7 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

7.1 Purpose of the Plan of Study for EIA

The requirements of Regulation 28 of Government Notice R.543 promulgated in terms of section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998) are as follows:

- A description of the tasks that will be undertaken as part of the environmental impact assessment process, including specialist reports or specialised processes, and the manner in which such tasks will be undertaken;
- An indication of the stages at which the competent authority will be consulted;
- A description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity;
- Particulars of the public participation process that will be conducted during the environmental impact assessment process; and
- Any specific information required by the competent authority.

In addition, there are a number of other requirements which the Plan of Study (PoS) for EIA must address. These include the following:

- The DEA EIA Regulations Guideline Document;
- The DEA response to the Final Scoping Report and Plan of Study for EIA (when received).

7.2 Impact Assessment Phase

7.2.1 Introduction

The purpose of the Impact Assessment Phase of an EIA is as follows:

- Address issues that have been raised during the Scoping Phase;
- Assessment of alternatives for the proposed activity in a comparative manner;
- Assessment of all identified impacts and thereafter determine the significance of each impact; and
- Formulate mitigation measures.

Numerous acceptable approaches and methodologies are available by which the above purpose can be achieved. South African legislation and guidelines does not prescribe the methodology that need to be used for the assessment of the impacts. An assessment framework is available within which environmental assessment practitioners are expected to structure a project-specific assessment methodology. This assessment framework recognises that there are different methodologies available for assessing the impact of a development but that the specific methodology selected must provide for the following:

- A clear process for impact identification, prediction and evaluation;
- The specification of impact identification techniques;
- Criteria for evaluating the significance of impacts;
- The design of mitigation measures to address impacts;
- Defining types of impacts (direct, indirect or cumulative); and
- Specification of uncertainties.

This section of the Final Plan of Study for EIA serves to describe the manner in which Lidwala intends undertaking the Impact Assessment Phase of the EIA.

7.2.2 Impact Assessment Methodology

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise as a result of the proposed Upington Solar Park and associated infrastructure. The process of assessing the impacts of the project encompasses the following four activities:

- Identification and assessment of potential impacts;
- Prediction of the nature, magnitude, extent and duration of potentially significant impacts;
- Identification of mitigation measures that could be implemented to reduce the severity or significance of the impacts of the activity; and
- Evaluation of the significance of the impact after the mitigation measures have been implemented i.e. the significance of the residual impact.

The possible impacts associated with the project were primarily identified in the Scoping Phase through on-site and desktop study and public consultation. In the Impact Assessment Phase, additional impacts will be identified through the more in-depth specialist investigations to be undertaken and through the ongoing consultation process with interested and affected parties.

In accordance with Government Notice R.543, promulgated in terms of section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), specialists will be required to assess the significance of potential impacts in terms of the following criteria:

- Cumulative impacts;
- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Impact non-reversibility;
- Impact on irreplaceable resources; and
- Confidence level.

Issues will be assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;
- The physical **extent**, wherein it is indicated whether:
  - 1 - the impact will be limited to the site;
  - 2 - the impact will be limited to the local area;
  - 3 - the impact will be limited to the region;
  - 4 - the impact will be national; or
  - 5 - the impact will be international;
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
  - 1 - of a very short duration (0–1 years);
  - 2 - of a short duration (2-5 years);
  - 3 - medium-term (5–15 years);
  - 4 - long term (> 15 years); or
  - 5 - permanent;
- The **magnitude of impact on ecological processes**, quantified on a scale from 0-10, where a score is assigned:
  - 0 - small and will have no effect on the environment;
  - 2 - minor and will not result in an impact on processes;
  - 4 - low and will cause a slight impact on processes;
  - 6 - moderate and will result in processes continuing but in a modified way;
  - 8 - high (processes are altered to the extent that they temporarily cease); or
  - 10 - 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 where:
  - 1 - very improbable (probably will not happen;
  - 2 - improbable (some possibility, but low likelihood);
  - 3 - probable (distinct possibility);
  - 4 - highly probable (most likely); or
  - 5 - definite (impact will occur regardless of any prevention measures);
- the **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- the **status**, which is described as either positive, negative or neutral;
- the degree to which the impact can be reversed;
- the degree to which the impact may cause irreplaceable loss of resources; and
- the degree to which the impact can be mitigated.

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

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

S = Significance weighting
E = Extent
D = Duration

M = Magnitude
P = Probability

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

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

This EIA Report will assess the significance of impacts for all phases of the project i.e. construction, operation and decommissioning. The results of the above will be summarised in a tabular format. An example is provided below.

Potential Impact	Mitigation	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	Significance (S=(E+D+M)*P)		Status (+ve or -ve)	Confidence
CONSTRUCTION PHASE									
BIODIVERSITY									
Impact 1: Loss or degradation of natural/ pristine habitat at Klipkraal 451.	**nature of impact:**	Adverse Impact due to loss or degradation of natural habitat							
	with mitigation	1	4	2	3	**21**	**Low**	-	high
	without mitigation	2	5	2	4	**36**	**Medium**	-	high
	degree to which impact can be reversed:	None							high
	degree of impact on irreplaceable resources:	Low							high

7.2.3 Public Participation Process (PPP)

PPP during the impact assessment phase revolves around the review and findings of the EIA, which will be presented in the Draft Environmental Impact Report (EIR). All I&APs will be notified of the progress to date and availability of the Draft EIR, via mail, email and advertisements in local newspapers. A legislated period of 40 consecutive days will be allowed for public comment. Reports will be made available in the following way:

- Distribution for comment at central public places, which were used during the scoping phase. Provision has been made for the placement of the reports at three venues;
- The document will be made available to download from Lidwala's website; and
- Copies of CDs will be made available on request.

A public meeting and an open day (depending on specific requests) is proposed to be held during this phase (venue to be confirmed). The meeting / open day will be facilitated by key members of the PPP project team. The purpose of the public meeting or open day will be to present the findings of the impact assessment. Focus group meetings will be held, if required, in accordance with topics of concern raised during the scoping phase as well as the assessment phase. I&APs will be given the opportunity to debate and discuss key issues and concerns.

All comments received during the EIA phase will be recorded in the comments and response report that will be included in the draft and final EIR. The final EIR will incorporate public comment received on the Draft EIR and will be made available for public review with hard copies distributed mainly to the authorities and key stakeholders.

Notification of Environmental Authorisation
All I&APs will receive a letter at the end of the process notifying them of the authority's decision, thanking them for their contributions and explaining the appeals procedure.

7.2.4 Consultation with DEA

It is envisaged that consultation with DEA and DENC will coincide with the compilation of the following key documents:

- PoS for EIA;
- Draft EIR and EMP; and
- Final EIR and EMP.

Consultation outside of the above deliverables will be undertaken as necessary in order to ensure that DEA and DENC are aware of the status of the project.

7.2.5 Consideration of Alternatives

The following project alternatives will be investigated in the EIA phase:

- **The 'no go' alternative:** In the context of this project, the no-go alternative implies that the proposed 1GW Upington Solar Park will not be established.
- **Layout/design alternatives:** In terms of the design of the Solar Park, particularly the placement, type and number of solar technologies including corridors/servitudes for associated infrastructure such as the access roads, power lines and water supply.

7.2.6 Terms of Reference for Specialist Studies

A list of specialists that are involved in this study and their area of expertise are listed in **Table 7.1** below.

Table 7.1: List of Specialist Studies

Specialist Study	Organisation and or Specialist Responsible for the Study
Impacts and fauna and flora	Simon Todd Consulting
Visual impact assessment	Aurecon
Heritage Impact Assessment	J A van Schalkwyk
Impacts on soils & agricultural potential	Agricultural Research Council
Impacts on surface water	Lidwala (SA)
Social Impact Assessment	Lidwala (SA)
Impacts on avifauna	Simon Todd Consulting
Impacts on traffic	Lidwala (SA)
Impacts on groundwater	SLR Consulting
Impacts due to noise	Francois Malherbe Acoustic Consultants
Impact on Palaeontology	Natura Viva

The terms of reference for each of the above mentioned specialist studies during the EIA phase of the project are detailed below.

- **Fauna & Flora (Simon Todd Consulting)**

The current study is based largely on a desktop assessment and additional fieldwork during the EIA phase will be an important activity required to validate and refine the findings of this report. This will include the following studies and activities:

- Ground-truth and refine the ecological sensitivity map of the site. Particular attention will be paid to the presence of sensitive features within the site, such as unique edaphic environments or habitats of particular significance for fauna. Although the pans have already been ground-truthed, the priority pans will be identified and possible options for ecological corridors identified.
- Better characterise the vegetation and plant communities present at the site. The SA vegetation map only provides a coarse picture of the vegetation present and on-site surveys will be conducted to generate a species list for the site as well as identify and where necessary map different plant communities present at the site if they are associated with different sensitivity classes.
- Identify and map the presence of any unique and special habitats at the site such as gravel patches, rock fields and other localised habitats.
- Locate, identify and map the location of significant populations of species of conservation concern. Some species of concern may be widespread and others localised and the distribution of such species will be established during the site visit. Of particular importance will be obtaining an estimate of the density of protected tree species at the site such as *Acacia erioloba*, *A.haematoxylon* and *Boscia ablitrunca*.
- Evaluate the likely presence of listed faunal species at the site such as the Giant Bullfrog, and identify associated habitats that should be avoided to prevent impact to such species.

- Evaluate, based on the site attributes, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- Assess the impacts identified above in light of the site-specific findings and the final layout to be provided by the developer.

- **Visual (Aurecon)**

It is recommended that a full visual impact assessment is required to address the potential change to the landscape character. The following issues need to be addressed in the impact assessment:

- The visual impact on receptors along the Orange River Basin (especially landscape based tourism and residents)
- The visual impact on tourists who travel through the area to access other tourist destinations, the focus will be on the main routes such as the N10 and N14, the N10 being the main road between Upington and Namibia and the N14 is the main road between Keimoes and Upington which also runs parallel to the Orange River. Both these roads are associated with tourism and should be recognised as view corridors. It is likely that the proposed infrastructure development will be visible from these roads.
- Detailed assessment of the landscape character of the area and each proposed option for the Solar Park
- The identification of key viewpoints, especially from farmsteads and higher lying areas which could possibly form important vistas (this will only be determined once a site visit has been conducted)
- The effect of glint and glare from the various Solar Park components, especially the glare from the solar receiver unit at the top of the solar power tower. Glint and glare is the result of viewers seeing the reflection of the sun (glint) or the corona around the sun (glare). Glint and glare will only occur during the summer months from viewpoints facing east and northeast to the project site during morning hours and viewers looking west and North West to the project site during evening hours. Viewers located north of the project area facing a southern direction will experience no glint or glare during any season.
- The duration of glint and glare by possible adjusting of panels, this will potentially have an impact on motorists passing through the study area at a certain speed. Simulations demonstrated glint and glare will be visible to motorists in their periphery for a brief period in the early morning or late evening during summer.
- The cumulative effects of solar energy projects in the Upington area – as it is expected that there are other government and private initiatives in the area as well due to the suitability from a solar point of view.

The terms of reference for the impact assessment phase are based on the findings of the site visit , as well as an interpretation of the guideline document for VIA's (Oberholzer

2005) commissioned by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP).

- **Heritage (J A van Schalkwyk and Natura Viva)**

In terms of the National Heritage Resources Act (No 25 of 1999), the potential impacts on archaeological, palaeontological, cultural and/or historical sites are required to be considered.

The following is required:

- Heritage Impact Assessment (HIA) of the preferred site alternative must be undertaken.
- A Paleontological heritage sensitivity study (Desk top study)

- **Soil and Agricultural Potential (Agricultural Research Council)**

The soil and agricultural impact study needs to address the following:

- Assessment of the potential impacts and significance rating.
- Final recommendation of appropriate mitigation measures.

- **Surface Water (Lidwala SA)**

The surface water impact study needs to address the following:

- Impacts on any watercourses depending on the final layout selected must be investigated;
- A basic draft storm water management plan will be compiled in consultation with the Design Engineer conducting storm water. If any of the watercourses (pans or drainage lines) identified on site may possibly be impacted on by the proposed Solar Park development an aquatic specialist will then have to conduct a full aquatic study.
- Site-specific issues in terms of nature, extent, duration, severity and significance will be assessed in the EIA in terms of the final layout to be provided by the developer.

- **Geohydrology (SLR Consulting)**

The geohydrological assessment will involve a number of tasks, namely:

- Site-specific issues in terms of nature, extent, duration, severity and significance will be assessed in the EIA in terms of the final layout to be provided by the developer.
- Obtain all relevant data to the project -Archive (and associated groundwater use databases). Obtain relevant geological maps and geohydrological maps. Obtain relevant groundwater reports. Compile a project map (aquifer types and sample points if available).
- Analyze the data, using geohydrological methods and describe the hydrogeological data with a brief groundwater conceptual description and summary of main issues.

- The results will then be documented in a report – along with the findings and recommendations.

- **Noise (Francois Malherbe Acoustic Consultants)**

- All the available information relevant to the project as supplied by the client and published in literature will be studied. The objective will be to obtain details of the involved technologies and their noise emission characteristics.
- A site visit will be conducted in order to familiarise the consultant with the environment of the proposed project. The location of the nearest noise sensitive receptors and existing major noise sources will be identified. Furthermore, the locations of suitable and representative noise monitoring points will be identified.
- Representative noise measurement samples will be taken in accordance with the procedures specified in SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'. The results will be processed to estimate the present ambient noise levels during the day and night in the environment of the project. Over and above the noise parameters specified in SANS 10103 additional measurements will be used to characterise the ambient noise levels.
- A detailed model of the future noise emissions during construction and the operational phases of the project will be developed. The model will take account of:
    - The noise emission levels of the mining equipment and processes;
    - The attenuation due to the geometrical spreading of the noise;
    - The attenuation provided by the ground and atmosphere;
    - The attenuation caused by the screening effect of the topography and other barriers, such as pit walls;
    - The effect of meteorological and other atmospheric conditions; and
    - The operational conditions of the mine and associated infrastructure.

- The calculated noise impacts will be presented as contours of the total resulting ambient noise levels and the increase in ambient noise levels during the day and night. The representative ambient noise levels determined as part of the baseline noise study will serve as reference to the calculations.
- The results of the calculations will be assessed in terms of the applicable Northern Cape noise regulations and the guidelines presented in SANS 10103.
- The methodology, results and findings of the noise study will be described in a detailed report.

- **Social (Lidwala SA)**

Fieldwork during the EIA phase will be an important activity required to validate and refine the findings of the scoping report. This will include the following studies and activities:

- Site Visit, and particular attention will be paid to the presence of settlements within the site and or adjacent farms;

- Map the presence of settlements/farms or populations;
- Evaluate, based on the site social attributes what the most applicable mitigation measures are to reduce the impact of the development on the livelihoods of the surrounding settlements if any are present;
- Public Participation will be undertaken and consultation with stakeholders will enable the project team to identify some important needs and expectations of the Upington community from the project;
- Determine the real and perceived social impacts in the area that will include migrant labour of various educational levels; and
- Determine the possible cumulative growth factor for the area in order to forecast any likely pressure on existing amenities like schools and hospitals.

- **Traffic (Lidwala SA)**

The traffic impact assessment will be undertaken by Alf Raspi of Lidwala SA. The following study elements should be undertaken as part of the Traffic Impact Assessment:

Various data is required for execution of this study, and summarized below:
- Current accesses position and layouts to and from the site provided by the client. Note that no traffic counts will be performed.
- Proposed construction accesses.
- Current traffic movement at the accesses and vehicular movement on site.

The assessment will include:
- Operational analysis of traffic movements at the access and on site.
- Proposals for optimal operation during the construction phase, considering simulation of particularly heavy vehicles on site.
- The adequacy of envisaged geometric and site layouts will be considered, including turning radii.

7.3 Conclusions and Recommendations

This Plan of Study for EIA is aimed at meeting the requirements of the EIA Regulations and the guidelines issued in respect thereof as a minimum.

The methodologies proposed to obtain the information required to effectively identify and assess the potential environmental impacts of the project are considered to be comprehensive and sufficient. This will allow for the compilation of an EIR and EMP that addresses I&AP concerns and will provide the competent authority with the appropriate information necessary to allow for informed decision-making process and authorisation.