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DRAFT SCOPING REPORT

for

RE CAPITAL 3: SOLAR DEVELOPMENT

on

Portion 12 of the farm Dyasonsklip 454, Upington, Northern Cape

In terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended & Environmental Impact Regulations 2010

Prepared for Applicant: Re Capital 3 (Pty) Ltd. (previously Kimbratrax (Pty) Ltd)

By: *Cape EAPrac*

Report Reference: KAI231/03

Department Reference: 14/12/16/3/3/2/538

Case Officer: To be allocated

Date: 6 August 2013

APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:

***Cape EAPrac* Environmental Assessment Practitioners**

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Report written & compiled by: **Dale Holder** (Ndip Nat Con), who has 11 years' experience as an environmental practitioner.

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PURPOSE OF THIS REPORT:

Public Review & Comment

APPLICANT:

Re Capital 3 (Pty) Ltd. (previously Kimbratrax (Pty) Ltd)

CAPE EAPRAC REFERENCE NO:

KHA231/03

DEPARTMENT REFERENCE:

14/12/16/3/3/2/538

SUBMISSION DATE

06 August 2013

DRAFT SCOPING REPORT

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended &
Environmental Impact Regulations 2010

RE Capital 3 Solar Development,

Portion 12 of the Farm Dyasonsklip 454, Upington, Northern Cape

Submitted for:

Stakeholder Review & Comment

Report Issued by:

Cape Environmental Assessment Practitioners

Tel: 044 874 0365
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REPORT DETAILS

Title:	**DRAFT SCOPING REPORT** **for proposed 'RE Capital 3 Solar Development'**
Purpose of this report:	This Draft Scoping Report forms part of a series of reports and information sources that are being provided during the Environmental Impact Assessment (EIA) for the proposed Re Capital 3 Solar Development in the Northern Cape Province. In accordance with the EIA Regulations, the purpose of the Scoping Report is to: • Provide a description of the proposed project, including a sufficient level of detail to enable stakeholders to identify relevant issues and concerns; • Describe the local environmental and developmental context within which the project is proposed, to assist further identifying issues and concerns; • Provide an overview of the process being followed in the Scoping Phase, in particular the public participation process, as well as present the Plan of Study for EIA that would be followed in the subsequent EIA phase; • Present the issues and concerns identified to date from the baseline specialist studies and the initial stakeholder engagement process, as well as an explanation of how these issues will be addressed through the EIA process. This Draft Scoping Report is made available to all stakeholders for a 40 day review & comment period, **Wednesday 07 August to Wednesday 18 September 2013**.
Prepared for:	RE Capital 3 (Pty) Ltd. (previously Kimbratrax (Pty) Ltd.)
Published by:	*Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)*
Authors:	Mr Dale Holder
Reviewed by:	Director: Louise-Mari v Zyl
Cape EAPrac Ref:	KAI131/11
DEA Case officer & Ref. No:	Enquiries: Kim Balutto 14/12/16/3/3/2/538
Date:	06 August 2013
To be cited as:	*Cape EAPrac,* 2013. Draft Scoping Report for the proposed RE Capital 3 Solar Development. Report Reference: KAI231/03. George.

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EXECUTIVE SUMMARY

1 PROJECT OVERVIEW

Cape EAPrac has been appointed by **RE Capital 3 (Pty) Ltd.** (previously Kimbratrax (Pty) Ltd.), hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner EAP), to facilitate the Scoping & Environmental Impact Reporting (S&EIR) process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the '**RE Capital 3 Solar Development** near Upington and Keimoes in the Northern Cape.

RE Capital 3 (Pty) Ltd. Have an option to sub-lease a portion of Portion 12 of the farm Dyasonsklip from the landowner, Owen Davies Trust, for the purposes of developing the proposed solar facility. A copy of a letter from Owen Davies Trust providing consent for the continuation of the EIA is attached in Appendix F.

The total generation capacity of the solar facility will not exceed **225MW** (3 Phases of 75MW) for input into the national Eskom grid.

2 NEED AND DESIRABILITY

The supply of electricity in South Africa has become constrained, primarily because of insufficient generation capacity, but also due to constraints on the transmission and distribution of electricity. Considering this situation and the impact that carbon emissions from existing (and future) coal-fired power stations have on the environment (Climate Change), this renewable energy project will contribute to the generation of 'clean' or so-called 'green' renewable electricity for input into the national grid to augment Eskom's power supply.

The South African Government has set a 10 year cumulative target for renewable energy of 10 000 GWh renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro power (White Paper on Renewable Energy Policy, 2003). This amounts to approximately 4% (1667MW) of the total estimated electricity demand (41 539MW) by 2013. The majority of this power will be generated by Eskom. However, in order to meet the increasing power demand within the country, Eskom has set a target of 30% of all new power generation to be derived from independent power producers (IPPs).

RE Capital 3 (Pty) Ltd is one such IPP which intends to generate electricity from the proposed RE Capital 3 Solar Development. This will contribute to South Africa's commitment to the Convention on Climate Change through emission-free generation of electricity and working towards an investor-friendly climate in the energy sector.

3 ENVIRONMENTAL REQUIREMENTS

The proposed solar energy facility project is subject to the requirements of the Environmental Impact Assessment Regulations (2010 EIA Regulations) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended) This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an EIA. An application for authorisation has been accepted by the DEA (under the Application Reference number 14/12/16/3/3/2/538).

A Scoping and Environmental Impact Assessment process is required in terms of NEMA, 2010. The listed activities associated with the proposed development, as stipulation under Regulations 544, 545 and 546, where applied for as follows:

- Regulation 544 (Basic Assessment): 10(i), 11, 18(i) & 22(ii)
- Regulation 545 (Scoping & EIA): 1, 8, 15 and
- Regulation 546 (Basic Assessment): 4 &14

Before any of the above mentioned listed activities may be undertaken, authorisation must be obtained from the relevant authority, in this case, the National Department of Environmental Affairs (DEA).

5 SITE DESCRIPTION

The property, Portion 12 of the farm Dyasonsklip 454, is located in the Siyanda district of the Northern Cape Province, within the jurisdiction area of the Khai Garib Local Municipality. The property is approximately 5725ha is size and is located approximately 22km west southwest of Upington and 15km northeast of Keimoes.

The proposed development site within the property is approximately 500ha in size. Two site alternatives are under investigation as detailed in section 4 of this report. The property is situated north of the N14 National Road.

The central site alternative is situated approximately 4km from the N14 and the northern site alternative approximately 15km. Current vehicular access to the site is via an existing gravel road with an entrance off the N14.

The topography is generally flat and has low relief form. The slope gradient is between 0 and 2% with a concave shape.

Higher ground drains towards multiple depressions (seasonal washes), forming waterways towards the Gariep River. Figure 42 and Figure 43 show the drainage patterns of the two alternative sites.

6 DEVELOPMENT PROPOSAL & ALTERNATIVES

The proposed RE Capital 3 Solar Development is to consist of solar photovoltaic panels with a generation capacity of 225MW (megawatts), implemented in 3 phases of 75MW each as well as associated infrastructure, which will include:

- On-site substation;
- Auxiliary buildings (administration / security, workshop, storage and ablution);
- Inverters, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Overhead electrical transmission line (to connect to connect to the proposed new Eskom MTS substation);
- Rainwater tanks; and
- Perimeter fencing.

Various alternatives, in terms of sites, technology of the solar arrays, as well as layout for the solar arrays and associated infrastructure on the development site, have been considered. The alternatives are described in detail in section 4 of this report.

In the event that the scoping/impact assessment process identify any other feasible/reasonable alternatives other than the above, such will be considered and incorporated as additional alternatives.

7 SPECIALIST STUDIES

The following aspects have been considered by specialists in order determine the current status of the target development site, as well as to identify potential risks and impacts associated with the development of the renewable energy park. These are described in greater detail in the main report, while the full specialist reports are available in Appendix D.

The following baseline specialist studies have been undertaken and used to inform this Draft Scoping Report as well as the project layout and concept:

- Agriculture potential;
- Biophysical (Fauna and Flora);
- Heritage (including archaeology and palaeontology)

The issues and concerns identified through the baseline studies will be further investigated and assessed through detailed specialist impact assessments to follow in the Environmental Impact Reporting (EIR) phase in order to determine the significance of potential impacts possibly associated with the proposed project.

8 PLANNING CONTEXT

Mr Martin Scott from Ilali Investments have been appointed as the planning specialist for this project and will be responsible for undertaking the necessary applications. Further details on the progress with the planning applications are included in section 8 of this report and will be presented in the Draft Environmental Impact Report.

9 AVOIDANCE APPROACH

A constraint map has been developed for the proposed RE Capital 3 Solar Development site. This serves to identify possible contextual constraints for the target solar property, the two alternative sites within the property as well as for the site-specific solar layout, based on local (site specific) as well as regional threshold criteria. The purpose of undertaking the constraints analysis is specifically to comply with the requirement of firstly avoidance of potential impacts, followed by minimisation and then mitigation of impacts.

The following key potential constraints have been identified, namely avoiding and setbacks from the main drainage channel on the property as well as the pans present on the Northern Study Site.

10 PROCESS TO DATE

As part of the public participation process the following steps were taken to ensure compliance with the legislation and to allow ample opportunity for members of the public and key stakeholders to be involved and participate in the environmental process. Please see **Appendix E** for evidence of this Public Participation process. The Public Participation Process has been undertaken according to the requirements of the new NEMA EIA regulations. The following requirements i.t.o the scoping process have been undertaken and complied with in terms of Regulation 56:

CHRONOLOGY OF EVENTS	
DATE	**ACTION**
23 May 2013	**Notification** was sent to the Landowner of portion 12 of Daysonsklip 454 notifying him of the development proposal and the environmental process to be followed.
23 May 2013	**Notifications** were sent to neighbouring landowners informing them of the development proposal and the environmental process. They were automatically registered as Interested and Affected Parties
23 May 2013	The **Siyanda District Municipality** and the **Khai Garib Local Municipality** (which have jurisdiction over the area) were notified and automatically registered as key stakeholders.
23 May 2013	O**rgans of state** (including SANParks, Northern Cape Nature Conservation, Department of Agriculture, Forestry & Fisheries, Department of Minerals and Energy, Department of Water Affairs, SAHRA, Eskom, Civil Aviation Authority etc.), were notified and registered as key stakeholders.
24 May 2013	**Advertisements** were placed in a regional newspapers (*Namaqua Weekly & Die Plattelander*), calling for stakeholders to register as Interested & Affected Parties
11 June 2013	**Notice Boards** (English & Afrikaans) were placed at the Keimoes Municipality and Keimoes Library.
11 June 2013	**Notice Boards** (English & Afrikaans) were placed on the boundary of the study site on portion 12 of the farm Dyasonsklip 454.
May 2013	A **Stakeholder Register** was opened and the details of all registered stakeholders entered for future correspondence.
02 August 2013	Hard copies of the Draft Scoping Report (DSR) have been placed at the Khai-Garib Municipality offices (Upington and Keimoes) and the Keimoes Library, to inform the public of the proposal and EIA process, and invite them to review the document and provide comment (**Monday 5 August 2013 to Monday 16 September 2013.**). The DSR has also been made available on the *Cape EAPrac* website: www.cape-eaprac.co.za/active
02 August 2013	Registered Stakeholders and I&APs were sent notifications informing that of the availability of the DBAR for a review and comment period of 40-days, extending from **Monday 5 August 2013 to Monday 16 September 2013.**

No issues or concerns have been raised by Interested and Affected Parties thus far in the environmental process. Comments received in response to the Draft Scoping Report will be included in the Final Scoping Report, to be submitted to the Department of Environmental Affairs (DEA) for consideration.

As part of the public participation process various key stakeholders have been identified and notified of the project and their right to participate and comment on the proposal. The project has been advertised and stakeholders that responded to the adverts and written notices will be kept informed throughout the remainder of the on-going environmental process.

11 CONCLUSIONS & RECOMMENDATIONS

This scoping exercise is currently being undertaken to present concept proposals to the public and potential Interested & Affected Parties and to identify environmental issues and concerns raised as a result of the proposed development alternatives to date. This will allow Interested & Affected Parties

(I&APs), authorities, the project team, as well as specialists to provide input and raise issues and concerns, based on baseline / scoping studies undertaken. The RE Capital 3 Solar Development site has been analysed from Ecological, Agricultural Potential, Heritage, Archaeological and Palaeontological perspectives, and site constraints and potential impacts identified.

This Draft Scoping Report (DSR) summarises the process to date, reports on the findings of relevant baseline studies.

Cape EAPrac is of the opinion that the information contained in this Draft Scoping Report and the documentation attached hereto is sufficient to allow the general public and key stakeholders to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. We believe that the proposed RE Capital 3 Solar Development will be sustainable in the long term and that the proposed development will be an asset to the Upington/Keimoes area, Northern Cape region and the broader South African society through supplementing the electricity supply for the National Eskom Grid from a renewable source

This Draft Scoping Report (DSR) is made available for stakeholder review and comment for a period of 40-days, extending from **Wednesday 7 August 2013 to Wednesday 18 September 2013**. All comments received, will be considered and addressed, and feedback will be provided to registered stakeholders.

Following this comment period, the Final Scoping Report will be prepared. Should the Final Scoping Report include significant amendments to this Draft report, it will once again be made available to registered Interested and Affected Parties (I&APs) for comment, for a further 21 day period. Should the amendments include only minor changes to this Draft Scoping Report, the Final Scoping Report will be submitted directly to the Department of Environmental Affairs (DEA) and only be made available for stakeholder information purposes. Whatever the case, all registered stakeholders will be kept informed throughout the remainder of the environmental process.

All stakeholders are requested to review this Draft Scoping Report and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 40-day comment period.

Comments must be submitted, in writing, to the following address no later than 18 September 2013

Cape Environmental Assessment Practitioners

Att: **Mr Dale Holder**

PO Box 2070, George, 6530

Fax: 044-874 0432 or Email: dale@cape-eaprac.co.za

DRAFT SCOPING MAIN REPORT

1 INTRODUCTION

Cape EAPrac has been appointed by **RE Capital 3 (Pty) Ltd.** (previously Kimbratrax (Pty) Ltd.), hereafter referred to as the Applicant, as the independent Environmental Assessment Practitioner EAP), to facilitate the Scoping & Environmental Impact Reporting (S&EIR) process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed development of the '**RE Capital 3 Solar Development** near Upington and Keimoes in the Northern Cape.

RE Capital 3 (Pty) Ltd. Have an option to sub-lease a portion of Portion 12 of the farm Dyasonsklip from the landowner, **Owen Davies Trust**, for the purposes of developing the proposed solar facility. A copy of a letter from Owen Davies Trust providing consent for the continuation of the EIA is attached in Appendix F.

The total generation capacity of the solar facility will not exceed **225MW** (3 Phases of 75MW) for input into the national Eskom grid.

The purpose of this ***Draft*** **Scoping Report** is to describe the environment to be affected, the proposed project, the process followed to date (focussing on the outcome of the initial public participation process and baseline specialist studies), to present the site constraints identified by the various specialist during their initial site assessments, and provide Plan of Study for the Impact Assessment phase of this development.

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

South Africa has for several years been experiencing considerable constraints in the availability and stability of electrical supply. Load shedding procedures have been applied since December 2005 due to multi-technical failures, as well as capacity and transmission constraints.

Eskom generates about 95% of South Africa's electricity supply, and has undertaken to increase capacity to meet growing demands. At the moment, the country's power stations are 90% coal-fired, and two huge new facilities are being built to add to this capacity. However, Eskom's plans to increase its national capacity by 40 000 megawatts in the period to 2025 have had to be scaled down due to the global economic recession (Northern Cape Business website).

International best-practice requires a 15% electricity reserve margin to deal with routine maintenance requirements and unexpected shutdowns in electricity supply systems. South Africa has historically enjoyed a large reserve margin (25% in 2002, 20% in 2004 and 16% in 2006), but that has declined over the recent past to 8% - 10%, as a result of robust economic growth and the associated demand for electricity. The spare power available to provide supply at any time of the day is known as the reserve capacity and the spare plant available when the highest demand of the year is recorded is known as the reserve margin (National Response to South Africa's Electricity Shortage, 2008). This has resulted in limited opportunities for maintenance and necessitated that power stations are run harder. This results in station equipment becoming highly stressed and an increase in unplanned outages and generator trips. The expected demand growth will rapidly erode this margin, as well as Eskom's ability to recover after it's already stressed systems shutdown.

This necessitates the additional generation of at least 3 000MW in the shortest possible time, to allow the reserve necessary to bring Eskom's system back into balance (*ibid*). This need can

either be addressed from the *supply* or the *demand* side. Where the demand side interventions include short, medium and long term aspects of a national Power Conservation Programme to incentivise the public to use less electricity (as mentioned above), one of the supply side options (besides Eskom building new plants and returning old plants to service) is to allow **Independent Power Producers** (IPPs) to contribute electricity to the national grid (National Response Document, 2008). **RE Capital 3 (Pty) Ltd.** is one such body, which intends generating electricity from a renewable energy resource, namely solar.

In March 2011, the Cabinet approved South Africa's Integrated Resource Plan 2010, in terms of which energy from renewable sources will be expected to make up a substantial 42% of all new electricity generation in the country over the next 20 years. The government's New Growth Path for the economy also envisages up to 300 000 jobs being created in the "green" economy by 2020 (South Africa info website).

The Northern Cape is suggested by many to be the ideal location for various forms of alternative energy. This has resulted in a number of feasibility studies being conducted, not least of which an investigation by the Industrial Development Corporation in 2010 (R33-million spent) into potential for photo-voltaic, thermal, solar and wind power (Northern Cape Business website).

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

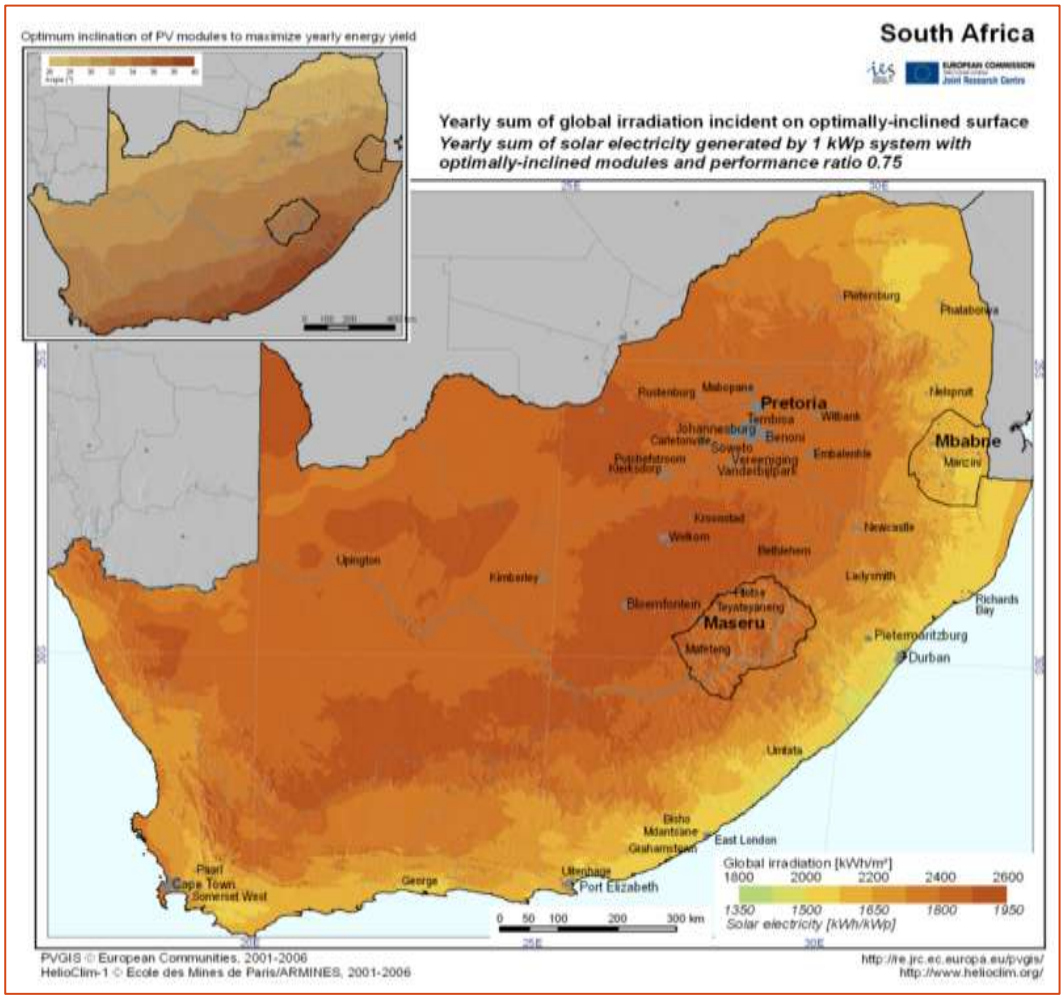

Figure 1: Solar radiation map for South Africa (Source: Solek Engineering Report, 2012).

The Northern Cape area is considered to have extremely favourable solar radiation levels over the majority of the year, making it ideal for the production of solar-power via Photovoltaic (fixed and tracking panels) and Concentrated (solar thermal) Solar systems. Several solar irradiation maps have been produced for South Africa, all of which indicate that the Northern Cape area **high solar irradiation**.

A solar-investment conference was held in November 2010 at Upington and was attended by 400 delegates from all over the world. Dipuo Peters, the national Minister of Energy, outlined the competitive advantages of the Northern Cape, over and above its extremely high irradiation levels, amongst others:

- relative closeness to the national power grid compared to other areas with comparable sunshine;
- water from the Orange River;
- access to two airports; and
- good major roads and a flat landscape (Northern Cape Business website – solar power).

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

To take advantage of this potential for the Northern Cape to become a national renewable-energy hub, the groundwork is being done on a mega-project that has the capacity to fundamentally change the structure of South Africa's power sector: to build a massive solar park that will generate an eighth of the country's electricity needs – 5 000MW – in the Northern Cape near Upington. Sixteen square kilometres of land (thousands of hectares) have been identified and Eskom is looking for private partners. The park, which will cost more than R150-billion, will generate 1 000MW in its first phase. A full feasibility study will now be conducted with the support of the Central Energy Fund and the Development Bank of Southern Africa (Northern Cape Business website – solar power). Significant job creation, lucrative private-sector investments, local industry development and a cleaner, more secure power supply are among the benefits of a large-scale park such as this (BuaNews online).

Indeed this potential for solar energy generation plants has resulted in the emergence of smaller solar energy projects throughout the Northern Cape. The Energy Minister, Dipuo Peters announced in February 2012 that 16 of the initial 28 preferred projects identified by the Department of Energy (DoE) under the renewable energy independent power producer (IPP) programme were located in the sun-drenched province (Creamer, Feb. 2012). Mining companies in the Northern Cape are looking to concentrating solar power (CSP) to provide power for their operations. Engineering company Group Five announced in 2011 that they were investigating the construction of a 150MW plant near Kathu. The Industrial Development Corporation (IDC) is supporting a number of projects in the province. These include a 100MW plant conceived by Abengoa Solar, a Spanish company with a global presence, and a Solafrica scheme to spend more than R3-billion on a Concentrated Solar Plant at Groblershoop (Northern Cape Business website – solar power).

The RE Capital 3 Solar Development Ltd. is one such IPP solar project which intends to generate 225MW of electricity from solar-energy for inclusion into the National grid. The RE Capital 3 solar development site is considered ideal, primarily due to:

- The flat topography of the proposed development site and it's the availability for use for an alternative energy generation facility;
- The grid connection potential based in proximity to existing transmission & proposed new Major Transmission Substation; and
- Its proximity to other Alternative Energy Facilities (both proposed and currently under construction)

The Renewable Energy Independent Power Producer Programme has made 3725 MW of power available to be generated as part of a first phase initiative, after which a number of phases would follow. So far, the first two bidding windows have taken up 2459.4 MW of this target. The Department of Energy (DoE) has set a number of dates for the submission of bid documents for private companies to apply for a licence to generate electricity. The bidding deadlines for the first two stages were as follow:

- 1st Bid Submission: 4 November 2011
- 2nd Bid Submission: 5 March 2012

The 3rd Bid Submission is planned for the 19th of August 2013.

2 LEGISLATIVE AND POLICY FRAMEWORK

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

2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

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

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)[1] . This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an Environmental Assessment.

The proposed scheme entails a number of listed activities, which require a **Scoping & Environmental Impact Reporting (S&EIR) process**, which must be conducted by an independent environmental assessment practitioner (EAP). Figure 2 depicts a summary of the S&EIR process.

[1] On 18 June 2010 the Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2010. These regulations came into effect on 02 August 2010 and replace the EIA regulations promulgated in 2006.

Figure 2: Summary of Scoping & EIR Process

The listed activities associated with the proposed development, as stipulation under 2010 Regulations **544, 545 & 546** are as follows:

Table 1: NEMA 2010 listed activities for the RE Capital 3 Solar Development

R544	Listed Activity	Activity Description
10(i)	The construction of facilities or infrastructure for the **transmission and distribution or electricity (i)** outside urban areas or industrial complexes with a capacity of more than 33kV, but less than 275kV.	**New overhead power line** linking the proposed on-site substation/operation building to the new proposed Major Transmission Substation. The final capacity of the transmission line may still change in the detailed design.
11	The construction of **(ii)** channels **(iii)** bridges **(v)** weirs **(x)** buildings exceeding 50m² in size, or **(xi)** infrastructure or structures covering 50m² or more, where such construction occurs **within a watercourse or within 32m of a watercourse**, measured from the edge of the watercourse, excluding where such construction will occur behind the development line.	The possible construction of roads/tracks & PV arrays across the minor drainage lines or in proximity to seasonal pans.
18	The **infilling or depositing of any material** of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, pebbles or rock of more than 5cubic metres from **(i) a watercourse.**	The possible construction of roads/tracks & PV arrays across the minor drainage lines
22 (ii)	The **construction of a road**, **outside urban areas**, **(i)** with a reserve wider than 13.5m or, **(ii)** where no reserve	Construction of **access and internal roads** for the solar facility for

	exists where the road is wider than 8m or, **(iii)** for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	construction and operation phases outside the urban area and of both Upington and Keimoes.
R545	**Listed Activity**	**Activity Description**
1	The construction of facilities or infrastructure for the **generation of electricity** where the electricity output is **20MW or more**.	RE Capital 3 will have a maximum generation capacity of **225MW**.
8	The construction of facilities or infrastructure for the **transmission and distribution of electricity** with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.	**New overhead power line** linking the proposed on-site substation/operation building to the proposed new Eskom Major Transmission Substation. The capacity of these proposed lines may change once detailed design is completed.
15	**Physical alteration of undeveloped, vacant or derelict land** to residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is **20ha or more**.	Development of the RE Capital 3 Solar Development of approximately **500ha** on vacant land, outside of the Urban Areas of both Upington and Keimoes
R546	**Listed Activity**	**Activity Description**
4	The **construction of a road wider than 4m** with a reserve less than 13.5m. All areas outside urban areas.	Construction of **access and internal roads wider than 4 metres** for the solar facility, outside the urban areas of both Upington and Keimoes.
14	The **clearance of an area of 5ha or more of vegetation** where 75% or more of the vegetative cover constitutes indigenous vegetation. All areas outside urban areas.	**Vegetation clearing** for the Solar Panels and associated infrastructure: access roads, cable trenches and on-site substation & axillary buildings etc. **outside the urban areas of Upington and Keimoes** Solar Energy Plant to be constructed over an area approximately 500ha on private land. Intact vegetation to be avoided by solar facility as far as possible.

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

2.3 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY (ACT 10 OF 2004)

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

The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is

required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur. **However, all of the vegetation types on both the study sites are classified as Least Threatened.**

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

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

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

According to the national vegetation map (Mucina & Rutherford 2006), the property lies within the three distinct vegetation types namely **Boesmanland Arid Grassland** on the southern/central portion of the property, **Kalahari Karroid Shrubland** on the northern section of the property and **Lower Gariep Alluvial Vegetation** along the Orange River on the south of the property. The proposed study sites fall within Boesmanland Arid Grassland and Kalahari Karroid Shrubland, both of which are considered **Least Threatened**.

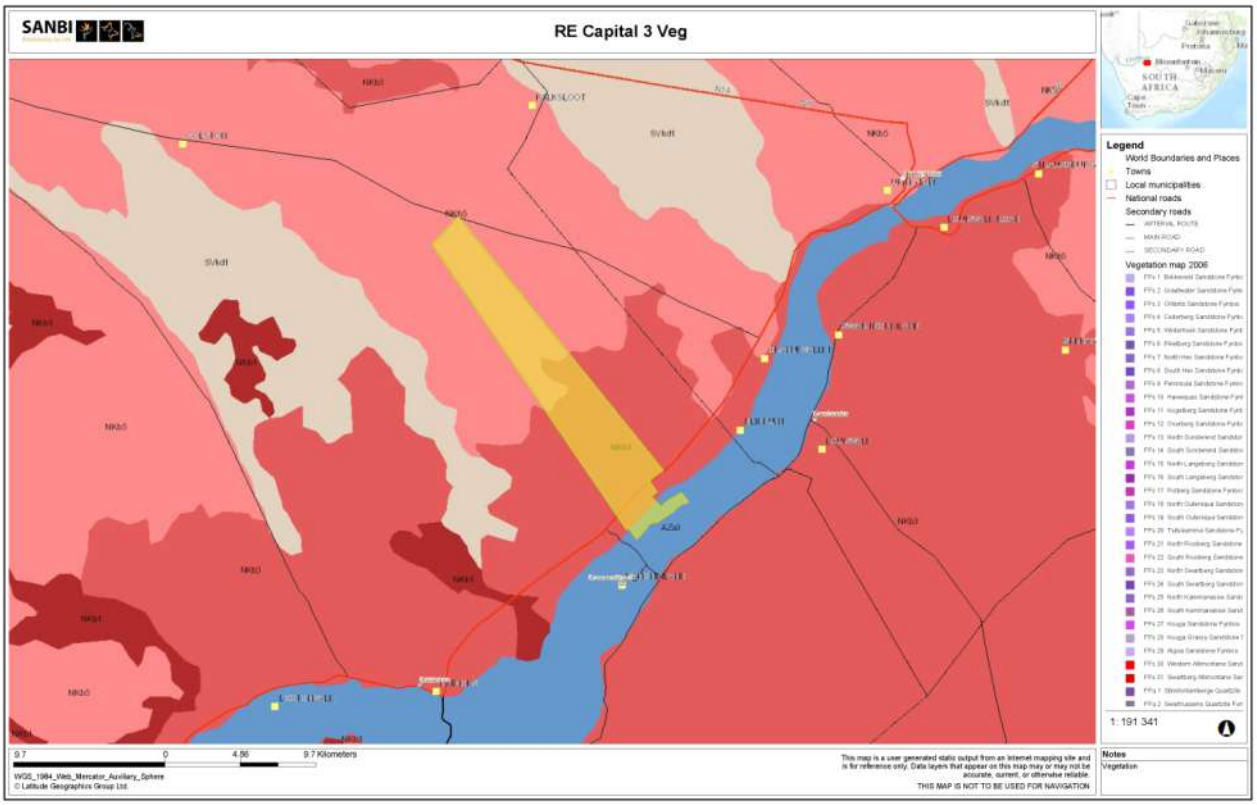

Figure 3: The broad-scale vegetation in and around the proposed RE Capital Solar Facility. The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006),

2.4 NATIONAL PROTECTED AREA EXPANSION STRATEGY (NPAES) FOR S.A. 2008 (2010)

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

The NPAES identifies 42 focus areas for land-based protected area expansion in South Africa. These are large intact and un-fragmented areas suitable for the creation or expansion of large protected areas. The closest focus area is the **Kamiesberg Boesmanland Augrabies** focus area that is situated 60km west of the study site.

The Kamiesberg Bushmanland Augrabies focus area, represents the largest remaining natural area for expansion of the protected area network and forms part of the planned Lower Orange River Trans-frontier Conservation Area (TFCA – extending from Augrabies Falls to the mouth of the Orange River, along the S.A./Namibian border). It provides an opportunity to protect 22 Desert and Succulent Karoo vegetation types, mostly completely unprotected, several river types that are still intact but not protected, and important ecological gradients and centres of endemism.

The proposed RE Capital 3 Solar Facility will **not have an effect** on this or any other **NPAES** focus Area.

2.5 NAMAQUA DISTRICT BIODIVERSITY SECTOR PLAN, 2008.

Biodiversity sector plans are intended to help guide land-use planning, environmental assessments and authorisations; and, natural resource management in order to promote development which occurs in a sustainable manner.

The Namaqua District Biodiversity Sector Plan was developed to further the awareness of the unique biodiversity in the area, the value this bio diversity represents to people as well as the management mechanisms that can ensure its protection and sustainable utilisation.

The biodiversity profile information from this plan has been incorporated into the environmental planning section of the Spatial Development Frameworks (SDF's) for each of the six local municipalities in the district (including the neighbouring Khai Ma Municipality).

The Namaqua District Critical Biodiversity Areas (CBA) have however been mapped to include the Khai Garib Municipal area including the study site. A **type 2 CBA** was mapped on the southern portion of the property along the Orange River. Level 2 CBA's are designated to near-natural landscapes including:

- Ecosystems and species largely intact and undisturbed,
- Areas with intermediate irreplaceability or some flexibility in terms of area required to meet biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising our ability to achieve targets, and
- These are landscapes that are approaching but have not passed their limits of acceptable change. .

The proposed RE Capital 3 Solar facility will not affect this level 2 CBA along the Southern section of the property.

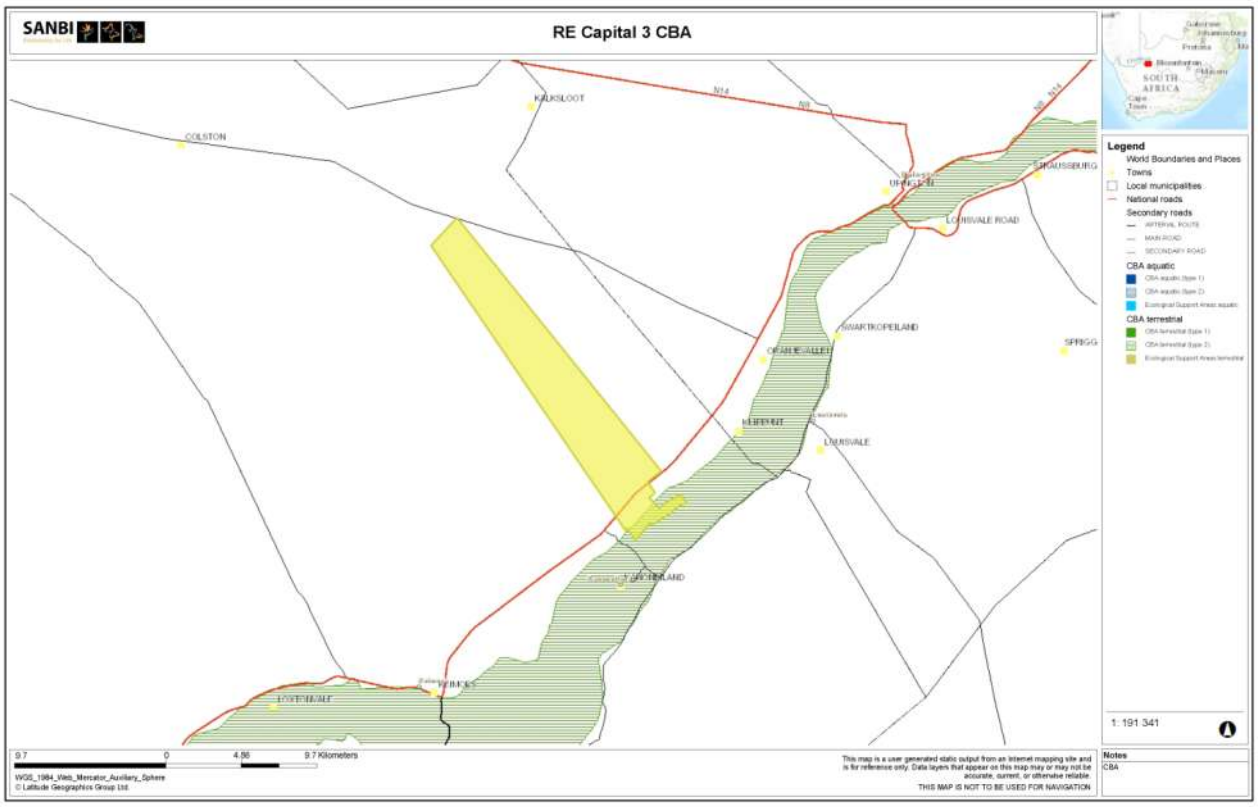

Figure 4: Showing Critical Biodiversity Areas (CBA's) in relation to Portion 12 of Dyasonsklip 454.

According to the information provided by the South African National Biodiversity Institute (SANBI) through their Biodiversity GIS (BGIS) system, the environment in the Kai! Garib Local Municipality is mostly untransformed (96% natural areas remaining). The Augrabies National Park covers 45 828ha, which amounts to 6.3% of the municipal area. Two biomes occur within the municipality, which support seven (7) vegetation types, none of which are classified as critically endangered, while one (Lower Gariep Alluvial vegetation) is considered to be Endangered.

This vegetation is however restricted to the banks of the Orange River and would not be affected by the RE Capital 3 Solar Development.

2.6 NATIONAL FORESTS ACT (NO. 84 OF 1998):

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

To date **no protected tree species** have been identified within the proposed RE Capital 3 solar development area. The biodiversity specialist will confirm this during the Environmental Impact Assessment Phase of the project.

Please refer to the Ecological Scoping Report in Appendix D, Annexure D1 for a detailed description of the plant species found to occur in the area.

2.7 CONSERVATION OF AGRICULTURAL RESOURCES ACT – CARA (ACT 43 OF 1983):

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

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

The abundance of alien plant species on the RE Capital 3 site is very low, which can be ascribed firstly to the aridity of the site.

In terms of soil and water resources, the main drainage channels and several pans highlighted as sensitive. Caution would need to be exercised if any development were to take place within these areas.

2.8 NORTHERN CAPE NATURE CONSERVATION ACT, NO. 9 OF 2009:

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

Manipulation of boundary fences: *19. No Person may –*

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

It is recommended that the perimeter fencing around the solar development site will be constructed in a manner which allows for the passage of small and medium sized mammals: The biodiversity specialist will make recommendations with regard to the specific fencing configuration during the EIA phase of this project.

There are also likely to be present which are either protected under the National Forests Act such as *Boscia albitrunca* or protected under the Northern Cape Nature Conservation Act of 2009, which includes all *Mesembryanthemacea, Boscia foetida*, all species within the *Euphorbiaceae*. *Oxalidaceae, Iridaceae*, all species within the genera *Nemesia* and *Jamesbrittenia*. Apart from the above species there may also be other listed species present as the area has probably not been well sampled in the past. Further detailed of protected species on site will be provided in the EIA phase of the project.

2.9 NATURE AND ENVIRONMENTAL CONSERVATION ORDINANCE (19 OF 1974)

This legislation was developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered. The provincial environmental authorities are responsible for implementing the provisions of this legislation, which includes the issuing of permits

etc. In the Northern Cape, the Department of Environment and Nature Conservation fulfils this mandate.

According to the SANBI SIBIS database, 286 indigenous plant species have been recorded from the quarter degree squares 2820 BD, DB and 2821 AC and CA. This includes 7 species of conservation concern as listed in Table 3 of the Ecological Scoping Report in Annexure D1.

Although not all the listed species would occur at the site, there is a high probability that at least some of these species occur at the site.

2.10 NATIONAL HERITAGE RESOURCES ACT

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

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

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

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

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

Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3).

In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

Dr **David Morris** from the **McGregor Museum Department of Archaeology** has provided heritage input into this Scoping Report. A copy of the Scoping Phase Heritage input is attached in **Annexure D3**.

2.11 NATIONAL WATER ACT, NO 36 OF 1998

Section 21c & i of the National Water Act (NWA) requires the Applicant to apply for authorisation from the Department of Water Affairs for an activity in, or in proximity to any watercourse. Such an application may be required for any access road that may cross the main drainage channel. The actual footprint of the solar panels is to be developed to avoid the main drainage channel crossing the property.

Water required for the construction and operation of the RE Capital 3 Solar is to be sourced from boreholes on the property (preferred supply), from the storage dam on the property or from the Khai Garib municipality. Please see the **Engineering Report** in **Annexure D4** for additional information in this regard.

Figure 5: Showing potential water sources on portion 12 of Dyasonsklip 454.

An Application will be submitted to the Northern Cape Department of Water Affairs (DWA) for the registration of the boreholes, as well as an **Application for a Water Use Licence (WUL)** for the use of the borehole water for the purposes of the solar facility.

This WUL Application will be reviewed by DWA once the Environmental Authorisation has been received from DEA and approval provided by the Department of Agriculture. DWA and the Department of Agriculture have been registered as a stakeholder on this environmental application.

2.12 SUSTAINABILITY IMPERATIVE

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

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

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

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

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

In terms of NEMA sustainable development requires the integration of the relevant factors, the purpose of which is *to ensure that development serves present and future generations.*[2]

It is believed that the proposed 225MW RE Capital 3 solar development supports the notion of sustainable development by presenting a reasonable and feasible alternative to the existing vacant land use type, which has limited agricultural potential due the lack of water and infrastructure.

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

3 ACTIVITY

The Applicant intends to develop a **solar energy facility** with a generation capacity not exceeding **225MW** (Megawatt). The proposed RE Capital 3 Solar Development is to be located on a development site of approximately 500ha on a portion of portion 12 of the farm Dyasonsklip near Upington in the Northern Cape. The project will consist of and be developed in three phases, consisting of 75MW each. Each phase will occupy approximately 165ha.

The proposed infrastructure planned to be constructed includes a series of solar PV arrays and inverters, internal electrical reticulation and an internal road network. An on-site substation will need to be constructed - this will typically include a transformer to allow the generated power to be connected to Eskom's electricity grid. Auxiliary buildings, including ablution, workshops and storage areas, are planned to be erected. A distribution line will also be required to distribute the generated electricity from the site to the Eskom substation and grid.

The series of **PV array** rows which will cover an approximate **footprint** of **450 hectares** (150 hectares per phase), **internal roads** covering approximately **36 hectares** (12 hectares per phase) and **Auxiliary Buildings** of approximately **3 hectares** (1 hectare per phase).

[2] See definition of "sustainable development" in section 1 of NEMA.

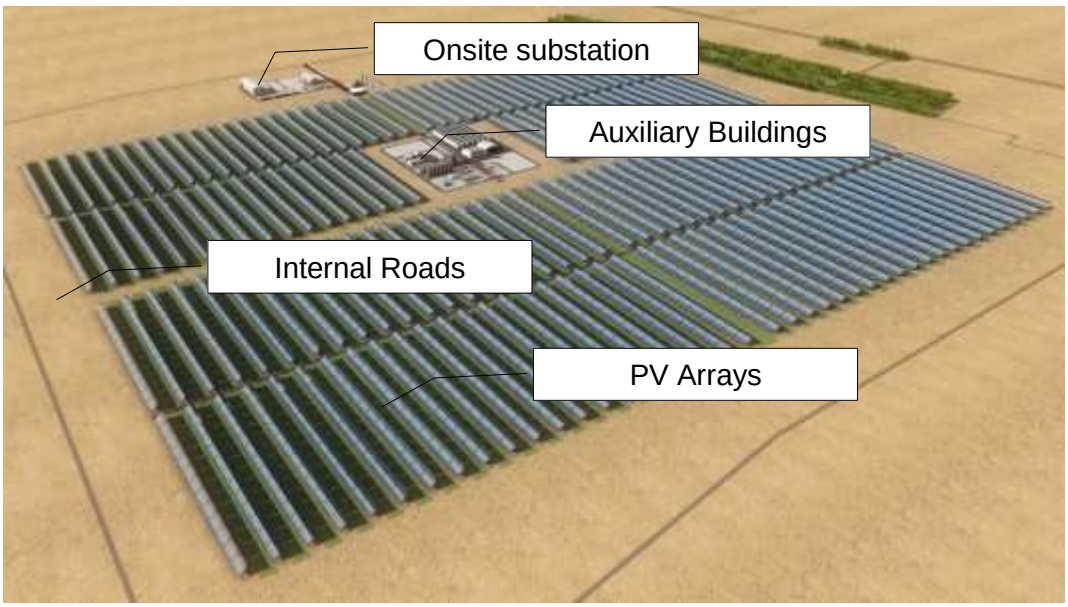

Figure 6: A typical layout of the components of a Solar PV facility (Source: Solek Engineering Report, 2013).

The 225MW RE Capital 3 will occupy approximately **500ha** of land – the estimated portion of land each component will typically occupy for the total project as well as for each phase is summarised in the tables below.

Table 2: Component size and percentage for total development

Component	Estimated extent of total component	Percentage of total footprint (500ha)	Percentage of total farm (±5725 ha)
PV arrays	450ha (4.5 km^2)	91%	less than 8%
Internal roads	36ha (0.36 km^2)	7%	less than 0.7%
Auxiliary buildings	3ha (0.03 km^2)	0.6%	less than 0.1%

Table 3: Component size and percentage for each phase

Component	Estimated extent of components	Percentage of total footprint (+ 165 ha)	Percentage of total farm (±5725 ha)
PV arrays	150 ha (1.5 km^2)	91%	less than 3%
Internal roads	12 ha (0.12 km^2)	7%	less than 0.3%
Auxiliary buildings	1 ha (0.01 km^2)	0.6%	less than 0.1%

Various site and layout alternatives for the abovementioned components are under consideration. Details regarding the consideration of alternatives is included in section 4 below.

Please see the **layout report** attached in **Appendix C** for additional supplementary information.

4 CONSIDERATION OF ALTERNATIVES

A number of alternatives, including activity, site, layout and technological alternatives were considered for the proposed RE Capital 3 Solar Development. The consideration of these alternatives are detailed below.

4.1 ACTIVITY ALTERNATIVES

Two activity alternatives were considered at the onset of this project, namely:

- The generation of electricity via Concentrated Solar Power (CSP) facilities; and
- The generation of electricity via Photovoltaic (PV) power facilities.

According to Solek, 2013, CSP facilities operate by concentrating the sun's energy to produce heat that either drives a steam turbine or an external heat engine to produce electricity. CSP facilities consist of a series of heliostats or trough panels with mirrors that concentrate sunlight on a receiver tower (although some CSP farms are developed without receiver towers).

A liquid (known as heat transfer fluid, HTF, which usually consists of a mix of oils) or gas medium is heated. The heat is then used to convert water to steam, which is used to generate electricity through steam turbine generators. The heated liquid (HTF) or gas medium is then cooled, condensed, and reused. Evaporation ponds for waste water are needed to separate sludge or solids containing hazardous chemicals from the chemical waste water, cycle water blow down and cleaning liquids. Such materials are removed from the ponds by a licenced waste company. Hazardous waste would then be disposed by a hazardous waste facility; waste that is not hazardous should be disposed at a landfill site.

The option of operating a CSP was eliminated and will not be considered further in this environmental process, for the following reasons:

- CSP facilities have greater impact on birds than PV farms because of the associated central receiver tower, standby focal points and heliostats;
- CSP facilities require significant volumes of water for operation (water is a scarce resource in this region); and
- CSP facilities generate significant volumes of waste product.

Figure 7: Example site of a Concentrated Solar Power Facility (Solek, 2013)

The remainder of the environmental process will thus only assess the impacts associated with the preferred activity alternative, namely the generation of power through a PV facility.

4.2 SITE ALTERNATIVES

Two site alternatives for the proposed facility have been considered will be investigated further. For ease of reference, these two site alternatives will be referred to as the Northern site and the Central Site (both these sites are on portion 12 of the farm Dyasonsklip 454).

Factors that will influence the final decision of whether the northern or central site will be developed include the environmental impacts, access to the site, the connection to the grid, the confirmed location of the new Major Transmission Sub-Station (MTS), water availability and the costs involved with each option.

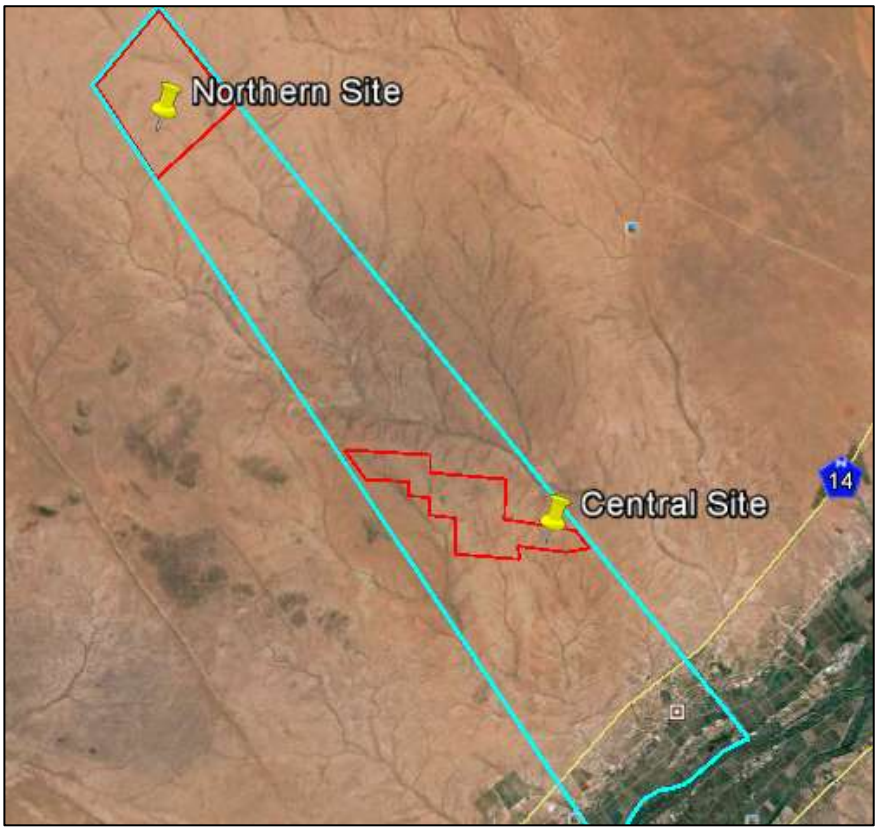

Figure 8: Showing the proposed site alternatives in relation to the property boundary.

Both the Northern and Central sites will be discussed in more detail below, taking into account the access to the site, the connection to the substation and the layout of the components inside the 500ha boundary. One of these alternatives may be eliminated after this scoping phase, in which case the assessment of impacts will only take place for one of the alternatives.

Further details regarding the site alternatives are included below and in the layout report attached in **Appendix C**.

4.2.1 Northern Site Alternative

The 500 hectare area was identified due to its level surface, easy access, and the close proximity to one of the options for the proposed new MTS substation. The vegetation is not very dense or high, eliminating the chances of casting shadows on the solar arrays or having an effect of food security.

The identified 500 hectare study area has been divided into three parts, approximately 165ha each, on which the three phases will be developed. The optimum arrangement of the three phases has not been fixed, and will only be determined once the project has been awarded preferred bidder status.

4.2.1.1 Access options

The D3276 district road runs directly past the top end of the proposed site. No additional access road will therefore be constructed and as such investigation of additional alternatives was not necessary. The entrance to the proposed site will be directly from the D3276. The laydown and auxiliary building area will be situated near the entrance of each phase to simplify the logistical arrangements.

Figure 9: Showing the proposed access to the Northern site along DR3276.

4.2.1.2 Powerline options

Four power line options are under investigation for the northern site. These alternative routes all lead from the individual on-site substations, to one of the three proposed locations for the new Eskom MTS substation. **Option 1** will be across the neighbouring farm to the northern MTS alternative location. **Options 2 and 3** will also be across the neighbouring farms, to one of the two alternative southern MTS locations. **Option 4** runs down the border of the Dyason's Klip farm to the existing 132kV line. The new power line will either loop into this existing 132kV line, or run parallel to the line, to the proposed MTS substation.

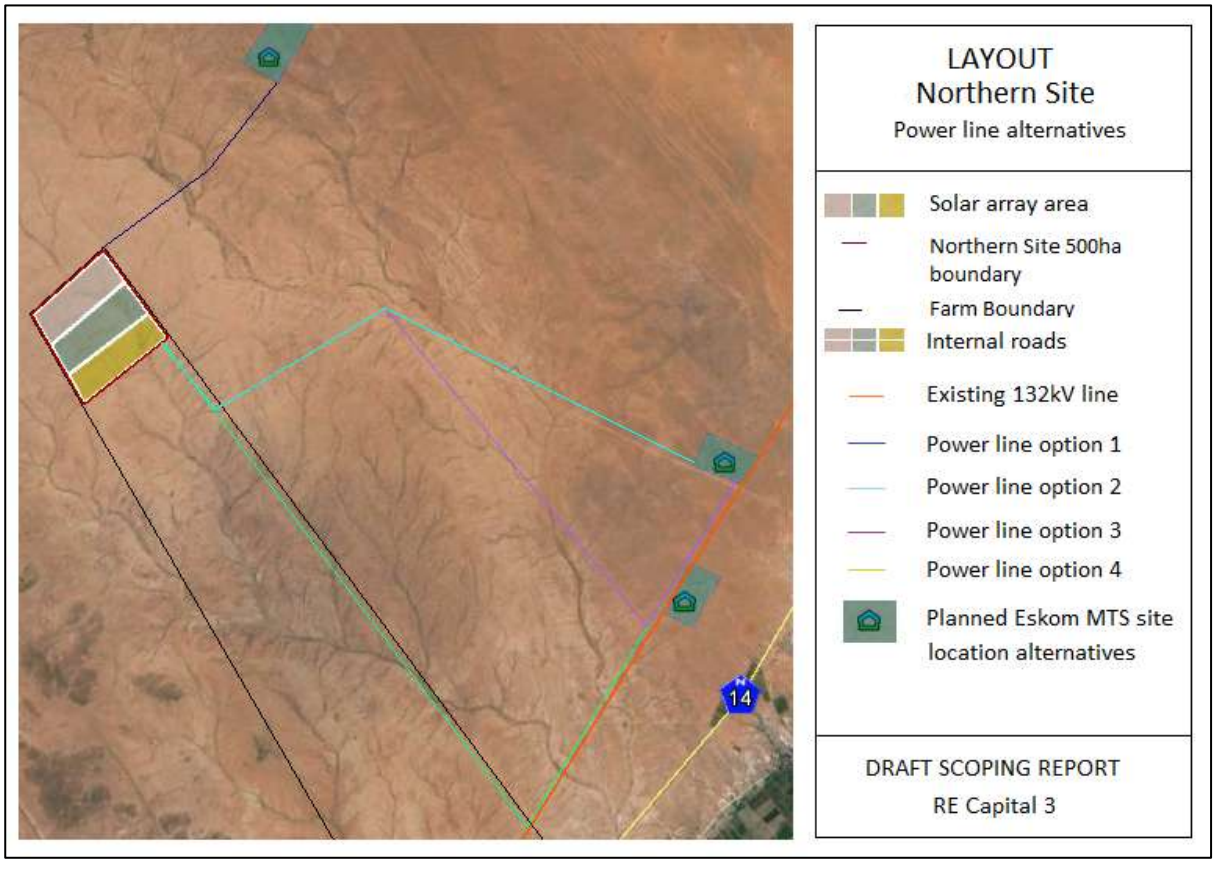

Figure 10: Northern site grid connection alternatives (Solek, 2013)

4.2.2 Central Site Alternative

The approximate 500 hectare area was identified due to its level surface, relatively easy access, and the close proximity to the existing 132kV line and proposed new MTS substations.

As with the northern site alternative, the identified 500 hectare central study area has been divided into three parts, approximately 165ha each, on which the three phases will be developed. The optimum arrangement of the three phases has not been fixed, and will only be determined once the project has been awarded preferred bidder status.

4.2.2.1 Access Options

Access to the central site can be via two routes. There is an existing farm road running from the N14 to the proposed site. This is indicated on the figure below as the "internal access road". This road will have to be upgraded and expanded to a width of approximately 6m, to make allowance for the construction vehicles. The second alternative is to use the access road already under construction for the purpose of accessing the neighbouring solar facilities "neighbouring access road", which runs directly adjacent to the Dyason's Klip farm (along the eastern boundary).

This road is being constructed by the neighbouring project teams, to serve as an access alternative to their projects. No additional alterations to the road should be necessary. Consent to co-use this road is being negotiated.

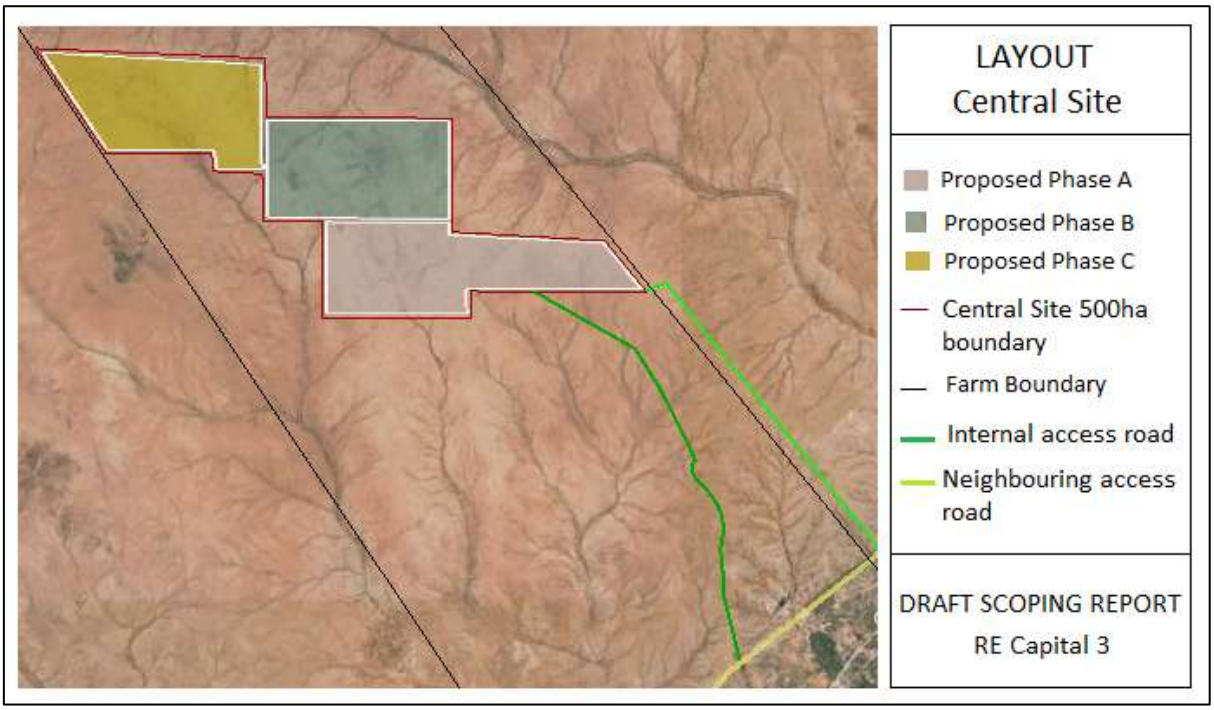

Figure 11: Central site alternative access options (Solek,2013)

Both these access options are considered viable and will be assessed in the environmental impact assessment phase of this project.

Figure 12: Showing internal access road (left) and neighbouring access road (right). The neighbour access road is currently being used for the construction of the Albengoa solar facility on an adjacent property.

4.2.2.2 Powerline options

For the central site four power line options are under investigation. As with the Northern site, these alternative routes all lead from the individual on-site substations, to one of the proposed locations for the new Eskom MTS substation. **Option 1** will be across the neighbouring farm, on the southern border of the farm, to one of the two possible MTS locations. **Options 2 and 3** will also be across the neighbouring farms, to the two possible southern MTS locations, running parallel and on both sides of the existing 132kV line. Option 4 is across the neighbouring farm, along the northern border of the farm, to one of the possible MTS substation locations. As with the Northern site, the options to loop in-to the existing line will also be investigated.

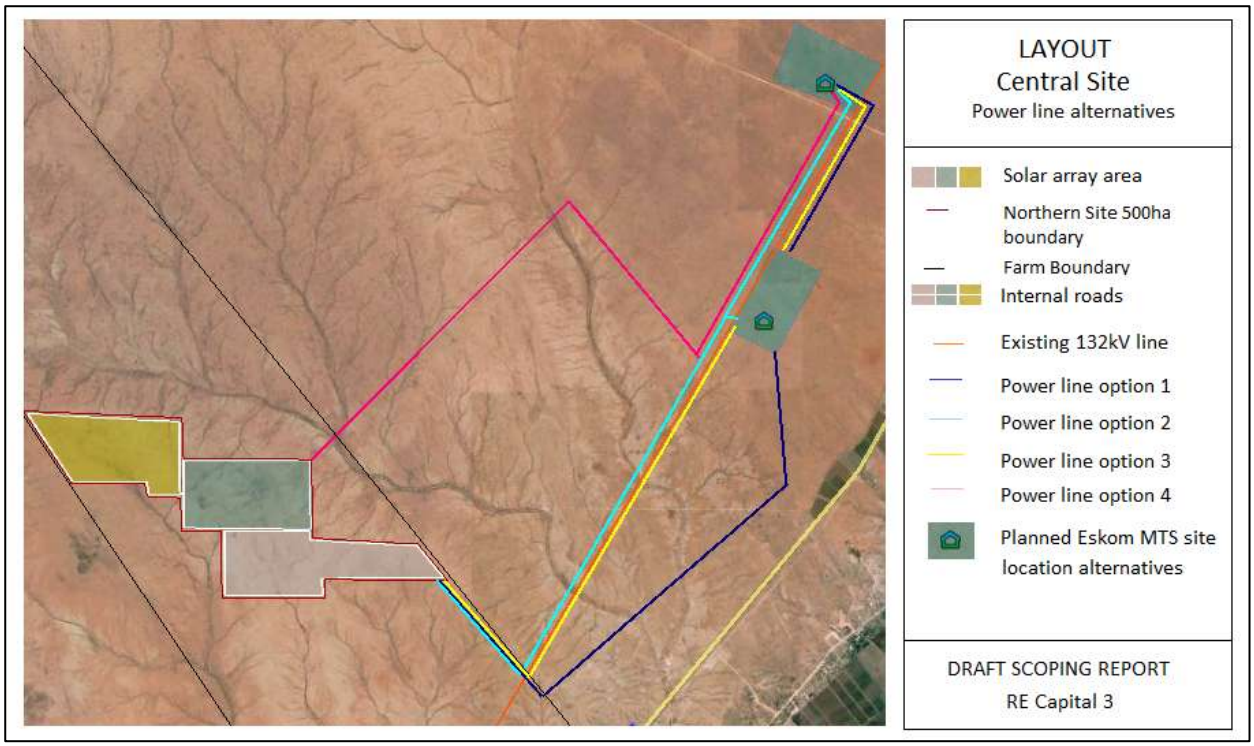

Figure 13: Central site grid connection alternatives (Solek, 2013)

4.3 LAYOUT ALTERNATIVES

Within each of the alternative sites, a number of layout alternatives will also be considered and assessed in this environmental process. At the current stage in the process (scoping) only the initial uniform layouts have been considered. Once all the participating specialists have identified sensitive areas within the initial study sites, additional layout alternatives will be developed to avoid these sensitive features.

Each of the site alternatives have been divided into three phases and a preliminary layout developed within these three phases.

NB: The optimum arrangement of the three phases and the specific layout within each phase is a costly exercise and will only be determined once the project has been awarded preferred bidder status.

For the purpose of the environmental process, a **total environmental footprint** will be considered and assessed (the detailed design within this footprint will only take place at a later stage).

Figures 14 - 21 below show the preliminary layout of the three phases within both alternative sites as well as the initial layouts within each phase.

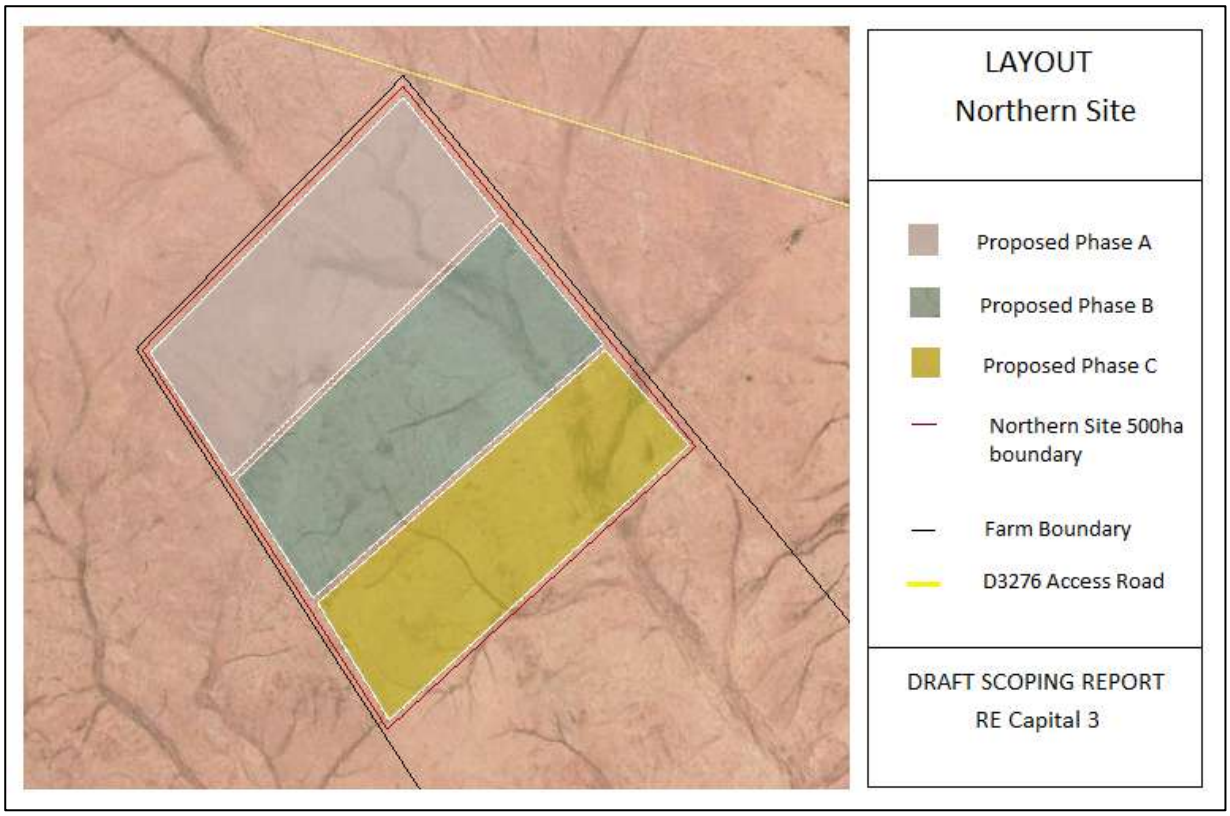

Figure 14: Showing the preliminary arrangement of phases within the northern site alternative (Solek, 2013).

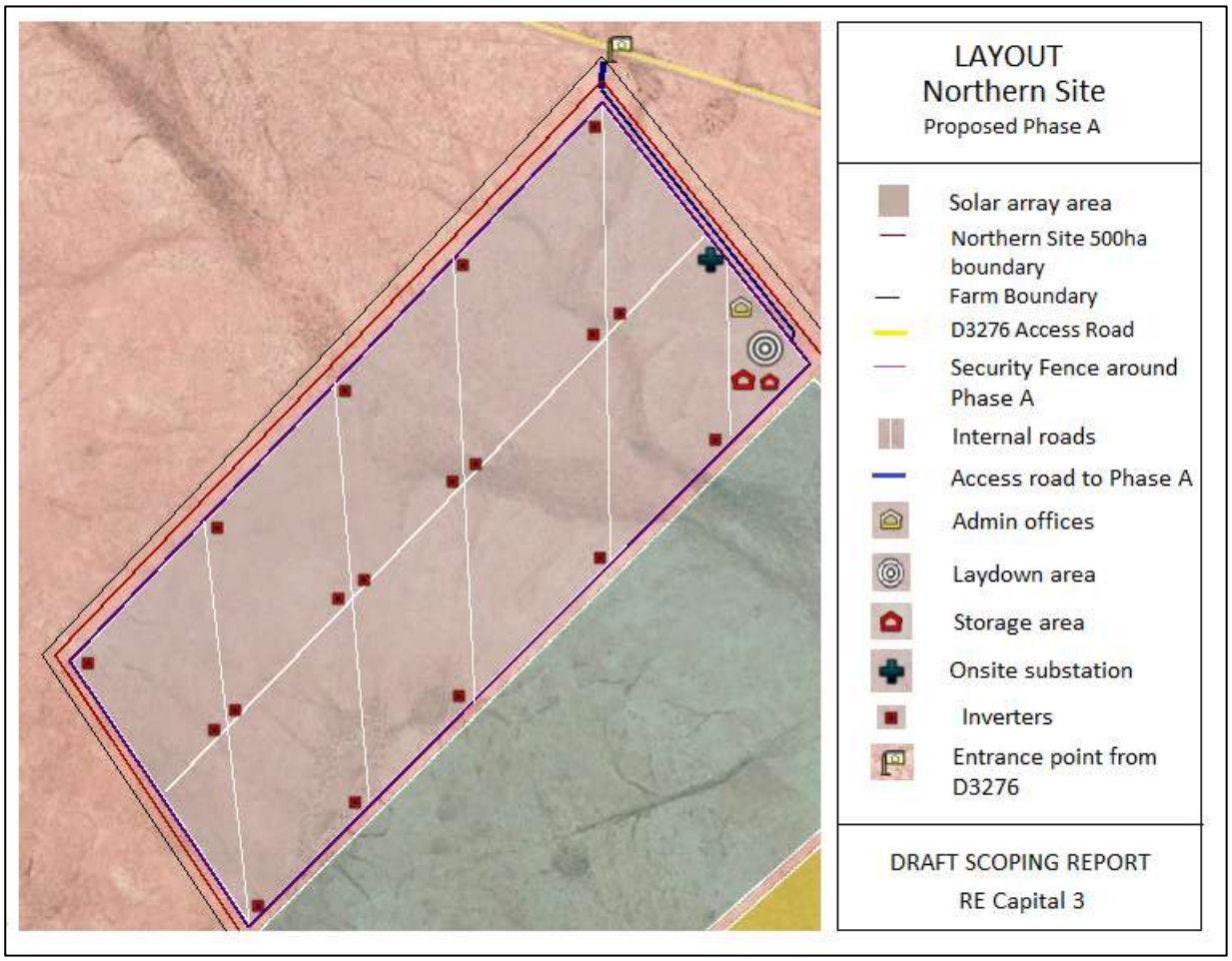

Figure 15: Showing the preliminary layout of Phase A within the northern site alternative (Solek, 2013).

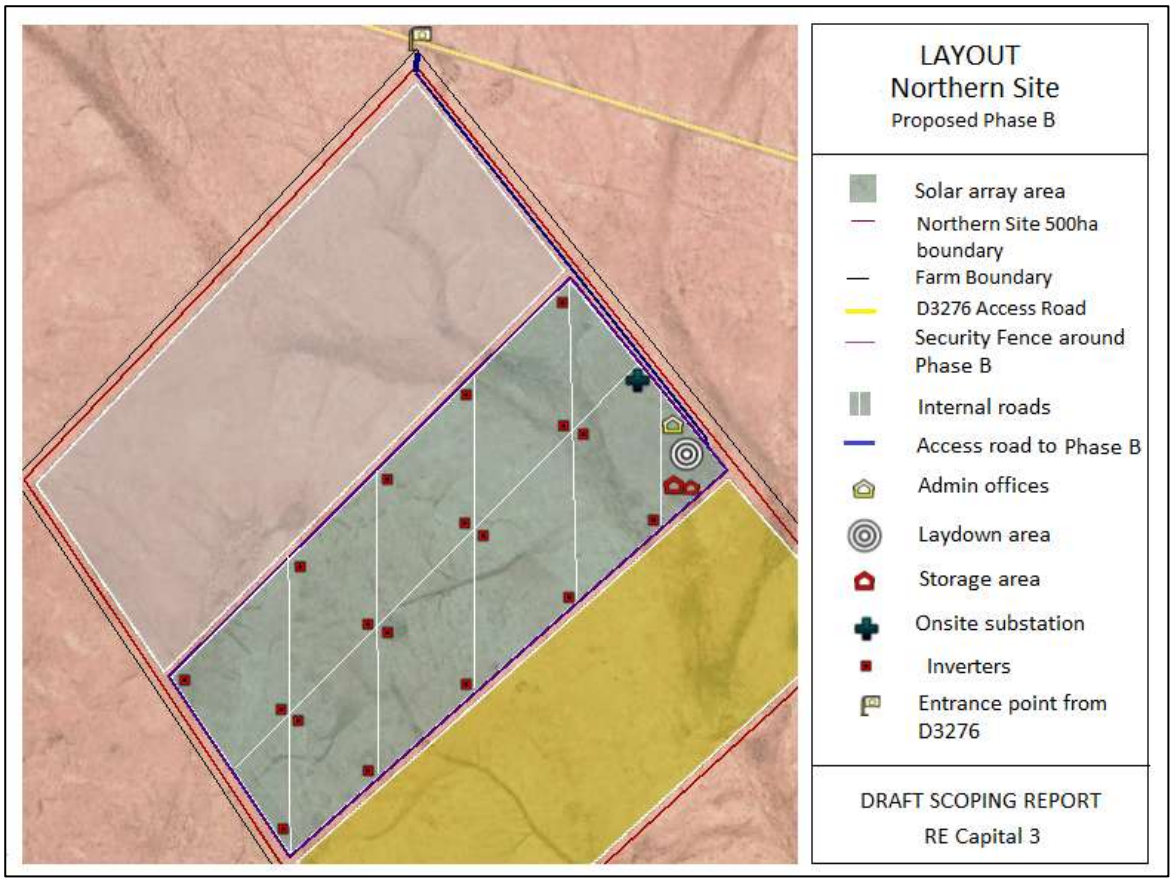

Figure 16: Showing the preliminary layout of Phase B within the northern site alternative (Solek, 2013).

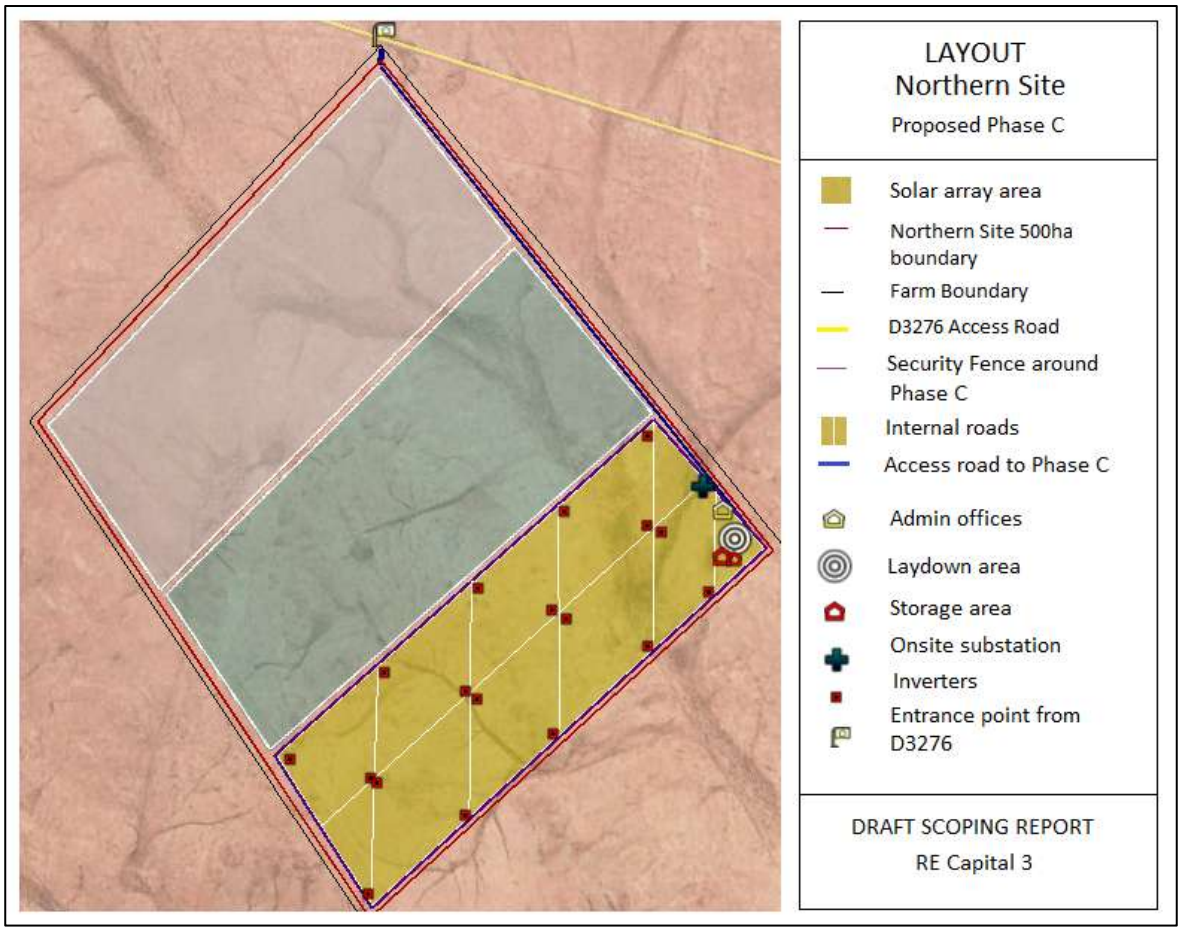

Figure 17: Showing the preliminary layout of Phase C within the northern site alternative (Solek, 2013).

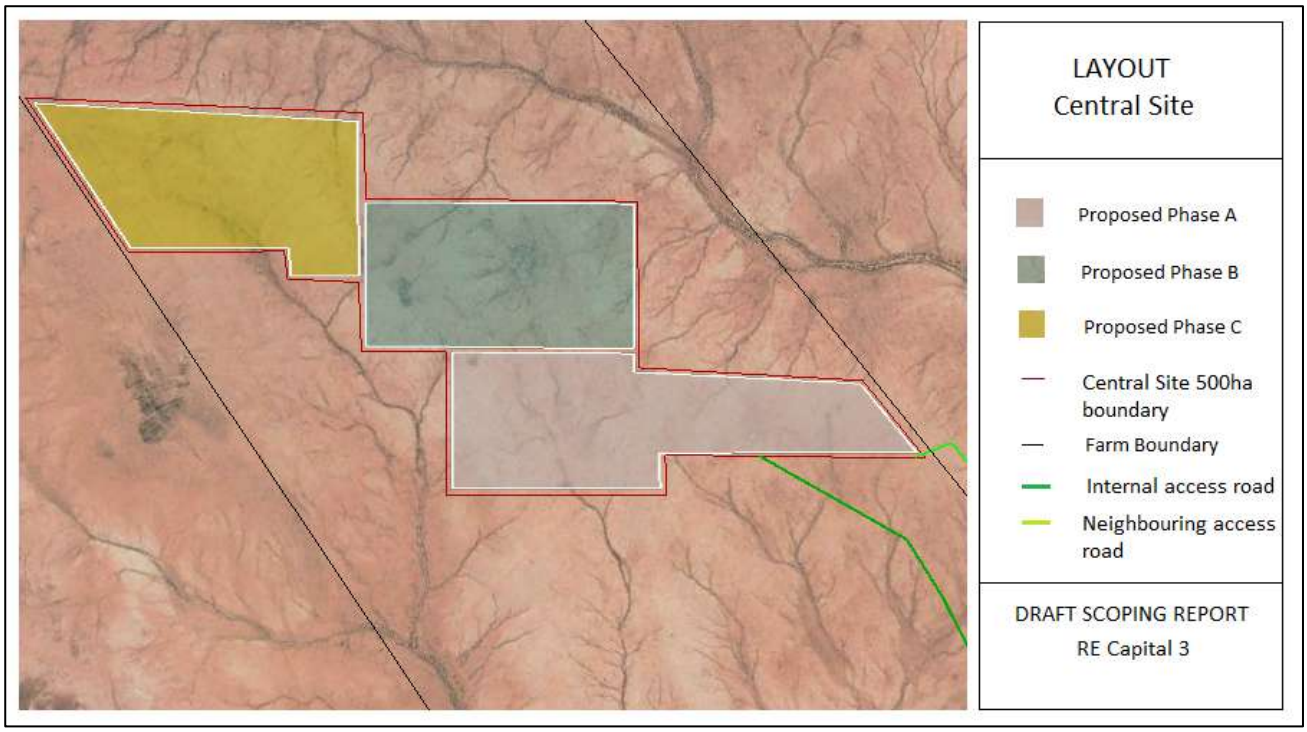

Figure 18: Showing the preliminary arrangement of phases within the central site alternative (Solek, 2013).

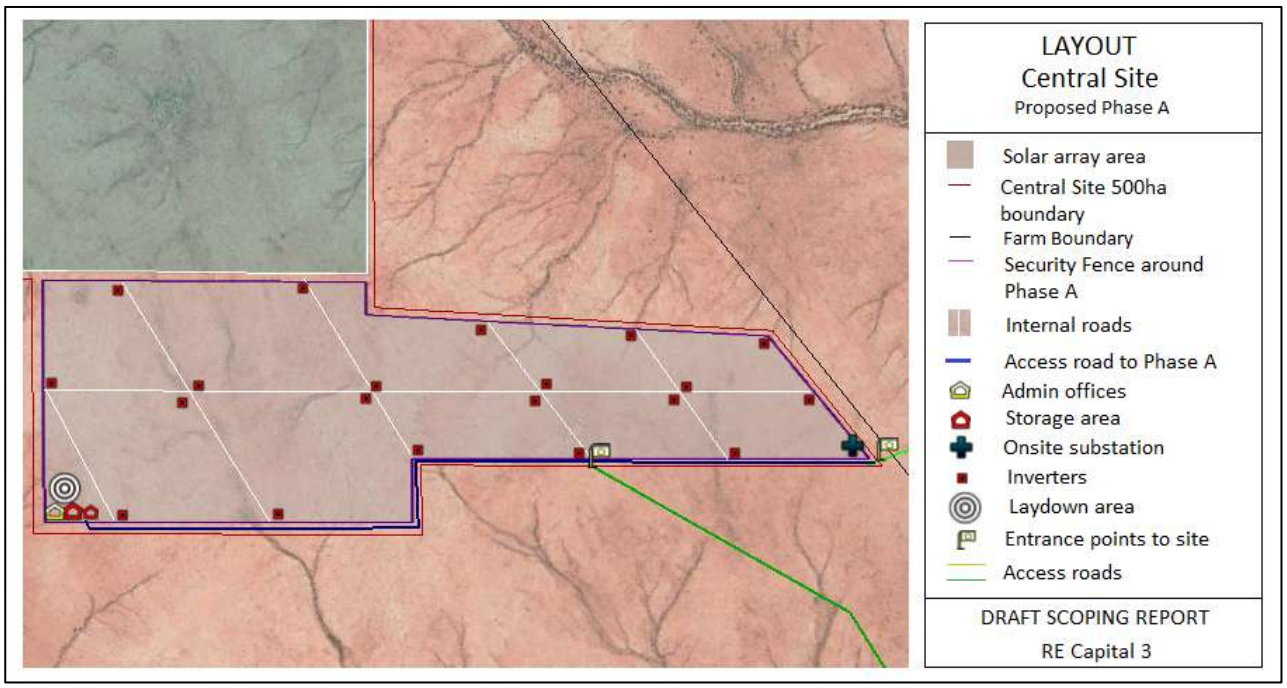

Figure 19: Showing the preliminary layout of Phase A within the central site alternative (Solek, 2013).

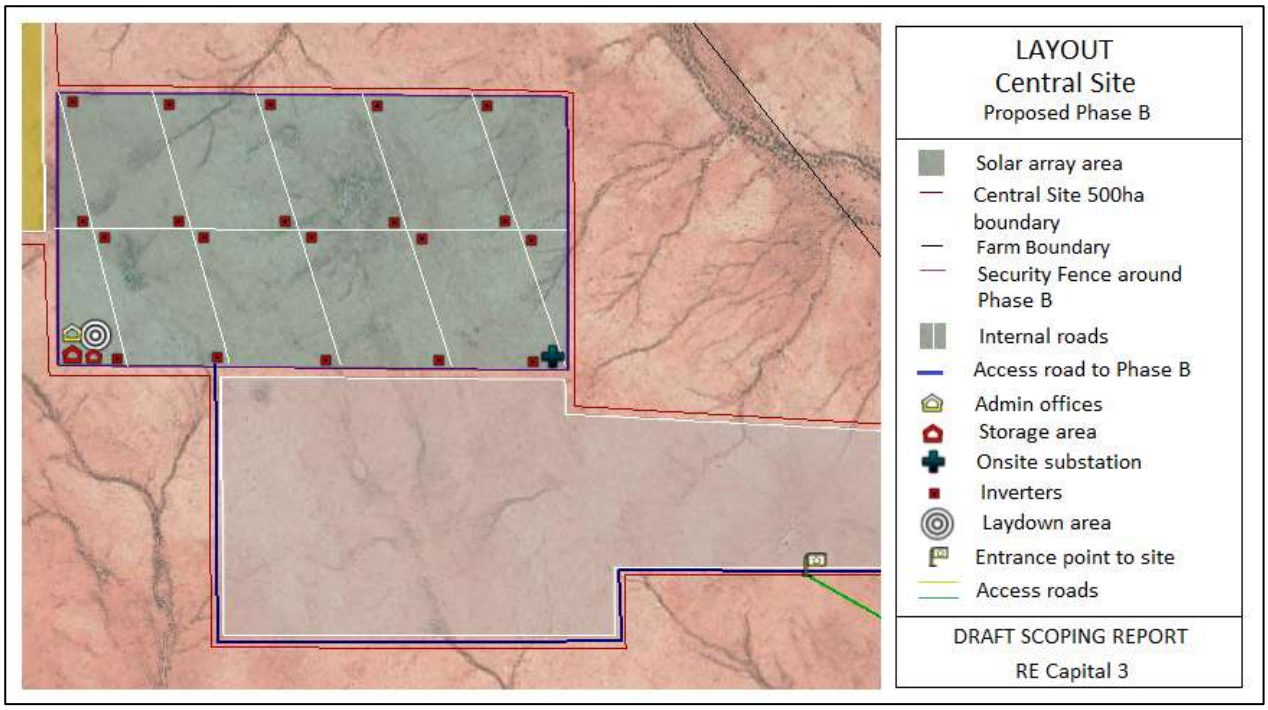

Figure 20: Showing the preliminary layout of Phase B within the central site alternative (Solek, 2013).

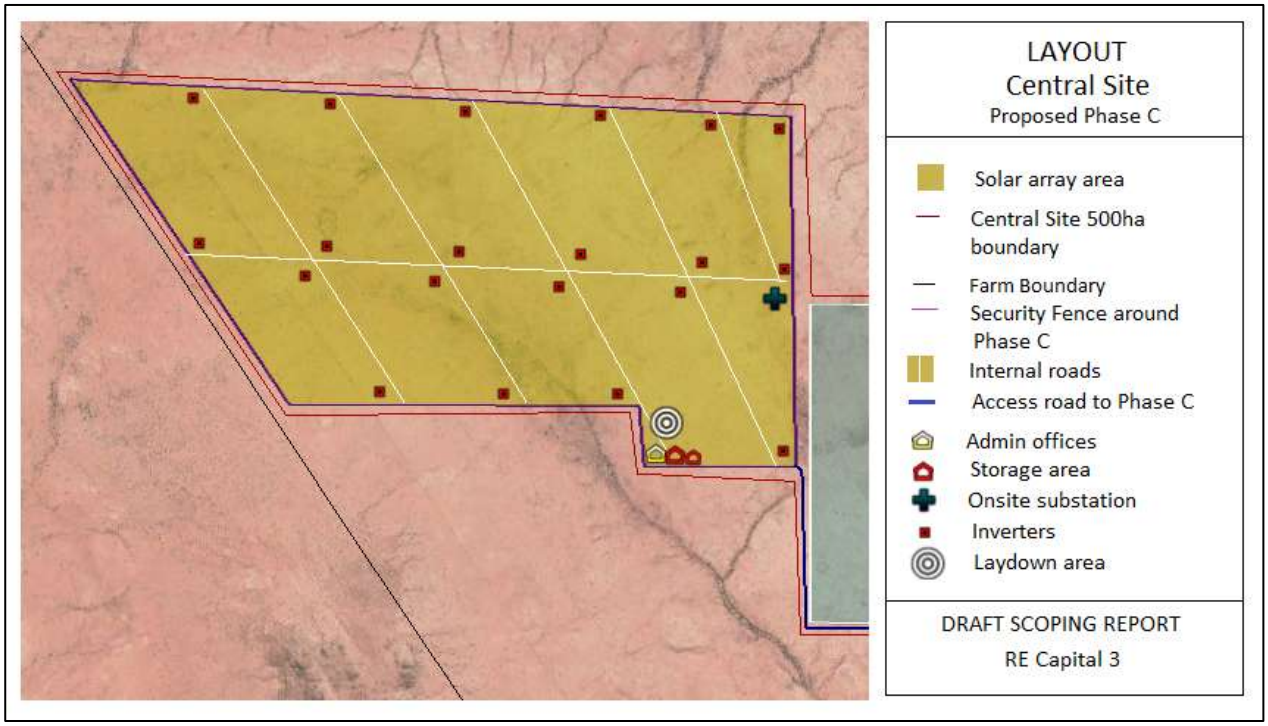

Figure 21: Showing the preliminary layout of Phase C within the central site alternative (Solek,2013).

4.4 TECHNOLOGICAL ALTERNATIVES

The preferred activity has been identified as the generation of electricity by means of a photovoltaic power facility. There are however technological alternatives or options that have been considered within the confines of the preferred activity. These technological alternatives for PV are considered under PV type, film alternatives and mounting alternatives.

4.4.1 PV Type

Two variations of PV generation were considered and are described in sections 4.4.1.1 and 4.4.1.2 below. The advantages and disadvantages of these PV types are summarised in table 4 below.

Table 4: showing advantages and disadvantages of PV types under investigation.

	Concentrated Photovoltaic	Conventional Photovoltaic
Advantages	- Takes up less surface area therefore "footprint" is less, resulting in less impact on soil, agriculture and biodiversity. - More energy can be produced per module.	- Lower visual impact (range between 2 m and 5 m in height). - Lower impact on birds due to lower height. - Lower impact on bats due to lower height. - Easier to erect PV technology. - Lower impact on heritage/ culture due to lower impact on landscape. - Easier to transport.
Disadvantages	- Higher visual impact, CPV systems can be up to 10 m high. - Higher impact on birds. - Higher impact on bats. - Requires skilled labour because more difficult to erect. - CPV systems are water intensive. - Higher cultural/ historic impact to the landscape. - Harder to transport – abnormal load.	- PV facilities of the same footprint of CPV facilities produce less power.

4.4.1.1 PV technological alternative T1: concentrated photovoltaic solar farm (CPV)

Concentrated Photovoltaic CPV technology differs from conventional photovoltaic systems (PV) in that the CPV modules use different solar cells and include lenses which focus light energy in a more concentrated manner, hence harvesting more energy from the sun. The efficiency of the cells provides benefits relating to capacity per module and reduced spatial requirements.

Figure 21: Example of concentrated photovoltaic (CPV) facility (Solek,2013)

CPV technology systems are much higher (vertically), thereby using less space(horizontally). CPV systems can often reach a maximum height of approximately 10 m.

CPV is not considered the preferred technological alternative for the following reasons:

- The increased height may result in visual impact on the landscape,
- CPV installations require a large amount of water for cooling, unlike PV panels which only require water for cleaning purposes, and
- CPV facilities are more difficult to construct than PV facilities.

4.4.1.2 PV Technological Alternative T2: Conventional Photovoltaic Solar Farm (PV)

This is the preferred and proposed technological alternative for the RE Capital 3 Solar Development.

Photovoltaic solar power is solar energy that is converted into electricity using photovoltaic solar cells. The captured light moves along a circuit from positive-type semiconductors to negative-type semiconductors in order to create electric voltage. Semiconductors only conduct electricity when exposed to light or heat, as opposed to conductors, which always conduct electricity, and insulators, which never conduct electricity.

Power is collected through a structure comprised of many solar cells, usually a solar power panel (also called a PV module). PV modules/solar panels can be combined into an "array" of panels in order to capture a greater amount of solar energy. PV solar panels can either be fixed (rows or tables) or they can be constructed on a single or double axis tracking system. Such a system will use sun sensors to follow the movements of the sun. With the double axis tracking system the sun can be tracked on more than one axis allowing the maximum radiation over the entire solar module.

The fixed tilt solar technology (table installations of rows) is the less expensive option but it has a much lower energy yield than the double axis tracking system (free standing panel installation).

4.4.2 Mounting Technology Alternatives

There are two major alternatives in terms of solar PV mounting, namely fixed-tilt and tracker mounting technology.

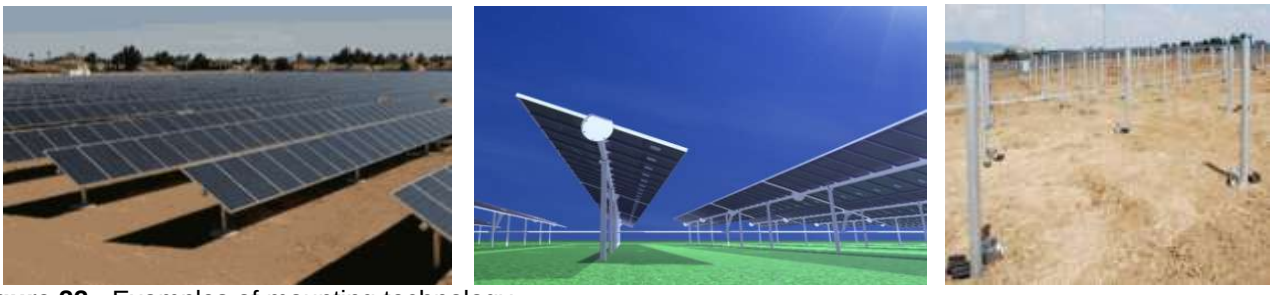

Figure 22: Examples of mounting technology.

When fixed-tilt solar mounting technology is considered, the solar PV modules are fixed to the ground and do not contain any moving parts. These modules are fixed at a specific north facing angle. This type of technology is less expensive than tracker technology, but it has a lower energy yield due to the limited exposure to sun radiation.

The **preferred technology** type is known as **horizontal tracker technology**. This technology is designed to follow the path of the sun across the sky. By using this technology, the modules are

exposed to typically 25% more radiation than fixed systems. The design is extremely robust and contains only a few moving parts. It also has more or less the same footprint and infrastructure requirements than that of fixed-tilt designs. The tracker requires approximately 1.8 to 2.3 hectares per megawatt. The tracking design is based on a simple design and makes use of a well proven off-the-shelve technology that is readily available. The maximum height of the trackers is typically less than 2 m. For the purpose of the environmental process, a maximum height of 5m is considered.

Figure 24: An example of a single axis tracking system. **NB – The final tracking technology will be only be decided at a later stage during the detailed design.**

The environmental impacts associated with different tracking technologies are likely to be similar and as such the final tracking technology will only be decided at a later stage during the detailed design.

The foundation of mountings can either be laid in a small concrete block, driven piers or a deep seated screw mounting system. The impact on agricultural resources and production of these alternatives are considered equal, although the concrete option will require greater inputs during decommissioning in order to remove the concrete from the soil. Driven piers and deep seated screws are recommended in order to minimise the environmental impact and input during decommissioning of the facility, but will be dependent on mechanical specifications.

The environmental impacts associated with different foundation technologies are likely to be similar and as such the final tracking technology will only be decided at a later stage during the detailed design.

4.4.3 Film Alternatives

There are a multitude of different film technologies available today. The best solution, according to research conducted, are either thin film (amorphous silicon or cadmium telluride) or multi-crystalline cells depending on the space and irradiance conditions. The electricity yield and application will be the deciding factor.

Multi-crystalline cells are the preferred technology type in South Africa, since the output of this technology is higher and it performs better under higher temperatures than the thin film technology. Furthermore, thin film technology is not yet feasible for South African large scale projects because of its higher price.

The environmental impacts associated with different film types are likely to be similar and as such the final film type technology will only be decided at a later stage during the detailed design.

4.5 NO-GO ALTERNATIVE

The **Status Quo Alternative** will mean that the RE Capital 3 Solar Development not go ahead and remain undeveloped as it is currently. The land on which the proposed project is proposed is currently vacant. It is currently used for limited cattle and sheep grazing activities. The agricultural specialist found the site unsuitable for commercial cultivation due to limiting factors such as shallow soil depth and hard setting carbonate horizons below surface. The low clay percentage results in low water holding capacity and low nutrient availability. Severe climatic conditions, such as low rainfall, further limit commercial cultivation.

The solar-power generation potential of the Dyasonsklip area, particularly in proximity to the New proposed MTS substation, is significant and will persist should the no-go option be taken. The 'No-go/Status Quo' alternative will limit the potential associated with the land and the area as a whole for ensuring energy security locally, as well as the meeting of renewable energy targets on a provincial and national scale. Should the 'no-go' alternative be considered, the positive impacts associated with the solar facility (increased revenue for the farmer, local employment and generation of electricity from a renewable resource) will not be realised.

The **no-go alternative is thus not considered a favourable option in light of the benefits associated with the proposed solar facility development, however it will be used as a baseline from which to determine the level and significance of potential impacts during the Impact Assessment phase of the on-going environmental process.**

5 ENGINEERING OVERVIEW

The following details were drawn from the **Engineering Report** (van der Merwe, 2012), attached in Appendix D, **Annexure D4**.

5.1 BASIC UNDERSTANDING OF SOLAR PV PLANTS

Photovoltaic (PV) panels convert the energy delivered by the sun to direct current (DC) electric energy. The array of panels is connected to an inverter by means of a network of cables. The DC power is inverted to alternating current (AC) power by a grid-tied inverter. The AC power can then be added to the national electricity network (grid). The voltage at which power is generated is stepped up to the required voltage and frequency of the national grid by using a transformer. The electricity is distributed from the on-site transformers via distribution lines to the nearest Eskom substation. From the Eskom substation the electricity is fed into the Eskom grid.

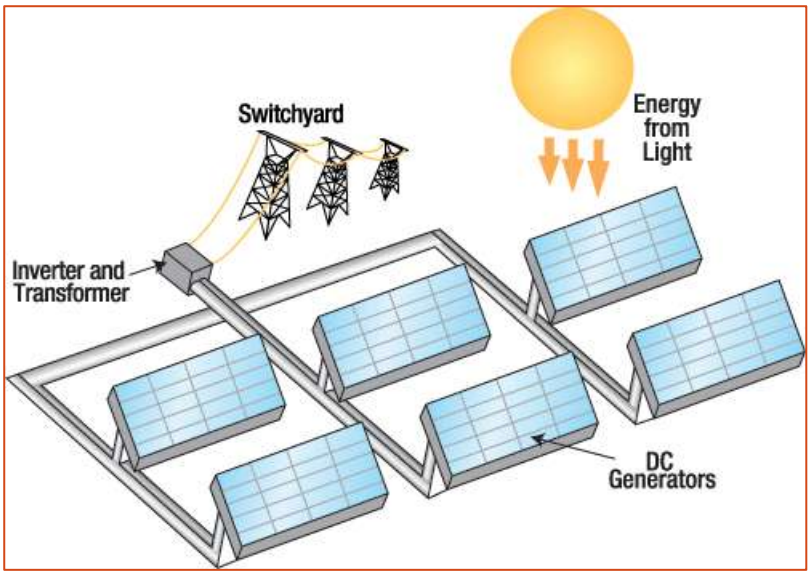

Figure 25: Typical overview of PV power generation facility (Solek, 2013).

The infrastructure of the facility includes the ground-mounted panels, cables, access roads, auxiliary roads, an on-site substation, and a distribution line. The primary input of the system is sunlight, which is converted to electricity. The facility also utilises auxiliary electricity from the Eskom grid to power tracker motors in order to optimise the amount of sunlight on the solar PV infrastructure.

Installing either a fixed or dual tracking PV system (arrays of PV panels) is proposed. In a fixed system, the PV panel stay in one position, and do not follow the path of the sun. A tracking system is ground-mounted and follows the sun's path with the use of typically single or dual-axis technology in order to maximise the amount of direct sunlight on the Solar PV panels. By following the sun, the tracked array rises quickly to full power and stays there on a clear sunny day, while the fixed array only maintains maximum power for a few hours in the middle of the day.

5.2 SITE DEVELOPMENT COMPONENTS

The final design will consist of different components. A typical description of the components and their assumed impact are listed below. For more detail on the preliminary layout, please refer to the Layout Report. Each 75 MW phase will consist of the same development components discussed below:

5.2.1 Position of solar facilities

The exact position of the solar PV array layout will follow a risk adverse approach and be determined by the recommendations in the environmental specialists' reports in order to avoid all sensitive areas in the positioning of the facility (Please see section 4 of this report discussing alternatives). In addition, the final layout will be influenced by the final detailed design of the project once a tender has been awarded. The footprint of each 75 MW phase will be located on approximately 165 ha of the proposed site (on the Remainder of Farm 454, Dyason's Klip).

Figure 25: Showing typical positioning of solar arrays in a photovoltaic power generation facility (Solek, 2013).

5.2.2 Foundation footprint

The physical footprint of the PV panels on the ground is formed by a network of vertical poles (typically 100 mm in diameter), on which the PV panels are to be mounted (see examples below).

Figure 26: Showing typical examples of foundation footprints.

Different methods are used to mount the panels to the ground. The alternative mounting technology is described in section 4 above.

5.2.3 Panel height

The PV panel arrays have an approximate height of 2.5 m. A maximum height of 5 m will be considered and assessed in the Environmental Impact Assessment Process. This will allow for flexibility to technology changes in the industry. The maximum height listed here is only a precautionary description due to foreseeable future changes in technology.

5.2.4 Access road to site

An access road of approximately 6m wide will be required for the facility. The access road alternatives are discussed in section 4 of this report.

5.2.5 Internal roads

Gravelled internal roads and un-surfaced access tracks are to be provided for. Such access tracks (typically < 4 m wide and limited to the construction site) will form part of the development footprint. Pathways (typically < 4 m wide) between the PV panel layout will typically also be provided for to make the cleaning and maintenance of the panels possible. Existing roads will be used as far as possible.

Figure 27: Showing example of typical internal roads between PV Panel Arrays (Solek, 2013)

5.2.6 On-site substations and transformers.

The step-up substation and its associated infrastructure and internal roads will have a footprint of approximately 0.04 ha (20 m x 20 m). Note that the 0.04 ha is an estimate and included in the entire building footprint of typically < 1 ha.

Figure 28: Typical example of on-site substation and transformer (Solek, 2013)

5.2.7 Cable routes and trench dimensions.

Shallow trenches for electric cables will be required to connect the PV Panels to the on-site substation (such electric cables are planned along internal roads and/or along pathways between the PV panels).

Figure 29: Examples of typical cable trenching used to connect the PV panels to the on-site substation (Solek, 2013)

5.2.8 Connection routes to the distribution/transmission network

Electricity will be transmitted from the on-site step-up substation via a new overhead power line to the planned Eskom substation which is located to the east of the proposed site. A number of possible connection routes are investigated in this EIA (please see section 4 above for the discussion of the power line route alternatives). The final preferred route will be subject to the negotiations with the neighbouring farmers and the outcome of this environmental process.

5.2.9 Security fence

A perimeter security fence will be constructed around the solar park with a guarded security point. The ecological specialist will provide recommendations into the type and location of perimeter fence during the impact assessment stage of this process.

5.2.10 Auxiliary buildings

The auxiliary buildings area will typically include:

- A workshop area;
- A storeroom area;
- A change and ablution room area;
- An administrative and security building; and
- 10 x 10 kl water tanks

The infrastructure for the auxiliary buildings should occupy approximately 1 ha. The workshop will be used for general maintenance of parts, etc. and will typically be 20 m x 40 m. The storeroom will be used for the storage of small equipment and parts and will typically be 20 m x 30 m. The change and ablution facilities will be very basic and will include toilets, basins and a change area. The administrative and security building will be used as an on-site office and will have a footprint of typically 10 m x 10 m.

The final detailed design and exact coordinated layout of the facility will be designed and finalised should the facility be approved and awarded a tender as an IPP. The components listed above are typical to such projects and may deviate due to engineering requirements, new technologies and regulatory changes from the government's tender process. The detailed design will take place with due consideration of the specialist recommendations.

Figure 30: Typical example of auxiliary buildings under construction (Solek, 2013).

5.2.11 Cut and fill areas

As far as possible, any cut and fill activity along the access roads will be avoided. The majority of the proposed access roads are currently being used by construction vehicles and should not need any alternation. Where alternations might be necessary, input from civil construction engineers and the environmental control officer will be sourced regarding the cut and fill aspects.

5.2.12 Borrow pits

As far as possible, the creation of **borrow pits will also be avoided**. There is an old tungsten mine on the Dyason's Klip farm. There is still a number of old gravel heaps at the mine site. Road surfacing material required (e.g. gravel/base course or stone) can be sourced from these heaps if required.

The current EIA application does not make provision for new borrow pits. Should new borrow pits be required on the property, these will have to be licenced/authorised in terms of the Minerals and Petroleum Resources Development Act and the National Environmental Management Act.

5.2.13 Soil heaps

As far as possible, the creation of **permanent soil heaps will be avoided**. All topsoil removed for the purpose of digging foundations are to be separately stockpiled within the boundaries of the 500 ha development footprint, for later rehabilitation. It is unlikely that major soil heaps will be required for this construction site.

5.3 CONSTRUCTION OF THE PROPOSED FACILITY

The following engineering construction phase considerations are proposed for this project. The environmental management of these activities will be addressed in the Environmental Management Programme that will be included with the Draft Environmental Impact Report (DEIR)

The facility will be developed and constructed in three consecutive phases. Each phase will consist of a 75 MW facility. The construction of each 75 MW phase should be between **14-18 months**. During the construction activities 5 jobs will be created for each MW of energy. 375 jobs are therefore expected to be created during the construction phase for each 75 MW facility, of which most will ideally be local employments. The construction material and sourcing of required goods can be from the local community and surrounding towns.

Should the project be approved, and all required approvals and licences are obtained from the DEA, NERSA and a Power Purchase agreement (PPA) is secured with Eskom, the construction is envisioned to begin in the second half of 2015. A series of activities would need to be undertaken, to construct the proposed facility and associated infrastructure.

Each facility will be established in different phases namely: the pre-construction, construction, operation and decommissioning phases.

The **preconstruction phase** includes:

1. Conducting of surveys;
2. Transporting of the required construction components and equipment to site; and
3. Pre-site preparation (establishment of temporary services for construction such as lavatories, water, health and safety requirements, site office, etc.).

The **construction phase** includes:

1. Transportation of solar components and equipment to site;
2. Establishment of internal access roads;
3. Undertaking site preparation (including clearance of vegetation; stripping of topsoil where necessary);
4. Erecting of solar PV frames and panels;
5. Constructing the on-site substation;
6. Establishment of additional infrastructure (workshop and maintenance buildings);
7. Establishing the underground connections between PV panels and on-site substation;
8. Connection of on-site substation to power grid;

9. Undertaking site remediation; and
10. Construction of perimeter fencing.

The activities that will be undertaken on site fall under different specialist fields and include:

- **Civil works:** site preparation, site grading, drainage, roads, foundations, storm water & anti-erosion management;
- **Mechanical works :** piers installations, mechanical assembly including trackers, mounting of panels; and
- **Electrical works :** installation from low to high voltage, including substation.
-

5.3.1 Transportation of solar components and equipment to site

All solar plant components and equipment are to be **transported** to the planned site **by road**. Construction should stretch over a period of approximately **18 months**. During this period the majority of the solar PV panels and construction components will be transported by utilising container trucks (e.g. 2 x 40 ft container trucks or a similar option).

Less than 30 containers will be required per installed MW. This will typically include all solar PV components and additional construction equipment. Over the period of 18 months, 2250 containers will therefore be transported to the proposed site. Roughly estimated this amounts to **two 2 x 40 ft container trucks per day**. Normal construction traffic will also need to be taken into account. The usual civil engineering construction equipment will need to be transported to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.). The components required for the establishment of the on-site substation power line will also need to be transported to the site. Some of this power station equipment may be defined as **abnormal loads** in terms of the **Road Traffic Act** (Act No.29 of 1989). Input and approval are to be sought from the relevant road authorities for this purpose.

Transport to the site will be along appropriate national, provincial and local roads. The access roads to the site will be from Upington or Keimoes, along the N14. This is a tarred national road and no alterations should be necessary to handle construction traffic and traffic involved in the operation phase.

In some instances, the smaller farm roads may require some alterations (e.g. widening of corners etc.), due to the dimensional requirements of the loads to be transported during the construction phase (i.e. transformers of the on-site substation). Permission from the relevant authorities can be obtained in this regard if required.

The alignment of the proposed access routes from the N14 to the site are discussed in section 4 of this report.

5.3.2 Establishment of internal access roads on the farm

Minor internal maintenance roads on the farm and proposed construction site are to be constructed. Where necessary, gravel may be used to service sections of the existing road on the farm itself. In order to form an access track surface some of the existing vegetation and level the exposed ground surface might need to be stripped off. The impact of this will be assessed by the botanical specialist in the impact assessment report. These access tracks (typically less than 4 m wide) will form part of the development footprint. The layout and alignment of these internal roads will be informed by recommendations made by the botanical specialist, as well as the topographical survey (although this detailed design based on the topographical survey will only

take place at a later stage). Pathways (typically less than 4 m wide) between the solar PV panels are to be provided for ease of maintenance and cleaning of the panels.

In addition, a fire break (buffer area) that can also serve as an internal road will be constructed around the perimeter edges of the entire proposed site. All gravel access roads constructed will be more or less 4 m wide.

5.3.3 Site preparation

Cleaning of the surface areas is necessary in order to construct the solar PV plant. This will include clearance of vegetation at the footprint of the solar PV panels, the digging of foundations for the on-site substation and workshop area foundations and the establishment of the internal access roads and lay-down areas. Where stripping of the topsoil is required, the soil is planned to either be stockpiled, backfilled and/or spread on site. In the instance where there are cultivated areas currently on the site, the upper 30 cm of the cultivated areas will be stockpiled on the boundaries of the site. The topsoil stockpiles must be protected from erosion by re-establishing vegetation (grasses) on them. The environmental management plan will provide specifications for this vegetation re-establishment.

Figure 31: Showing typical examples of site preparation during the construction phase of the project (Solek, 2013).

To reduce the risk of open ground erosion, the site preparation will typically be undertaken in a systematic manner / phased approach. Where any botanical species of concern or sites of cultural/heritage value are involved, measures are to be put in place to attend to the preservation or restoration of these elements as recommended by the participating specialists and in the Environmental Management Programme.

5.3.4 Erecting of solar PV panels

Once the site preparation has been done, and all necessary equipment has been transported to the site, the solar PV panels and structures are **assembled on site**. Each solar PV module consists of a number of cells, forming a single panel. Each module is capable of generating typically 230 W - 260 W of **DC electrical power**. The solar PV modules are assembled in long rows across the solar PV array, with the rows approximately 5 m apart. The exact amount of modules in each solar PV array is subject to the **final facility design** and is still to be confirmed. Foundation holes for the solar PV panels are to be mechanically quarried to a depth of approximately 300 - 500 mm.


Figure 32: Showing typical erection of PV panels during the construction phase of the project (Solek, 2013).

Driven piers and screws are recommended in order to minimise the environmental impact of the facility, but will be dependent on mechanical specifications.

If concrete foundations are used, foundation holes will be mechanically excavated to a depth of about 30 cm – 50 cm. The concrete foundation will be poured and be left for up to a week to cure.

5.3.5 Construct ion of on-site substation

An on-site substation will be necessary to enable the **connection between** the **solar energy plant** and the **National Eskom electricity grid**. The generated voltage is planned to be stepped up to 132 kV by means of an on-site substation in order to be fed into the Eskom grid via the new MTS Eskom substation. The on-site substation and its associated infrastructure and internal roads should have a **footprint** of approximately **0.04 ha** (20mx20m).

The on-site substation is constructed in a few sequential steps. First a site is determined by the recommendations from the reports of the environmental specialists to avoid the most sensitive areas in the positioning of the substation. Once the site is approved, the site clearing and levelling is to be done, after which the access roads to the substation are constructed. Next the substation foundation is laid. Once the foundation is constructed, the assembly, erection and installation of all equipment, including the transformers, are to be completed. The final step is the connection of the conductors to the equipment. The post-construction phase includes the rehabilitation of disturbed areas and protection of erosion sensitive areas. Below is typical on-site substation that connects to the existing Eskom substation.

Figure 33: Showing typical example of on-site substation.

5.3.6 Establishment of additional infrastructure

To minimise the potential ecological impact of this project, a decision was made to limit all activities and storage of equipment to one nominated area. A dedicated construction equipment camp and lay-down area are planned to be established, which will then form part of the auxiliary building area. The laydown area for the construction period will be approximately 1ha. This area will

typically be used for the assembly of the solar PV panels and the generation placement/storage of construction equipment. A temporary facility are planned to be used to secure the storage of fuel for the on-site construction vehicles. Necessary control measures will be put in place for correct transfer and use of fuel.

The auxiliary building area will typically consist of the following:

- workshop area;
- storeroom area;
- change and ablution room area;
- administrative and security building; and
- 10 x 10 kL water tanks.

5.3.7 Connect on-site substation to power grid

In order to evacuate the power generated by the proposed facility and feed it into the Eskom grid, a distribution line would have to be constructed between the proposed on-site substation and the new planned Eskom MTS substation. As stipulated in Eskom's TDP 2013-2022 document, Eskom plans to build a 5 x 500 MVA 400/132 kV transmission substation 5-10 km from the proposed site. The planned MTS substation will be a key substation in the Upington and Northern Cape area. The substation is built in order to distract the energy generated from the distribution network onto the national transmission network. The MTS was planned and designed in such a way to accommodate the proposed renewable projects in the area. With the 5 x 500 MVA 400/132 kV transformer capacity available, the proposed project as well as the surrounding projects in the area should be able to connect onto the grid. Various alignment options for the powerline from the site to this MTS substation are under investigation as detailed in section 4 of this report.

A grid feasibility application will be submitted to Eskom, to confirm the connection possibilities for this project. Feedback on the grid feasibility application will be included in the final Environmental Impact Report.

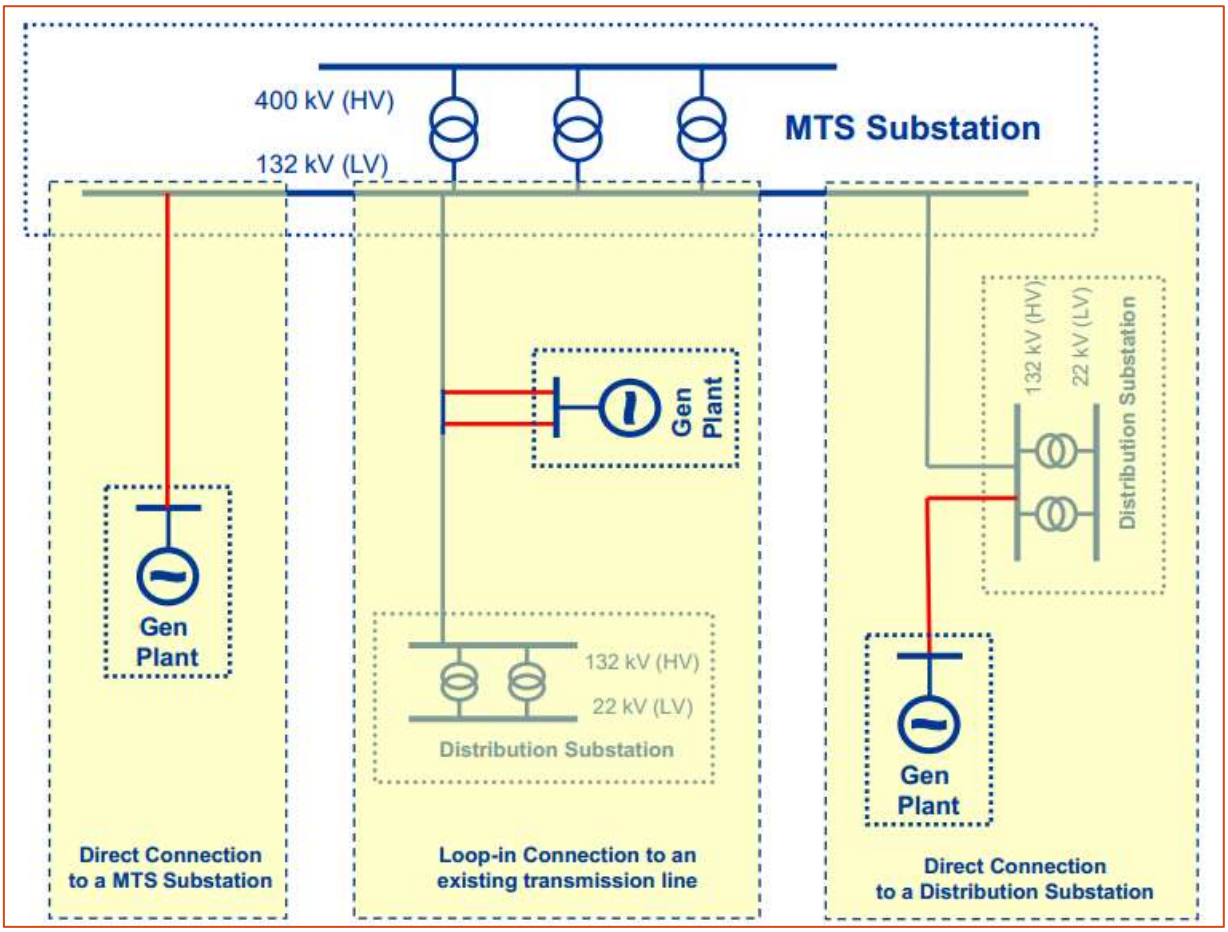

Figure 34: showing the various alternatives of connecting to the Eskom Grid

As shown in figure 34 above, there are different alternatives to connect to the existing Eskom grid. Two of the options that will be investigated are looping into the existing 132 kV line currently running over the farm or building a new line directly to the new MTS Eskom substation. The "loop-in" option will be subject to the available capacity on the existing 132 kV line. The line currently has a total carrying capacity of 80 MW.

If this capacity is already occupied, then a new line will be built to the planned Eskom MTS. This line will be constructed by the developers, but would be handed over to Eskom for operation and maintenance. **Application for the new line forms part of this Environmental Process**. The location of this line will be subject to the final location of the new Eskom MTS substation. The exact location of the planned substation is still to be confirmed by Eskom; three alternatives have been indicated in the Eskom's EIA Reports. The image below shows the three alternative locations and is pointed out by the yellow blocks. Different power line routes are being investigated for the project to accommodate the different Eskom MTS locations. These power line routes are indicated with the orange lines. These alternatives are explained in more detail in section 4 of this report and in the layout report attached in **Appendix C**.

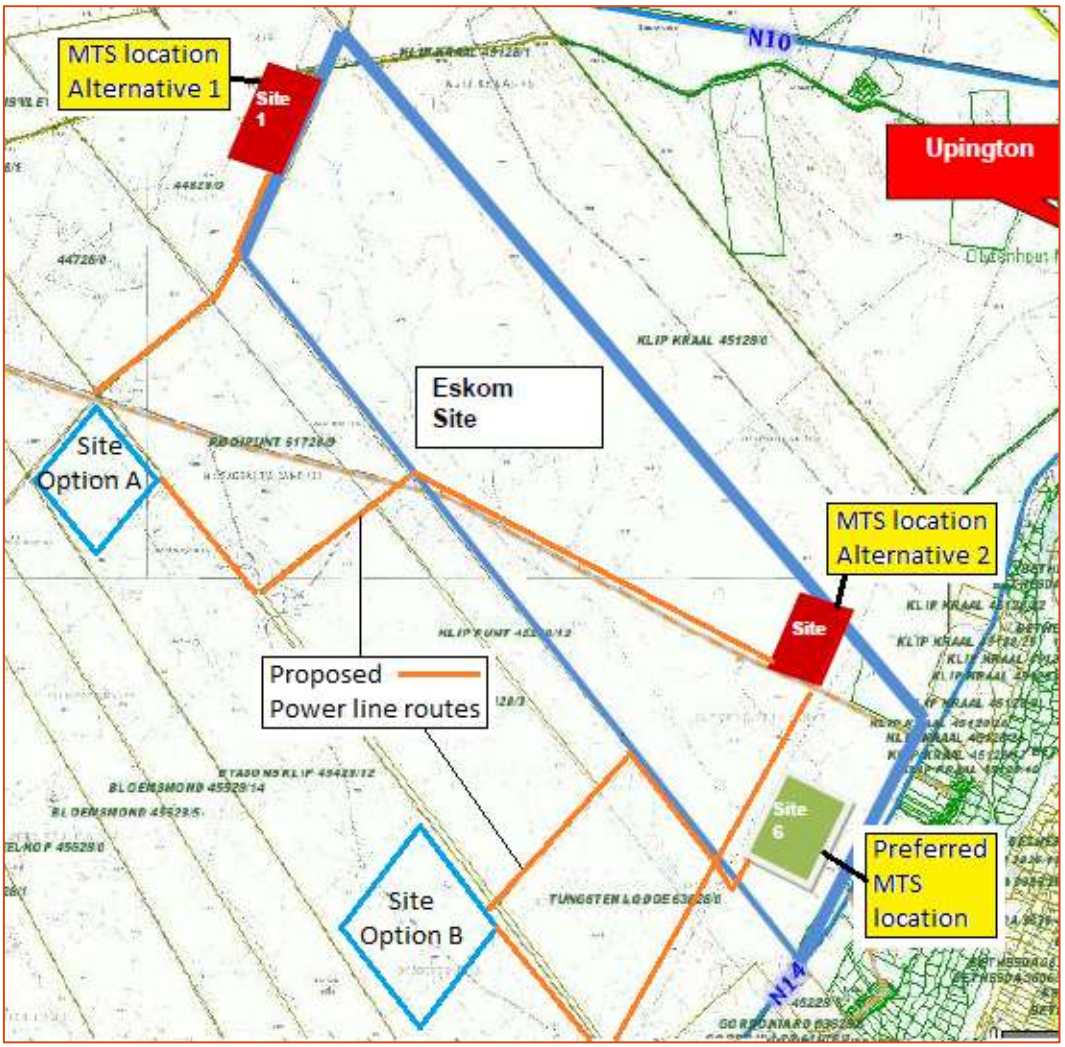

Figure 35: Showing alternative locations of the proposed new Eskom MTS substation.

5.3.8 Undertake site remediation

Once construction is completed and once all construction equipment is removed, the site is to be rehabilitated where practical and reasonable. In the case where access routes to the site will not be used during operation, the access points are to be closed and rehabilitated as detailed in the Environmental Management Programme.

5.4 ACCESS TO FACILITY

As mentioned, transport to the site will be along appropriate national, provincial and local roads. The access roads to the site will be from Upington or Keimoes, along the N14. The Dyason's Klip farm entrance is directly from the N14. Different access routes are investigated to the northern and central site as detailed in section 4 of the report.

The northern site (Site Option A) can be accessed directly from the **D3276** district road running past the northern corner of the Dyason's Klip farm.

Figure 36: Showing access to the D3276 from the N14.

The central site can be access either via an internal farm road running through the Dyason's Klip farm or an access road being constructed on the adjacent farm, for a similar project. Both of these access road options will be investigated to determine which one will have the least environmental impact and would be more viable.

Figure 37: Showing existing farm access from the N14.

5.5 WATER USE REQUIREMENTS

The project requires about 8 litres of water per panel per annum for the purposes of construction and maintenance (cleaning of the panels). The capacity of the panels that will be used will therefore determine how many water will be required for a 75 MW plant (i.e. one phase of the proposed development). If a 250 Watt panel is used, a 75 MW plant will consist of more or less 300 000 panels, which will roughly calculate to 6.6 kl of water required per day. The ten 10 kl capacity tanks will be places on site in order to store 100 000 litres of water at any given time. The water distribution system will distribute water from the ten 10 kl water tanks to a high pressure hose and onto the solar panels. The proposed activity is not a "water intensive activity" (as opposed to CSP). Only a limited amount of water is required in low rainfall periods to clean the modules once every quarter so that they can operate at maximum capacity. No chemicals will be used to clean the panels, only water.

Weather conditions, traffic and general dustiness at the site play a role in the exact amount of ground water required to wash the solar PV panels. At present it is assumed that each panel should be washed once every three months.

To further reduce the use of water at the solar facility, the use of alternative panel cleaning methods are also being investigated. The most feasible technology under consideration uses compressed air to blow off any debris from the panel's surface. At this stage the technology is being tested and needs refinement before it would be commercially viable.

5.5.1 Water Sources

The following water sources are currently under investigation:

5.5.1.1 Boreholes (preferred supply):

The preferred water sources are the existing boreholes on the proposed farm. Two boreholes are situated near the proposed northern site, and two boreholes situated near the central site (A plan showing the location of these boreholes is shown in figure 5 of this report).

These boreholes are seen as a possible water option for the facility. The small volumes of water required for washing the solar PV panels and for general operational purposes (maximum 7 kl per day or 210 kl per month) can be sourced from these boreholes. According to the farmer the boreholes are strong enough and the water they supply is drinking water quality.

Depending on where on the final design the water tanks will be located, the water from the boreholes will probably be pumped to the water tanks through a pipeline. The pipe diameter will be approximately 150mm-300mm. The pipeline will be laid on the ground, or just below the ground by means of manual excavation. The water pipeline should not result in any additional environmental impacts outside of the main construction area.

5.5.1.2 Storage dam (alternative supply)

An additional option is the storage dam the farmer has on the Dyason's Klip farm. The dam is situated south of the proposed sites and a pipeline will have to be constructed to distribute the water to the proposed sites. As an alternative to the pipeline, trucks can be used to transport the water from the storage dam to the proposed sites. Confirmation on the capacity of the boreholes and the storage dam will be sought from the farmer.

5.5.1.3 Khai Garib municipality (alternative supply)

Permission to use water directly from the two nearest towns, Upington and Keimoes, can be sought from the Khai Garib Municipality. This water will also have to be transported by trucks to the proposed site. This will be seen as the last alternative as transport costs will be significantly higher compared to the other two options.

5.5.1.4 Rainwater (additional supply)

As an additional measure, PVC rainwater tanks could also be placed alongside the on-site buildings to collect the rainwater runoff from the roof. These PVC tanks will then form part of the water storage tanks. Investigation is also underway to possibly capture the rainwater runoff from the PV panels.

5.5.2 Water buffer

Water storing infrastructure is to be provided as part of the auxiliary building footprint area. Storing capacity for two weeks are planned to be provided for. This requires the installation of ten 10 kl water tanks. These tanks will serve as both a water buffer as well as for rainwater capture as described above.

5.5.3 Water-use permission

The quantity of water required usually qualifies for a general authorisation, but the specific quaternary area in which the development site is situated does not allow for general authorisation. Thus, a formal water use licence would have to be applied for. However, a full assessment of the water-use licence application will only be undertaken by the Department of Water Affairs (DWA)

once the project is approved. The EIA application can therefore be submitted without a water licence, as long as there is enough confirmation that there are sufficient water available. A Non-binding Water Confirmation Letter for the project will be applied for at the DWA, in which the DWA will be asked to confirm that according to their information there should be adequate water available for the project. The engineers have made contact with DWA who have confirmed that the application for a non-binding water agreement should only be applied for later in the EIA Phase.

The DWA are also registered as a key stakeholder in the environmental process and will have an opportunity to provide any additional input.

5.6 EROSION AND STORM WATER CONTROL

The erosion potential of the site is low because of the extremely low annual rainfall in the area. The ground condition in the Upington area is such that any surface water is very quickly absorbed into the soil. This avoids water build up on the surface and quickly reduces any water flow which might cause water erosion.

On large structures or buildings appropriate guttering would be used around the building to avoid water erosion where roof water would be flowing off the roof. Wherever practically possible rainfall run-off from the roofs/gutters will be captured and stored in rainwater tanks. If this water cannot be captured, water will be channelled into energy dissipating structures to spread the water and slow it down to reduce the risk of erosion. Such a structure could be moulded from precast concrete, loosely packed rock or perforated bags filled with stone.

Any rainfall on the solar panels would be welcomed due to its cleaning effect, but as mentioned before the annual predicted rainfall is very low and would not cause any erosion. The solar panel surfaces are installed at a relatively large incline with gaps between panels. This does not allow significant water build up on the panels while also reducing the energy in falling droplets. Considering that the panels are on a tracking system, this also means that droplets leaving the solar panel surface would not drop onto the same ground areas all the time.

The construction area might cross over a number of seasonal washes. To avoid erosion in these washes recognised building practices will be followed to keep the natural flow of water within its natural borders. It is in the interest of the solar operator to keep the area clean and free of erosion to avoid any damage to the equipment. The solar panels would be installed on frames, allowing for natural water flow underneath the structure.

During the construction phase of the project there might be a risk of wind erosion where natural vegetation is removed. This might increase the risk of damaging sensitive equipment with a sandblasting effect and all parties involved will have to be vigilant in avoiding this from happening. The environmental management programme submitted as part of the Draft Environmental Impact Report will contain management recommendations regarding dust and erosion control during the construction phase.

Note that the construction will take place in three phases. This phased construction approach should also minimise the amount of exposed soil at any one time thus reducing the risk for wind erosion and dust generation. Once the construction on each phase is complete the cleared areas will be re-vegetated. Bare areas will also be packed with brush removed from other parts of the site to encourage natural vegetation regeneration and limit erosion. Any water being used in the cleaning process would speed up this natural vegetation rehabilitation process. Further it will also have a bonding effect on the sandy soil, avoiding the loose sand blowing away causing wind erosion.

Access roads and internal roads would also be designed and build using recognised erosion and storm water management systems. During the construction phase of the solar PV facility temporary solutions would be implemented to ensure that the environment is preserved in a sustainable way by avoiding erosion. The following figure shows a typical temporary solution that would be implemented during the construction phase, basically consisting of an inlet, channel and outlet. During outflow of the water energy is dissipated allowing any particles to sink to the ground which also avoids fast flowing water to sweep particles up from the ground avoiding erosion, by flowing though packed stones acting as a filter. Such measures are only likely at a single existing crossing of the main drainage only if the existing farm access is used to gain access to the site.

Figure 38: Showing examples of temporary measures for the potential crossing of the main drainage channel on site (Solek, 2013).

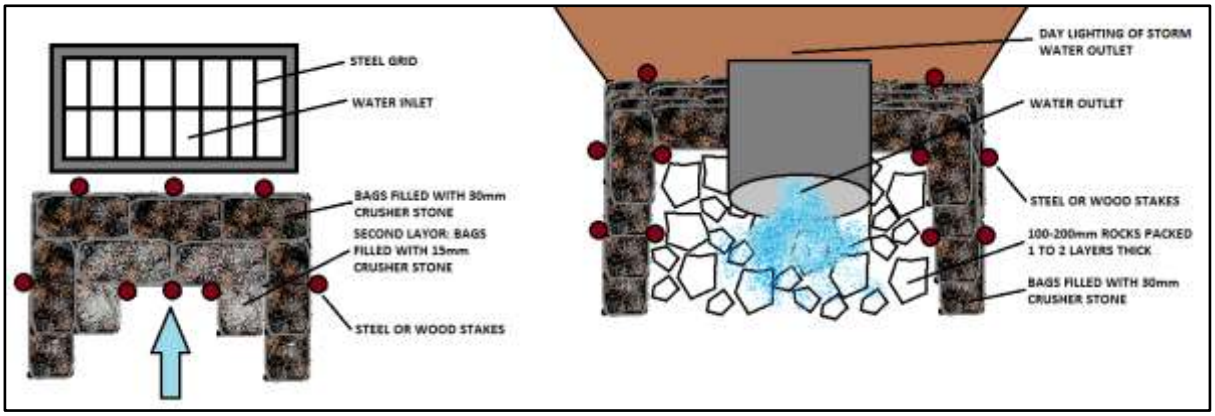

Figure 39: Showing diagrammatic examples of erosion protection mechanisms for catch pits and culverts (Solek, 2013).

More **permanent solutions** would be designed to address stormwater control in a sustainable way. These structures would be built to be aesthetically pleasing by using fixtures such as stones packed in wire mesh to stay in a position or locking retaining walls at the inflow and outflow of the culverts also acting as scour protection. The type of structure will depend on the type of crossing (i.e. crossing of the seasonal washes will have different engineering requirements to crossing of the main drainage channel).

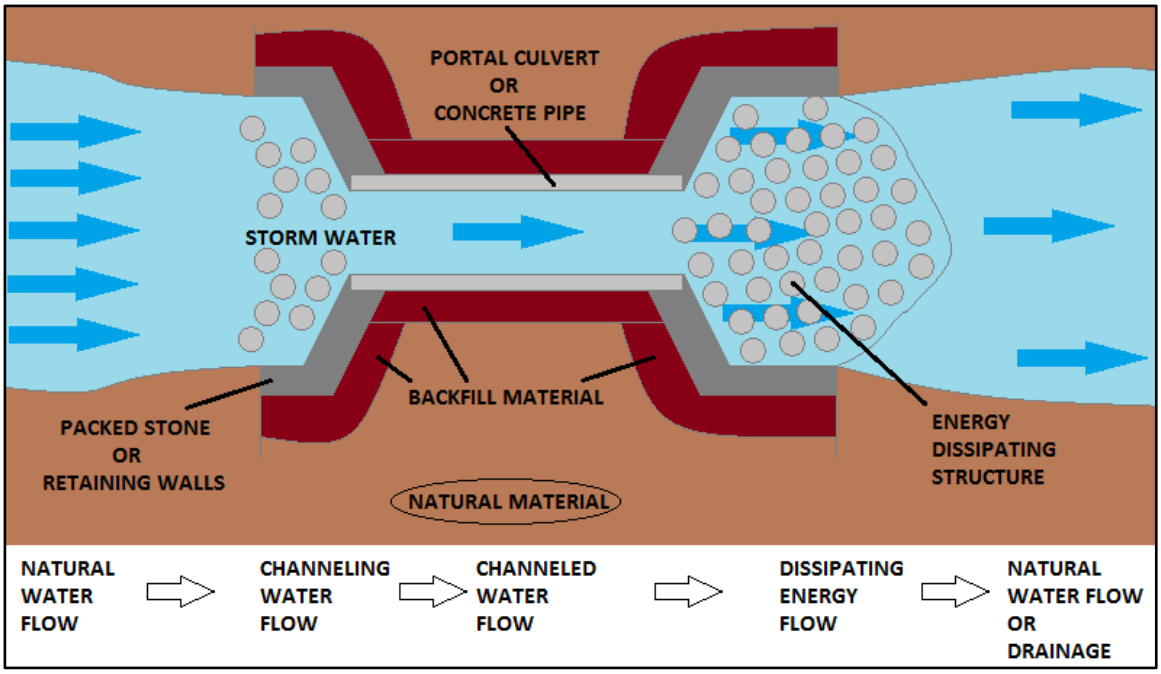

Figure 40: Diagrammatic example of portal culvert or concrete pipe – One of the options of crossing drainage channels (Solek, 2013).

An alternative to culverts considering drainage line crossings, **Low-level River Crossings** (LLRC) can be used. A LLRC is a structure that is designed in such a way to provide a bridge when water flow is low, while under high flow conditions water runs over the roadway, without causing damage.

Two types of LLRC can be used depending of the particular situation. A "Causeway" contains openings underneath the surface, which allows passing water through where a "Drift" does not.

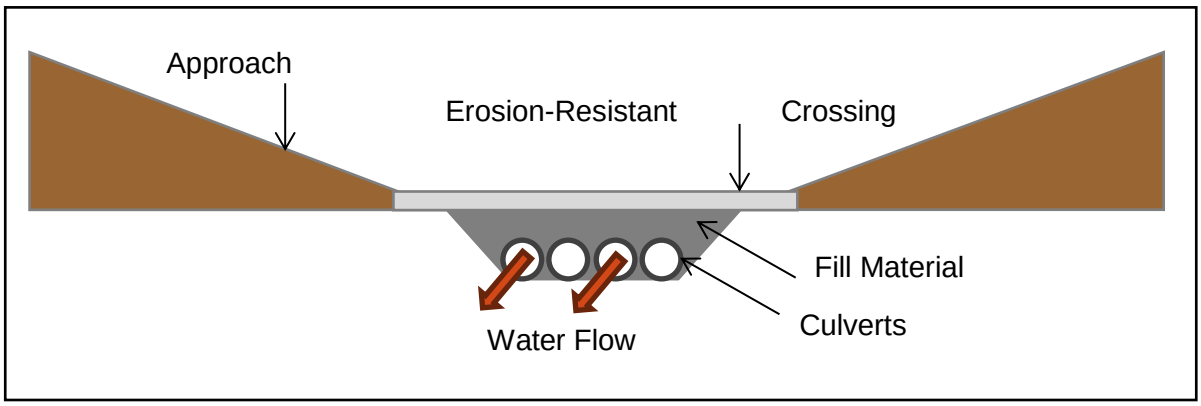

Figure 41: Diagrammatic example of low level river crossing (Causeway)

The same type of erosion control methods discussed with the culverts is taken into account when designing a LLRC. Because a LLRC is designed for water to flow over it, erosion protection is very important. Rock filled baskets, loosely packed rock or perforated bags filled with stone are some of the methods usually considered with LLRC.

Note, these types of structures will only be likely if the access road to the central site, going through the Dyason's Klip farm is selected.

The water use licence application process will include **application for potential crossings of water courses** in terms of section 21(i)&(c) of the National Water Act. This application process will only commence if the project is selected as a preferred bidder.

5.7 PROJECT OPERATION AND MAINTENANCE PHASE

The proposed operation of the site is for **25 years**. During this life-cycle, the plant will be maintained and monitored. The aim is to generate at full capacity by the second half of 2016. The facility should be operational during daylight hours, except during maintenance, poor weather conditions or breakdowns. Regular maintenance will typically include periodic cleaning, greasing of bearings and inspection. The panels are planned to be cleaned with water or compressed air. Any waste products generated (defunct bearings, broken panels etc) be disposed of in accordance with the National Environmental Management: Waste Act (Act 59 of 2008).

During the operation 1 job will be created for each MW of energy. The staff members will typically include technicians, maintenance and security personnel. Staff can be transported around the site using utility vehicles and a typical mini bus to transport staff from nearby towns of Upington, Keimoes and surrounding community. From time to time additional contract staff may be required for ad hoc ground cleaning or special panel cleaning.

When the solar modules and associated equipment become defective, they will be recycled and re-used where possible.

5.8 PROJECT DECOMMISSION PHASE

The proposed solar energy facility is expected to have a lifespan of approximately 25 years if the specified periodic maintenance is performed. If financially viable and depending on climate factors in 25 years' time (farming may no longer be viable) the PV facility may continue operating. Existing infrastructure and components of the PV facility may be replaced with new technology.

Once the facility has reached the end of its economic life, the infrastructure is to be decommissioned. The decommissioning of the facility would entail the disassembly and replacement of components with other appropriate technologies. However, if not deemed so, then the facility would be completely decommissioned.

Preparation activities for site decommissioning should include confirming the integrity of access to the site. Site access should be able to accommodate the required equipment (e.g. lay down areas, construction platform) and the mobilisation of decommissioning equipment.

The components would be disassembled, reused and recycled where possible, or disposed of in accordance with regulatory requirements. Functional components are planned to be donated to and installed at local schools and clinics to benefit the community.

5.9 WASTE EFFLUENT, EMISSION AND NOISE MANAGEMENT (CONSTRUCTION, OPERATION & DECOMMISSIONING)

5.9.1.1 Solid waste management

During the construction phase an estimated amount of **less than 5m^3 non-hazardous solid construction waste** are to be produced **per month**, for the expected 18 month construction period. All construction waste will be safely stored, and should be removed from site on a scheduled waste removal basis by the appointed construction contractor where and when deemed necessary. The construction waste, where applicable, are to be disposed at a municipal landfill site that is appropriately licenced. The Environmental Management Programme will address solid waste management during construction.

During the operational phase after construction, the facility should not produce any solid waste.

5.9.1.2 Liquid effluent (sewage)

The liquid effluent generated is going to be minimal and limited to the ablution facilities.. All workers will be transported to site on a daily basis and no workers will be housed on site. Chemical toilets will be on site during construction and during operation of the facility. These chemical toilets will be serviced and emptied on a weekly basis by a private contractor. The sewage will be transported to a nearby Waste Water Treatment Works for treatment. The use of a septic vs. conservancy tank during operation will be determined by the local authority, namely Khai Garib Municipality. The Khai Garib municipality are registered stakeholders on this process and will be requested to provide input.

Due to the remote locality of the farm, sewage cannot be disposed in a municipal waterborne sewage system.

5.9.1.3 Emissions into the atmosphere and noise generation

Very little emissions should be released into the atmosphere (with the exception of dust during the construction phase) and no significant noise should be generated, except during the construction period with drilling and hammering. Due to the site location this should not pose any issue as no residential area is located nearby. The Environmental Management Programme will address the noise and dust generation during the construction phase.

6 ECONOMIC CONTEXT

The economic context described below was provided by the project managers, Solek renewable energy engineers. Please see the engineering report attached in Annexure D4 supplementary information in this regard.

6.1 PROJECT COST OVERVIEW

Renewable energy projects, such as the proposed solar facility, require significant investment. Funds of equity and debt investors either from foreign or domestic sources are obtained. The cost requirements and potential revenue are discussed in this section.

The project costs consist of two parts, capital cost and running cost. The **capital cost** pertains to all costs incurred for the establishment of a producing facility. The **running cost** relates to those costs incurred to ensure that the facility operates as it should throughout its expected lifetime.

Solar PV installations can operate for **many years** with **little maintenance or intervention**. Therefore after the initial capital outlay required for building the solar power plant, financial investment is limited. Operating costs are also extremely low compared to other existing power generation technologies.

6.2 PROJECT SPECIFIC COSTS

The Re Capital 3 detailed costing has not been completed on the date of submitting this engineering report. The running cost of a solar PV facility is minimal related to the initial capital cost, contributing to the most significant cost of constructing and running a solar PV facility. The economic feasibility of the project has however been determined.

6.3 OPERATIONAL REVENUE STREAMS

The revenue streams during the operation of the facility results mainly from electricity sales, intended under the current governmental subsidy, known as the Independent Power Producer Procurement Programme (IPP procurement programme).

The IPP procurement programme portrays **fixed ceiling prices** for bidders to tender against. The establishment of these ceiling prices is based on **industry standard return on investments**. The IPP governmental study identified the feed-in tariff per technology related to the capital cost required per technology against its revenue potential, **identifying the required subsidy per technology to be paid**.

In short the subsidy offered by the IPP procurement programme enables the project to be **financially viable** by **selling electricity** at a **subsidised price**, while the costs of such a facility relates to the industry standard.

As part of the IPP procurement programme preferred bidders will enter into a **power purchase agreement** between the **IPP generator** and the **Single Buyers Office**. **National treasury** stands in for **surety**, while the National Energy Regulator of South Africa (NERSA) regulates the IPP licences.

NERSA and the IPP procurement programme require an Environmental Authorisation as a gate keeping criteria, where no project would be considered without the Environmental Authorisation being granted.

7 SITE DESCRIPTION AND ATTRIBUTES

The following sections provide a description of the environmental and built environment context of portion 12 of the Farm Dyasonsklip 454, with particular focus on the two alternative site locations for the proposed RE Capital 3 Solar Development.

7.1 LOCATION & BUILT ENVIRONMENT

The target property, Portion 12 of the farm Dyasonsklip 454, is located in the Siyanda district of the Northern Cape Province, within the jurisdiction area of the Khai Garib Local Municipality. The property is approximately **5300ha** is size and is located approximately 22km west southwest of Upington and 15km northeast of Keimoes.

The proposed RE Capital 3 development site is approximately 500ha in size (two alternatives under investigation as detailed in section 4 of this report) and is situated north of the N14 National Road. The central study site is situated approximately 4km from the N14 and the northern study site approximately 15km. Current vehicular access to the site is via an existing gravel road with an entrance off the N14.

No buildings, ruins or any other structures were noted on or within the direct proximity of either the proposed solar development site.

7.2 GEOLOGY & CLIMATE

The Geology and climate of the study site was defined by the agricultural specialist as follows.

7.2.1 Geology

The area lies in the Kalahari geological group, in the Namaqualand metamorphic complex. This is the youngest of the geological groups formed in the past 65 million years)

The lithology (mineralogical composition and texture of rocks) of this area consists of the following components:

7.2.1.1 Sand

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

7.2.1.2 Limestone

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

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

7.2.2 Climate

The region is classified as an arid zone with desert climate. The following specific parameters are applicable:

Table 5: Showing typical data associated with portion 12 of the farm Dyasonsklip 454.

Rainfall	
Annual rainfall	0-200mm
Summer rainfall	<62.5mm
Winter rainfall	<62.5mm
Variation in rainfall	40 to 50%
Temperature	
Mean maximum temperature	>35ºC
January Temperature	>27.5ºC
Mean minimum temperature	2.1 to -4ºC
July temperature	<7.5ºC
Temperature range	>15ºC
First frost expected	21 to 31 May
Last frost expected	21 to 30 September
Hours of sunshine	>80%
Evaporation	>2400mm
Humidity	<30%

7.3 TOPOGRAPHY

The topography of the study site was defined by the agricultural specialist as follows:

The topography is generally flat and has low relief form. The slope gradient is **between 0 and 2%** with a concave shape.

Higher ground drains towards multiple depressions (seasonal washes), forming waterways towards the **Gariep River**. Figure 42 and Figure 43 show the drainage patterns of the two alternative sites.

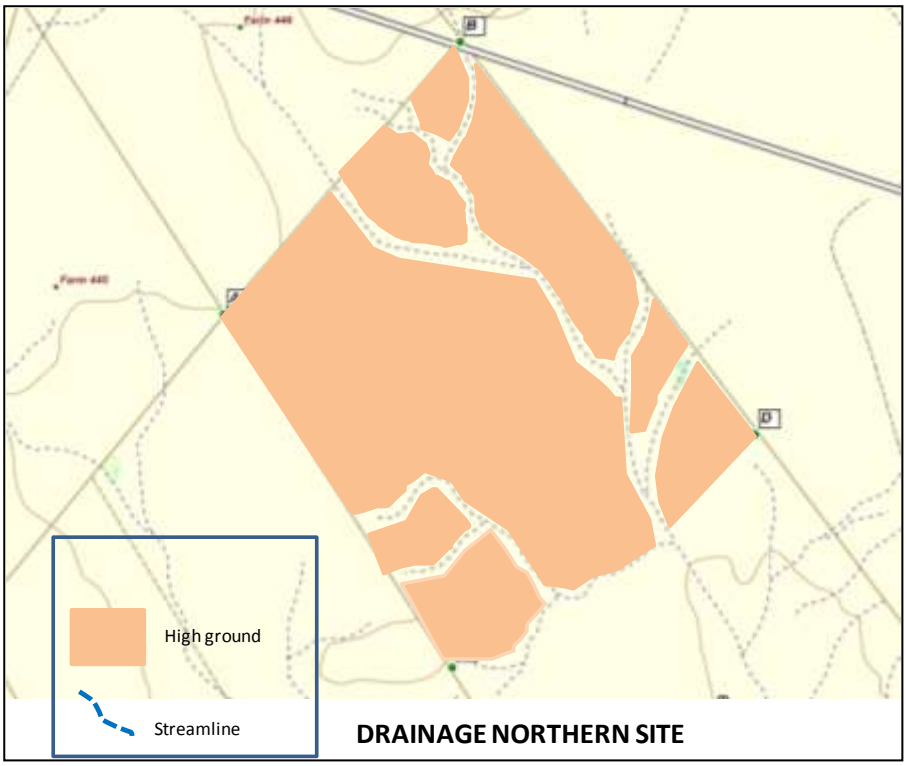

Figure 42: Drainage pattern for the Northern Site Alternative (Lubbe, 2013).

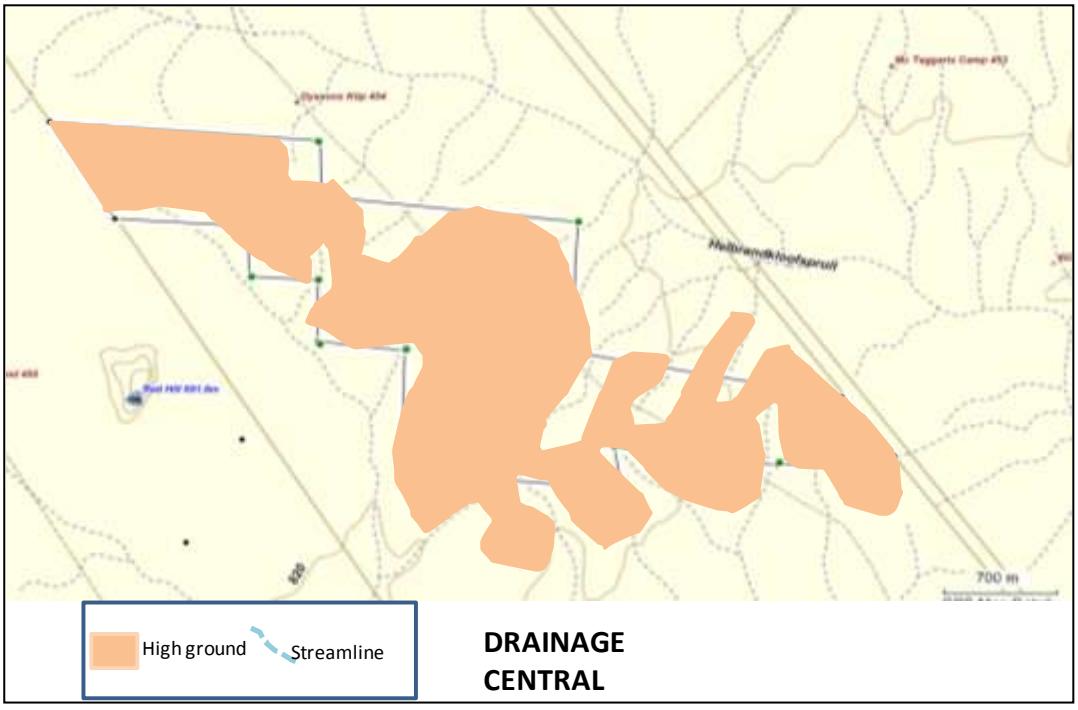

Figure 43: Drainage pattern of the Central Site Alternative (Lubbe, 2013).

7.4 VEGETATION

Mr. Simon Todd, of Simon Todd Consulting, conducted an Faunal and Flora scoping study of the proposed Solar development sites (see **Appendix D, Annexure D1** for full report), from which the following is drawn.

The purpose of the Ecological Scoping Report is to describe and detail the ecological features of the proposed site; provide a preliminary assessment of the ecological sensitivity of the site and identify the likely/potential impacts that may be associated with the development.

A desktop review of the available ecological information for the area was conducted in order to identify and characterize the ecological features of the site. This information was used to derive a **draft ecological sensitivity map** that presents the presumed ecological constraints and opportunities for development of the site. These assumptions will be verified by means of a detailed site inspection during the environmental assessment stage of this process.

The information and sensitivity map presented by the ecologist thus provides an ecological baseline that can be used in the planning phase of the development to ensure that the potential negative ecological impacts associated with the development can be minimized. The constraints detailed in this plan will be used to generate the preferred layout alternative for this proposed facility.

7.4.1 Scope of Study

The specific terms of reference for the scoping ecological study included the following:

- a description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed project;
- a description and evaluation of potential environmental issues and potential impacts (including direct, indirect and cumulative impacts) that have been identified; and
- Identification of potentially significant impacts to be assessed within the EIA phase and the details of the methodology to be adopted in assessing these impacts. This should be detailed enough to include within the Plan of Study for EIA and include a description of the proposed method of assessing the potential environmental impacts associated with the project

7.4.2 Sensitivity Mapping & Assessment

A draft ecological sensitivity map of the site was produced by integrating the **available ecological** and **biodiversity information** available in the literature and various spatial databases. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** – Units with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. This category is reserved specifically for areas where the natural vegetation has already been transformed, usually for intensive agricultural purposes such as cropping. Most types of development can proceed within these areas with little ecological impact. Due to the large amount of transformation that has occurred in the area, this is the dominant sensitivity category within the study area.
- **Medium**- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.

- **High** – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
- **Very High** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.
- In some situations, areas where also categorized between the above categories, such as Medium-High, where an area appeared to be of intermediate sensitivity with respect to the two defining categories.

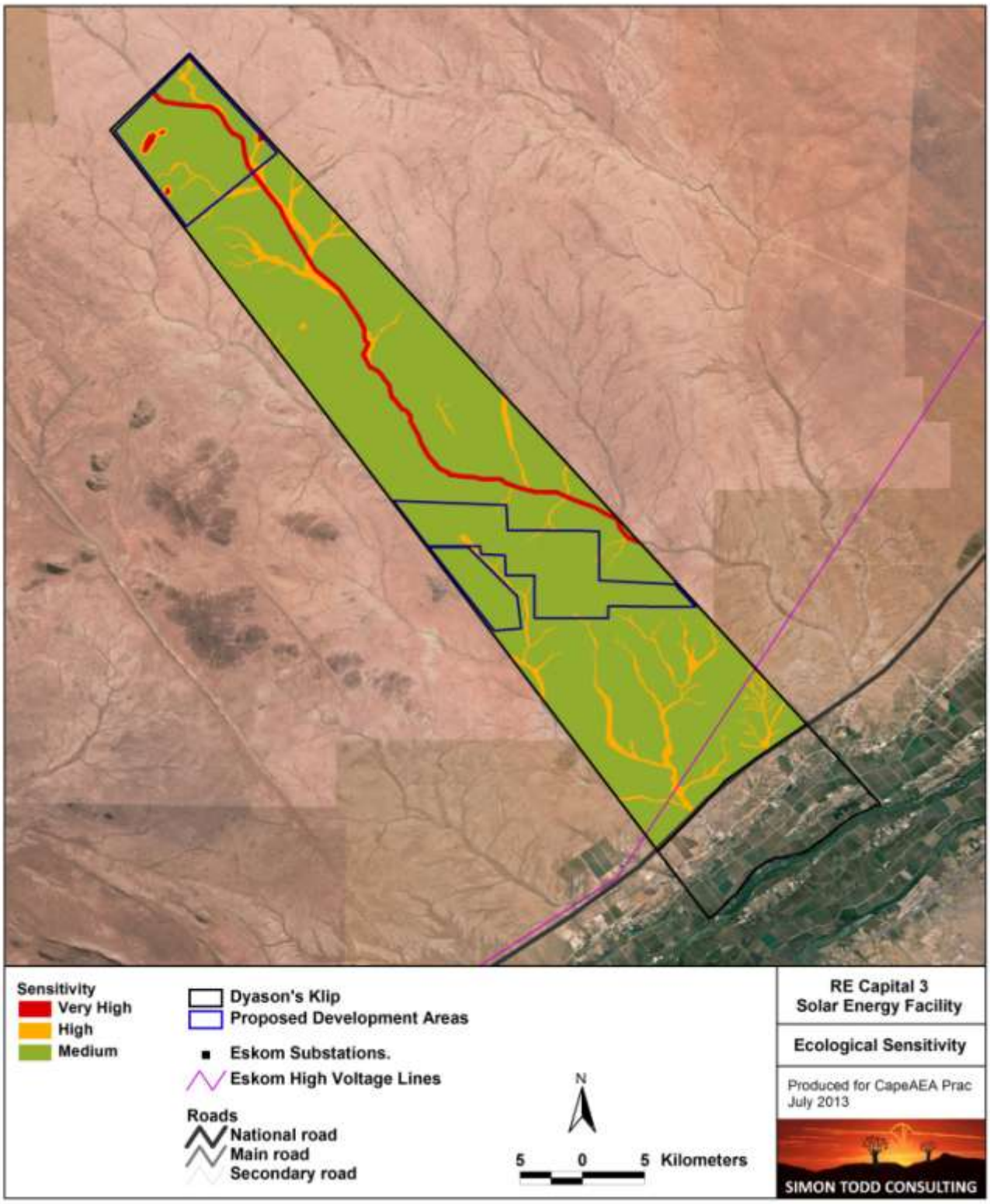

Figure 42: Draft Ecological sensitivity map for portion 12 of the farm Dyasonsklip 454 (Todd,2013)

7.4.3 Baseline Description of the Affected Environment

The following baseline description of the affected environment was provided by the Ecological Specialist.

7.4.3.1 Broad-Scale Vegetation Patterns

According to the national vegetation map (Mucina & Rutherford 2006), there are **three vegetation types** within the boundaries of the farm, and an additional two which are common in the area, but which do not occur within the site. Within the area affected by the proposed development (i.e. the central and northern site alternatives), only **two vegetation types** occur, namely **Kalahari Karroid Shrubland** and **Bushmanland Arid Grassland**.

In terms of the conservation status of the various vegetation types **of the area**, only **Lower Gariep Alluvial Vegetation** which is listed as **Endangered** is of concern. This vegetation type is however associated with the alluvium **along the Orange River and would not be impacted by the current development** which is some distance from the river itself. Furthermore, within the study area the **majority of the Lower Gariep Alluvial Vegetation has been transformed** by intensive agriculture.

Both **Kalahari Karroid Shrubland** and **Bushmanland Arid Grassland** are classified as **Least Threatened** and have been **minimally impacted by transformation** and more **99% of their original extent is still intact**.

The **biogeographically important** and endemic species known from these vegetation types tend to be **widespread** within the vegetation type itself and local-level impacts are not likely to be of significance for any of these vegetation types or species concerned. Both Bushmanland Arid Grassland and Gordonia Duneveld (another vegetation type present in the vicinity but not within the study sites) are widely distributed and represent some of the most extensive vegetation types in South Africa. Kalahari Karroid Shrubland is less extensive, but represents a **transitional vegetation** type between the **northern Nama Karoo** and **Kalahari (Savannah)** vegetation types.

At this point, there is **little basis to differentiate** between the different vegetation types of the potentially affected area in terms of **botanical sensitivity**.

The ecological sensitivity of the different parts of the site are likely to be related to local ecological features and the presence of species and habitats of conservation concern, rather the broad distribution of vegetation types.

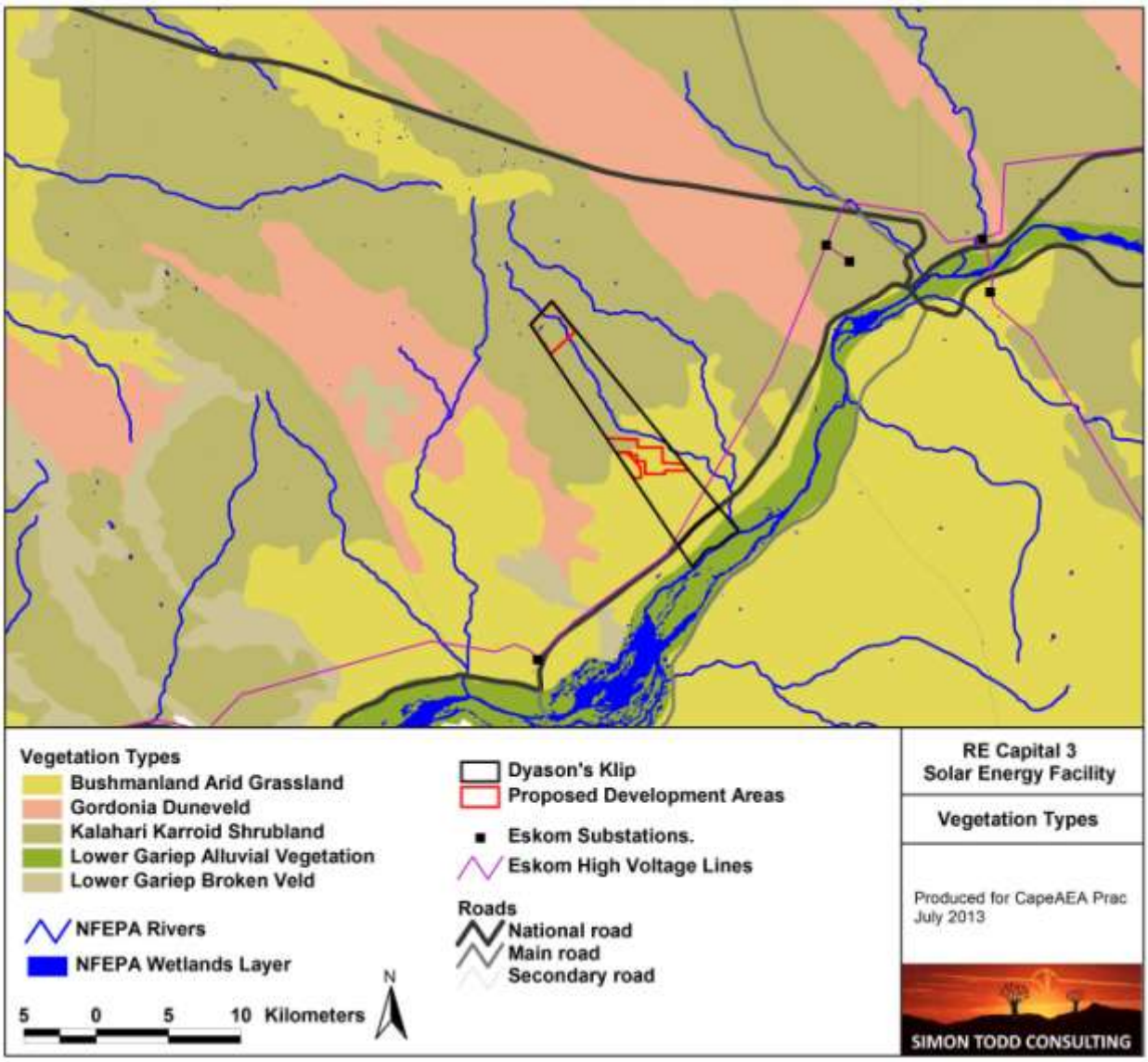

Figure 43: Broad-scale overview of the vegetation in and around the RE Capital 3 Solar Energy Development (Todd,2013).

Areas of **Bushmanland Arid Grassland** generally comprise **extensive open plains** with greater or lesser amounts of scattered taller woody species and trees present, especially along drainage courses. Typically, this vegetation unit is dominated by grasses such as *Stipagrostis ciliata*, *S.uniplumis*, *S.amabilis* and *Schmidtia kalahariensis*. Trees and shrubs of the open plains include *Boscia foetida*, *Boscia albitrunca*, *Parkinsonia africana*, *Phaeoptilum spinosum*, *Rhigozum trichotomum* and *Aptosimum albomarginatum*. It is **not likely** that there are many **habitats of conservation concern** within this vegetation type as it tends to be very homogenous usually has a relatively **low species richness**.

Species commonly observed within the areas of **Kalahari Karroid Shrubland** include shrubs such as *Leucosphaera bainesii*, *Hermannia spinosa*, *Monoechma genistifoilium*, *Salsola rabieana*, *Aptosimum albomarginatum*, *A.spinecens*, *Kleinia longiflora*, *Limeum argute-carinatum*, *Phyllanthus maderaspatensis*, *Zygophyllum dregeanum* and grasses such as *Stipagrostis anomala*, *S.ciliata*, *S.uniplumis*, *S.hochstetteriana*, *S.uniplumis* and *Schmidtia kalariensis*. As this habitat occurs on the more exposed parts of the topography, areas of exposed calcrete or quartz outcrops are often present and it is in these areas that **species of conservation concern are usually located**. The presence of these will need to be assessed during the site visit for the EIA

phase of the study. **Species of conservation concern** that are often present within such areas include *Adenium oleifolium*, *Aloe claviflora* and *Hoodia gordonii*.

The drainage lines within the vicinity of the study site are generally broad and flat, often without a distinct drainage channel. These areas generally contain similar grass species to the surrounding plains but contain a **greater proportion of woody trees** and shrubs, particularly *Acacia erioloba*, *A.mellifera*, *Boscia albitrunca*, *B.foetida*, *Rhigozum trichotomum* and *Lycium oxycarpum*. The presence of these will be verified during the EIA phase of the Study.

7.4.3.2 Listed and Protected Plant Species

According to the SANBI SIBIS database, **286 indigenous plant species** have been recorded from the quarter degree squares 2820 BD, DB and 2821 AC and CA (Table 3). This includes **7 species of conservation concern** as listed below in Table 3 of the Ecological Scoping Study in Annexure D1. Although not all the listed species would occur at the site, there is a high probability that at least some of these species occur at the site (This will be verified during the EIA phase of the study). There are also likely to be additional species present which are either protected under the **National Forests Act** such as *Boscia albitrunca* or protected under the **Northern Cape Nature Conservation Act** of 2009, which includes all *Mesembryanthemacea*, *Boscia foetida*, all species within the *Euphorbiaceae*. *Oxalidaceae*, *Iridaceae*, all species within the genera *Nemesia* and *Jamesbrittenia*. Apart from the above species there may also be other listed species present as the area has probably not been well sampled in the past. Habitats likely to harbour such species will be searched for species of conservation concern during the EIA phase of the study.

7.4.3.3 Critical Biodiversity Areas & Broad-Scale Processes

No fine-scale conservation planning has been conducted for the region and as a result, no Critical Biodiversity Areas have been defined for the study area. In terms of other broad-scale planning processes, the site does not fall within a National Protected Areas Expansion Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region. In terms of the NFEPA wetland assessment, a few small pans within the northern extent of the site were identified as wetlands and there appear to be several other similar smaller pans at the site as well. The smaller pans are usually little more than small depressions which hold water occasionally and do not usually contain any species associated with mesic conditions.

7.4.4 Faunal Communities

7.4.4.1 Mammals

The site falls within the distribution range of **46 terrestrial mammals**, indicating that the **mammalian diversity** at the site is **potentially moderate**. Given the relative homogenous nature of the site and the lack of rocky outcrops and other forms of habitat diversity, actual mammalian diversity at the site is **likely to be low**.

No species associated with rocky outcrops are likely to occur within the proposed development areas, which would significantly reduce the number of the species that would be directly affected. As the affected habitat is widely available in the local area, as well as at a broader scale, impacts on mammals would be local in nature. Three listed terrestrial mammals may occur at the site, the Honey Badger *Mellivora capensis* (Endangered), Brown Hyaena *Hyaena brunnea* (Near Threatened) and Black-footed cat *Felis nigripes* (Vulnerable). Although the area is used for livestock production, human activity in the area is currently low and it is possible that all three listed

species occur in the area. As these species have a wide national distribution, the development **would not create a significant extent of habitat loss** for these species, a single individual of which has a home range far exceeding the extent of the current development.

The site lies within the distribution range of **6 bat species**, indicating that the richness of bats at the site is probably quite **low**. **Bat activity** is probably **focused** along the **Orange River**. The lack of wetlands and large drainage lines away from the Orange River suggests that bat activity patterns within the site are likely to be low. The pans would also be areas that would attract bats when they had water, but this is likely to be infrequently and so the pans are not likely to be significant in terms of providing long-term habitat and foraging grounds for bats.

Overall there do **not appear** to be any **highly significant issues** regarding mammals and the development of the site. In general the major impact associated with the development of the site for mammals would be **habitat loss** and potentially some disruption of the **broad-scale connectivity** of the landscape.

7.4.4.2 Reptiles

The site lies within the distribution range of **34 reptile species**, suggesting that the reptile diversity in the area is likely to be **quite low**. Within the affected plains habitat of the site, the reptile composition is likely to be dominated by species which inhabit open areas, such as Horned Adders, Sand Lizards, Ground and Barking Geckos. There do not appear to be any large rocky outcrops within the proposed development areas with the result that species associated with such habitats are not likely to be affected by the development. As with mammals, the development is likely to result in local habitat loss for reptiles but as there are no listed or range-restricted reptiles that are likely to occur at the site the impacts are not likely to be of broader significance.

The construction of the solar panels with supporting structures and electrical connections would **significantly alter the habitat structure** within the development area as compared to the original open vegetation. This is likely to **change the reptile composition** within the affected area and species able to tolerate or utilise the conditions will increase at the expense of those species associated with the open vegetation. Functionally this is likely to represent an **increase in geckos** and other climbing species at the **expense of diurnal ground-foraging species**. This effect is likely to be of **local extent** and given that there are few listed species that might be affected, of relatively **low significance** as well.

7.4.4.3 Amphibians

The site lies within the distribution range of **10 amphibian species**. The only listed species which may occur at the site is the Giant Bullfrog *Pyxicephalus adspersus* which is listed as Near Threatened. The **larger pans** within the northern site alternative would represent the only **potentially suitable breeding habitat** for this species. As these **pans** are **ecologically sensitive** from an amphibian perspective as well as for other fauna, the **development should avoid** these areas including an appropriate buffer around the pans to maintain their ecological functioning. Those amphibians which require perennial water are likely to be restricted to the vicinity of the Orange River and the plains of the site are likely to contain low amphibian diversity and are not likely to be highly significant from an amphibian perspective. Apart from the pans, it is unlikely that there are any highly significant amphibian habitats at the site and impacts on amphibians are likely to be local in nature and of low magnitude.

7.4.4.4 Avifauna

According to the SABAP 1 and 2 data sets, **190 bird species** are known from the broad area surrounding the site. This includes **7 IUCN listed species**, detailed below in Table 4. All of the listed species are susceptible to some degree to either or both **electrocution** or **collision** from power-line infrastructure. Larger raptors are susceptible to both collision and electrocution, while storks and bustards are all vulnerable to collision with power lines. This is a potentially significant source of impact for these species. The new Eskom MTS substation is however in close proximity to the site and the length of the new transmission lines required for the development will be **less than 10km long**. In addition, the use of mitigation measures such as fitting **bird flight diverters** can significantly reduce the impact of transmission lines and is a recommended standard practice for new transmission line infrastructure. Although the habitat loss resulting from the construction of the facility is the most obvious avifauna-related impact, power lines may generate a more significant long-term cumulative impact as slow breeding species are often affected and without mitigation, the impact persists for the lifetime of the power line.

8 PLANNING CONTEXT

Mr Martin Scott from Ilali Investments has been appointed as the planning specialist for this project and will be responsible for undertaking the necessary applications. Further details on the progress with the planning applications will be presented in the Draft EIR. The following key components will likely take place from a planning perspective.

- A **land use change application** for the rezoning of 500, from **Agricultural Zone I to Special Zone**, will be lodged at the Khai-Garib Local Municipality, in accordance with the Northern Cape Planning and Development Act (Act 7 of 1998).
- If there are restrictive Title Deed conditions burdening the proposed development, an application for the removal thereof will be lodged at the Government of the Northern Cape Province, Department: Corporate Governance and Traditional Affairs, in accordance with the Removal of Title Deed Restriction Act (Act 84 of 1967).
- Parallel to the rezoning application, a **long term lease application will be lodged at the National Department of Agriculture**, in accordance with the Subdivision of Agricultural Land Act (Act 70 of 1970).
- Relevant planning documents, on all spheres of Government, will be evaluated before any land use change application is launched. These documents include, but are not limited to the following: **NSDP** (National Spatial Development Perspective); **PGDS NC** (Provincial Growth and Development Strategy), Northern Cape Province; **IDP** (Integrated Development Plan); **SDF** (Spatial Development Framework).

The town planning specialist will negotiate the best possible statutory process/program, submit the required land use application to all the relevant authorities, pay the application fees on behalf of the client, prepare notices and advertisements, place of adverts in the local newspapers, send registered letters, travel where required, etc. - this includes facilitation/submissions for comment/input and/or authorisation to among others the following competent authorities:

- **Upington Municipality** for approval in terms of the relevant Zoning Scheme/LUPO;
- **Northern Cape Department of Agriculture** as well as the **National Department of Agriculture, Forestry & Fisheries** (DAFF) for approval in terms of Act 70 of 70 (SALA) and Act 43 of 83(CARA);
- **District Roads Engineer** for comment on the land use application;
- **Department of Water Affairs** (DWA) for comment in terms of the National Water Act and the land use application;

- **Department of Mineral Resources** for approval in terms of Section 53 of Act 28 of 2002;
- **Department of Transport & Public Works** for comment on the land use application;
- **South African Heritage Resource** (SAHRA) Agency for comment on the land use application;
- **Civil Aviation Authority** for comment on the land use application;
- **Eskom** Northern Cape for comment on the land use application; and
- **Northern Cape Nature** Conservation for comment on the land use application.

These same authorities have been registered as key stakeholders in the environmental process and as such will be given an opportunity to provide comment on this Draft Scoping Report.

9 AGRICULTURAL POTENTIAL STATEMENT

Mr Christo Lubbe, an agricultural specialist, undertook an agricultural potential study of the proposed RE Capital 3 Solar Development from which the following is drawn. A full copy of the agricultural potential study is attached in Appendix D, Annexure D1 of this report.

9.1 OBJECTIVES

The objectives of the agricultural potential study were:

- To evaluate the possibility of impacts on agricultural production that may result from the development of the PV power station.
- To consider the necessity of conducting a full agricultural study.

9.2 APPROACH AND METHODOLOGY

The methodology applied by the agricultural specialist included a desktop study as well as a field investigation as described below.

9.2.1 Desktop Study

A desktop study was conducted to review existing data and literature sources. The desktop review provided a baseline agricultural and land use profile, focusing on the specific geographical area potentially impacted by the proposed project.

9.2.2 Field Investigation

The site was visited by the specialist and a field survey was carried out.

Potential impacts of the proposed project on agriculture were identified with particular attention to the following issues:

- The possibility of permanent loss of high potential agricultural land;
- Impairment of land capability due to construction;
- Analysis of erosion risk because of altered drainage patterns and poor rehabilitation in erosion-sensitive areas; and
- Veld conditions for grazing.

9.3 ASSUMPTIONS AND LIMITATIONS

As far as **regional** information is concerned, this is primarily a desktop-based study. Climatic conditions, land uses, land type and terrain are readily available from literature, GIS information and satellite imagery.

Notwithstanding these limitations, the **site-specific** field studies confirmed most of the desktop findings.

The specialist however confirmed that he is confident that the findings provide sufficient detail for the agricultural potential study reported in the study.

9.4 PHYSICAL DESCRIPTION OF SITE

The area surrounding the site has a differentiated agricultural character. The N14 from Keimoes towards Upington divides the agricultural practices abruptly into two practices: East from the N14 towards the Orange floodplain intensive irrigated farming is practised while extensive livestock farming takes place on the western side of the road. The reason for this abrupt difference is the availability of water for irrigation and alluvial deposits on the floodplain of Gariep River and its catchment area on the east side of the road and the arid character of the region west of the road.

9.4.1 Soils

With the climate and geology associated with the area, **calcic soils** are prone to develop.

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

Soil forms with these characteristics include Molopo, Askham, Kimberly, Plooysburg, Etosha, Gamoep, Addo, Prieska, Brandvlei and Coega

The typical profile for soils in this region as follows:

9.4.1.1 Area specific

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

9.4.1.2 Site specific

The **Northern Site Alternative** soil pattern is indicated as AR2, a red and yellow well-drained sandy soil with high base status. The larger part of the area (90%) is classified as **floodplain** (Landform 4). Majority soils expected (>80%) to be found here are:

The ***Central Site*** soil pattern is indicated as LP2. These soils has minimal development, are usually shallow, on hard or weathering rock with or without intermittent diverse soils. Lime generally present in part or most of the landscape.

9.4.2 Past and Current Agricultural Activities on Site

The sites are currently utilised for extensive cattle and sheep farming. There is no evidence of past or current cultivation.

9.4.3 Agricultural Structures on site

Current agricultural structures on site include:

- Handling facilities (collecting kraals with removable handling facilities;

- Boundary fences consist of 1200mm Jackal Proof fence wire. The northern fence is electrified;
- Internal stock camp fencing (900mm in height);
- Windmills;
- Reservoir;
- Drinking troughs where camps intersect; and
- One overhead Eskom transmission line through the Northern Site and one between the N14 and the Central Site.

The location of these structures for the northern site alternative are illustrated in Figure 44 and for the central site alternative in Figure 45.

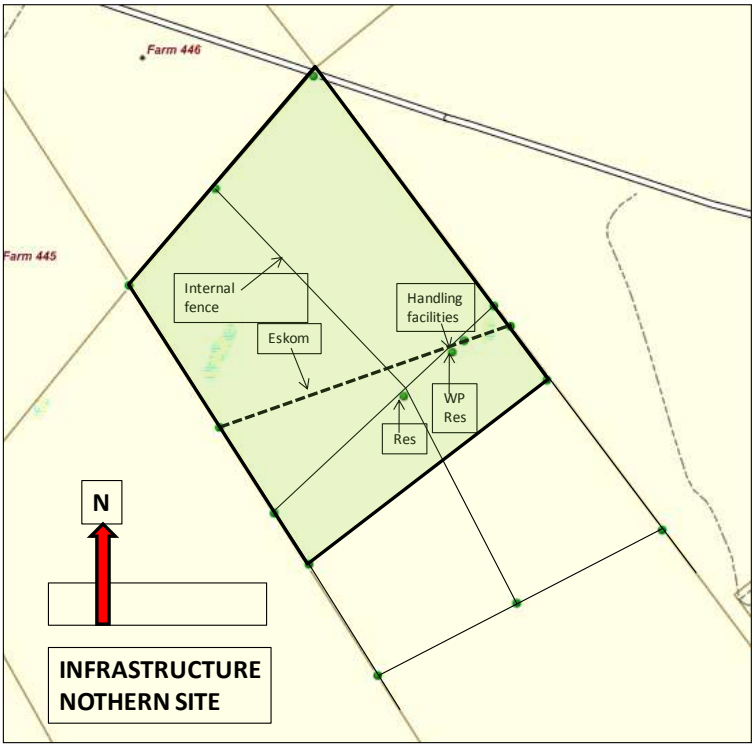

Figure 44: Agriculturally Related Infrastructure on the Northern site Alternative (Lubbe, 2013)

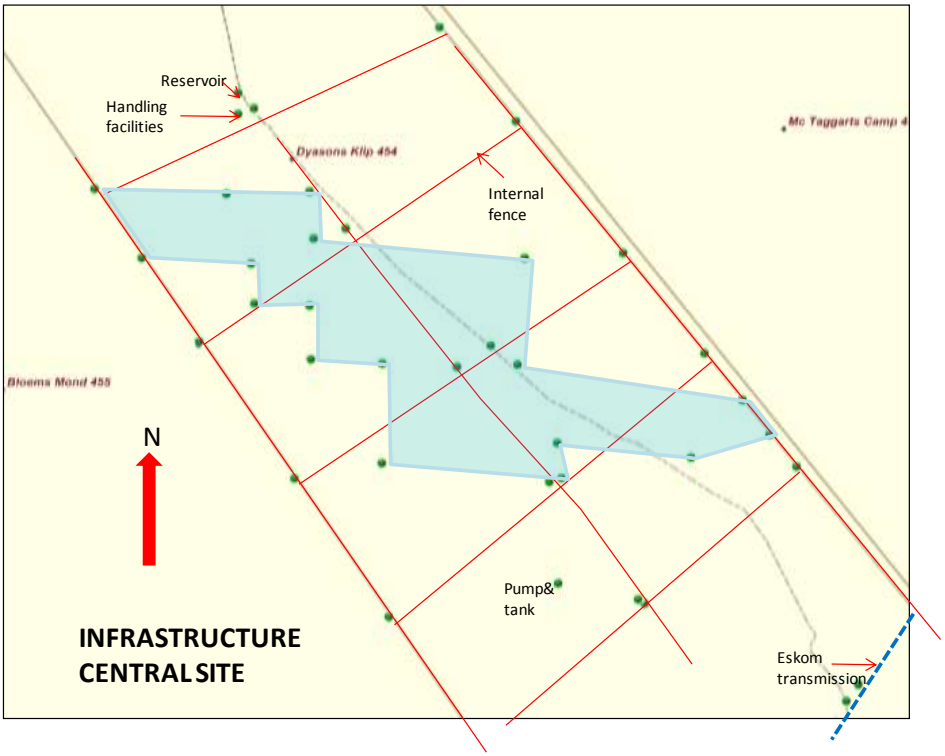

Figure 45: Agriculturally related Infrastructure situated on the central site alternative.

9.4.4 Agricultural study findings

The agricultural specialist study had the following findings.

9.4.4.1 Soil survey

The site inspection was undertaken by the agricultural specialist on 8 and 9 July 2013.

Soil was augured at a 200m interval on sections of the alternative sites as indicated in Figures 6 to 8 of the agricultural potential study and soil properties were noted

The soil forms found on the northern site alternative are shown in Table 6 below.

Table 6: Soil Forms identified on the northern site alternative.

Plooysburg (40-60 cm)
About **13%** of the area is represented by the Plooysburg form (Family Brakkies), indicated by a red line in Figures 6 and 7. Details are as follows.
10-20cm red sandy (Very fine grade) single grain structured top soil
20-40cm Red brown, loamy sand, (Very fine grade) structure less sub soil
40-60cm Hardpan Carbonate horizon
Brandvlei (20-30 cm)
About **13%** of the area is represented by Brandvlei (Family Grootvloer), indicated by a green line in Figures 6 and 7. Details are as follows
10-20cm red sandy (fine grade) with single grain structured top soil
40-60cm Soft Carbonate horizon
Coega (20-30 cm)
The largest part of the site (74%) consists of the Coega soil form (Family Marydale). These areas are marked by a yellow line on Figures 6 and 7.
0 - 20cm red, sandy, (fine grade)with single grain structure top soil
40 – 60cm Hard pan Carbonate horizon

Figure 46: Showing example of the Plooysberg soil form found on the northern site alternative (Lubbe, 2013).

Figure 47: Showing example of the Coega soil form found on the northern site alternative (Lubbe, 2013).

The soil forms found on the central site alternative are shown in Table 7 below.

Table 7: Soil Forms identified on the central site alternative.

Plooysburg (40-60 cm)
About **23%** of the area is represented by the Plooysburg form (Family Brakkies), indicated by a red line in Figure 8. Details are as follows.
10-20cm red sandy (Very fine grade) single grain structured top soil
20-40cm Red brown, loamy sand, (Very fine grade) structure less sub soil
40-60cm Hardpan Carbonate horizon
Coega (20-30 cm)
The largest part of the site (77%) consists of the Coega soil form (Family Marydale). These areas are marked by a yellow line on Figure 8.
0 - 20cm red, sandy, (fine grade)with single grain structure top soil
40 – 60cm Hard pan Carbonate horizon

Figure 48: Showing example of the Plooysberg soil form found on the central site alternative (Lubbe, 2013).

Figure 49: Showing example of the Coega soil form found on the Central site alternative (Lubbe, 2013).

9.4.4.2 Veld Condition Assessment

A veld condition assessment was done simultaneous with the soil survey, by visual acknowledgement and random sampling on a 1m^2 grids.

The outcome of the veld condition assessments for the northern site are shown in Table 8 and the central site in and Table 9 below.

Table 8: Veld Condition Assessment outcome: Northern Site Alternative

ASSESSMENT CATEGORY	FINDING	SCORE
PLANT COVER	Plant cover very sparse with large bare areas	3
COMMON GRASSES	Moderate and poor grazing mixed Stipagrostis Ciliata Fingerhuthia Africana Karoo shrubs	6
SURFACE CONDITION	Moderate levels of top soil loss	3
BUSH ENCROACHMENT	Medium to light encroachment present	6
SOIL TYPE	Sandy soil	2
	TOTAL	**20**

Figure 50: Typical Veld conditions: Northern Site Alternative (Lubbe 2013)

With a score of 20/80 and rainfall of only 200 mm per annum, the veld condition of the northern site alternative is classified as very poor with a grazing capacity of 110 ha/LSU.

Table 9: Veld Condition Assessment outcome: Central Site Alternative

ASSESSMENT CATEGORY	FINDING	SCORE
PLANT COVER	Plant cover very sparse with large bare areas	10
COMMON GRASSES	Moderate and poor grazing mixed Stipagrostis Ciliata Fingerhuthia Africana Karoo shrubs	10
SURFACE CONDITION	Moderate levels of top soil loss	3
BUSH ENCROACHMENT	Medium to light encroachment present	6
SOIL TYPE	Sandy soil	2
	TOTAL	**31**

Figure 51: Typical Veld conditions: Central Site Alternative (Lubbe 2013)

With a score of 31/80, the veld condition of the central site alternative is regarded as poor with a grazing capacity of 63ha/LSU.

9.4.4.3 Water Availability/Provision

Water is provided to livestock from boreholes pumped by windpumps and stored in reservoirs and troughs. Rainwater is also harvested in earth dams where stock can drink in season. The low rainfall and high evaporation impede the success of this operation.

9.4.4.4 Land Capability and Suitability for agriculture

Land capability is classified as **non-arable low potential grazing land** .This is due to the arid climate and limiting soil properties.

The land capability and suitability of **crop production** for the northern site alternative is shown in **Table 10** and the central site alternative in **Table 11** below, while capability and suitability for **grazing** in the northern site alternative is set out in **Table 12** and the central site in **Table 13** below.

Table 10: Land Capability and Suitability for Crop Production – Northern Site Alternative

Land capability class	Suitability Rating	Major Limitation to Crop Production	Distance Km	% of Local Study Area
Class VI Cg and Br	**Very low**	Low water holding capacity Shallow rooting zone Severe climate Severe erosion hazard	6.8	90
Class lV Py	**Low**	Low water holding capacity Severe climate	0.8	10

Table 11: Land Capability and Suitability for Crop Production – Central Site Alternative

Land capability class	Suitability Rating	Major Limitation to Crop Production	Distance Km	% of Local Study Area
Class VI Cg	**Very low**	Low water holding capacity Shallow rooting zone Severe climate Severe erosion hazard	5.3	77
Class lV Py	**Low**	Low water holding capacity Severe climate	1.6	23

Table 12: Land Capability and Suitability Assessment for Grazing - Northern Site Alternative.

Area Description	Suitability Rating	Major Limitation to Grazing	Area (ha)	% of Local Study Area
Cattle /Sheep	**Low**	Very shallow rooting depth on carbonate hard setting, low clay content, low rain fall, with carrying capacity of 21-25ha/LSU	590 ha	100

Table 13: Land Capability and Suitability Assessment for Grazing - Central Site Alternative.

Area Description	Suitability Rating	Major Limitation to Grazing	Area (ha)	% of Local Study Area
Cattle /Sheep	**Low**	Very shallow rooting depth on carbonate hard setting, low clay content, low rain fall, with carrying capacity of 21-25ha/LSU	450	100

9.4.4.5 Summary of findings

The site is largely unsuitable for cultivation due to the following limiting factors:

- Low annual rainfall, high evaporation and extreme temperatures restrict dry land cultivation.
- The very shallow soil depth with its limited water holding capacity restricts root development
- The very fine sand grade of top soil influences the stability and increases erodability potential.
- Low clay percentage results in low water holding capacity and low nutrient availability, resulting in low soil fertility.
- The establishment of a PV power station would have no severe impact on the agricultural potential or activities at the identified site, while agricultural activities would continue in the surrounding area. The following possible impacts were considered.

The area could be utilised as grazing, but it should be noted that the **grazing potential** is **very low**.

In comparison, the **two alternative sites are identical** as far as **agricultural potential** and impact is concerned. The **topography of the Central Site is more favourable** for the construction of the PV power facility than the Northern Site, since it is less undulating.

From the **management viewpoint** of the farmer, however, the **Northern Site is preferable** because the farm will not be divided in separate management units. Furthermore, an access road through the farm will not be necessary, since the Northern Site can be reached from the North.

The agricultural specialist therefore recommended that the development be done on the **Northern Site**. There is thus a conflict between the preferred site recommended by the ecologist and that recommended by the agricultural specialist. This will be investigated further in the

9.5 IDENTIFICATION OF POSSIBLE IMPACTS ON AGRICULTURAL POTENTIAL

Due to the low agricultural potential of both alternative sites, possible impacts on agricultural activities during construction and operation of the PV power facility are few.

Due to the low carrying capacity, the loss of **grazing during construction is negligible**. After construction and due to the nature of the facility, animals will still be able to graze the site.

9.5.1 Conclusion

The findings of the agricultural potential study indicate that **impacts on agriculture**, locally and on site, will be **minimal** and will have **very little influence** on **commercial farming**. Due to poor soil properties and extreme climatic conditions, farming activities consist of grazing for sheep, but due to the low grazing potential of the region, the **loss of the small area of grazing land is negligible**.

A full agricultural impact assessment will probably not indicate otherwise and is therefore regarded as unnecessary.

10 ECOLOGICAL SENSITIVITY ANALYSIS

Mr. Simon Todd, of Simon Todd Consulting, conducted an Ecological Sensitivity Analysis of the proposed RE Capital 3Solar Development (see **Appendix D, Annexure D1** for full report), from which the following is drawn:

The draft sensitivity map for the RE Capital 3 Solar Energy Development site is illustrated in figure 42 above (in section 7 of this report as well as in the Fauna and Flora Scoping Report attached in Annexure D1.

The majority of the site consists of **open plains** considered to be of **moderate sensitivity** and would be **suitable for development** without a very high risk of significant ecological impacts. The **northern site alternative** is seen as the **least preferred site alternative** from an ecological point of view as there is a significant drainage line which traverses the area as well as several pans which are also considered ecologically sensitive. The central site alternative appears to be significantly less sensitive and is identified as the preferred development option from an ecological point of view. Although there are also some minor drainage channels in this area, these are not likely to be highly ecologically significant. The vegetation structure and composition of these washes will be investigated during the EIA phase to evaluate their ecological value and sensitivity.

10.1 POTENTIAL IMPACTS

Based on the results of the abovementioned ecological sensitivity analysis, the following impacts have been identified as the most significant potential impacts likely to be associated with the development of the RE Capital 3 solar facility:

The development will result in a variety of impacts, associated largely with the disturbance, loss and transformation of intact vegetation and faunal habitat to hard infrastructure such as PV arrays, roads, operations buildings etc. The following impacts are identified as the major impacts that are likely to be associated with the development and which will be assessed during the EIA phase of the development, for the preconstruction, construction and operational phases of the development. The potential significance of these impacts is contained in the fauna and flora scoping report (annexure D1) but will only be assessed in detail during the EIA phase.

10.1.1 Impacts on vegetation and protected plant species

It is highly likely that some listed plant species occur within the site and there is a probability that some of these would be affected by the development. Depending on the identity and status of the affected species, impacts on such species are likely to be of **low to moderate significance** given the relatively low footprint of the PV facility in relation to the extensive nature of the surrounding landscape. As PV developments generate a high local impact, the exact location of the PV facility in relation to the sensitive receptors is usually the most important factor determining the impact of this element of the development.

10.1.2 Soil erosion and associated degradation of ecosystems

The large amount of disturbance created during construction will leave the site vulnerable to alien plant invasion and soil erosion. On the one hand, the generally low slope at the site will to some extent reduce the likely severity of this impact, while the panels themselves will constitute several hectares of hardened surface which will generate a large amount of runoff with a high erosion capacity during large storm events. Therefore, runoff management will be a key factor in reducing the likely impact of the development on local vegetation, soils and hydrology.

10.1.3 Direct Faunal impacts

Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals or reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. However in the long term, operational phase impacts are likely to be relatively low.

10.1.4 Impacts on Broad-Scale Ecological Processes and Loss of Landscape Connectivity

As there are several other renewable energy developments in the area, the development of the site will contribute towards cumulative impacts, particularly the loss of landscape connectivity. The site is likely to be fenced and the cleared site is also likely to be hostile to many smaller fauna which will prevent or impede their movement across the landscape. The significance of this impact will need to be evaluated at the landscape level with consideration of the location and configuration of the other developments in the area.

10.1.5 Avifaunal Impacts

Large raptors and many larger bird species such as cranes and bustards are vulnerable to collisions with or electrocution from power line infrastructure. This can be a particular problem if the power line lies within the movement or migration pathway of the birds. As many of these species are long-lived slow-breeding species, collisions with power lines can be a major source of mortality for such species and may threaten the viability of local or regional populations. Insulating

electrical components and fitting bird flight diverters can provide effective mitigation against such impacts and is recommended as standard practice for new power line infrastructure.

10.2 CONCLUSION & PRELIMINARY RECOMMENDATIONS

The site does **not appear to be highly sensitive** from a botanical perspective. The only listed vegetation type in the area is Lower Gariep Alluvial Vegetation which is restricted to the vicinity of the Orange River and will not be impacted by the development. The affected vegetation types have been little impacted by transformation and are still overwhelmingly intact. As these vegetation types are common in the local area as well as in the broader region, the loss of a relatively small extent of these vegetation types does not appear to be a significant concern. There is however likely to be a number of listed and protected species present within the site which may be impacted by the development. Although there are no indications at this stage that any of these are very abundant at the site, an important activity during the field assessment will be to locate and map the distribution of such species at the site, so that impact on such species can be reduced or avoided. It is likely that many of the species of conservation concern are associated with localised habitats containing plant communities of conservation concern such as quartz outcrops or calcrete patches.

Overall, the **faunal diversity** of the site is likely to be **low** with relatively few species of conservation concern present. The listed mammals which may occur at the site all have wide distribution ranges and the development would not constitute a significant loss of habitat for such species. The major impact associated with the development of the site for mammals would be habitat loss and potentially some disruption of the broad-scale connectivity of the landscape. No listed or range-restricted reptiles are likely to occur at the site the impacts on reptiles resulting from the development are not likely to be of broader significance. Site clearing and the construction of the panels will alter habitat structure within the affected area for reptiles and is likely to result in an increase in geckos and other climbing species at the expense of diurnal ground-foraging species. The Giant Bullfrog *Pyxicephalus adspersus* is the only listed amphibian which may occur at the site and is listed as Near Threatened. The larger pans within the northern development option would represent the only potentially suitable breeding habitat for this species. A number of listed avifauna are likely to be present and in the long-term, the overhead power line to connect the facility to the Eskom grid is identified as the major threat to avifauna resulting from the development.

The sensitivity mapping suggests that the majority of the site consists of open plains considered to be of moderate sensitivity and which would be suitable for development without a very high risk of significant ecological impacts. The northern development option is seen as the least preferred option as there is a significant drainage line which traverses the area as well as several pans which are also considered ecologically sensitive. The alternative development area in the central part of the site appears to be significantly less sensitive and is identified as the preferred development option. As the Eskom MTS has yet to be built, the preferred powerline route to the substation cannot be identified at this point but with suitable mitigation, is not likely to generate significant impact.

11 HERITAGE CONSIDERATIONS

A preliminary desktop heritage scoping study for the proposed RE Capital 3 Solar Development was undertaken by Dr David Morris of the McGregor Museum Department of Archaeology. A full copy of this study is attached in Annexure D3 of this report. The following key points are drawn from this report:

11.1 PURPOSE OF STUDY

The heritage scoping report is focused on the proposed development footprint alternatives of the solar energy facility (anticipated to be in three phases, 75 MW each, each phase occupying approximately 165 ha) with all associated infrastructure.

Relative to the anticipated impact of such a development, the scoping report presents a brief baseline description and sets out the plan of study for the impact assessment phase of the process.

11.2 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The environment in question is arid, comprising relatively flat drainage plains stretching up to 15 km north west of the Orange River. The landscape is sparsely vegetated, with shallow soils. As such, any surface archaeological traces tend to be highly visible.

11.3 HERITAGE FEATURES OF THE REGION

No previous archaeological survey work by the McGregor Museum has been carried out on the farm Dyasonsklip. However previous survey work has documented archaeological observations on nearby properties including McTaggarts Camp 453. For the broader region the following comments can be made as background or baseline information from which certain heritage predictions may be made. These predictions will be confirmed (tested) in the environmental impact assessment phase of the project.

11.3.1 Colonial frontier

The eighteenth- and nineteenth-century records for this region pertain mainly to the areas south of and along the Orange River. None of these accounts refer to the specific area of the proposed development.

Dyasons Klip derives its name from events during the Korana War of 1879-1880. A certain Captain Dyason of the Northern Border Police was killed by Korana adversaries while walking between two rocks at this place in 1880 (Van Vreeden 1961:271, citing Gordonia News, 11 Nov 1949). It is not recorded exactly where these stones are situated: most likely they would be near to the Orange River.

There was further military activity in the area in the early twentieth century in relation to Jacob Marengo, shot dead on 20 September 1907 near Eensaamheid Pan where, in an incident of “severe overkill”, 5000 rounds were fired to exterminate the resistance leader, five other armed Nama and two accompanying women (Masson 1995). Eensaamheid is about 100 km north west of Upington.

Tungsten mining took place at the north western-most part of the adjoining farm McTaggarts Camp in the 1930s (Morris 2012). Tungston mining also took place on the Dyasonsklip farm.

11.3.2 Later Stone Age

Late Holocene Later Stone Age (LSA) sites are frequently noted in surveys south of and south west of the region of proposed development and along the Orange River. These are generally short-duration occupations by small groups of hunter-gatherers. In contrast, there are substantial herder encampments along the Orange River floodplain itself and in the hills north of Kakamas. In a range of hills north east of Keimoes, on Zovoorby, a rock shelter and specularite working (a

sparkling mineral with known cosmetic and ritual use in the precolonial past) has been excavated . LSA sites are usually focused on a particular feature in the landscape such as a hill or rocky outcrop and in relation to resources like water and associated habitats richer in animals and plant foods.

11.3.3 Pleistocene: Middle and Earlier Stone Age

Beaumont et al. (1995:240-1) note a widespread low density stone artefact scatter of Pleistocene age across areas of Bushmanland to the south where raw materials, mainly quartzite cobbles, were derived from the Dwyka glacial till. Similar occurrences have been noted north of Upington in situations where raw materials are abundant. Systematic collections of this material at Olyvenkolk south west of Kenhardt and Maans Pannen east of Gamoep could be separated out by abrasion state into a fresh component of Middle Stone Age (MSA) with prepared cores, blades and points, and a large aggregate of moderately to heavily weathered Earlier Stone Age (ESA) (Beaumont et al. 1995).

The ESA included Victoria West cores on dolerite and quartzite (a fine example has been found at Hondeblaf north of Upington), long blades, and a very low incidence of handaxes and cleavers. The Middle (and perhaps in some instances Lower) Pleistocene occupation of the region that these artefacts reflect must have occurred at times when the environment was more hospitable than today. This is suggested by the known greater reliance of people in Acheulean times on quite restricted ecological ranges, with proximity to water being a recurrent factor in the distribution of sites.

11.4 DESCRIPTION AND EVALUATION OF ISSUES AND POTENTIAL IMPACTS ON HERITAGE RESOURCES.

Heritage resources including archaeological sites are in each instance unique and non-renewable resources. Area and linear developments such as those envisaged can have a permanent destructive impact on these resources. The objective of the impact assessment phase of this study will be to assess the sensitivity of such resources where present, to evaluate the significance of potential impacts on these resources and, if and where appropriate, to recommend no-go areas and measures to mitigate or manage said impacts.

Area impacts are possible in the case of the RE Capital 3 Solar Development and the proposed substation; the power lines and access roads would represent linear impacts.

11.4.1 Direct, indirect and cumulative impacts (in terms of nature, magnitude and extent)

The destructive impacts that are possible in terms of heritage resources would tend to be direct, once-off events occurring during the initial construction period. In the long term, the proximity of operations in a given area could result in secondary indirect impacts resulting from the movement of people or vehicles in the immediate or surrounding vicinity. The Environmental Management Plan should seek to minimize the latter impacts as far as possible.

With respect to the magnitude and extent of potential impacts, it has been noted that the erection of power lines would have a relatively small impact on Stone Age sites, whereas a road or a water supply pipeline would tend to be far more destructive.

11.4.2 Issues potentially influencing choice of preferred development locales

Areas along natural drainage lines – water resources and ecology: Various considerations including possible concentration of past human activity (and hence archaeological traces) along water courses may suggest that the development footprint not be directly on or near the main

drainage channels. The ecological specialist has come to this same conclusion. Future layouts will thus be developed to avoid these features entirely.

11.5 CONCLUSION

Based on previous experience, the terrain on which the proposed RE Capital 3 Solar Development would be located is **not likely to be rich in archaeological traces of major significance**.

There appear to be none of the features such as hills or rocky features (which in other parts of this landscape provide shelters with traces of precolonial Stone Age occupation/activity.

Nineteenth- and twentieth-century cultural history and intangible heritage values attached to places may be difficult to recover owing to the sparse population. It is not thought likely that any significant intangible heritage values would be attached to the particular terrain in question.

There appear not to be colonial era built environment features in the areas of proposed Solar Development.

The likelihood of paleontological features of significance occurring would be subject to a desktop enquiry and fieldwork if deemed necessary. These confirmations and the assessment of potential impacts on heritage resources will be considered in the impact assessment phase of this process.

12 SUMMARY OF SITE CONSTRAINTS

The following site-specific constraints were identified by various specialists during this scoping / baseline phase of the environmental process. These site constraints will be used to further refine the proposed solar facility layout, as the potential impacts associated with them will be and recommendations to avoid and/or mitigate impacts are provided during the on-going environmental process.

12.1 FLORA:

- **Main drainage lines & seasonal washes**;
- ***Protected*** plants species and communities;
- **Pans** (within the Northern Alternative Site);

12.2 FAUNA:

- **Main drainage lines & seasonal washes**;
- Potential **collision and electrocution from power-line infrastructure** are significant causes of mortality for bustards, flamingos, eagles and vultures.

12.3 AGRICULTURAL POTENTIAL:

No specific constraints in terms of agricultural potential were identified

12.4 HERITAGE:

- **Main drainage lines & seasonal washes**.

12.5 VISUAL:

Due to the remote location of the site and distance from the N14 there are not deemed to be any visual constraints on the

13 PUBLIC PARTICIPATION PROCESS TO DATE

As part of the public participation process the following steps were taken to ensure compliance with the legislation and to allow ample opportunity for members of the public and key stakeholders to be involved and participate in the environmental process. Please see **Appendix E** for evidence of this Public Participation process. The Public Participation Process has been undertaken according to the requirements of the new NEMA EIA regulations. The following requirements i.t.o the scoping process have been undertaken and complied with in terms of Regulation 56:

Table 14: Summary of Public Participation Process to date.

CHRONOLOGY OF EVENTS	
DATE	**ACTION**
23 May 2013	**Notification** was sent to the Landowner of portion 12 of Daysonsklip 454 notifying him of the development proposal and the environmental process to be followed.
23 May 2013	**Notifications** were sent to neighbouring landowners informing them of the development proposal and the environmental process. They were automatically registered as Interested and Affected Parties
23 May 2013	The **Siyanda District Municipality** and the **Khai Garib Local Municipality** (which have jurisdiction over the area) were notified and automatically registered as key stakeholders.
23 May 2013	O**rgans of state** (including SANParks, Northern Cape Nature Conservation, Department of Agriculture, Forestry & Fisheries, Department of Minerals and Energy, Department of Water Affairs, SAHRA, Eskom, Civil Aviation Authority etc.), were notified and registered as key stakeholders.
24 May 2013	**Advertisements** were placed in a regional newspapers (*Namaqua Weekly & Die Plattelander*), calling for stakeholders to register as Interested & Affected Parties
11 June 2013	**Notice Boards** (English & Afrikaans) were placed at the Keimoes Municipality and Keimoes Library.
11 June 2013	**Notice Boards** (English & Afrikaans) were placed on the boundary of the study site on portion 12 of the farm Dyasonsklip 454.
May 2013	A **Stakeholder Register** was opened and the details of all registered stakeholders entered for future correspondence.
02 August 2013	Hard copies of the Draft Scoping Report (DSR) have been placed at the Khai-Garib Municipality offices (Upington and Keimoes) and the Keimoes Library, to inform the public of the proposal and EIA process, and invite them to review the document and provide comment (**Wednesday 07 August 2013 to Wednesday 18 September 2013.**). The DSR has also been made available on the *Cape EAPrac* website: www.cape-eaprac.co.za/active
02 August 2013	Registered Stakeholders and I&APs were sent notifications informing that of the availability of the DBAR for a review and comment period of 40-days, extending from **Wednesday 7 August 2013 to Wednesday 18 September 2013.**

No issues or concerns have been raised by Interested and Affected Parties thus far in the environmental process. Comments received in response to the Draft Scoping Report will be included in the Final Scoping Report, to be submitted to the Department of Environmental Affairs (DEA) for consideration.

Figure 52: Site notices placed on site, at the Khai Garib Municipality and the Keimoes Library.

13.1 BACKGROUND INFORMATION DOCUMENT

With the initial stakeholder registrations background information documents (BID's) were made available to stakeholders. All key stakeholders were provided with hard copies of the BID along with the notification letters. BID's were also made available at the Keimoes Library and the Khai Garib municipality. The BID's were also made available on the Cape EAPrac Website.

Figure 53: Background Information Documents available at the Keimoes Library.

13.2 REGISTRATION OF KEY STAKEHOLDERS

A number of key stakeholders were automatically registered and will be given an opportunity to comment on this Draft Scoping Report. A list of key stakeholders registered for this process included in table 15 below.

Table 15: Key Stakeholders automatically registered as part of the Environmental Process.

Stakeholders Registered		
Neighbouring property owners	Department of Environmental Affairs and Nature Conservation	Department of Water Affairs
Khai Garib Municipality: Municipal Manager	South African National Parks	Department of Science and Technology
Khai Garib Municipality: Ward Councillors	South African National Roads Agency Limited	The Council for Scientific and Industrial Research
South African Heritage Resources Agency	Department of Transport and Public Works	The South African Square Kilometre Array
Northern Cape Heritage	Department of Health	The South African Civil

Resources Authority		Aviation Authority
Department of Agriculture, Forestry and Fisheries	Department of Minerals and Energy	
Provincial Department of Agriculture	Eskom	

NOTE: The environmental Regulations make provision that as there are no substantive changes between the *Draft* Scoping Report (DSR) and *Final* Scoping Report (FSR), the Final SR can be submitted to the Department (DEA) without a further public comment period of 21-days (subject to approval by the delegated Authority). The FSR will then be made available to the public for information purposes whilst the Department considers the report

2 ASSUMPTIONS & LIMITATIONS

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

- It is assumed that the information on which this report is based (specialist studies and project information, as well as existing information) is **correct, factual and truthful.**
- The proposed development is **in line** with the statutory planning vision for the area (namely the local Spatial Development Plan), and thus it is assumed that issues such as the cumulative impact of development in terms of character of the area and its resources, have been taken into account during the strategic planning for the area.
- It is assumed that all the relevant **mitigation measures** and agreements specified in this report will be implemented in order to ensure minimal negative impacts and maximum environmental benefits.
- It is assumed that due consideration will be given to the **discrepancies in the digital mapping** (PV panel array layouts against possible constraints), caused by differing software programs, and that it is understood that the ultimate/final positioning of solar array will only be confirmed on-site with the relevant specialist/s.
- The Department of Water Affairs **may consider the submission of a water use application** necessary for allowing the use of water from the farm boreholes and possible the crossing of the on-site drainage lines by the infrastructure associated with the solar facility. The assumption is made that on review of this Draft Scoping Report the Department of Water Affairs will provide prompt confirmation and recommendations in this regard.
- It is assumed that Stakeholders and Interested and Affected Parties notified during the initial public participation process will submit all relevant **comments within the designated 40-days** review and comment period, so that these can included in the Final Scoping Report can be timeously submitted to the delegated Authority, the Department Environmental Affairs for consideration.

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

3 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT REPORT

This section outlines the assessment methodology and legal context for specialist studies. Based on the issues raised by the project team, specific impact assessments are required to address issues that may result in significant impacts. For these specialist impact assessments, the specialists have been provided with a set of criteria for undertaking their assessments, to allow for

comparative assessment of all issues. These criteria are detailed in the Terms of Reference to each specialist and summarised below.

3.1 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS

These criteria are based on the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989, as well as the Specialist Guidelines drawn up in terms of the NEMA Regulations.

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

- **Nature of the impact**
  This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.
- **Extent of the impact**
  Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.
- **Duration of the impact**
  The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.
- **Intensity**
  The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.
- **Probability of occurrence**
  The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

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

- **Status of the impact**
  The specialist should determine whether the impacts are negative, positive or neutral ("cost – benefit" analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.
- **Cumulative impact**
  Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments planned and already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.
- **Degree of confidence in predictions**
  The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

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

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

The final impact assessment report should as a minimum include the following sections:

- Executive Summary
- Introduction And Description Of Study
- Methodology
- Results
- Assessment of Impacts (Direct, In-direct & Cumulative, including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables)
- Comparative Assessment between project Alternatives
- Discussion and Recommendation for Preferred Alternative
- Specialist recommendation for Pre-Construction, Construction and Operational Phases)
- Conclusion

3.2 BRIEF FOR SPECIALIST STUDIES TO BE UNDERTAKEN AS PART OF THE EIA

- Each specialist is required to consider the project in as much detail as is required to inform his/her impact assessment.
- Specialists must ensure that they are aware of the necessary **planning, environmental and service requirements** associated with the proposal.
- Specialists must ensure that they **liaise with other relevant specialists** (via the EAP) if it seems necessary to use information from another discipline.
- Impact Assessments must **consider all the identified alternatives** in order to provide a comparative assessment of impacts **as well as the no-go option.**
- Specialists should consider **national and international guidelines and standards** relevant to their respective focus area. For example: *The Environmental, Health and Safety Guidelines (2007) IFC, World Bank Group* etc.
- Any **assumptions** made and any uncertainties or **gaps in knowledge**, as well as **limitations** regarding the specialist studies, must be clearly described and explained.
- The proximity of the site in relation to **key features** must be considered.
- The draft impact assessment report of each specialist are subject to public/stakeholder review and comment – all comments received will be considered by each specialist, responded to and the final impact assessment report updated accordingly.

4 TERMS OF REFERENCE FOR SPECIALIST STUDIES

Table 16: Terms of reference for Specialist Studies

Specialist Study	Aim of the Study / Input	Terms of Reference

Ecological / Biophysical	Determine the impacts that the construction, operation and decommissioning of the Proposed RE Capital 3 Solar development, substation / auxiliary building site, transmission line and associated infrastructure will have on vegetation and fauna. The above assessment must include the NO-GO and include a cumulative assessment.	• Approximately 500ha will be disturbed during construction and shaded during operation. • A six metre wide access road will be required to access the facility • 4m wide access gravel roads and internal road network will need to be constructed to and between the PV panel arrays. These roads may cross small drainage lines, which may require Low-Level-Crossing-Structures / drifts, with associated anti-erosion gabion structures, where necessary. • An on-site substation of approx. as well as auxiliary buildings with a footprint of approximately 1ha will be constructed. • A transmission line of approximately from the on-site substation to the new MTS substation will be required. • Based on the findings of the Scoping Ecological Report assess potential impacts on fauna & flora from the construction, operation and decommissioning activities. • Describe avoidance measures required, as well as mitigation / management measures that may be implemented to avoid or reduce any negative impacts on vegetation and fauna.
Heritage	Assess the Proposed RE Capital 3 Solar Development and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Heritage Resources and the Cultural Landscape and provide recommendations for avoidance &/ mitigation.	• On the basis of the public participation process for the Scoping phase, conclude the Heritage Impact Assessment, which includes: • Analysis of Cultural Landscape, Visual – Spatial and Cumulative Impacts; • Liaison with other specialists regarding the Archaeological and Paleontological and Impact Assessments. • Describe mitigation / management measures that may be implemented to avoid or reduce any negative impacts.
Archaeological	Assess the Proposed RE Capital 3 Solar Development and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Archaeological Resources and provide recommendations for avoidance &/ mitigation.	• Outline the requirements for the Archaeological monitoring (should this be necessary) during earthmoving activities so as to avoid or minimize negative impact on potential subsurface archaeological resources. • Describe mitigation / management measures that may be implemented to avoid or reduce any negative impacts.
Planning	Re-zoning and Long-term Lease Applications.	• Start preparing Re-zoning & Lease Applications based on preferred, mitigated layout of the solar facility. • Follow-up with Khai-Garib Municipality and Department of Agriculture regarding progress of the Re-zoning & Lease Applications for the Solar Facility on Agricultural land.

5 PROCESS TO BE FOLLOWED

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

- This Draft Scoping Report is made available for public review and comment for a period of 40 days. Comments received on this document will be responded to and included in the Final Scoping Report. Should there be substantial changes between the Draft and Final Scoping Report, this Report will be made available for review and comment for a further 21-day period. Should there be no substantial changes between the draft and final documents the Final Scoping Report will be submitted directly to the Department of Environmental Affairs (DEA) without a further 21-day public review and comment period. Registered Interested and Affected Parties will be notified when the Final Report is available on the *Cape EAPrac* website and/or be provided with digital copies of the FSR for information purposes
- Once the DEA accepts the Final Scoping Report and Plan of Study for Environmental Impact Report, the relevant specialists will undertake and complete their respective impact assessments;
- Discussions will be held with the various specialists and project team members in order to determine how best the development concept should be amended / refined to avoid significant impacts;
- In the event that amendments to the development plan are not required, the Draft Environmental Impact Report (DEIR) can be concluded;
- However, if an amendment becomes necessary, changes can be made to the layout plan to form another development alternative that will address and/or avoid any significantly detrimental impacts;
- Such an alternative will be circulated to all the relevant specialists in order for them to complete their comparative assessments and final impact assessment reports;
- The DEIR will be made available for public review and comment period of 40-days;
- All comments and inputs received during the comment & review period will be included with the Final EIR;
- The Final EIR will be submitted to the DEA for consideration and decision-making;
- The DEA's decision (Environmental Authorisation) on the FEIR will be communicated with all registered I&APs.

The competent Authority will be involved through continuous email and report **updates** on the process, in particular, when the **draft and final Environmental Impact Reports** have been completed. Should any unforeseen problems occur during the course of the impact assessment phase the competent authority will also be **contacted** for an **update and/or advice**.

6 CONCLUSION & RECOMMENDATIONS

This scoping exercise is currently being undertaken to present concept proposals to the public and potential Interested & Affected Parties and to identify environmental issues and concerns raised as a result of the proposed development alternatives to date. This will allow Interested & Affected Parties (I&APs), authorities, the project team, as well as specialists to provide input and raise issues and concerns, based on baseline / scoping studies undertaken. The RE Capital 3 Solar Development site has been analysed from Ecological, Agricultural Potential, Heritage, Archaeological and Palaeontological perspectives, and site constraints and potential impacts identified.

This Draft Scoping Report (DSR) summarises the process to date, reports on the findings of relevant baseline studies.

Cape EAPrac is of the opinion that the information contained in this Draft Scoping Report and the documentation attached hereto is sufficient to allow the general public and key stakeholders to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. We believe that the proposed RE Capital 3 Solar Development will be sustainable in the long term and that the proposed development will be an asset to the Upington/Keimoes area, Northern Cape region and the broader South African society through supplementing the electricity supply for the National Eskom Grid from a renewable source

This Draft Scoping Report (DSR) is made available for stakeholder review and comment for a period of 40-days, extending from **Wednesday 7 August 2013 to Wednesday 18 September 2013**. All comments received, will be considered and addressed, and feedback will be provided to registered stakeholders.

Following this comment period, the Final Scoping Report will be prepared. Should the Final Scoping Report include significant amendments to this Draft report, it will once again be made available to registered Interested and Affected Parties (I&APs) for comment, for a further 21 day period. Should the amendments include only minor changes to this Draft Scoping Report, the Final Scoping Report will be submitted directly to the Department of Environmental Affairs (DEA) and only be made available for stakeholder information purposes. Whatever the case, all registered stakeholders will be kept informed throughout the remainder of the environmental process.

All stakeholders are requested to review this Draft Scoping Report and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 40-day comment period.

Comments must be submitted, in writing, to the following address no later than 18 September 2013

Cape Environmental Assessment Practitioners

Att: **Mr Dale Holder**

PO Box 2070, George, 6530

Fax: 044-874 0432 or Email: dale@cape-eaprac.co.za

ABBREVIATIONS

AFNP	Augrabies Falls National Park
AIA	Archaeological Impact Assessment
BGIS LUDS	Biodiversity Geographic Information System Land Use Decision Support
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
CEMPr	Construction Environmental Management Programme
DEA	Department of Environmental Affairs
DEA&NC	Department of Environmental Affairs and Nature Conservation
DME	Department of Minerals and Energy
EAP	Environmental Impact Practitioner
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act

PM	Post Meridiem; "Afternoon"
PSDF	Provincial Spatial Development Framework
S.A.	South Africa
SACAA / CAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
TOPS	Threatened and Protected Species

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