozumplíková, 2018). Very little research has been undertaken on solar energy facilities with much of the attention placed on wind energy, however, the findings are likely to also apply to some degree in respect of solar energy. In a study of public attitudes towards onshore windfarms in south-west Scotland it was found that many regarded the visual impact of these developments in a positive light. It must, however, be noted that this was linked with community ownership having a positive impact on public attitudes towards windfarm developments in Scotland (Warren & McFadyen, 2010). A further and important consideration in this regard is of an ethical nature associated with community acceptance and energy justice and raises the question of the incorporation of public acceptance, particularly that of the underrepresented, into energy policy (Roddisa, Carvera, Dallimerb, Normana, & Ziva, 2018, pp. 362-363).

It is important that the visual impacts of these projects are considered from both a static and dynamic perspective and the impact it has on the character of the landscape. Static in respect of the effect that the project may have on local residents living in sight of several facilities; and dynamic in respect of the impact on travellers, such as tourists, moving through the area and encountering multiple facilities on route.

8.3. SERVICES, SUPPLIES AND INFRASTRUCTURE

With the proliferation of renewable energy facilities in the area it is quite likely that the local authorities, currently hard pressed to deliver services, will find it difficult to keep up with the

requirements of this development. The influx of construction workers is likely to place pressure on accommodation and the need for both services and supplies. The local municipalities and towns across the region such as Aggeneys, Pella and Pofadder are likely to bear the brunt of the demand for accommodation, services and supplies. On this basis market demands could inflate costs that may have a negative effect on local communities, particularly the poor, who may be forced to pay higher prices for essential supplies resulting in an escalation of the cost of living in the area. Social services such as medical and educational facilities could also be placed under pressure due to increased demand. Although this may reach its peak during the construction phase it should be mitigated somewhat by the fact that the construction of the various projects will be spread across different timelines, with some projects commencing while others reach completion. Employing local people across the various projects and project phases may also assist in reducing the stress placed on services, supplies and infrastructure in the area.

During the operation phases of the projects it is likely that these demands will continue as operational staff take up more long-term residency in the area and are supported by service and maintenance personnel who may spend some time on site on a contractual basis. An influx of temporary maintenance and service workers is likely to last over the operation phase of the projects but is likely to be limited and to settle within the medium term as the economy adjusts and the municipal authorities are able to respond to this growth.

8.4. ECONOMIC

The cumulative economic impact of the project will be both positive and negative. The negative economic impacts are associated with a possible rise in living costs driven by market demand, which are considered under the section above. Under this section the positive economic impacts will be addressed.

From a positive perspective the proliferation of renewable energy facilities within the region is likely to result in significant and positive cumulative impacts in the area in terms of both direct and indirect job creation, skills development, training opportunities, and the creation of business opportunities for local businesses. In this regard it is indicated in the IPPPP Quarterly Report, as at 31 March 2018, that in respect of South Africa as a whole and through the Independent Power Producers Procurement Programme, " ..*the REIPPPP is targeting broader economic and socio-economic developmental benefits*" and that "[t]*o date, a total of 35 702 job years have been created for South African citizens, of which 30 763 were in construction and 4 938 in operations*" (Independent Power Producer Office, 2018a, p. 36 & 40). In addition to this, R 20.6 Billion has been committed to socio-economic development while the projected procurement spend is "…*R 147.6 billion of which R 55.5 billion has been spent to date.*" The district and local municipalities within the area have identified renewable energy as a strategic economic opportunity in a region that previously had few such opportunities. This is indicated in the various IDPs pertaining to the affected municipalities (Khâi-Ma Local Municipality, 2012; Namakwa District Municipality, 2018, p. 19).

8.5. ASSESSMENT OF CUMULATIVE IMPACTS

The cumulative impacts discussed above are assessed below in **Table 17** to **Table 20**.

Table 17: Risk of HIV

Nature: Increased risk of HIV and AIDS due to the influx of workers, job seekers and deliveries and availability of disposable income.		
	Overall impact of the 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	**High (-60)**	**High (-72)**
Status	Negative	Negative
Reversibility	No	
Irreplaceable loss of resources	Yes	
Can impacts be mitigated?	Yes	

Mitigation:

- Mitigation can only be implemented on a regional basis and are not project specific.
- Ensure that all companies coming into the area have and are implementing an effective HIV/AIDS policy.
- Introduce HIV/ADS 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 any increase in the HIV prevalence rate in the area.

Residual impacts:

The area currently has a very low HIV prevalence rate and any 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.

Table 18: Transformation of sense of place

Nature: Transformation of the sense of place due to the nature of the project.		
	Overall impact of the 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	**Moderate to high (-60)**	**High (-80)**
Status	Negative	Negative
Reversibility	Difficult to reverse	
Irreplaceable loss of resources	Yes	
Can impacts be mitigated	Yes	

Mitigation:

Mitigation measures can only be implemented on a regional basis and are not project specific.

- Consider undertaking a cumulative impact assessment to evaluate the changes taking place across the area on a broader scale.
- Form a regional work group 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.

Residual impacts:

The residual impact would be the long-term change in the sense of place of the area.

Table 19: Service, supplies and infrastructure

Nature: 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 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	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	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.

Residual impacts:

As long as any damage to existing infrastructure is promptly repaired and most workers are recruited locally, there should not be any residual impacts.

Table 20: Economy

Nature: Positive economic impacts in respect of the creation of jobs and business opportunities and revenue source for local authorities.		
	Overall impact of the 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 (60)**	**High (76)**
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources	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 REIPPPP. • 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 and lasting effect on the security of electricity supply.		

The impacts assessed above are summarised and a pre and post mitigation comparison is presented in

Table 21.

Table 21: Impact summary

Construction Phase					
Environmental parameter	**Issues**	**Rating prior to mitigation**	**Average**	**Rating post mitigation**	**Average**
Health & social wellbeing	Annoyance, dust and noise	-36		-28	
	Increase in crime	-36		-33	
	Increased risk of HIV and AIDS	-64		-60	
	Influx of construction workers and job seekers	-50		-45	
	Hazard exposure.	-55	**-48.2**	-50	**-43.2**
			Negative medium		Negative medium
Quality of the living environment	Disruption of daily living patterns	-44		-30	
	Disruptions of services, supplies and infrastructure	-33	**-33**	-30	**-30**
			Negative medium		Negative low/medium
Economic	Job creation and stimulus of local business opportunities.	30	**30**	44	**44**
			Positive low to medium		Positive medium
Operational Phase					
Environmental parameter	**Issues**	**Rating prior to mitigation**	**Average**	**Rating post mitigation**	**Average**
Quality of the living environment	Transformation of the sense of place	-65	**-65**	-60	**-60**
			Negative high		Negative moderate to high
Economic	Job creation and stimulus of local business opportunities.	39	**39**	60	**60**
			Positive medium		Positive high/medium
No-go Alternative					
No project		-75	**-75**	No mitigation measures	
			Negative high		
Cumulative Impacts					
		Overall impact of the project considered in isolation		**Cumulative impact of the project and other projects in the area**	
Environmental parameter	**Issues**		**Average**		**Average**
Health & social wellbeing	Risk of HIV	-60	**-60**	-72	**-72**
			Negative medium to high		Negative high
Quality of the living environment	Transformation of sense of place	-70		-85	
	Services, supplies & infrastructure	-30	**-50**	-56	**-70.5**
			Negative medium		Negative high
Economic	Economic	60	**60**	76	**76**
			Positive medium to high		Positive high

9. ALTERNATIVES

In respect of the two facility substation alternatives the social assessment supports the finding of the visual assessment for the same reasons provided in the visual assessment, which are the following.

> "*The selection of Alternative Substation 1 is also important in minimising impacts on…* [the un-surfaced road running adjacent to the northern boundary of the site]. *Alternative 1 is located approximately 2km from the road and is partially screened by the array and is therefore unlikely to be highly obvious. By comparison, Alternative Substation 2 is located adjacent to the road and it will be highly obvious*" (Environmental Planning and Design, 2019, p. 62).

Apart from being highly obvious Alternative 2 will also be in closer proximity to pedestrians, cyclists and motor vehicles using the road. Consequence, from a social perspective Alternative 1 is the preferred facility substation alternative as well.

10. ENVIRONMENTAL MANAGEMENT PLAN

The following measures pertaining to the social impacts are to be included in the draft Environmental Management Plan.

OBJECTIVE: To ensure, as far as is reasonable and practical, an environment that is safe and without risk to the health of employees and the general public who come into contact with activities associated with the project.

Project component/s	Project site including laydown areas and access road. Deliveries on public roads to and from the project site.
Potential Impact	Hazards exposure to the public and employees associated with construction and operation activities and construction and operation related traffic.
Activity/risk source	Construction and operation activities and project related traffic.
Mitigation: Target/Objective	Safety of the workforce, safety of visitors to site and safety of the general public who may come into contact with project related components and/or activities.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Restrict public access to work areas including construction areas, laydown and storage sites via	Project developer in	Over the construction and

appropriate security such as: ➢ Security fencing and appropriate signage; ➢ The presence of security personnel. Only allow site access after appropriate induction and use of appropriate personal protective equipment. Impose vehicle speed restrictions and display appropriate signage. Ensure use and storage of hazardous materials is in accordance with Health and Safety regulations. Keep record of all accidents or transgressions of safety in accordance with OHS Act and implement corrective action. Ensure that fires are not permitted on site. Engage a safety officer.	association with contractors.	operation phases of the project

Performance Indicator	Accident and incident tally and compliance with OHS Act.
Monitoring	Comprehensive record of accidents and incidences and related investigations, findings and corrective action in accordance with the OHS Act.

OBJECTIVE: Reduce dust generation and emissions from site works and vehicle movements along access road.

Project component/s	Clearing of site, construction activities, deliveries and daily traffic to and from site.
Potential Impact	Degraded air quality and potential impact on human and animal health and accumulation of dust on vegetation used for grazing.
Activity/risk source	Site clearance, construction activities and project related construction and operational traffic. Emissions from project related traffic.
Mitigation: Target/Objective	To reduce and manage the potential exhaust emissions and dust impacts associated with construction activities and traffic travelling to and from the site.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Wet gravel roads on a regular basis. Ensure that vehicles used to transport sand and building	Project developer in	Over the construction and

materials are fitted with tarpaulins or covers. Ensure all vehicles are roadworthy and drivers are qualified and made aware of the potential noise and dust issues. Ensure that drivers adhered to speed limits. Re-vegetate disturbed areas as soon as is practical after construction. Appoint a community liaison officer to deal with complaints and grievances from the public.	association with contractors.	operation phases of the project.
Performance Indicator	Frequency of complaints from the public and time lapse between receiving and resolving complaints. Public satisfaction in having their complaints addressed. Overall public satisfaction.	
Monitoring	Maintain a record of complaints containing full details including dates and times of significant events. If compliancy levels fall below acceptable levels undertake regular surveys to identify the source and swiftly implement corrective action.	

OBJECTIVE: Control of the nuisance factor for surrounding communities.			
Project component/s	Project site including laydown areas and access road.		
Potential Impact	General nuisance factor resulting from construction and operation activities and associated traffic.		
Activity/risk source	Movement of heavy vehicles in delivering plant, equipment and PV components. Construction of the access road and traffic to and from the site during the operation phase.		
Mitigation: Target/Objective	To minimise the nuisance factor experienced by surrounding communities.		
Mitigation: Action/control		**Responsibility**	**Timeframe**
Schedule the delivery hours to avoid peak hour traffic, weekends and evenings. Limit the need for transportation over long distances by sourcing as much materials and goods as is feasible from local suppliers. Alert traffic authorities well in advance of any heavy loads that will be transported on local roads and elicit		Project developer in association with contractors.	Over the construction and operation phases of the project.

their assistance in controlling traffic associated with the transportation of these loads. Alert workforce to the need to behave in a socially responsible manner, being considerate towards local residents. Establish a code of conduct for the workforce. When upgrading, constructing and maintaining the access road ensure that proper hazard warnings signage and traffic control mechanisms such as flags men and traffic control barriers, chevrons and traffic cones separating the road from the worksite are in place at all times. Restrict work activities that require power tools and plant that generates noise to normal working hours and limit such activities over weekends. Ensure that local by-laws are always adhered to. Appoint a community liaison officer. Ensure that a grievance/complaint reporting procedure is in place, appropriately implemented and that all submissions received are managed by: ➢ Recording grievance submission date. ➢ Keeping complainant informed of progress towards corrective action. ➢ Keeping a record of corrective action taken and recording closure date. Introduce an incident reporting system to be tabled at weekly/monthly project meetings.		
Performance Indicator	The frequency of complaints laid and the time lag between notification of the complaint and resolution. Level of public satisfaction.	
Monitoring	Monitor and evaluate performance at weekly/monthly site meetings and report to contract manager.	

OBJECTIVE: Controlling of the spread of STDs and HIV

Project component/s	Migrant labour and transport workers.		
Potential Impact	Spread of STDs and HIV.		
Activity/risk source	Arrival of construction and transportation workers carrying STDs and/or HIV interacting with local communities during leisure hours. An increase in prostitution driven by an increase in exposable income in the area.		
Mitigation: Target/Objective	To minimise the risk of the spread of STDs and HIV in the area.		
Mitigation: Action/control		**Responsibility**	**Timeframe**
Implement an HIV/AIDS Awareness and Training Programme for the Contractor's workforce and if feasible the local community within two weeks of commencement of construction. Ensure that the HIV/AIDS Awareness and Training Programme is consistent with national guidelines and/or IFC's Good Practice. Focus on the recruitment of local labour which may help to stabilise the risk of the spread of HIV/AIDS by avoiding the need to introduce migrant labour during the construction phase. Provide voluntary and free counselling, free testing and condom distribution services.		Human resource department and project manager. Contractors.	Over the construction and operation phases of the project.
Performance Indicator	The stability of STDs and HIV infections amongst the workforce.		
Monitoring	This is difficult to monitor on an individual level as HIV status is confidential so can really only be monitored on a voluntary basis. Consultations with local clinics may provide some insight but this will depend on the availability of resources in the area and cooperation from the relevant health authorities.		

OBJECTIVE: Maximise the employment of local people and the services of local business during construction and operation.

Project component/s	Construction and operation of the facility, infrastructure and access road.

Potential Impact	Employment opportunities for local people and business opportunities for local businesses.
Activity/risk source	External contractors are likely to use their existing labour source and their existing supplier/service network resulting in lost opportunities for local workers and businesses.
Mitigation: Target/Objective	Project developers should enter into agreements with contractors to support the use of local labour and businesses wherever feasible.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Ensure that the majority of the low-skilled workforce is recruited locally. Undertake a skills audit to determine level of skills and establish the development and training requirements. Commence with skill development programmes within the first month of construction. Identify employment opportunities for women and ensure that women are employed on the construction site and are trained. Identify opportunities for local businesses and ensure that the services from local businesses are prioritised.	Human Resources, Project developer and contractors.	From appointment of contractors and throughout the construction and operational phases.

Performance Indicator	Composition of the labour force and value of procurement from local businesses. Level of skills imparted to local workforce.
Monitoring	Human Resources and Finance function to monitor and report on through audits.

OBJECTIVE: Minimising the risk of increased crime associated with the project.

Project component/s	Construction and laydown areas.
Potential Impact	Construction activities may result in opportunities for criminal activities, such as theft, damage to property, stock theft and alcohol related crime amongst others.
Activity/risk source	Increased activity and human traffic in the area may lead to opportunistic crime.
Mitigation: Target/Objective	To minimise the risk potential for local communities.

Mitigation: Action/control	**Responsibility**	**Timeframe**

Fence and secure the project site. Encourage contractors and local people to report any suspicious activity associated with crime to the appropriate authorities. Inform workers that trespassing onto adjoining private properties is not permitted. Ensure that the local municipalities, police, security companies, and policing forums are alerted to the increased construction activities in the region and the risk it poses in respect of crime. Prevent loitering within the vicinity of the construction camp as well as construction sites. Manage the growth of informal settlements that may arise as a response to perceived job opportunities by promptly alerting the appropriate authorities.	Project developer and contractors.	Over the construction phase of the project.

Performance Indicator	Frequency of incidents of project related crime experienced.
Monitoring	Keep a record of criminal incidents associated with the project and table it at weekly/monthly project meetings and report to project manager.

OBJECTIVE: To manage the impact of the influx of construction workers on family structures and social networks.

Project component/s	Workforce employed over the construction phase.
Potential Impact	The behaviour of the workers who are accommodated within the local community.
Activity/risk source	The after work hours interaction between the workers and local communities.
Mitigation: Target/Objective	To minimise the disruptive effect that the workforce may pose for local communities.

Mitigation: Action/control	**Responsibility**	**Timeframe**
As far as possible source low-skilled workers from local communities and surrounding areas. If feasible employ local contractors.	Project developer and contractors.	Over the construction phase of the

		project.
Performance Indicator	The frequency of complaints and incidents between the workforce and local communities.	
Monitoring	Maintain a full incident record and monitor and evaluate performance at weekly/monthly site meetings and report to project manager.	

11. CONCLUSION AND RECOMMENDATIONS

In assessing the social impact of this proposed development it was found that, in respect of the energy needs of the country and South Africa's need to reduce its carbon emissions, the project is aligned with national, provincial and municipal policy.

With regard to the impacts associated with the project it was established that most apply over the short term to the construction phase of the project. Of these impacts all can be mitigated to within tolerable ranges and there are no fatal flaws associated with the construction of the project. On this basis it is unlikely that any further social assessment would be necessary with the proviso that if any significant social issues arise at a later stage that these be given the appropriate attention.

Although the project 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 thus carries a significant benefit.

Considering the two facility substation alternatives under consideration, facility substation Alternative 1 emerges as the preferred social alternative supported by the findings as outlined in the visual assessment.

Considering the impacts discussed above it is evident that the cumulative impacts associated with changes to the social environment of the region are more significant than those attached to the project. On a negative front there are two issues associated with developments in the region that are of most concern. The first of these issues is the change to the sense of place of an area. The second is the potential, through an influx of labour and an increase in transportation to constructions sites, of the risk for the prevalence of HIV to rise in an area that has the lowest HIV prevalence rate in South Africa. It is important that the relevant authorities recognise these issues and find ways of mitigating them to ensure that

they do not undermine the benefit that renewable energy projects bring, both to the region as well as to the country as a whole. As these impacts are broad based in that they stretch across various developments in the area it is beyond the scope of a single project developer to address and would require attention on a regional and possibly a national basis.

Having carefully considered all the social impacts associated with the development of Aggeneys 2 it is likely that the benefits attached to the generation of renewable energy and local economic and social development will offset the negative impacts. On this basis the project is considered acceptable, subject to the implementation of the recommended mitigation measures.

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