ALLEPAD PV FOUR, NORTHERN CAPE PROVINCE

ADDENDUM TO THE SCOPING REPORT – SOCIAL IMPACT ASSESSMENT
Dated: February 2019

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EXECUTIVE SUMMARY

INTRODUCTION

Social Impact Assessment – Scoping Reports were generated for Allepad Solar 1, 2, 3 and 4, a commercial photovoltaic energy generation facility proposed on a portion of the remaining extent of Erf 5315 which is located some 11 km northwest of Upington. These reports were extensive and of a high quality and adequately describing the project, legislation and policy applicable to the project and the social environment within which the project will unfold. It was clear from these scoping reports that the project was most likely to have a limited effect on the social environment. As these reports were drafted for the scoping phase, the impacts were identified but were not assessed.

APPROACH TO STUDY

In order to fulfil the requirement of assessing these impacts without duplicating previous efforts the social impact assessment scoping reports where used as a basis on which to identify and assess the impacts associated with this project. To compliment this additional data such as the Comments and Responses Reports applicable to the project, the findings of other specialists and a broad-based literature scan was also used and integrated into this assessment.

IMPACTS IDENTIFIED

The social impacts that were identified in associated with the project were as follows:

Construction Phase

Health and social wellbeing

- Annoyance, dust, noise
- Increase in crime
- Increased risk of HIV infections
- Influx of construction workers
- Hazard exposure.

Quality of the living environment

- Disruption of daily living patterns
- Disruptions to social and community infrastructure

Economic

- Job creation and skills development
- Socio-economic stimulation.

Operational Phase

Quality of the living environment

- Transformation of the sense of place.

Economic

- Job creation and skills development
- Socio-economic stimulation.

Cumulative impacts

Health and social wellbeing

- Risk of HIV and AIDS;

Quality of the living environment

- Sense of place;
- Service supplies and infrastructure and;

Economic

These impacts are assessed, and optimisation and mitigation measures are attached as appropriate in respect of this assessment. As a result of this assessment pre and post mitigation assessment scores are presented in the following table.

PRE AND POST MITIGATION COMPARISON OF IMPACTS

Construction Phase					
Environmental parameter	**Issues**	**Rating prior to mitigation**	**Average**	**Rating post mitigation**	**Average**
Health & social wellbeing	Annoyance, dust and noise	-30		-25	
	Increase in crime	-28		-18	
	Increased risk of HIV infections	-64		-60	
	Influx of construction workers	-35		-30	
	Hazard exposure.	-28	**-37**	-24	**-31.4**
			Negative Medium Impact		Negative Medium Impact
Quality of the living environment	Disruption of daily living patterns	-28		-24	
	Disruptions to social and community infrastructure	-32	**-30**	-28	**-26**
			Negative Medium Impact		Negative Low Impact
Economic	Job creation and skills development	+35		+40	
	Socio-economic stimulation	+45	**+40**	+50	**+45**
			Positive Medium Impact		Positive Medium Impact
Operational Phase					
Quality of the living environment	Transformation of the sense of place	-70	**-70**	-65	**-65**
			Negative High Impact		Negative High Impact
Economic	Job creation and skills development	+45		+50	
	Socio-economic stimulation	+65	**+55**	+70	**+60**
			Positive Medium Impact		Positive High Impact
No Project Alternative					
No project		-75	**-75**	No mitigation measures	
			Negative High Impact		
Cumulative Impacts					
Health & social wellbeing	Risk of HIV	-60	**-60**	-64	**-64**
			Negative High Impact		Negative High Impact
Quality of the living environment	Sense of place	-65		-80	
	Services, supplies & infrastructure	-24	**-24**	-60	**-60**
			Negative High Impact		Negative Medium Impact
Economic	Economic	+80	**+80**	+85	**+80**
			Positive High Impact		Positive High Impact

FINDINGS

Regarding the impacts associated with the project it was found that most apply over the short term to the construction phase of the project. Of these impacts all can be mitigated to within acceptable ranges and there are no fatal flaws associated with the construction of the project. It was also found that in respect of the energy needs of the country and South Africa's need to reduce its carbon emissions that the project fits with international, national, provincial and municipal policy. Although highly visible the project is located within an area close to the Renewable Energy Development Zone 7 – Upington and, although this will result in a cumulative impact, it is preferable that these projects are clustered together rather than widely dispersed to limit the impact on the sense of place of the area, a view consistent with the finding of the visual specialist. Accordingly, the project carries with it a significant benefit and as such is deemed acceptable. It should be noted that the expected benefits associated with the project, which include generation of electricity from renewable sources and local economic and social development are likely to outweigh the perceived impacts associated with the project.

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 specifically attached to a single 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 the area. The second is the potential, through an influx of labour and an increase in transportation of material and equipment to construction sites, of the risk for the prevalence of HIV to rise in an area that has a relatively low HIV prevalence rate. 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. This, however, is beyond the scope of individual projects as it would need to be addressed at a regional or even on a national basis.

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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 the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: 

Name of Specialist: Neville Bews

Date: 21 February 2019

1. INTRODUCTION

Social Impact Assessment – Scoping Reports were generated for Allepad Solar 1, 2, 3 and 4, a commercial photovoltaic energy generation facility proposed on a portion of the remaining extent of Erf 5315 which is located some 11 km northwest of Upington. These reports were extensive and of a high quality and adequately describing the project, legislation and policy applicable to the project and the social environment within which the project will unfold. It was clear from these scoping reports that the project was most likely to have a limited effect on the social environment. As these reports were drafted for the scoping phase, the impacts were identified but were not assessed.

The project will comprise the following key infrastructure and components:

- Arrays of PV panels with a generation capacity of up to 100 MW.
- Mounting structures to support the PV panels (utilising either fixed-tilt / static, single-axis tracking, or double-axis tracking systems).
- Combiner boxes, on-site inverters (to convert the power from Direct Current (DC) to Alternating Current (AC)), and distribution power transformers.
- A 132 kV on-site substation up to 1 ha in extent to facilitate the connection between the solar energy facility and the Eskom electricity grid.
- A new 132 kV double-circuit power line (which will make use of a loop-in and loop-out configuration utilising a double-circuit monopole construction), up to 5 km in length. The power line will connect the on-site substation to the upgraded 132 kV double-circuit power line running between the new Upington Main Transmission Substation (MTS) (currently under construction approximately 15 km south of the project site), and the Gordonia Distribution Substation (located in Upington town). The point of connection is located approximately 5 km east of the project site.
- Cabling between the project's components (to be laid underground where practical).
- Meteorological measurement station.
- An energy storage area up to 2 ha in extent.
- Access road and internal access road network.
- On-site buildings and structures, including a control building and office, ablutions and guard house.
- Perimeter security fencing, access gates and lighting.
- Temporary construction camp up to 1 ha in extent, including temporary site offices, parking and chemical ablution facilities.

» Temporary laydown area up to 1 ha in extent, for the storage of materials during the construction and for a concrete batching plant.

1.1. APPROACH TO STUDY

In order to fulfil the requirement of assessing these impacts without duplicating previous efforts the social impact assessment scoping reports where used as a basis on which to identify and assess the impacts associated with this project. To compliment this additional data such as the Comments and Responses Reports applicable to the project, the findings of other specialists and a broad-based literature scan was also used and integrated into this assessment.

1.2. IMPACT ASSESSMENT METHODOLOGY

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 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)xP

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).

1.3. ASSUMPTIONS AND LIMITATIONS

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

1.3.1. ASSUMPTIONS

It is assumed that the technical information provided by the project proponents, ILEnergy Development (Pty) Ltd as well as by the environmental consultants, 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.

1.3.2. 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. 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.

2.1. HEALTH AND SOCIAL WELLBEING

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

- Annoyance, dust, noise
- Increase in crime
- Increased risk of HIV infections
- Influx of construction workers
- Hazard exposure.

2.1.1. ANNOYANCE, DUST NOISE

Annoyance, dust and noise will be more 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 unsealed access roads will generate the most dust and noise. Dust that accumulates on foliage and grasses that is used for grazing may result in that foliage and those 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 through the application of appropriate mitigation measures.

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

2.1.2. INCREASE IN CRIME

The project location falls within the Upington Precinct which had a total of 4 418 crimes reported in 2018. This is not a good indication of criminal activities within the vicinity of the project as Upington is an urban area while the project is located within a rural setting some 11 km northwest of Upington. There are, however, no separate crime statistics for the specific area that the project is located in apart from those that apply to the Upington Precinct.

It is often opportunistic crimes such as, stock theft, the abuse of alcohol and relationship related crimes that are associated with construction activities. With this in mind it would be pertinent for the developers to ensure that processes are put in place through which any suspected criminal activates associated with the project can be easily communicated and swiftly addressed. The construction phase carries with it a higher risk of associated criminal activates than would be the case during the operational phase of the project.

2.1.3. INCREASED RISK OF HIV INFECTIONS

In 2013 the then Siyanda district, now the ZM Mgcawu District Municipality, had a relatively low HIV prevalence rate amongst antenatal women at 20.1%. This placed the district 11th lowest when compared to all districts across the country. 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 infections (Singh & Malaviya, 1994; 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 and is likely to subside during the operational phase.

Consequently, it is important that this issue be given serious attention and that the appropriate mitigation measures are implemented, and the situation is closely monitored throughout the construction and operational 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 5: Cumulative Impacts below.

2.1.4. INFLUX OF CONSTRUCTION WORKERS

An influx of construction workers is likely to lead to a temporary demographic change in the region that could have both positive and negative impacts. The positive impacts are associated with an increase in buying power and are assessed under economic impacts below. There may also be a range of negative impacts such as, inflationary pressures due to heightened demands for goods and services and pressure being placed on existing infrastructure, services and utilities. An influx of workers is also likely to result in increased health risks and the exploitation of opportunities associated with criminal or illicit behaviour all of which are assessed separately below.

During construction the workforce is likely to peak at approximately 300 workers most of whom will be accommodated off site and will commute to and from site on a daily basis. During the operational phase the workforce will comprise of a total of 25 people all of whom will commute to and from work on a daily basis as no accommodation will be provided on site.

2.1.5. 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 who may have difficulty in getting out. From a road traffic perspective a traffic management plan was undertaken by the project proponent and it was found that:

> "…*the existing access from the N10 national road does not present any hazards that are out of the ordinary and that industry standard practice should be applied in managing the site access*" (ILEnergy (Pty) Ltd, 2019, p. 7).

This Traffic Management Plan also provides safety guidelines in respect of traffic hazards associated with the project as stated under the heading **2. Purpose** on page 5 of the plan.

There will also be an increased risk of fires brought about through construction workers lighting fires for cooking and for warmth during cold periods. Nevertheless, with the recommended mitigation measures being successfully put in place this can be controlled.

2.2. QUALITY OF THE LIVING ENVIRONMENT

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

- Disruption of daily living patterns
- Disruptions to social and community infrastructure
- Transformation of the sense of place.

2.2.1. DISRUPTION OF DAILY LIVING PATTERNS

Project related activities such as the movement of construction vehicles on busy roads, an increase in the workforce in the area and the excavation of trenches amongst other activities could all disrupt the daily living patterns and routes of local residents. Disruptions to daily living patterns are likely to be minimal and restricted to the construction phase of the project. This impact will be mainly associated with the site and the main access roads. 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.

2.2.2. DISRUPTION TO SOCIAL AND COMMUNITY INFRASTRUCTURE

The increase in the workforce could result in a disruption to social and community infrastructure such as access to schools, health facilities and place strain on municipal services.

With the workforce associated with the construction phase peaking at approximately 300 workers, of which approximately 60% will be locally recruited, it is unlikely that in isolation the project will have any significant effect on social and community infrastructure in the area. However, on a cumulative basis, considering the activities currently taking place and planned for the area, there is likely to be a significant impact with regard to the disruption of social and community structures in the region. This impact is dealt with in greater depth under Section 5 Cumulative Impacts below.

2.2.3. TRANSFORMATION OF THE SENSE OF PLACE

Photovoltaic facilities are highly visible due to their large size and geometry. Consequently, local communities perceive these facilities as having a negative impact on the landscape and as such limiting their quality of life (Chiabrando, Fabrizio, & Garnero, 2011) as a result of the transforming of the sense of place of the area. However, some researchers have found mixed reactions to the visual impacts of these facilities with those who link positive economic benefits to nearby large-scale facilities tending to see these projects in a more positive light (Carlislea, Kaneb, Solan, & Joed, 2014; Visschers & Siegrist, 2014). It seems a more reliable indication of public opinion towards renewable energy sources is attached to the evaluation process. In this regard when people evaluate renewables on an abstract level they tend to be more positive than when evaluating them at a more concrete level (Sütterlin & Siegrist, 2017).

The visual environment is an important element through which a sense of place is constructed and is, as such, subject to a separate specialist study in which it is evaluated and mitigated. The findings of this study indicate that:

> "*The construction and operation of the proposed Allepad PV Four SEF and its associated infrastructure, may have a visual impact on the study area, especially within (but not restricted to) a 3km radius of the proposed facility. The visual impact will differ amongst places, depending on the distance from the facility.*
>
> *The combined visual impact or cumulative visual impact of up to eight solar energy facilities (i.e. Allepad PV One, Two, Three, Four, Sasol CSP, Upington Solar Park, Eskom CSP and the existing Khi Solar One SEF) is expected to increase the area of potential visual impact within the region. The intensity of visual impact to exposed receptors, especially those located within a 3km radius, is expected to be greater than it would be for a single SEF. It is however still more preferable that these solar energy developments are all concentrated within this area than being spread further afield.*
>
> *Overall, the significance of the visual impacts is expected to range from* ***moderate*** *to* ***low*** *as a result of the generally undeveloped character of the landscape*" (LOGIS, 2019, p. 40).

Apart from the visual criteria a sense of place, from a social perspective, also needs to consider a range of other criteria which may include smell, sound, community, heritage and a feeling of safety amongst others, all of which result in feelings and perceptions held amongst people tying them to a particular place or neighbourhood. These feelings are personal and unique fostering a sense of belonging but could also have negative connotations such as in situations of overcrowding. What is important in understanding a sense of place is the meaning that people attach to the concept. It is agreed that the significance of a sense of place, as indicated in the visual assessment, is highest at a cumulative level and it is addressed as such under Section 5: Cumulative Impacts below.

2.3. ECONOMIC

The economic impacts related to the project include.

- Job creation and skills development
- Socio-economic stimulation

2.3.1. JOB CREATION AND SKILLS DEVELOPMENT

The project will lead to the creation of both direct and indirect job which will have a positive economic benefit within the region. In this regard there are approximately 300 direct jobs associated with the construction phase of the project and approximately 25 over the operational phase. During the construction phase approximately 60% of these direct job opportunities will be for low and non-skilled workers with ~25% going to semi-skilled and ~15% to skilled workers. It is anticipates that the majority of the general labour force will as far as possible be sourced from the local labour pool and specifically those with experience from other renewable sites in the area, hoping to provide some continuity. Where relevant skills are unavailable from the local labour pool, these would need to be sought elsewhere. The injection of income into the area in the form of wages will represent an opportunity for the local economy and businesses in the area.

During the operational phase ~40% of the job opportunities will be for low and unskilled workers. Many of the beneficiaries are likely to be historically disadvantaged members of the community and the project will provide opportunities to develop skills amongst these people. Labour costs have been estimated to be tween R10 and R12 million per annum. Apart from this it is estimated that a further 250 indirect jobs will be created through the project.

2.3.2. SOCIO-ECONOMIC STIMULATION

Apart from the increase in job creation, the project is also likely to stimulate the local economy and again this is likely to be most significant at a cumulative level. Socio-economic stimulation will be based on the use of local goods and services will include, but is not limited to, the provision of construction materials and equipment, and workforce essentials such as catering services, trade clothing, safety equipment, ablution, accommodation, transportation and other goods. At the project level there will be an economic contribution attached to Allepad PV Four. This contribution will be in the form of disposable salaries and the purchases of services and supplies from the local communities in and around the region. The capital expenditure on completion of the project is anticipated to be in the region of R1.1

billion of which 55% will be spent in South Africa, 10% within the district and 2 to 5% within the local area.

In terms of business opportunities for local companies, expenditure during the construction phase will create business opportunities for the regional and local economy. The increase in demand for new materials and services in the nearby area may stimulate local business and local economic development. There is likely to be a direct increase in industry and indirect increase in secondary businesses.

In addition to this the project developer will also be required to contribute towards local economic development in accordance with the Department of Energy's Independent Power Producers Procurement Programme (IPPPP) established in 2010. In this regard an in-depth Community Needs Assessment (CNA) is required to ensure that the beneficiary community's needs are understood and sufficiently addressed by the proposed development programmes in order to contribute meaningfully towards local economic growth and development.

2.4. 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 and Palaeontology Impact Assessment was undertaken and it was concluded that:

> "*Overall, from an archaeological perspective there are no fatal flaws, and provided that the recommendations are implemented, there are no objections to the proposed development proceeding. The results indicate that the receiving environment is not a sensitive, vulnerable or threatened archaeological landscape. While archaeological resources may be impacted by the proposed development, these are of low, contextual significance and are not in situ.*
>
> *The archaeological site 0526, graded IIIB, must not be impacted by the proposed development and a 100m no-go buffer must be implemented around this site.*
>
> *The possible burial identified as site 0506 must not be impacted by the proposed development and a 30m no-go buffer must be implemented around it*" (CTS Heritage, 2019, p. 31).

In accordance with these findings there is likely to be no impact on cultural issues and therefor this impact will not be considered beyond noting it here.

3. IMPACT ASSESSMENT

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

3.1. PLANNING AND DESIGN PHASE

An investigation was undertaken to assess the viability of the choice of site and it was found that due to climatic conditions and current land use the site was suitable for a solar energy facility. Further to this it is evident that the project fits with legislation and key planning and policy documentation. In this regard renewable energy facilities are supported on a national, provincial and municipal level.

3.2. 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 infections
- Influx of construction workers
- Hazard exposure
- Disruption of daily living patterns
- Disruptions to social and community 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 1** to **Table 9**.

Table 1: Annoyance dust and noise

***Nature:* Annoyance dust and noise**		
	Without mitigation	**With mitigation**
Extent	Local = 1	Local = 1
Duration	Short-term = 1	Short-term = 1
Magnitude	Low = 4	Minor to Low = 3
Probability	Definite = 5	Definite = 5
Significance	**Medium (-30)**	**Low (-25)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	Yes
Mitigation: ✓ Where necessary apply the appropriate dust suppression methods; ✓ Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring 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: ✓ Other construction activities in the area will heighten the nuisance impacts, such as noise, dust and wear and tear on roads.		
Residual impacts: This impact will not remain after construction is completed.		

Table 2: Increase in crime

Nature: Increase in crime		
	Without mitigation	**With mitigation**
Extent	Regional = 2	Regional = 2
Duration	Short-term = 1	Short-term = 1
Magnitude	Low = 4	Minor to Low = 3
Probability	Highly probable = 4	Probable (3)
Significance	**Low (-28)**	**Low (-18)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	Yes

Mitigation:

- ✓ Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing;
- ✓ Fence off construction site and control access to these sites;
- ✓ 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, and to 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 in visa an offsite recruiting office/agent, whatever is most appropriate.

Cumulative impacts: With the various projects planned for the area it is possible that on a cumulative basis this would increase crime levels in the region.

Residual impacts: If crime levels are escalated it will probably take some time before they return to their pre-construction levels.

Table 3: Increased risk of HIV infections

***Nature:* Increased risk of HIV infections.**		
	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)**	**High (-60)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated	Yes	Yes
Mitigation: ✓ Ensure that an onsite HIV infections policy is in place and that construction workers have easy access to condoms; ✓ Expose workers to a health and HIV/AIDS awareness educational programme; ✓ Consider the viability of extending the HIV/AIDS programme into the community with specific focus on schools and youth clubs.		
Cumulative impacts: The HIV prevalence rate is currently low in the area, however, with the influx of workers there is a risk that this could increase the HIV prevalence rate in the area if the situation is not monitored and managed.		
Residual impacts: An increase in the HIV prevalence rate that will last beyond the construction period.		

Table 4: Influx of construction workers

***Nature:* Influx of construction workers resulting in a temporary change in demographics.**		
	Without mitigation	**With mitigation**
Extent	Regional = 2	Regional = 2
Duration	Short-term = 1	Short-term = 1
Magnitude	Low = 4	Low to Minor = 3
Probability	Definite = 5	Definite = 5
Significance	**Medium(-35)**	**Low (-30)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	Yes

Mitigation:

- ✓ Communicate the limitation of opportunities created by the project through Community leaders and Ward Councillors 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 the Community Leaders and Ward Councillors of the area and ensure compliance with this policy.

Cumulative impacts: With the various projects being undertaken in the area the influx of workers could reach significant level which could lead to an increase in crime in the area.

Residual impacts: There is the risk that some workers remain in the area in the hope of finding employment with other projects planned for the region. This risk is, however, reduced as most workers will be recruited locally.

Table 5: Hazard exposure

***Nature:* Hazard exposure**		
	Without mitigation	**With mitigation**
Extent	Regional = 2	Regional = 2
Duration	Short-term = 1	Short-term = 1
Magnitude	Low = 4	Minor to Low = 3
Probability	Highly probable = 4	Highly probable = 4
Significance	**Low (-28)**	**Low (-24)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	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 wilds 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 knowledgeable on how to raise concerns and have these addressed.
- ✓ Compile and implement a Fire Management and Emergency Preparedness and Response Plan.
- ✓ Follow the recommendations in the Traffic Management Plan.

Cumulative impacts: With a possible increase in heavy vehicle traffic and an increase in workers associated with the various projects planned for the area there is likely to be an increased risk of hazard exposure including fire risk.

Residual impacts: With an increased risk of hazard exposure there is the possibility that people may be injure or killed which will place a burden on their families.

Table 6: Disruption of daily living patterns

***Nature:* Disruption of daily living patterns**		
	Without mitigation	**With mitigation**
Extent	Regional = 2	Regional = 2
Duration	Short-term = 1	Short-term = 1
Magnitude	Low = 4	Minor to Low = 3
Probability	Highly probable = 4	Highly probable = 4
Significance	**Low (-28)**	**Low (-24)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	Yes

Mitigation:

- ✓ Follow the recommendations in the Traffic Management Plan;
- ✓ 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.
- ✓ Avoid heavy vehicle activity during “peak” hours (when children are taken to school, or people are driving to work).
- ✓ 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 the various projects planned for the area it is possible that there will be an increase in the disruptions of living patterns, especially due to an increase in traffic.

Residual impacts: It is unlikely that any disruption of community patterns will persist after construction.

Table 7: Disruption to social and community infrastructure

***Nature:* Disruptions to social and community infrastructure**		
	Without mitigation	**With mitigation**
Extent	Regional = 3	Regional = 3
Duration	Short-term = 1	Short-term = 1
Magnitude	Low = 4	Low = 3
Probability	Highly probable = 4	Highly probable = 4
Significance	**Medium (-32)**	**Low (-28)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	Yes
Mitigation: ✓ Regularly monitor the effect that construction is having on infrastructure and immediately report any damage of infrastructure to the appropriate authority; ✓ Ensure that where communities' access is obstructed that this access is swiftly restored to an acceptable state.		
Cumulative impacts: There is a risk that social and community infrastructure in the area will be disrupted due to the increase in similar projects in the area.		
Residual impacts: If disrupted social and community infrastructure is not swiftly restored there is a risk that local communities may experience an extended loss in this respect.		

Table 8: Job creation and skills development

***Nature:* Job creation and skills development**		
	Without enhancement	**With enhancement**
Extent	Regional = 3	Regional = 3
Duration	Short-term = 1	Short-term = 1
Magnitude	Minor Low = 3	Low = 4
Probability	Definite = 5	Definite = 5
Significance	**Medium (+35)**	**Medium (+40)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be optimised	Yes	Yes

Enhancement:

- ✓ Wherever feasible, 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 should, where possible, be put in place and 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: Job creation and skills development in the region could rise as a result of the various projects planned for the area.

Residual impacts: Job creation and skills development may help in addressing poverty and low living standards in the region and improve skills and experience in the local area.

Table 9: Socio-economic stimulation

***Nature:* Socio-economic stimulation.**		
	Without enhancement	**With enhancement**
Extent	Regional = 2	Regional = 2
Duration	Short-term = 1	Short-term = 1
Magnitude	Moderate = 6	Moderate = 7
Probability	Definite = 5	Definite = 5
Significance	**Medium (+45)**	**Medium (+50)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be optimised	Yes	Yes
Enhancement: ✓ A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction phase. ✓ A database of local companies, specifically Historically Disadvantaged Individuals (HDIs) which qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created and companies listed thereon should be invited to bid for project-related work where applicable.		
Cumulative impacts: The various projects planned for the area could have a positive impact on the regional economy due to the opportunity for local capital expenditure.		
Residual impacts: The project could assist in upgrading the skills of local community members and growth in local business.		

3.3. OPERATIONAL PHASE

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

- Transformation of the sense of place and
- Economic
  - Job creation and skills development
  - Socio-economic stimulation

These impacts are assessed below in **Table 10** to **Table 12** and mitigation and optimisation measures are suggested in each case.

Table 10: Transformation of the sense of place

***Nature:* Transformation of the sense of place.**		
	Without mitigation	**With mitigation**
Extent	Regional = 4	Regional = 4
Duration	Long-term = 4	Long-term = 4
Magnitude	Moderate = 6	Low moderate = 5
Probability	Definite = 5	Definite = 5
Significance	**High (-70)**	**High (-65)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	Yes
Mitigation: ✓ Apply the mitigation measures recommended in the Visual Impact Assessment Report; ✓ Communicate the benefits associated with renewable energy to the broader community; ✓ Ensure that all affected land owners 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 Visual and Heritage and Palaeontology Impact Assessments should be followed.		
Cumulative impacts: There is a significantly high risk that the projects planned for the area will transform the sense of place of the area.		
Residual impacts: Once the project has been decommissioned it will take some time and effort to restore the area's original sense of place.		

Table 11: Job creation and skills development

***Nature:* Job creation and skills development**		
	Without enhancement	**With enhancement**
Extent	Regional = 2	Regional = 2
Duration	Long-term = 4	Long-term = 4
Magnitude	Minor to Low = 3	Low = 4
Probability	Definite = 5	Definite = 5
Significance	**Medium (+45)**	**Medium (+50)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be optimised	Yes	Yes
Enhancement: ✓ Implement a training and skills development programme for locals; ✓ Work closely with the appropriate municipal structures in regard to establishing a social responsibility programme. ✓ The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.		
Cumulative impacts: The various projects planned for the area could contribute towards job creation in the region.		
Residual impacts: Job creation and skills development may help in addressing poverty and low living standards in the region.		

Table 12: Socio-economic stimulation

***Nature:* Socio-economic stimulation**		
	Without mitigation	**With mitigation**
Extent	Regional = 4	Regional = 4
Duration	Long-term = 4	Long-term = 4
Magnitude	Low to Moderate = 5	Moderate = 6
Probability	Definite = 5	Definite = 5
Significance	**High (+65)**	**High (+70)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be optimised	Yes	Yes
Mitigation: ✓ Ensure that the procurement policy supports local enterprises; ✓ Establish a social responsibility programme either in line with the REIPPP BID guidelines or equivalent; ✓ Work closely with the appropriate municipal structures with 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 various projects planned for the area could have a positive impact on the regional economy and the contribution towards the national grid could have a significant positive national impact.		
Residual impacts: The project could assist in upgrading the skills of local community members and in strengthening the national grid.		

3.4. 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 that would have 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 could be replaced with more up-to-date technology that would extend the life of the photovoltaic plant, depending on the situation at time of decommissioning. 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 25 with 15 being skilled and probably able to 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 facility and the time period attached to decommissioning.

Considering the relatively long 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.

4. ASSESSMENT OF NO-GO ALTERNATIVE

The no-go alternative would mean that the social environment is not affected as the status quo remains. On a negative front it would also mean that all the positive aspects associated with the project would not materialise. Consequently, 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 that Co_2 emissions need to be reduce by 45% from 2010 levels by 2030 and to zero by 2050 which basically means that the countries heavy reliance on coal powered energy generation must be replaced with more environmentally friendly modes of energy generation. The no-go alternative is assed in **Table 13**.

Table 13: No project alterative

***Nature:* 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

5. 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. Many of these facilities are being constructed in parts of the Western and Northern Cape Provinces, in particular in areas such as the Karoo that has the ideal climate, with long cloudless days that result in the area having high levels of solar irradiation and wind energy. Accordingly, the government has identified eight Renewable Energy Development Zones (REDZs) and embarked on an initiative, the Renewable Energy Independent Power Producer Procurement Program (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.

On a more project specific basis the following projects listed in **Table 14** have been identified within a 30km radius from the project site and are illustrated in **Figure 1**

Table 14: Renewable energy projects in the area

Name	Facility	Status
CEF – Upington Solar Park	CSP & PV	Government planning
Eskom – Klwano CSP	1 x CSP	Government planning
Sirius Solar PV – Sirius Solar PV Projects 1 & 2	2 x PV	Approved & in progress
Solar Reserve - Rooipunt	1 x CSP	Approved
28 Degree Energy S-Kol PV Plant	1 x PV	Approved & in progress
AEP – Bloemsmond Solar 1 & 2	2 x PV	Approved & in progress
Solis Power – Solis I & II	2 x CSP	Approved
Adengoa – Kal Garib	1 x CSP	Approved
Scatec - Dyasonsklip	2 x PV	Preferred bidder
Abengoa – Khi Solar One	1 x CSP	Operational
ACSA PV – Upington Airport Solar PV	1 x PV	Operational

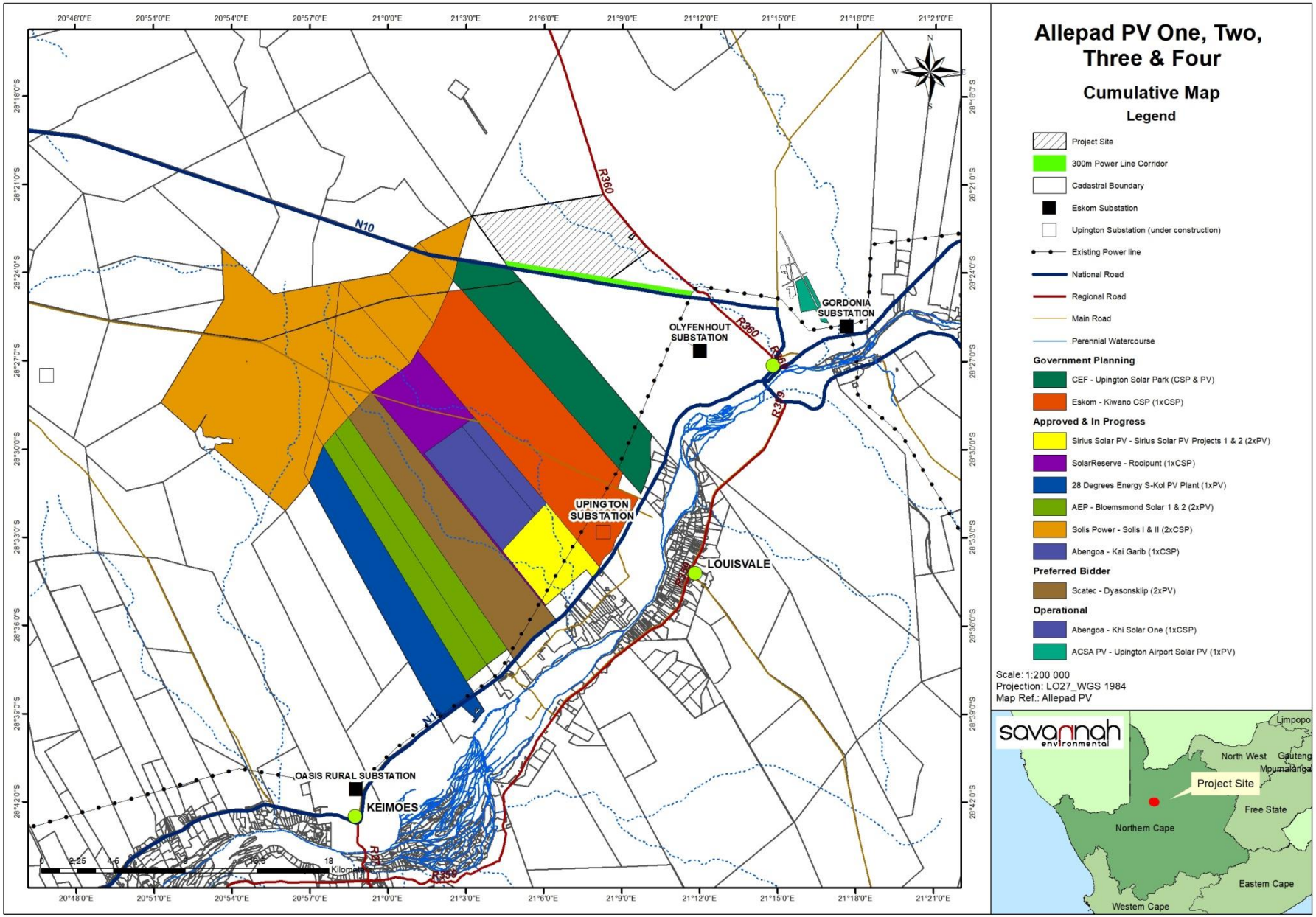

Figure 1: Renewable energy developments in the area

In response to renewable energy and mining developments within the Karoo, which fall under REDZ 8-Springbok, there has been a counter reaction amongst some communities opposed to this relatively sudden change to what was previously an isolated, tranquil and pristine environment. In this vein the Heritage Association of South Africa published an undated appeal to the Minister of the Department Environmental Affairs to consider the need for a cumulative impact assessment with regard to the cumulative effect of mining and energy developments within the area[1]. REDZ 7-Upington is probably somewhat less sensitive in this respect due to a higher level of urbanisation and industrialisation in the region. Apart from the general reaction towards the cumulative effects of renewable energy projects the following more specific social issues need to be considered, these relate to the effects on:

Health and social wellbeing

- Risk of HIV

Quality of the living environment

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

Economic

5.1. RISK OF HIV INFECTIONS[2]

With an HIV prevalence rate of 17.5 percent, the Northern Cape Province is the province with the lowest HIV prevalence rates as assessed in 2013 compared to all other provinces across the country. At a district level the Siyanda district, now the Z F Mgcawu District Municipality, had the eleventh lowest HIV prevalence rate across all districts in South Africa, with the HIV prevalence rate amongst antenatal women being at 20.1%. Consequently, the district within which the project is located, and some of the neighbouring districts, have some of the lowest HIV prevalence rates across the country.

[1] Heritage Association of South Africa: Karoo News Group – Undated, Appeal to Minister. http://heritagesa.org/wp/2222-2/

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

These figures are 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, that had an HIV prevalence rate of 18.7% in 2013, the rest of the 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 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 which can be spread amongst the local communities, particularly through the spread of prostitution that follows the availability of disposable income (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). 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.

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 relatively isolated region. In this regard The 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.*"

5.2. TRANSFORMATION OF SENSE OF PLACE

Eight geographical areas have been identified by Government (Government Gazette No. 41445, 2018) as having a high potential for the development of renewable energy projects while also having the lowest negative impact on the environment. These zones, referred to

as renewable energy development zones (REDZ), are spread across the country and have resulted in several projects being clustered together. The project falls outside of but on the boarder of REDZ 7 – Upington. REDZ 7 has the highest solar potential, at 34 000 MW, of all eight zones identified across the country (Rycroft, 2015, p. 17). Although a set of project guidelines have been produces in order to address development density it remains likely that, due to this development density and the high visibility of these PV facilities, there will be a change in the sense of place of the area. As this change will be associated with the clustering of several projects in the area it will need to be considered on a cumulative basis.

5.3. DISRUPTION OF 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 this development. The influx of construction workers is likely to place pressure on accommodation and the need for both services and supplies. The urban area of Upington, some 13 km southeast of the project is 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 project will be spread across different timelines, with some project commencing while other reach completion. Where numerous projects are entering into construction phase simultaneously, the project companies should engage to align efforts. 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 operational phases 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 operational phase of the projects but is likely to settle within the medium term as the economy adjusts and the municipal authorities are able to respond to this growth.

5.4. ECONOMIC

The cumulative economic impact of the project will be both positive and negative. The negative economic impacts, associated with a possible rise in living costs driven by market demand, 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. The fact that the project is proposed within an area characterised by good levels of solar irradiation suitable for the development of commercial solar energy facilities implies that the surrounding area is likely to be subject to considerable future applications for PV facilities. Levels of unemployment and the low level of earning potential may attract individuals to the area in search of better employment opportunities and higher standards of living.

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 R20.6 Billion has been committed to socio-economic development while the projected procurement spend is "…*R147.6 billion of which R55.5 billion has been spent to date.*" The 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 and LEDs pertaining to the affected municipalities.

5.5. ASSESSMENT OF CUMULATIVE IMPACTS

The cumulative impacts discussed above are assessed below in **Table 15** to **Table 18**. It must, however, be noted that this assessment is at a superficial level as any in-depth investigation of the cumulative effects of the various developments being planned for the region are beyond the scope of this study as they would require a broad-based investigation on a far larger scale.

Table 15: Risk of HIV

Nature: Risk of HIV		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Regional = 4	Regional = 4
Duration	Long-term = 4	Long-term = 4
Magnitude	Moderate to High = 7	High = 8
Probability	Highly probable = 4	Highly probable = 4
Significance	**High (-60)**	**High (-64)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated	Yes	Yes
Mitigation: Mitigation can only be implemented at a regional level and will need to be driven on a provincial and municipal basis. In this sense the following mitigation measures would need to be considered. ✓ Ensure that all companies coming into the area have and are implementing an effective HIV/AIDS policy; ✓ Introduce HIV/AIDS awareness programmes 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.		
Cumulative impacts: The HIV prevalence rate is currently low in the area however with the influx of workers there is a risk that this could increase the prevalence rate in the area if the situation is not monitored and managed.		
Residual impacts: An increase in the HIV prevalence rate that will last well beyond the construction period and will have dire consequences for local communities.		

Table 16: Transformation of sense of place

Nature: Sense of place.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Regional = 4	Regional = 4
Duration	Long-term = 4	Long-term = 4
Magnitude	Low moderate = 5	High = 8
Probability	Definite = 5	Definite = 5
Significance	**High (-65)**	**High (-80)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	Yes
Can impacts be mitigated	Yes	Yes

Mitigation:

Mitigation can only be implemented at a regional level and will need to be driven on a provincial and municipal basis. In this sense the following mitigation measures would need to be considered.

- ✓ 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 tourism businesses and authorities in the region to identify any areas of cooperation that may exist.
- ✓ Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprints of the facilities.
- ✓ Maintain the general appearance of the facility as a whole.

Table 17: Disruption of service, supplies and infrastructure

***Nature:* Service supplies and infrastructure**		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Regional = 2	Regional = 4
Duration	Short-term = 1	Long-term = 4
Magnitude	Minor to Low = 3	Moderate to high = 7
Probability	Highly probable = 4	Highly probable = 4
Significance	**Low (-24)**	**High(-60)**
Status (positive or negative)	Negative	Negative
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be mitigated	Yes	Yes

Mitigation:

- ✓ Mitigation can only be implemented at a regional level and will need to be driven on a provincial and municipal basis. In this sense the following mitigation measures would need to be considered.
- ✓ 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.

Table 18: Economy

***Nature:* Positive economic impacts**		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Regional = 4	Regional = 5
Duration	Long-term = 4	Long-term = 4
Magnitude	Low to Moderate = 5	Moderate to High = 7
Probability	Definite = 5	Definite = 5
Significance	**High (+65)**	**High (+80)**
Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources	No	No
Can impacts be optimised	Yes	Yes

Enhancement:

- ✓ Mitigation can only be implemented at a regional level and will need to be driven on a provincial and municipal basis. In this sense the following mitigation measures would need to be considered.
- ✓ Implement a training and skills development programme for locals;
- ✓ Ensure that the procurement policy supports local enterprises;
- ✓ Establish a social responsibility programme in line with the REIPPP Programme;
- ✓ 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.

The assessment of the cumulative impacts takes into consideration the impacts associated with solar energy facilities in the area and on this basis no fatal flaws associated with the cumulative impacts are evident at a social level. The impacts assessed above are summarised and a pre and post mitigation comparison is presented in **Table 19**.

Table 19: Impact summary

Construction Phase					
Environmental parameter	**Issues**	**Rating prior to mitigation**	**Average**	**Rating post mitigation**	**Average**
Health & social wellbeing	Annoyance, dust and noise	-30		-25	
	Increase in crime	-28		-18	
	Increased risk of HIV infections	-64		-60	
	Influx of construction workers	-35		-30	
	Hazard exposure.	-28	**-37**	-24	**-31.4**
			Negative Medium Impact		Negative Medium Impact
Quality of the living environment	Disruption of daily living patterns	-28		-24	
	Disruptions to social and community infrastructure	-32	**-30**	-28	**-26**
			Negative Medium Impact		Negative Low Impact
Economic	Job creation and skills development	+35		+40	
	Socio-economic stimulation	+45	**+40**	+50	**+45**
			Positive Medium Impact		Positive Medium Impact
Operational Phase					
Quality of the living environment	Transformation of the sense of place	-70	**-70**	-65	**-65**
			Negative High Impact		Negative High Impact
Economic	Job creation and skills development	+45		+50	
	Socio-economic stimulation	+65	**+55**	+70	**+60**
			Positive Medium Impact		Positive High Impact
No Project Alternative					
No project		-75	**-75**	No mitigation measures	
			Negative High Impact		
Cumulative Impacts					
Health & social wellbeing	Risk of HIV	-60	**-60**	-64	**-64**
			Negative High Impact		Negative High Impact
Quality of the living environment	Sense of place	-65		-80	
	Services, supplies & infrastructure	-24	**--24**	-60	**-60**
			Negative High Impact		Negative Medium Impact
Economic	Economic	+80	**+80**	+85	**+80**
			Positive High Impact		Positive High Impact

6. CONCLUSION AND RECOMMENDATIONS

Regarding the impacts associated with the project it was found that most apply over the short term to the construction phase of the project. Of these impacts all can be mitigated to within acceptable ranges and there are no fatal flaws associated with the construction of the project. It was also found that in respect of the energy needs of the country and South Africa's need to reduce its carbon emissions that the project fits with international, national, provincial and municipal policy. Although highly visible the project is located within an area adjacent to the Renewable Energy Development Zone 7 – Upington and, although this will result in a cumulative impact, it is preferable that these projects are clustered together rather than widely dispersed to limit the impact on the sense of place of the area, a view consistent with the finding of the visual specialist (LOGIS, 2019, p. 40). Accordingly, the project carries with it a significant benefit and as such is deemed acceptable. It should be noted that the expected benefits associated with the project, which include generation of electricity from renewable sources and local economic and social development are likely to outweigh the perceived impacts associated with the project.

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 specifically attached to a single 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 the area. The second is the potential, through an influx of labour and an increase in transportation of material and equipment to constructions sites, of the risk for the prevalence of HIV to rise in an area that has a relatively low HIV prevalence rate. 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. This, however, is beyond the scope of individual projects as it would need to be addressed at a regional or even on a national basis.

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