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PROPOSED COMMERCIAL CONCENTRATED SOLAR POWER (CSP) FACILITY

DRAFT SCOPING REPORT

2012/06/11

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PROPOSED COMMERCIAL CONCENTRATED SOLAR POWER (CSP) FACILITY

DRAFT SCOPING REPORT

2012/06/11

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EXECUTIVE SUMMARY

Introduction

Need and Desirability

Recent economic growth and increased efficiency in distribution across the country has resulted in a deficit between electricity supply and demand. In response to this the Department of Energy developed an Integrated Resource plan identifying the need for new generation capacity, opening opportunities for organisations to become Independent Power Producers and contribute to the national power grid.

Constraints associated with coal-fire power production, such as the non-renewable nature of the coal resource and the competition with other industries for the use of coal, as well as South Africa's commitment to reduce carbon emissions, have led to growing demand for renewable energy sources.

Solar energy is the most abundant energy source on Earth and is a clean energy source. It is widely acknowledged that solar power has the potential to become cost competitive with conventional coal and nuclear power in the future. Concentrated solar power can also provide distributed large-scale, steady-state power generation with low CO2 emissions and relatively low water consumption.

Description of the Proposed Site

Concentrated solar power projects are suited to semi-desert regions, such as the Northern Cape, where vast amounts of space are available for the required infrastructure and where clear skies with little cloud cover and low dust and/or water vapour are favoured. Prior to the commencement of the S&EIA process, three farms (Van Roois Vley, Droogehout and Areachap) in the Northern Cape were selected by SNE to undergo an environmental screening investigation (ESI) to determine their suitability for the establishment of a Commercial CSP facility. The environmental screening comprised an assessment biophysical, social and enviro-legal characteristics of each site and identified Van Roois Vley farm as the most suitable site.

The proposed site is located approximately 25 km west of the town of Upington and approximately 26 km north the town of Keimoes, and is located between the D3276 gravel road and the N10 tarred road, and is transversed by the railway line running between Upington and the Namibian border of Ariamsvlei. There is no infrastructure on the site except for wind pumps and camp fences and the current land use is for grazing (sheep and cattle) (see Description of Receiving Environment below).

Description of the Proposed Project

Available CSP technologies include:

- Parabolic trough – a linear parabolic reflector, or mirror that concentrates the sun's rays onto a receiver (absorber tube) positioned along the mirror's focal line. The absorber tube is filled with a heat transfer fluid (HTF) which is heated and cycled through heat exchangers and back into the tube. The heat exchangers super heats water creating steam that drives a turbine to produce electricity.
- Central linear Fresnel – long, thin segments of mirrors focus the suns energy onto an absorber located at a common focal point of the mirrors. The energy is transferred into a thermal, which is cycled through heat exchangers and back to the absorber. The heat exchangers super heats water creating steam that drives a turbine to produce electricity.
- CSP tower facility – thousands of tracking mirrors (called heliostats) focus the sun's thermal energy onto a receiver in a tower located in the middle of the field of heliostats. The receiver absorbs thermal energy and transfers the heat to water within the receiver, which super heats the water creating steam that drives a turbine to produce electricity.

A CSP tower facility has been selected by Sasol through pre-S&EIA investigations as its preferred CSP technology. CSP tower facilities typically include the following development components:

- Solar field (± 700 ha) – approximately 50,000 heliostats (17 m^2 in size) arranged in circular rows around the power block and focused up to the receiver on top of the tower facility in the power block. Heliostats are mounted on a pylon linked to a computerised system that will rotate the heliostat to track the sun. Although

the solar field is the largest component of the project in terms of footprint, the area beneath the heliostats will not cleared of vegetation.

- Power block – a concrete power tower with a receiver located on to (total height of ± 200 m). Steam generated in the receiver is piped to a turbine (to produce electricity) and through air-cooled condensers to convert it back to water that is cycled back to the receiver in a closed-loop system. An auxiliary boiler will be required to start up the turbines in the mornings. Diesel for the auxiliary boiler will be stored in two containers of 83 m^3 each.
- Connection infrastructure (transmission/substations) – to connect the proposed CSP facility to a recently authorised Eskom substation located an adjacent property to the east of the proposed site. Cables will be laid underground up to the boundary of the proposed site and above ground from the proposed site boundary to the future substation.
- Access and internal roads – gravel roads around the site boundary and between the heliostats and site components.
- Services and resource requirements – municipal water will be investigated but should this not be available, abstraction piping from the Orange River will be applied for. Water will need to be treated using cation and anion exchange resins to provide pure/clean water for cleaning of the heliostats. A small-scale sewage treatment plant will be investigated. It is proposed that waste water resulting from the water treatment plant and sewage treatment plant will be sent to an evaporation pond on site. Sediment/sludge will be removed from the evaporation pond 2-3 times a year and disposed of at an existing, approximately licenced facility. Other service/resource requirements include a fire protection unit and telecommunications.
- Other associated infrastructure – administration and control buildings; staff facilities; including accommodation; fencing and security, fire breaks and fire prevention equipment; Permanent storage/laydown facilities/areas; maintenance building, temporary/construction phase infrastructure, including laydown areas and site camps.

Proposed Adjacent CPV Facility

SNE proposes to develop a CPV facility adjacent to the CSP facility. The CPV facility will be located in the same project area and will occupy approximately 200 ha. This facility will need to undergo EA before it can commence, therefore an application to undertake a S&EIA process has been submitted to the authorising authority, DEA, reference number: 14/12/16/3/3/2/336. Further information with regards to the proposed CPV development and its interaction with the proposed CSP development will be provide in the EIA Report.

Alternatives

Alternatives can be identified through the S&EIA process. Potential alternatives identified thus far, which will be investigated as part of the EIA Phase, include:

- Layout Alternatives – the location of infrastructure will be investigated as part of the EIA Phase and will take cognisance of specialist investigations and assessment of environmental sensitivity on site. Layout alternatives in terms of the location of a future substation for connection to Eskom's transmission/distribution grid, as well as the provision of water for the facility (by the municipality or through abstraction and piping form the Orange River, will be investigated.
- Process alternatives
  - Fundamental solar technologies – a pre-S&EIA assessment of the available CSP technologies was conducted by SNE, out of which a CSP tower facility was found to be the preferred solar technology to meet SNE's objectives and needs. More information in this regard will be provided in the EIA Phase.
  - Cooling-technologies – wet-cooling has higher electricity production efficiency; however air-cooling has lower water requirements. Pre-S&EIA investigations by SNE indicated that, for this proposed project and project location, air-cooling is preferred due to the scarcity of water. Further information will be provided in the EIA Phase.
- No-go option – without the development of the renewables industry, including solar and projects such as the Project Solis, Eskom's reserve margin will continue to deplete and drastic measures such as load-shedding may be required to stabilise energy demand. Taking a long term view, renewable energy will provide South Africa with access to electricity that is cheaper and cleaner than coal and nuclear alternatives.

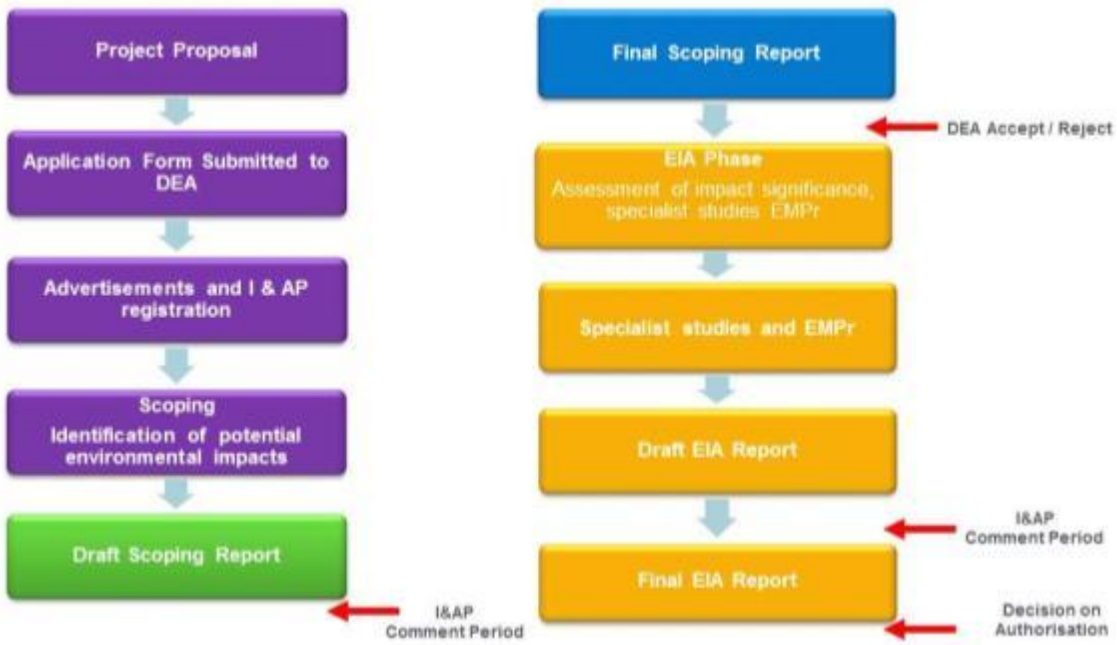
Governance – Legislative Framework

The following legislation was identified as applicable to the proposed CSP facility:

- National Environmental Management Act (No. 107 of 1998) (NEMA), as amended – activities listed in Government Notices (544, 545 and 546), published in terms of NEMA, were identified and require an S&EIA process and EA prior to commencement.
- National Environmental Management: Waste Act (No. 59 of 2008) (NEM: WA) – activities listed in Government Notice 718, published in terms of NEM: WA, were identified and require an S&EIA process and Waste Management Licence prior to commencement.
- National Water Act (No. 36 of 1999) (NWA) – possible water uses listed in terms of Section 21 of the NWA was identified, for which a Water Use Licence may potentially be required.
- National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM: AQA) and Minimum Emission Standards – activities listed in Government Notice 248, published in terms of NEM: AQA, were identified and require an Air Emissions Licence prior to commencement.
- National Heritage Resources Act (No. 25 of 1999) - Section 38 indicates that all new developments with a site exceeding 5 000 m² or the construction of a road, power line, pipeline or other similar form of linear development or barrier exceeding 300 m in length, are subject to consent by SAHRA prior to commencement.
- National Environmental Management: Biodiversity Act (No. 10 of 2004) – should any threatened or protected species be found within the footprint of a proposed development, permits for the removal of these species will be required.
- National Forests Act (No. 84 of 1998) – should any species that are protected in terms of this Act be found on site, licence for the removal of these species will be required.
- Aviation Act (No. 74 of 1962) – requires that the Civil Aviation Authority is consulted, and consent requested, for structures exceeding 45 m above ground level or 150 m above mean ground level.

Description of the Integrated EIA process

The S&EIA Process is depicted in the figure below. The application for EA for the proposed CSP facility is currently in the 'Draft Scoping Report' Phase.



The Scoping Phase

The Scoping Phase included the following:

- Application for authorisation – an application was submitted to the DEA who registered the project under the reference number 14/12/16/3/3/2/335
- Scoping Phase site investigations – various site visits with the Applicant, the DEA, the local municipality, the project specialists and the EIA team were conducted May 2012.
- Description of the receiving environment – based on site visits and specialist input, the receiving environment of the proposed site was described in relation to climate, air quality, noise characteristics, geology and soils, topography, land use and land capability, hydrology, geohydrology, flora and fauna including avifauna, archaeology, culture and heritage, aesthetic value and socio-economic characteristics.
- Stakeholder engagement – initial notification of the proposed project was conducted via placement of adverts (English and Afrikaans) in local and regional newspapers, placement of notices on-site and the nearest towns (Upington and Keimoes), email, fax and SMS. Public and authority's meetings were conducted to present the proposed CSP facility and EIA process. An Issues Trail documenting all comments and concerns raised during stakeholder engagement has been prepared.

Potential Environmental Impacts and Plan of Study for EIA

The EIA phase considers the impacts of the proposed project on the environment, and will consider the following project development phases in detail:

- Construction phase;
- Operation phase; and
- Normal, abnormal and emergency conditions.

The impact assessment will assess the significance of direct, indirect and cumulative impacts on the receiving biophysical and socio-economic environment. The EIA will utilise the specialist studies described below, an impact assessment methodology and management and mitigation measures to assess the significance of potential impacts on the environment.

Based on inputs from the project team, stakeholders, I&APs and specialists the environmental (biophysical, social and cultural) impacts in the table below have been identified as potentially associated with the proposed development and will be investigated during the EIA phase of the process as indicated.

Environmental Aspect	Potential Impact	Proposed method of investigation
Soil, Land Use and Land Capability	Loss of agricultural capacity	Land Capability Assessment (Agriculture and soils)
	Loss of grazing capacity	
Biodiversity	Loss of terrestrial habitat	Botanical Impact Assessment, Faunal Impact Assessment, Avifaunal Impact assessment
	Loss of ephemeral habitat	
	Disturbance and displacement of fauna//avifaunal species	
	Faunal interaction with structures, servitudes and personnel	
	Impact on surrounding habitat and species	
	Increase in environmental degradation	
	Loss of Red data / protected floral species	
	Introduction / spread of alien species	
	Loss of species diversity	

Environmental Aspect	Potential Impact	Proposed method of investigation
Surface and Groundwater	Soil erosion from changes in surface water flow due to construction of infrastructure	Hydrological and Geohydrological Impact Assessment
	Soil erosion due to storm water runoff from heliostats	
	Impact on water users downstream of proposed abstraction point in the Orange River	
Air Quality	Particulate matter (dust) impacts during construction phase	Air Quality Impact Assessment
	Air quality impacts due to burning of diesel in auxiliary boiler	
Visual	Light reflection from heliostats into surrounding properties and traffic routes	Visual Impact Assessment
	Light reflection from heliostats into the sky (aviation safety)	
	Visual impact from viewpoints overlooking the proposed site	
	Visual impact of power tower structure	
Noise	Noise impact during construction	Noise specifications on experiment will be investigated during the EIA Phase
	Noise from steam turbine	
Traffic	Construction vehicles using the existing road networks to access the proposed site	Traffic Impact Assessment
	Increase in the number of vehicles on the existing networks during operation	
Culture and Heritage	Loss of significant archaeological sites	Heritage Impact assessment (including Phase I archaeological investigations)
	Loss of significant cultural / heritage resources	
Air Space	Physical obstacle to aircraft	Consultation with the Civil Aviation Authority
Socio-Economic	Job creation	Social Impact Assessment
	Expansion of local skill	
	Small business opportunities	
	Economic development	
	Increased potential for stock theft	
	Visual disturbance	
	Security risks	
	Noise intrusion	
	Dust intrusion	
	Light intrusion	
	Increased potential for fires	

Conclusions

The scoping phase was undertaken in line with the requirements of the NEMA EIA regulations. The information contained in the Scoping Report provides a comprehensive description of the aim and purpose of the proposed establishment of the CSP facility. The aim of the environmental investigations and, in particular, the EIA phase is to ensure that any negative impacts are eliminated or reduced as far as possible. The plan of study for the EIA contained in this report, describes the proposed way in which this will be done. During the EIA phase, the issues identified during the scoping phase will be addressed in greater detail and assessed to identify significant impacts and appropriate mitigation measures.

A plan of study for the EIA has been included in the Scoping Report indicating the purpose of the EIA and provides the framework for the next phase of the authorisation process. It includes the methodologies for the proposed specialist studies; a description of the risk rating methodology to be used and details the overall deliverables (i.e. EIA and EMP reports). During the EIA phase the abovementioned specialist studies will be conducted in order to further investigate potential impacts on the environment as a result of the proposed CSP facility:

An important part of any scoping phase is stakeholder engagement. The stakeholder engagement was initiated from the onset of the project to ensure that all stakeholders were adequately and effectively consulted. Stakeholder engagement is a continuous process for the duration of the S&EIA. Future actions will include the notification of the availability of the Draft EIA report for public review, as well as a public presentation on the findings of the EIA phase during the review period.

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1 Introduction

1.1 Background to the Project

Sasol New Energy Holdings (Pty) Ltd (SNE) proposes to develop a Commercial Concentrated Solar Power (CSP) facility near Upington, in the Northern Cape Province (Figure 1), hereafter termed the facility. The proposed facility involves activities in Government Notices (GNs) 544, 545, 546 of 2010, published in terms of the National Environmental Management Act (No. 107 of 1998), as amended (2010) (NEMA). Prior to commencement of any activities listed in these notices, an Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA) is required.

WSP Environment and Energy (WSP) were appointed by SNE as the independent environmental assessment practitioner (EAP) on the 28 March 2012 to undertake the Scoping and Environmental Impact Assessment (S&EIA) process required in application for an EA. A description of the S&EIA process has been provided in Section 5.2.

1.2 Need and Desirability

Recent economic growth and increased efficiency in distribution across the country has resulted in an increase in electricity demand, beyond what current infrastructure can support (Banks, 2006). Blackouts experienced periodically, particularly in winter, from 2004 onwards necessitated the development of implementation of a load shedding plan by Eskom during 2008. This was in spite of attempts to implement energy efficiency and demand side management plans to accommodate the sharp increase in demand (WSP, 2012).

In response to the deficit between electricity supply and demand, the Department of Energy compiled an Integrated Resource Plan (IRP), which is a long term electricity capacity plan that defines the need for new generation and transmission capacity for the country. The shortage of electricity, as well as the IRP, has subsequently opened opportunities for organisations in the electricity sector. There has been a growing need for the independent power producers (IPPs) to contribute generation capacity to the national grid.

Current electricity supply in South Africa is primarily from coal-fired power stations. Issues associated with the dependence on coal include 1) the fact that the resource is non-renewable, 2) consumption of coal for use in power generation reduces the availability of coal for other uses and 3) burning of coal is one of the major producers of carbon dioxide, which is commonly accepted as a contributor to climate change, deterioration in urban and rural air pollution and acid rain (Banks, 2006). These issues associated with the burning of coal as well as the rising prices for other fossil-fuels (such as oil), geopolitical developments and environmental concerns have led to growing demand for renewable energy sources. Several renewable energy technologies have the potential to contribute significantly to meeting future energy demand, in South Africa, such as, solar thermal and photovoltaic energy generation; wind electricity generation; biomass conversion and hydropower wave power (Banks, 2006).

In order for Sasol to remain competitive and can grow sustainably, Sasol is investigating the use of alternative sources of energy, with solar power being identified as one of the most economically and environmentally sustainable technologies for Sasol's implementation, through its subsidiary, SNE.

Solar energy is the most abundant energy source on Earth, and is a clean energy source. The levels of solar irradiation in Southern Africa are comparable with countries such as Spain and the USA where solar power has been successfully implemented. While it is not currently cost competitive with conventional coal and nuclear power, the cost of solar energy has been consistently decreasing. It is widely acknowledged that solar power has the potential to become cost competitive with conventional coal and nuclear power but this will require further technology development. Concentrated solar power can provide distributed large-scale, steady-state power generation with low CO_2 emissions and relatively low water consumption.

The proposed solar power facility is well aligned with South Africa's Renewable Energy Policy and its objectives and will contribute to meeting the goals of the Department of Energy's Integrated Energy Plan (Section 5.2).

1.3 Project value

South Africa enjoys an abundance of solar energy, which is higher than in many countries that have already successfully implemented solar power projects. CSP was evaluated to be capable of reaching grid parity in the medium to long term. CSP benefits from economies of scale and is suited to utility scale applications.

The expected capital is between R 4 and R 5 billion. The project will create between 30 and 50 permanent jobs in the operations phase. Additional job opportunities will be created in the construction phase, the number of which will be estimated as part of the S&EIA process.

1.4 Details of the Applicant

The applicant for the proposed Commercial CSP facility is Sasol New Energy (Pty) Ltd (SNE) and its details are provided in Table 1.

Table 1: Project Applicant Details

Project applicant:	Sasol New Energy Holdings (Pty) Ltd		
Contact person:	Shane Pillay		
Physical address:	The Mall Office, Cradock Avenue, Rosebank, 2196		
Postal address:	P.O Box 5486, Johannesburg, 2000		
Postal code:	2196	Fax:	011 522 8618
Telephone:	011 344 2743	E-mail:	Shane.pillay@sasol.com

Sasol New Energy's role in the Sasol group is to develop sustainable solutions for Sasol to prosper in a carbon- and water-constrained world. Sasol is a significant generator and consumer of electricity and a key focus of Sasol New Energy is the generation of low carbon and zero carbon electricity.

1.5 Details of the Independent Environmental Assessment Practitioner

WSP was appointed by SNE as the independent environmental assessment practitioner (EAP) to facilitate the environmental authorisation process, Table 2. WSP is a leading international environmental consultancy with a broad range of expertise in the environmental industry. WSP is a subsidiary of WSP Group plc, a global consultancy which is listed on the London Stock Exchange. WSP has successfully project managed a number of high profile environmental projects in South Africa over the past 20 years (refer to WSP's Capability Statement in (**Appendix 1**).

Table 2: EAP Details

Project applicant:	Sasol New Energy Holdings (Pty) Ltd		
Contact person:	Catherine Greengrass, Chevonne Stevens		
Physical address:	WSP House Bryanston Place, 199 Bryanston Drive, Bryanston, Sandton, 2021		
Postal address:	PO Box 5384, Rivonia		
Postal code:	2196	Fax:	086 240 0693
Telephone:	011 361 1395 or011 300 6178	E-mail:	Catherine.Greengrass@wspgroup.co.za Chevonne.Stevens@wspgroup.co.za

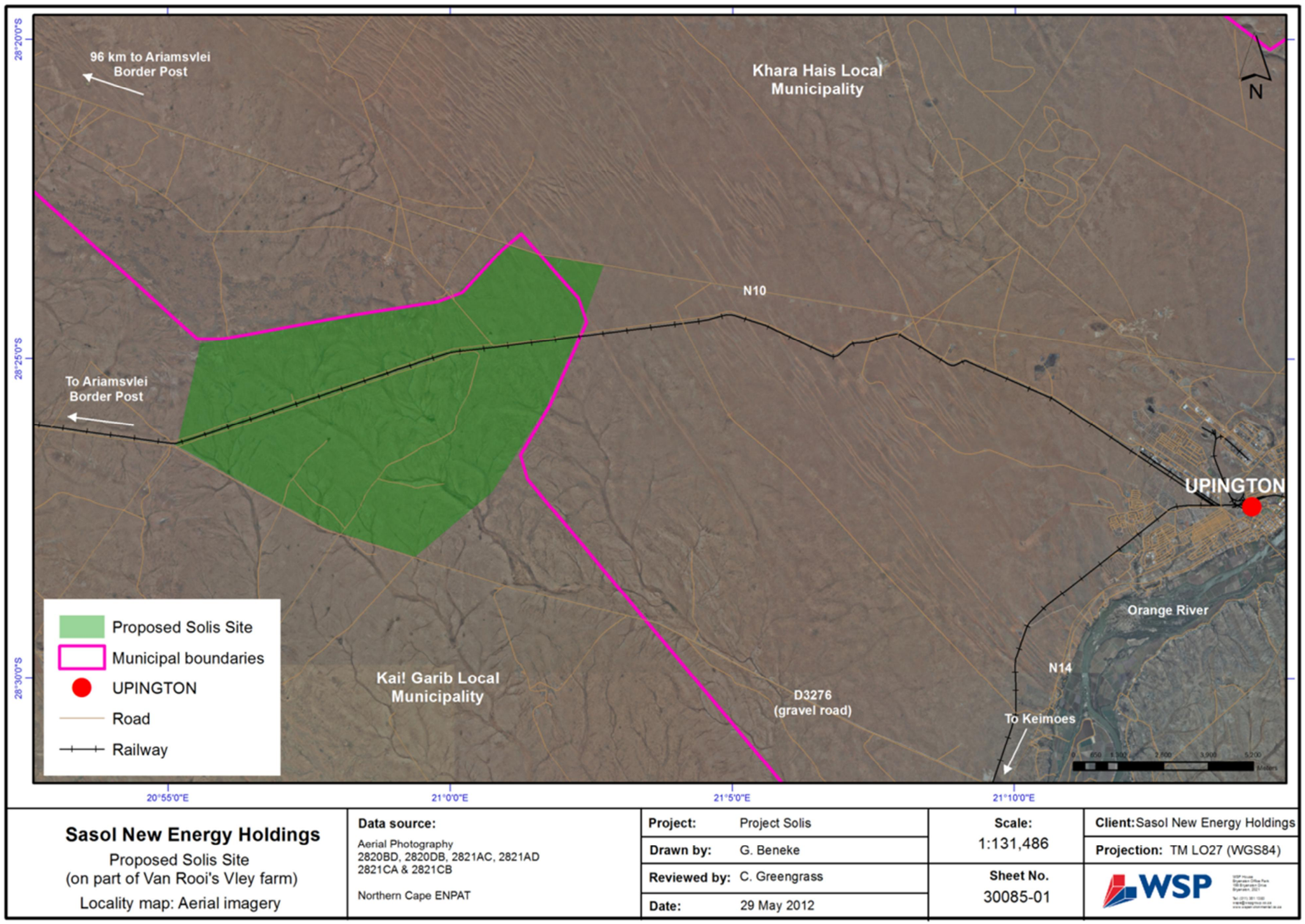

Figure 1: Locality Map

2 Description of the Proposed Site

Concentrated solar power projects are suited to semi-desert regions where vast amounts of space are available for the required infrastructure and where clear skies with little cloud cover and low dust and/or water vapour are favoured. The Northern Cape region has the top solar resource in the country, which ranks with some of the best solar statistics in the world (see Section 6.3.1.3).

Prior to the commencement of the S&EIA process, three farms in the Northern Cape were selected by SNE to undergo an environmental screening investigation (ESI) to determine their suitability for the establishment of a Commercial CSP facility (**Appendix 2**). The farms, namely, Van Roois Vley, Droogehout and Areachap, are all located within the Siyanda District Municipality in the Northern Cape Province (Figure 2).

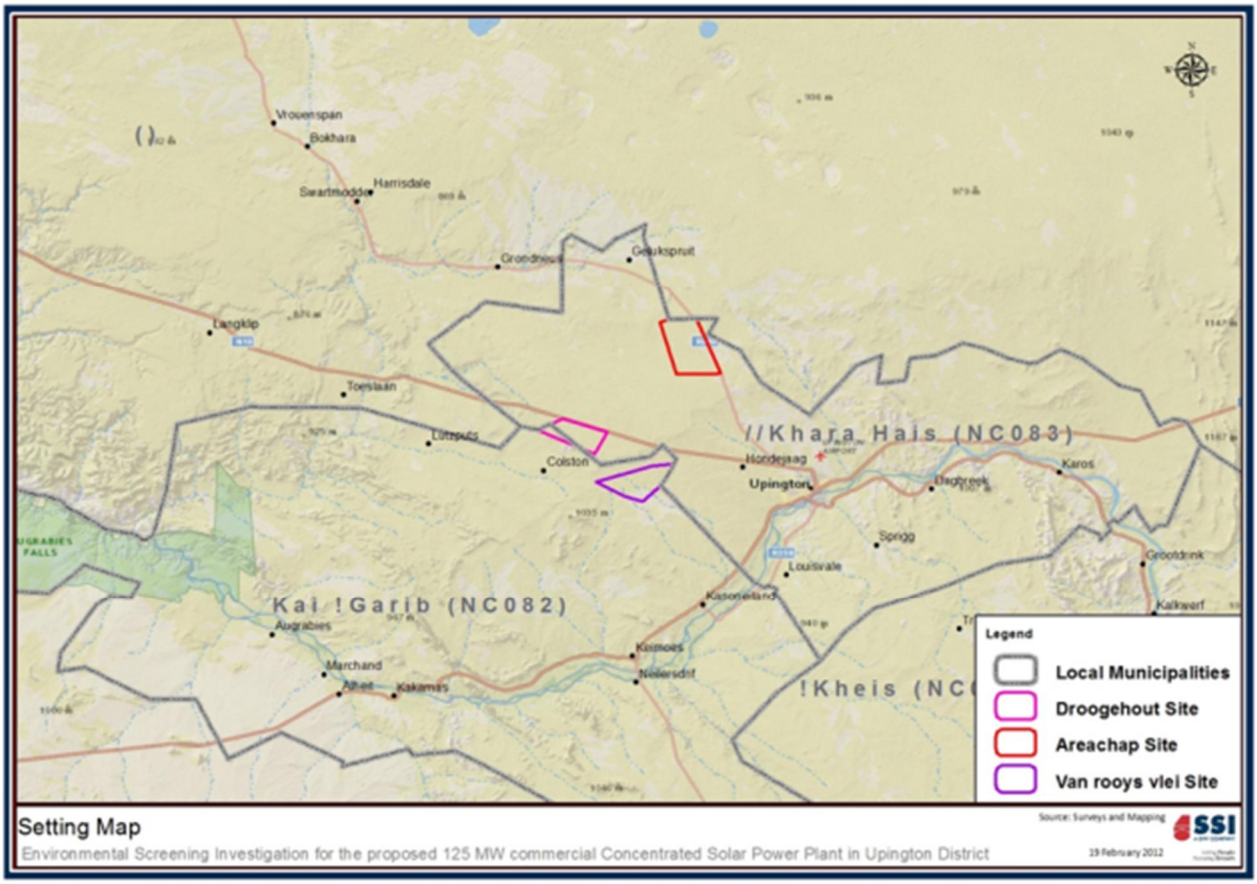

Figure 2: Setting Map from ESI Report (SSI, 2012)

The environmental screening comprised an assessment of the biophysical, social and enviro-legal criteria indicated in Figure 3.

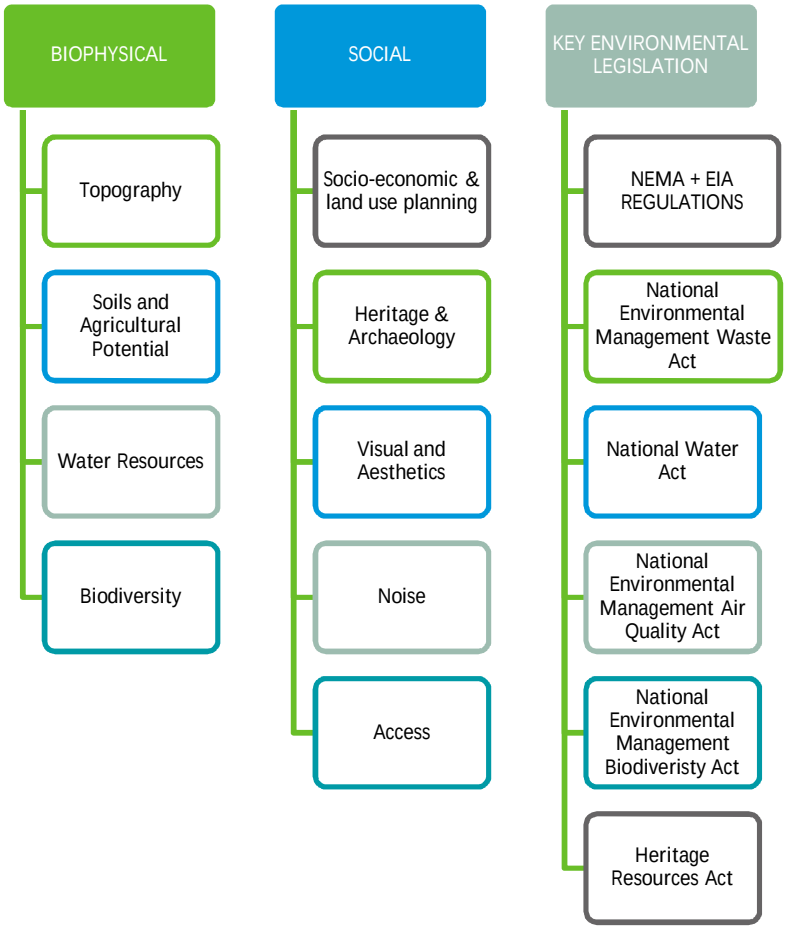

Figure 3: ESI assessment criteria

In summary, the ESI found that the Van Roois Vley farm is the least environmentally sensitive site and would be the preferred option from an environmental point of view for the development of the proposed Commercial CSP facility. The Droogehout farm would be the second preferred option, although, when compared to the Van Roois Vley site, the environmental attributes are so similar in their scoring that both of these farms would be suitable for the establishment of the CSP tower project. The least preferred site was the farm Areachap due to conflicting local planning objectives.

The farm on which the Commercial CSP facility is therefore proposed to be located is Van Roois Vley. The full farm boundary is indicated in Figure 4, however, only part of the farm is proposed for the development of the Commercial CSP facility. The area indicated as the Proposed Solis Site is the area under investigation for Commercial CSP in this S&EIA process, as well as for a proposed Concentrated Photovoltaic (CPV) facility, which is being assessed as part of a separate S&EIA process (see Section 3.7).

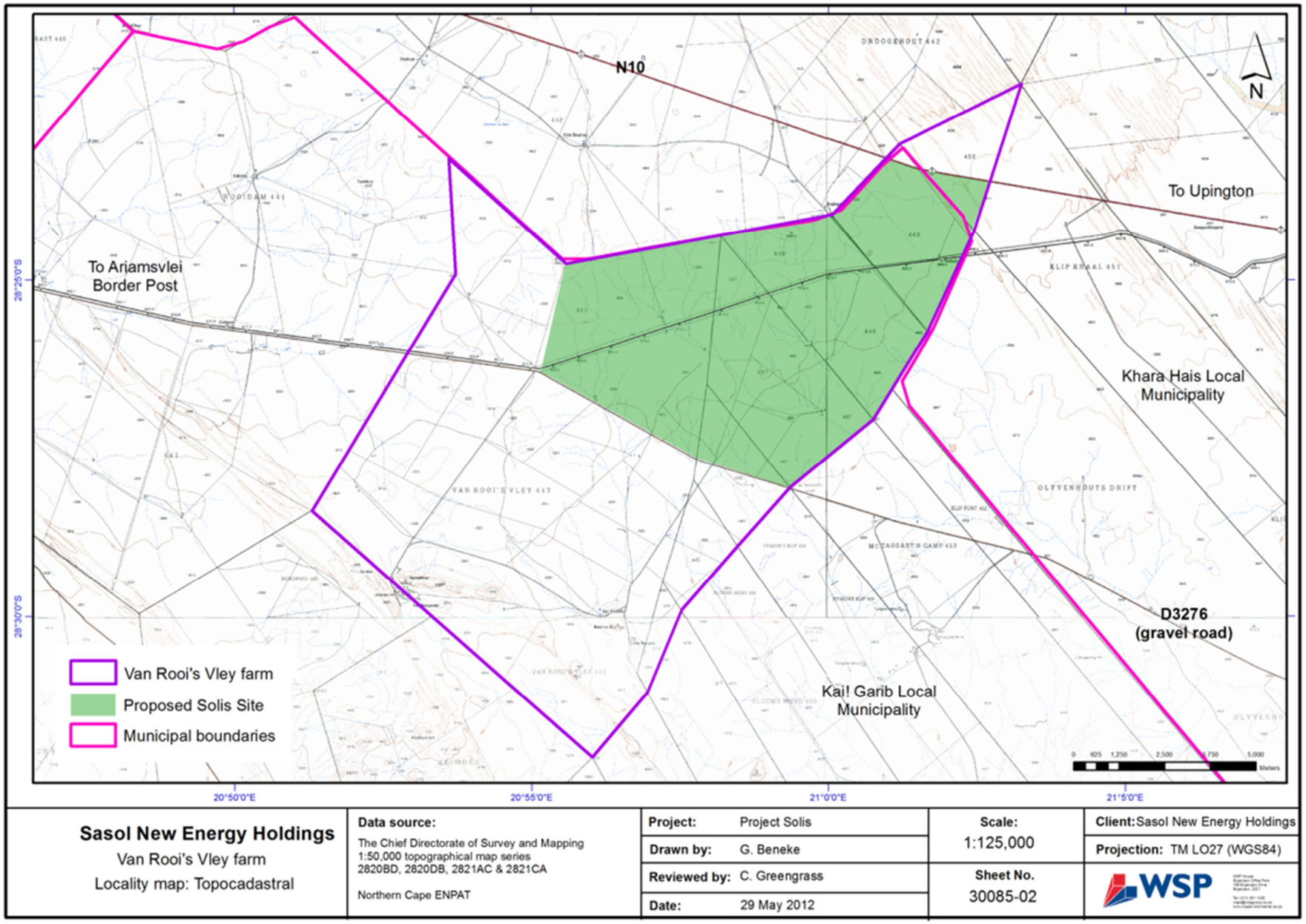

Figure 4: Topocadastral Map

The proposed Solis site is located approximately 25 km west of the town of Upington and approximately 26 km north the town of Keimoes. The proposed Solis site is located mainly within the Kai! Garib Local Municipality (KGLM) but the north-east corner falls within the //Khara Hais Local Municipality (KHLM) (Figure 1 and Figure 4). The full details of the affected properties within Van Roois Vley are provided in Table 3 and indicated in Figure 4.

Table 3: Details of properties within the proposed Solis site

Farm Name	Farm Number	Surveyor general code
Van Roois Vley	443	C02800000000045000000
	444	C02800000000044300000
	445	C02800000000044400000
	446	C02800000000044500000
	447	C02800000000044600000
	448	C02800000000044700000
	449	C02800000000044800000
	450	C02800000000044900000

The existing access to the site is via the well-graded D3276 gravel road that runs east-west along the southern boundary of the site. The D3276 can be accessed via the N14, which connects Upington and Keimoes. A new access road is proposed, as indicated by the green line on Figure 5, which will provide access to the site from the N10 tarred road that connects Upington with the Namibian border post Ariamsvlei. The proposed access will need to cross the railway line running between Upington and Ariamsvlei.

The Van Roois Vley farm and the surrounding farms have low agricultural potential (SSI, 2012).The current land use on the farm, and those directly adjacent to it, is the grazing of sheep and/or cattle, however grazing capacity is also considered to be low.

There are no households or homesteads on the proposed Project Solis site. The only existing infrastructure on site includes gravel roads, grazing camp fences and wind pumps with associated reservoirs and piping.

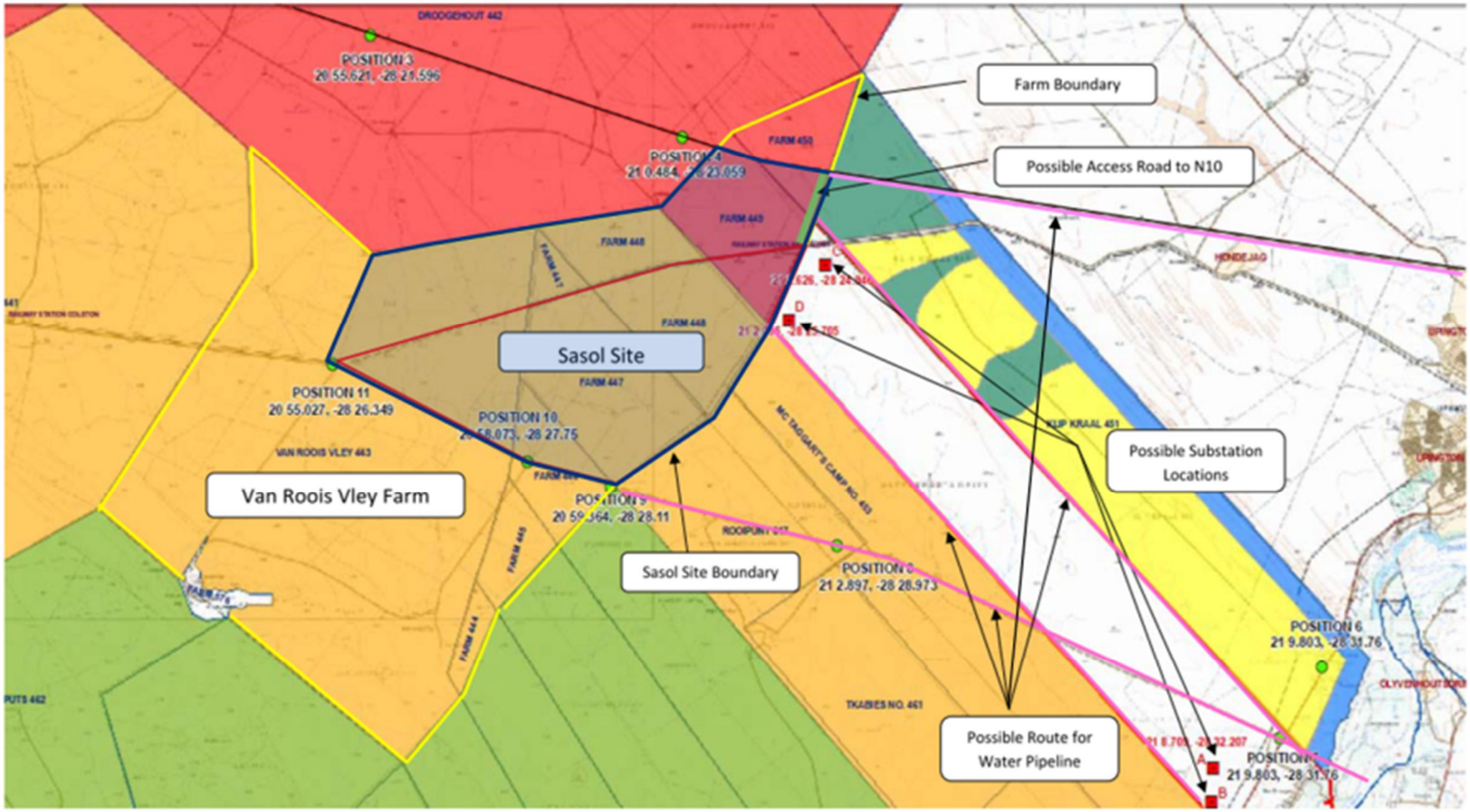

Figure 5: Affected properties indicated in blue shaded area

3 Description of the Proposed Project

Solar power technology involves the use of energy from the sun to produce electricity. The sun's energy is used to heat a medium (usually water), which is then sent to turbines where electricity is produced and generated. This is referred to as solar-thermal power generation. "Concentrated Solar Power" has been identified as having the lowest cost for large-scale solar-thermal power production. This technology involves the use of mirrors (heliostats) to reflect sunlight to a focal point (power tower receiver), thereby concentrating the sun's heat in one place. There are three main types of CSP technologies that have been developed and successfully implemented in various places around the world: the parabolic trough system, the central linear Fresnel system and the central receiver (power tower receiver) system.

3.1 Available CSP Technologies

3.1.1 Parabolic Trough

A parabolic trough is a solar thermal energy collector consisting of a linear parabolic reflector, or mirror, which is usually coated with either silver or polished aluminium. The reflector concentrates the sun's rays onto a receiver positioned along the mirror's focal line. Sunlight is reflected by the mirror and concentrated onto an absorber tube (also known as the Dewar tube) running the entire panel length at the focal point. The trough is optimally aligned on a north-south axis, and rotated to track the sun as it moves across the sky each day (NER, 2012).

An example of parabolic trough infrastructure is illustrated in Figure 6 and Figure 7. If thermal energy storage is not utilised, a hybrid, co-generation plant is used to heat the heat transfer fluid (HTF) to operating temperatures (around 400°C). The cool HTF runs through the tubes and absorbs the energy from the concentrated light, causing the fluid temperature to rise to as much as 400°C. The heated fluid returns to a series of heat exchangers in the power block from which the heat energy is transferred to water to generate high-pressure, superheated steam. The superheated steam drives the turbines to produce electricity. The spent steam from the turbines is condensed in a standard condenser and returned to the heat exchangers, via condensate and feed water pumps, to be transformed back into steam as described above. Condenser cooling is provided by a dry cooling system which requires less water than other systems (e.g. mechanical wet cooling towers).

Figure 6: Photograph of existing parabolic trough infrastructure in Spain (Flagsol, 2010)

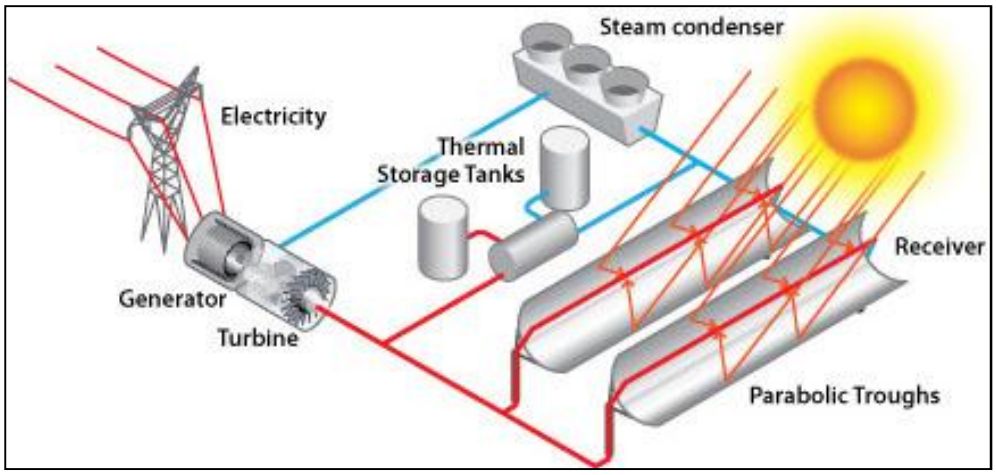

Figure 7: Parabolic trough process flow diagram

3.1.2 Central Linear Fresnel

Linear Fresnel Reflectors use long, thin segments of mirrors to focus sunlight onto a fixed absorber located at a common focal point of the reflectors. These mirrors are capable of concentrating the sun's energy to approximately 30 times its normal intensity (Dey, 2004). This concentrated energy is transferred through the absorber into the thermal fluid. The fluid then goes through a heat exchanger to produce steam and then to power a steam generator.

A challenge that must be addressed in any solar concentrating technology is the changing intensity of the incident rays (the rays of sunlight striking the mirrors) as the sun progresses throughout the day. The reflectors of a Linear Fresnel Reflector are typically aligned in a north-south orientation and turn about a single axis using a computer controlled solar tracker system. This allows the system to maintain the proper angle of incidence between the sun's rays and the mirrors, thereby optimising energy transfer (Figure 8). The tracking system is however not able to rotate in the east-west direction, which reduces the potential exposure to the sun in comparison to those that can, such as CSP technology.

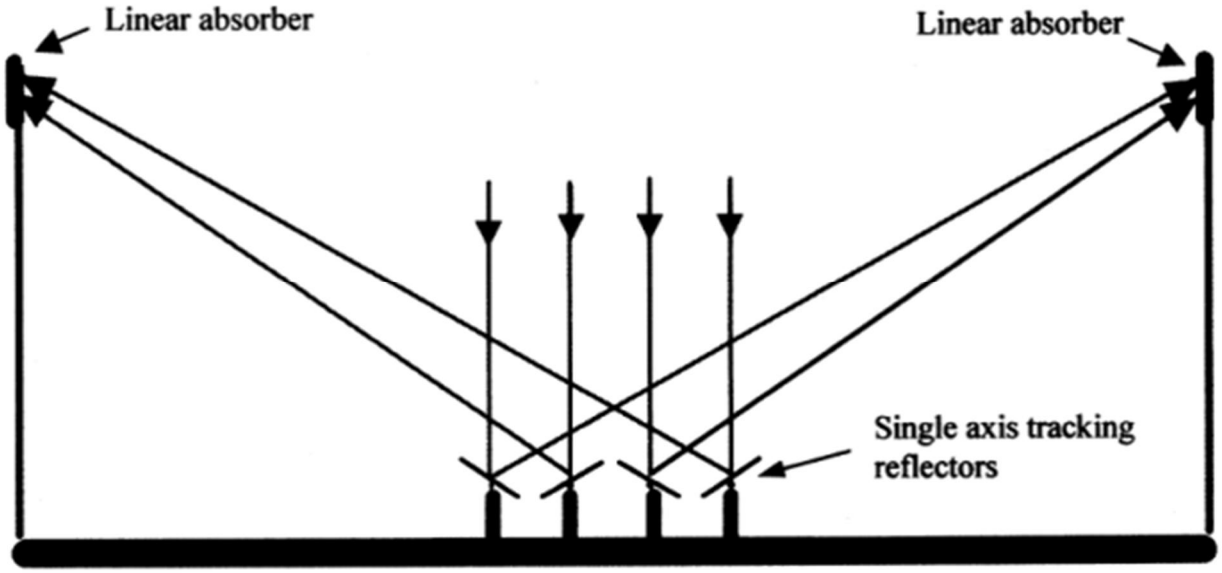

Figure 8: Central linear Fresnel power generation process

3.1.3 CSP Tower Facility

CSP Tower facilities (also known as 'central tower' power plants or 'heliostat' power plants) focus the sun's thermal energy with thousands of tracking mirrors (called heliostats). A tower resides in the centre of the heliostat field. The heliostats focus sunlight on the central receiver, which sits on top of the tower. Within the receiver, the concentrated sunlight heats a solution to over 540°C. The heated solution then flows into a thermal storage tank, and/or to a steam turbine and electricity generator. The steam drives a standard turbine to generate electricity. This technology is illustrated in Figure 9, Figure 10, Figure 11, Figure 12 and Figure 13.This process is similar to a standard coal-fired power plant, except it is fuelled by clean solar energy. The advantage of this design above the parabolic trough design is the higher temperature achieved. Thermal energy at higher temperatures can be converted to electricity more efficiently.

Figure 9: Heliostat in California (Bright Source, 2010)

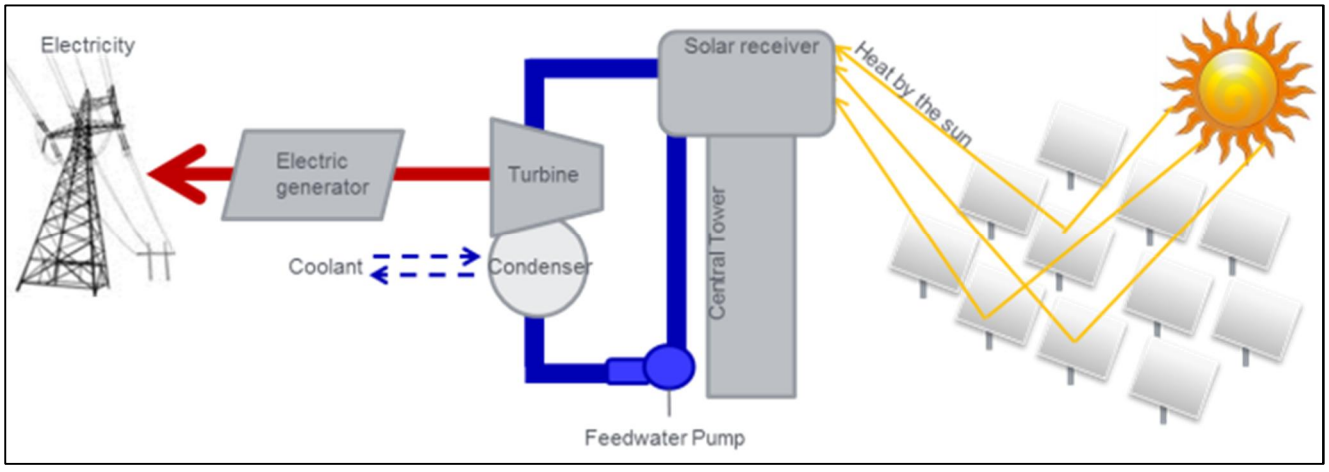

Figure 10: Central tower electricity generation process

Figure 11: Central tower concentrated solar power technology (Abengoa Solar, 2010)

Figure 12: CSP technology (Bright Source, 2012)

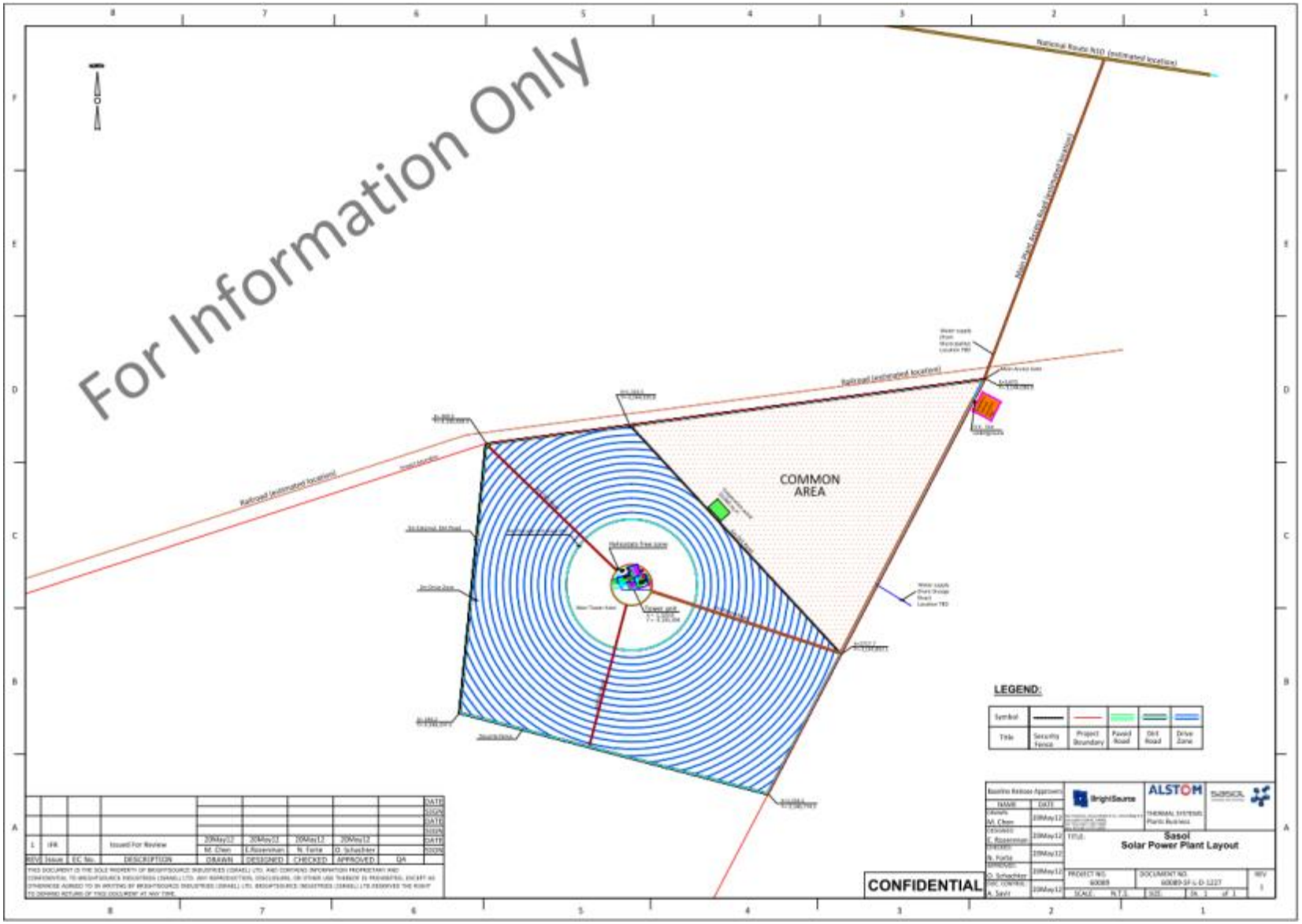

Figure 13: Conceptual layout of Commercial CSP components on the north-east corner of the proposed Soils site

3.2 Detailed Project Description for CSP tower facility

A pre-S&EIA assessment of the available CSP technologies was conducted by SNE, out of which a CSP tower facility was found to be the preferred technology to meet SNE's objectives and needs. More information in this regard will be provided in the EIA Phase.

The proposed CSP facility, as described in Section 3.1.3, will typically include the following development components:

- Solar field;
- Power block;
- Connection infrastructure (transmission/substations);
- Access and internal roads;
- Services and resource requirements; and
- Other associated infrastructure.

A conceptual layout for the proposed Commercial CSP facility has been provided as Figure 13. These components are described in the sections below. All components will be investigated in the EIA phase and more detail, such as exact location, footprint and other specifications, for each component will be provided in the EIA report.

3.2.1 Solar Field

The solar field refers to the area which the heliostats will occupy. The following components typically apply to the solar field for the proposed CSP facility:

- Approximately 50,000 heliostats arranged in circular rows around the power block and focused up to the receiver on top of the tower facility in the power block (see Section 3.2.2). The heliostats will be spread across an area of approximately 700 ha.
- Each heliostat is approximately 17 m^2 and is made up of two mirrors of approximately 8.5 m^2 each. Heliostats are raised approximately 0.5 m off the ground. The exact height will vary slightly based on the topography of the ground on which the solar field is located.
- Each heliostat is mounted on a pylon linked to a computerised system (optimisation/control system) that will rotate the heliostat to track the sun as it moves through the sky. The tracking system can also be used to turn heliostats so that they do not focus the suns energy onto the tower, to control the amount of heat focused on the receiver or for heliostat/receiver maintenance purposes. When there is cloudy weather or storm events the heliostats can also be turned to the restore position where no sunlight is reflected. For these purposes, the heliostat tracking system can rotate in a north-south or east-west orientation.

Although the solar field is the largest component of the project in terms of footprint, the area beneath the heliostats will not cleared of vegetation. Vegetation will be allowed to continue to grow beneath the heliostats but will be trimmed to a lower level to prevent obstruction of the panels if required.

3.2.2 Power Block

The following components typically apply to the power block:

- Power tower consisting of a concrete tower (± 170 m high and ± 21 m in diameter) and receiver located at the top of the concrete tower (± 30 m high and ± 26 m wide). The total height of the proposed tower will thus be ± 200 m above normal ground level.
- The receiver structure absorbs the concentrated energy and heats water contained within a boiler to produce steam. Although technologies using various salt solutions are available, the solution for the

proposed CSP facility will be water. Temperatures at the external surface of the receiver could reach approximately. 600 °C.

- Steam generated in the receiver is piped down the power tower to a turbine located adjacent to the power tower. The steam drives the turbine to produce electricity and is then converted back to water through an air-cooled condenser and returned to the receiver.
- An air-cooled condenser is commonly preferred over water-cooled condensers in arid environments like the Northern Cape as air cooling uses 90% less water than wet cooling.
- An auxiliary boiler that will provide heat for plant start-up in the mornings before the sun has risen to expedite the start-up and increase the capacity factor of the plant will be installed adjacent to the power tower. The capacity factor refers to the online operation of the plant as a percentage of the total day.
- Fuel required for the boiler will be diesel, which will be stored on site in two storage containers of 83 m^3 each. The auxiliary boiler will only be run for about 1 hour each morning and consumption of diesel will thus be approximately 5 m^3 per hour (approximately 1850 m^3 per year) for this purpose.

3.3 Connection infrastructure (transmission/substations)

Infrastructure to connect to Eskom's transmission grid will be required. Currently, it is proposed that the facility will connect to an approved (but not yet built) substation on the site of Eskom's recently authorised CSP facility adjacent to the proposed Solis site (see Figure 5 "Possible Substation Locations"). Discussions with Eskom will be conducted in the EIA phase to attain consent for this connection and to obtain confirmation of the final location for the proposed substation. Further details pertaining to this will be provided in the EIA report. Connection to the possible substation location (will be via an underground cable along the site's eastern boundary, and via above ground cable from the proposed site boundary to the proposed substation, as indicated in Figure 13.

3.4 Access and Internal Roads

The proposed main plant access road is indicated in Figure 13. The specific details relating to this access route will be investigated further in the EIA phase, and the area between the N10 and the site boundary is available for the location of this road. A railway crossing will be required, the details of which will be included in the EIA report.

Internal road infrastructure will be constructed as a network of gravel roads; however, these will be kept to a minimum and will provide for a 5 m circular gravel road around the power block, a 5 m wide gravel external boundary road, a 5 m wide gravel road between the solar field and the 'common area' and three roads between the property boundaries and the power block (transecting the solar field). The rows of heliostats will be placed approximately 3 m apart, which will allow for access for the purposes of cleaning the heliostats. Cleaning is required on a daily basis and is done using high pressure water guns and scrubbers. Maintenance vehicles will drive through the fields along the designated roads and spray water on each mirror. Each mirror will then be scrubbed automatically.

3.5 Services and Resource Requirements

The total amount of water required for the proposed facility will be 50,000 m^3 per year (Mirror cleaning, boiler feed water make-up, potable water, inter alia). Currently, water will be sourced as follows:

- Municipal water (treated water) from the municipal system. There is sufficient capacity available however, a formal request still needs to be issued and signed off on.
- Should the municipality be unable or unwilling to provide treated water to the facility, abstraction and piping from the Orange River is being considered in parallel. Proposed routes are indicated in Figure 5 and, if required, an application for the abstraction and storage of water will be submitted to the Department of

Water Affairs (DWA) as part of the S&EIA process. More detailed information will be provided in the EIA report.

The following additional service/resource requirements will be investigated as part of the EIA phase:

- A water treatment plant will be required to provide pure/clean water for the cleaning of the heliostats. Total water requirements will be 50 000 m^3 per year (<0.2 Mℓ/day). Water treatment will be by means of cation and anion exchange resins. Of this amount, 20 000 m^3 per year is required for cleaning of the heliostats. The rest of the water will be used for top-up water for the remaining amount of water will be used as boiler feed water make-up and potable water for human consumption and safety showers. A reservoir of untreated water is retained for fire water in the event of emergencies. Further information pertaining to water usage will be provided in the EIA phase.
- Waste from the water treatment plant (approximately 10 000 m^3) will be sent to an evaporation pond where the salts will be concentrated and the resultant sediment/sludge will be disposed of 2-3 times a at an appropriate waste disposal facility. The method for management of this waste will be further investigated in the EIA phase.
- Management of solid and general waste is currently proposed to be disposed of at the municipal waste disposal facility.
- Sewage will be treated on site and the effluent sent to the evaporation pond. The pond will be cleaned out once or twice a year and disposal of at the appropriate waste facility Storm water management.
- Water will be required for a fire protection unit.
- Telecommunications.

3.6 Other Associated Infrastructure

The location and detailed information regarding the following associated components will be investigated in the EIA phase and information will be provided as part of the EIA report:

- Administration and control buildings and staff facilities (including accommodation for night operation staff).
- Fencing and security.
- Fire breaks and fire prevention equipment.
- Permanent storage/laydown facilities/areas.
- Maintenance building for ad-hoc maintenance on pumps, etc.
- Temporary/construction phase infrastructure, including laydown areas and site camps (with employee accommodation).

3.7 Proposed adjacent CPV facility

SNE proposes to develop a CPV facility adjacent to the CSP facility. The CPV facility will be located in the same project area and will occupy approximately 200ha. This facility will need to undergo EA before it can commence, therefore an application to undertake an S&EIA process has been submitted to the authorising authority, DEA, reference number: 14/12/16/3/3/2/336. Further information with regards to the proposed CPV development and its interaction with the proposed CSP development will be provide in the EIA Report.

4 Alternatives

4.1 Layout Alternatives

The layout provided in Figure 13 indicates the conceptual layout of the proposed Commercial CSP facility. The location of infrastructure will be investigated as part of the EIA Phase and will take cognisance of specialist investigations and assessment of environmental sensitivity on site. Layout alternatives with regards to connection to the transmission grid will also arise out of upcoming discussions with Eskom aimed at finding the most suitable solution for this connection.

Similarly, layout alternative with regards to the provision of water will be determined by discussions with the municipality on whether it can supply sufficient water for the proposed development, or whether water will need to be abstracted and pipe to site from the Orange River.

4.2 Process Alternatives

4.2.1 Fundamental solar technology

A pre-S&EIA assessment of the available CSP technologies was conducted by SNE, out of which a CSP tower facility was found to be the preferred technology to meet SNE's objectives and needs. More information in this regard will be provided in the EIA Phase.

4.2.2 Cooling technology

Currently there are two feasible alternative cooling technologies that could be used in the condenser required to convert steam back to water: air-cooled and water-cooled. The technologies differ in their electricity production efficiencies with wet-cooling having a higher efficiency; however air-cooling has lower water requirements. Pre-S&EIA investigations by SNE indicated that, for this proposed project and project location, air-cooling is preferred. Further information will be provided in the EIA Phase.

4.3 'No-go' option

Without the development of the renewables industry, including solar and projects such as the Project Solis, Eskom's reserve margin will continue to deplete and drastic measures such as load-shedding may be required to stabilise energy demand. This energy gap could extend beyond 2014 in the event of Medupi and Kusile power stations being delayed. Mining and industry, being the largest energy users, would likely suffer as a result, leading to a negative impact on the national economy.

Furthermore, South Africa's current dependence on coal as a fossil fuel based energy supply means that energy generation is the country's main contributor to CO_2 emissions, being responsible for 70% of the country's CO_2 emissions. CO_2 is the primary greenhouse gas that has been linked to climate change. With South Africa's commitment to reducing its CO_2 emissions by 34% by 2020 (Copenhagen Accord, 2010), coupled with the increasing demand for electricity, the 'no-go option' is not considered a viable alternative to this project.

The cost of renewable energy such as hydro, wind, and solar power has been steadily decreasing while coal and nuclear costs are escalating. Taking a long term view, renewable energy will provide South Africa with access to electricity that is cheaper and cleaner than coal and nuclear alternatives. By utilising Independent Power Producers to supply the power, the South African government will also save on capital investment required to build Eskom owned generation capacity.

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5 Governance

The EIA Regulations, in terms of the National Environmental Management Act (No. 107 of 1998), as amended (NEMA) 2010, are applicable. The EIA Regulations require that the EAP conducting the EIA must have "a good working knowledge of all relevant policies, legislation, guidelines, norms and standards." A legal review is therefore also an essential component of the S&EIA and will identify all of the applicable legislation, including national and provincial legislation, local by-laws, policies and guidelines and relate them to the project specifics.

5.1 Legislative Framework

5.1.1 The National Environmental Management Act (No. 107 of 1998), as amended

The Act provides for the right to an environment that is not harmful to the health and wellbeing of South African citizens; the equitable distribution of natural resources, sustainable development, environmental protection and the formulation of environmental management frameworks (Government Gazette, 1998).

The principles of the Act include:

- Environmental management must place people and their needs at the forefront of its concern;
- Development must be socially, environmentally and economically sustainable;
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated;
- Environmental justice must be pursued;
- Equitable access to environmental resources to meet basic human needs and ensure human well-being must be pursued;
- Responsibility for environmental health and safety consequences of a project or activity exists throughout its life cycle;
- The participation of all interested and affected parties in environmental governance must be promoted;
- Decisions must take into account the interests, needs and values of all interested and affected parties;
- The social, economic and environmental impacts of activities, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment;
- Decisions must be made in an open and transparent manner, and access to information must be provided in accordance with the law;
- The environment is held in a public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage;
- The cost of remedying pollution, environmental degradation and consequent adverse health effects must be paid for by the parties responsible for harming the environment; and
- Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar eco-systems require specific attention in management and planning procedures, specifically where they are subject to significant human resource usage and development pressure.

In accordance with GNR. 543, 544, 545 and 546 of 2010, promulgated under the NEMA, the undertaking of certain listed activities requires environmental authorisation prior to construction. These listings are as follows:

- GNR.544: Listing Notice 1 - activities triggered in this listing require a basic assessment (BA) process;
- GNR 545: Listing Notice 2 - activities triggered in this listing require a scoping and environmental impact assessment process (S&EIA); and
- GNR 546: Listing notice 3 - this listing pertains to specific geographical areas.

Activities listed in Listings 1 – 3 that may potentially be applicable to the proposed development have been provided in the following tables. In particular, the applicability of activities in

Table 6 will need to be investigated as part EIA Phase.

Table 4: Listed Activities according to GN R. 544 of the National Environmental Management Act (No. 107 of 1998), as amended 2010

GN R. 544 LIST OF ACTIVITIES AND COMPETENT AUTHORITIES IDENTIFIED IN TERMS OF SECTIONS 24 AND 24D OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO. 107 OF 1998), AS AMENDED 2010.	
Activity Description	**Applicability**
10(i). The construction of facilities or infrastructure for the transmission and distribution of electricity – Outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.	The proposed facility will be located at the Van Roois Vley farm, near Upington transmission will be at the capacity of 132 kilovolts.
11. The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; buildings exceeding 50 square metres in size; or (xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	Three ephemeral streams are located on site. Layout options will be determined in the EIA phase and the proximity to any rivers will need to be considered.
13. The construction of facilities or infrastructure for the storage, or for the storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres.	Storage of diesel will be required for use in the auxiliary boiler and for the maintenance/refuelling of vehicles on site Storage capacity is estimated at 166 m^3.
18 (i). The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from a watercourse.	Three ephemeral streams are located on site. Layout options will be determined in the EIA phase and the proximity to any rivers will need to be considered.
22(ii) The construction of a road, outside urban areas – Where no reserve exists where the road is wider than 8 metres.	An access road will be developed for the site.

Table 5: Listed Activities according to GN R. 545 of the National Environmental Management Act (No. 107 of 1998), as amended 2010

GN R. 545 LIST OF ACTIVITIES AND COMPETENT AUTHORITIES IDENTIFIED IN TERMS OF SECTIONS 24 AND 24D OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO. 107 OF 1998), AS AMNEDED 2010.	
Activity Description	**Applicability**
1. The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.	The proposed CSP facility will have an electricity output of approximately 125MW.

Table 6: Listed Activities according to GN R. 546 of the National Environmental Management Act (No. 107 of 1998), as amended 2010

GN R. 546 LIST OF ACTIVITIES AND COMPETENT AUTHORITIES IDENTIFIED IN TERMS OF SECTIONS 24 AND 24D OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO. 107 OF 1998), AS AMNEDED 2010.	
Activity Description	**Applicability**
4. The construction of a road wider than 4 metres with a reserve less than 13.5 metres. ii. Outside urban areas, in: (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (gg) areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.	An access road will be developed for the proposed project.
13.The clearance of an areas of 1 hectare or more vegetation where 75% or more of vegetation cover constitutes indigenous vegetation - (c) In Eastern Cape, Free State, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape and Western Cape: ii. Outside urban areas, the following: (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Core areas in biosphere reserves.	Clearance will be required for the construction of infrastructure, access and internal roads, firebreaks, fencing. The footprint of the clearance will be determined in the EIA phase. The % of indigenous vegetation will be determined in the EIA phase.
14.The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (2) The undertaking of a process included in the list of waste management activities published in terms of the National Environmental Management: Waste Act (No. 59 of 2008) in which can the activity is regarded to be excluded from this list; (3) The undertaking of a linear activity falling below the thresh-olds in Notice 544 of 2010. (a) In Eastern Cape, Free State, KwaZulu-Natal, Gauteng, Limpopo, Mpumalanga, Northern Cape and Western Cape: i. All areas outside urban areas.	Clearance will be required for the construction of infrastructure. It is unlikely that this activity will apply; however, the footprint of the clearance will only be determined in the EIA phase. The % of indigenous vegetation will be determined in the EIA phase.

As a result of the above activities potentially being triggered an S&EIA process is required to be undertaken in order to apply for EA.

5.1.2 National Environmental Management: Waste Act (No. 59 of 2008)

This Act serves to reform the law regulating waste management in order to protect the health and the environment. This is done by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and

social development, to provide for national norms and standards for regulating the management of waste by all spheres of government, for specific waste management measures, and for matters incidental thereto.

The Act protects the health, well-being and the environment by providing reasonable measures for minimisation of consumption of a natural resource, minimising general waste, reducing, re-using, recycling and recovering waste, safely treating or disposing waste as a last resort, preventing pollution and ecological degradation, securing ecological sustainable development. The Act also promotes economic and sustainable development, promotes and ensures effective delivery of waste services, remediating land where contamination is or could be present, and achieving integrated waste management.

Of relevance to the project is GN: R718 (July 2009) which comprises a list of waste management activities that have, or are likely to have a detrimental effect on the environment – activities contained in this list require a Waste License and in turn require a Basic Assessment (BA) Process (Category A activities) or Scoping and EIA (Category B activities).

Table 7 indicates waste activities that may be applicable to the proposed development. The relevance of the following listed activities will be reviewed during the EIA phase of the project when more information will be available, and a Waste Licence Application will be submitted.

Table 7: Listed Activities according to GN R. 718 of the National Environmental Management: Waste Act (No. 59 of 2008)

GN R. 718 **NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (NO. 59 OF 2OO8} LIST OF WASTE MANAGEMENT ACTIVITIES THAT HAVE, OR ARE LIKELY TO HAVE, A DETRIMENTAL EFFECT ON THE ENVIRONMENT**	
CATEGORY A	**Applicability**
A person who wishes to commence , undertake or conduct an activity listed under this Category, must conduct a basic assessment process as stipulated in the environmental impact assessment regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as part of a waste management licence application	
Treatment of Waste 11. The treatment of effluent, wastewater or sewage with an annual throughput capacity of more than 2,000 m^3 but less than 15,000m^3.	The establishment of a small-scale sewage treatment plant is under consideration. Applicability of this activity will be determined in the EIA Phase.
Construction, Expansion or Decommissioning of Facilities and Associated Structures and Infrastructure 18. The construction of facilities for activities listed in Category A of this schedule (not in isolation to associated activity).	In application for Activities 1 and 11.
CATEGORY B	**Applicability**
A person who wishes to commence , undertake or conduct an activity listed under this Category, must conduct an environmental impact assessment process as stipulated in the environmental impact assessment regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as part of a waste management licence application	
Storage of Hazardous Waste 1. The storage including the temporary storage of hazardous waste in lagoons.	An evaporation pond is proposed for the handling of waste water from the water treatment and sewage treatment processes that will be selected.
Treatment of Waste	Treatment of waste water from the water treatment process may be

GN R. 718 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (NO. 59 OF 2OO8} LIST OF WASTE MANAGEMENT ACTIVITIES THAT HAVE, OR ARE LIKELY TO HAVE, A DETRIMENTAL EFFECT ON THE ENVIRONMENT	
7. The treatment (evaporation) of effluent, wastewater or sewage with an annual throughput capacity of 15,000 m^3 or more.	considered.
Construction of Facilities and Associated Structures and Infrastructure 11. The construction of facilities for activities listed in Category B of this schedule (not in isolation to associated activities).	In application for Activities 1 and 7.

5.1.3 National Water Act (No. 36 of 1999)

The National Water Act (NWA) provides for fundamental reformation of legislation relating to water resources and use. The preamble to the Act recognizes that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users. The purpose of the Act is stated, in Section 2 as, inter alia:

- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources; and
- Meeting international obligations.

The Act presents strategies to facilitate sound management of water resources, provides for the protection of water resources, and regulates use of water by means of Catchment Management Agencies, Water User Associations, Advisory Committees and International Water Management.

Part 5 of the NWA details the pollution of water resources following an emergency incident, such as an accident involving the spill of a harmful substance that finds, or may find its way, into a water resource. In terms of Section 30 of NEMA and Section 20 of the NWA, the responsibility for remedying the situation rests with the person responsible for the incident or the substance involved. If there is a failure to act, the relevant Catchment Management Agency may take the necessary steps for remediation and, recover the costs from the responsible person.

Section 21 of the Act lists water uses for which authorisation a Water Use Licence will be required. Potential water sues relating to the proposed development have been listed in Table 8. The applicability of each will be investigated during the EIA Phase, in consultation with the DWA and an application for a Water Use Licence will be submitted for any applicable water uses.

Table 8: Listed Activities according to the National Water Act (No. 36 of 1999)

NATIONAL WATER ACT (NO. 36 OF 1999) Section 21 Water Uses requiring a Water Use Licence, if the use exceeds the thresholds set out under the particular use in the General Authorisations published in terms of the Act.	
Section 21	**Applicability**
(a) taking water from a water resource	Abstraction from the Orange River may be required.
(b) storing water	Water may need to be stored prior to treatment.
(i) altering the bed, banks, course or characteristics of a watercourse	Three ephemeral streams are

	located on site. Layout options will be determined in the EIA phase and the proximity to any rivers will need to be considered and the applicability of this activity will be determined.

5.1.4 National Environmental Management: Air Quality Act (No. 39 of 2004)

The NEMA Air Quality Act (NEM: AQA) states the following as its primary objective: "To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government, for specific air quality measures, and for matters incidental thereto.

Whereas the quality of ambient air in many areas of the Republic is not conducive to a healthy environment for the people living in those areas, let alone promoting their social and economic advancement, whereas the burden of health impacts associated with polluted ambient air falls most heavily on the poor, whereas air pollution carries a high social, economic and environmental cost that is seldom borne by the polluter, and whereas atmospheric emissions of ozone-depleting substances, greenhouse gases and other substances have deleterious effects on the environment both locally and globally, and whereas everyone has the constitutional right to an environment that is not harmful to their health or well-being, and whereas everyone has the constitutional right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:

- Prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources.

Minimisation of pollution through vigorous control, cleaner technologies and cleaner production practices is key to ensuring that air quality is improved, and whereas additional legislation is necessary to strengthen the Government's strategies for the protection of the environment and, more specifically, the enhancement of the quality of ambient air, in order to secure an environment that is not harmful to the health or well-being of people.

5.1.5 National Environmental Management: Air Quality Act (No. 39 of 2004) and Minimum Emission Standards

GNR 248 of the National Environmental Management: Air Quality Act (No. 39 of 2004) is a list of activities which result in atmospheric emissions, which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage.

The following activities listed under GNR 248 are relevant to the proposed Commercial CSP facility, dependent on the boiler that will be used onsite, table:

Table 9: Listed activities according to the National Environmental Management: Air Quality Act (No. 39 of 2004)

National Environmental Management: Air Quality Act (No. 39 of 2004)	
Category 1	**Applicability**
Subcategory 1.2: Liquid fuel combustion installations Liquid fuels combustion installations used primarily for steam raising or electricity generation, except reciprocating engines.	A 50MW diesel auxiliary boiler will be present on site to heat up the entire system every day, which will use 50 ppm diesel as fuel

All installations with design capacity equal to or greater the 50MW heat input per unit, based on the low calorific value of the fuel used	source.

An Atmospheric Emission Licence (AEL) for the facility will therefore be required. An application for an AEL will be conducted as part of the current Scoping and EIA process.

5.1.6 National Heritage Resources Act (No. 25 of 1999)

The National Heritage Resources Act established the South African Heritage Resources Agency (SAHRA) in 1999. SAHRA is tasked with protecting heritage resources of national significance. Under Section 38 of this Act, all new developments with a site exceeding 5 000 m² or the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length, are subject to assessment by SAHRA. A Heritage Impact Assessment must be carried out by a heritage specialist approved by SAHRA to enable them to make an informed decision.

5.1.7 National Environmental Management: Biodiversity Act (No. 10 of 2004)

In line with the Convention on Biological Diversity, the Act aims to legally provide for biodiversity conservation, sustainable use and equitable access and benefit sharing. It provides for the publishing of lists of threatened or protected ecosystems and species, as wells as threating activities. Should a threatened or protected ecosystem be found on site, authorisation for activities within this eco-system will be required. Similarly, should any threatened or protected species be found within the footprint of a proposed development, permits for the removal of these species will be required.

5.1.8 National Forests Act (No. 84 of 1998)

The objectives of the National Forests Act (No. 84 of 1998) are to promote the sustainable management and development of forests, provide special measures for the protection of certain forests and trees; promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. The Act provides for the declaration of protected forests and protected species. Should any species that are protected in terms of this Act be found on site, licence for the removal of these species will be required.

5.1.9 Aviation Act (No. 74 of 1962)

The Act requires that the Civil Aviation Authority is consulted, and consent requested, for structures exceeding 45 m above ground level or 150 m above mean ground level (i.e. the lowest ground level within a 3 km radius of the structure). This would apply for the CSP power tower.

5.1.10 Fencing Act (No. 31 of 1963)

The aim of the Fencing Act (No. 31 of 1963) is to consolidate the laws relating to fences and the fencing of farms and other holdings. When a landowner erects a fence in a designated area, he / she may insist that the adjacent owner make a contribution towards the erection or maintenance costs. In areas where contributions are not mandatory / have not been published in the Government Gazette, a contribution can be claimed from the adjacent owner if the fence offers beneficial use for such a person. The Act also makes provision for a mechanism to deal with disputes between adjacent owners regarding a contribution towards erecting or repairing a fence.

Table 10: Legal requirements according to the Fencing Act (No. 31 of 1963)

FENCING ACT (NO. 31 OF 1963)	
Section 17	**Applicability**
Requires that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to the protection of flora.	A security fence will be erected around the boundary of the facility.

5.2 Applicable Policies and Plans

Table 11 reflects applicable policies, plans and guidelines that have relevance to the propose project, A more detailed description of each is included in **Appendix 3.1**.

Table 11: Applicable Policies and Plans

Policy / Plan	Applicability
Renewable Energy Policy (DME, 2003b)	Recognises that the medium and long-term potential of renewable energy is significant While South Africa is well endowed with renewable energy resources that can be sustainable alternatives to fossil fuels, so far these have remained largely untapped It is the intention of the Government to make South Africa's due contribution to the global effort to mitigate greenhouse gas emissions
Integrated Energy Plan	Diversify energy supply through increased use of natural gas and new and renewable energies Maximise load factors on electricity generation plant to lower lifecycle costs Ensure environmental considerations in energy supply, transformation and end use
National Strategy for Sustainable Development (NSSD; Enviropaedia, 2007)	Enhancing systems for integrated planning and implementation Sustaining our ecosystems and using resources sustainably Building capacity for sustainable development Investing in sustainable economic development and infrastructure
Climate Change Strategy (Rumsey and King, 2009)	Establishing the institutional capacity for effective climate change response Integrating climate change response in government and with other stakeholders Promoting the use of donor funding to address vulnerability and adaptation issues Ensuring that the strategy is consistent with national priorities,

	including poverty alleviation and economic development, and using local resources and expertise where possible
National Electricity Response Plan (NERP; DME, 2008)	The National Electricity Response Plan was drawn up for many reasons, one of them being the security of supply crisis of 2008 Demand related interventions include the supplementation of power generation with alternate or renewable energy sources such as gas and solar power generation.

5.3 Applicable Guidelines

Many guidelines exist relating to various aspects of the proposed CSP facility. The following are the key applicable guidelines

- DEA, 2010. Draft Companion to the EIA Regulations 2010. Drafted as Guideline 5 in terms of the Integrated Environmental Management Guideline series gives access to the content of the Regulations in layman's terms.
- DEA, 2010. Draft Guideline on Public Participation in the EIA Process. Drafted as Guideline 7 in terms of the Integrated Environmental Management Guideline series gives access to the content of the Regulations as it pertains to public participation in layman's terms, as well as providing guidance on the proper fulfilment of public participation processes.
- DEA, 2008. Guideline on Environmental Impact Assessments for Facilities to be Included in the Electricity Response Plan, Government Notice 162, Government Gazette 32970.This Guideline (published in GN 162 of 2010) provides a framework for the procedures to be used in response to S&EIA applications for facilities to be included in the NERP. In particular it provides for shorter timeframes to be applied to the various regulatory steps of the process (refer to **Appendix 3.1**).

5.4 Description of the Integrated EIA process

Section 24 (5) of NEMA provides for the Minster of Environmental Affairs to publish regulations describing the requirements for environmental authorisation processes for listed activities (as described in Section 5.1.1). Government Notice Regulation 543 of 2010 was published in terms of this Section and describes in detail the requirements for a Scoping and EIA process.

Section 24 L of the NEMA provides for instances where the carrying of out of a listed activity in terms of NEMA is also regulated in terms of another law or a specific environmental management Act (such as the NEMWA), that one integrated process can be followed for all authorisations required. Authorisations resulting from an integrated process will be combined in the form of an Integrated Environmental Authorisation. The Integrated Scoping and EIA process has been indicated in Figure 14 and the requirements of each Phase of the process are described in **Appendix 3.2**.

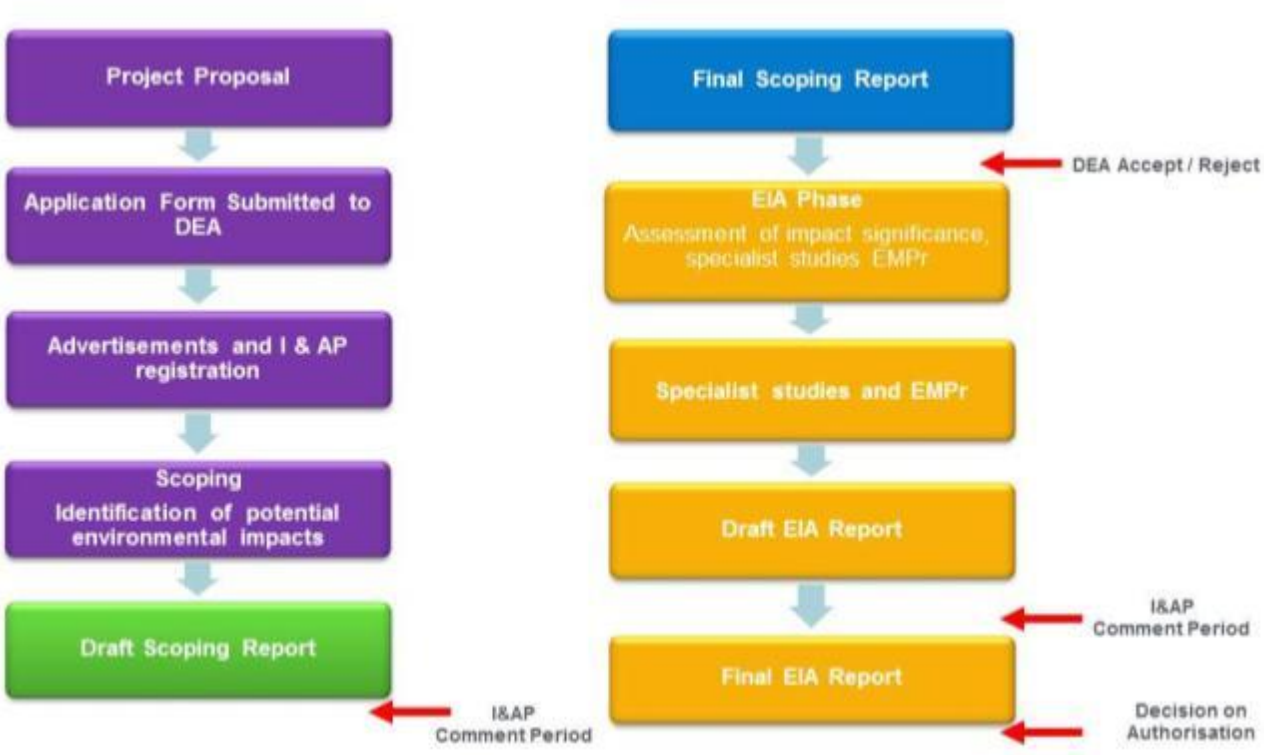

Figure 14: Process flow chart for Integrated Scoping and EIA

6 The Scoping Phase

This Section documents the tasks undertaken and investigations conducted as part of the Scoping Phase as required in terms of the EIA Regulations (GNR 543 of 2010) and described in Section 5.2.

6.1 Application for Authorisation

An application form for an environmental authorisation was submitted to the DEA (the Competent Authority for energy projects) for NEMA listed activities. Acknowledgement of receipt was received and formal authorisation to proceed was received on 26 April 2012. The DEA reference number for the project is 14/12/16/3/3/2/335 (**Appendix 4**).

During the Scoping Phase it was established that applications for the following authorisation will also be required for this project:

- Waste Management Licence; and
- Atmospheric Emissions Licence.

At a post-application authorities meeting with the case officer for the DEA, Ms Masina Litsoane, it was confirmed that an Integrated EIA Process will be used in application for these authorisations. A Draft Integrated Application form has thus been prepared (**Appendix 5**) and will be updated and finalised during the EIA phase when specific project information has become available.

In addition to this, a Water Use Licence Application will also be required. Consultation with the DWA will be conducted in this regard and information provided in the EIA Report.

6.2 Scoping Phase Site Investigations

Various site visits were conducted as part of the Scoping Phase in order to observer the receiving environment and identify potential issues or impacts of the propose development.

- 8 May 2012 - Initial WSP site visit;
- 21 May 2012 – Site visit with WSP, the Applicant (SNE) and various project specialists (see Section 9) for the project team);
- 22 May 2012 – Site visit with WSP, the Applicant (SNE),the DEA, and members of the Kai! Garib Local Municipality; and
- 23 May 2012 – Site visit WSP and project specialist.

6.3 Description of Receiving Environment

Based on information gathering through desk top investigations, site visits and input from the various project specialists, the following description of the receiving environment was compiled.

6.3.1 Climate

6.3.1.1 Precipitation and Evaporation

The Upington area is characterised by fluctuating temperatures, high evaporation rates as well as low and unpredictable rainfall. Rainfall follows the same trend as the temperature of the region, with it being high in the beginning and end of the year and low in the winter months (Figure 15). The low annual rainfall (avg. of 170 – 240 mm in Upington and even lower in some surrounding areas) is significantly lower than the evaporation rate, resulting in the dry arid climate that is experienced in the area.

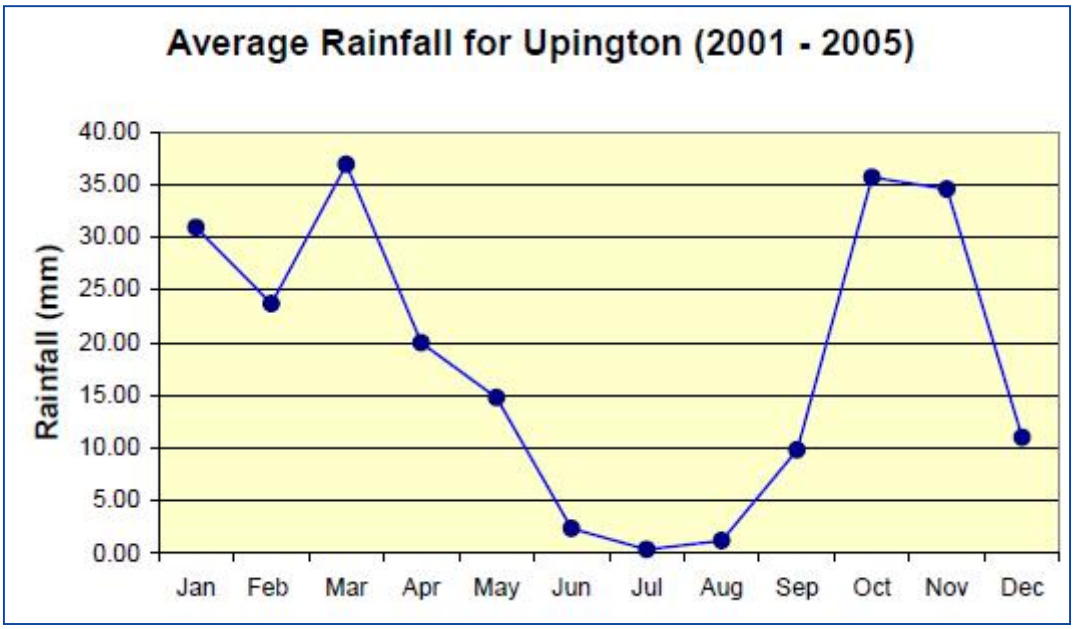

Figure 15: Average monthly Rainfall for the Upington area (2001 – 2005)

6.3.1.2 Temperature

The Northern Cape Province is characteristic of semi-desert climatic conditions such as that of the southern Kalahari. Temperatures for the Upington area range between -2 ºC and 41 ºC. Weather data for the Upington area for the time period 2001 - 2005 depicts mean monthly temperatures that range from 12 ºC to 28 ºC (Table 12). Temperature follows the same trend as the rainfall of the region, with it being high in the beginning and end of the year and low in the winter months. Thus, the winters at the study area are cold and dry with significant variance between day and night temperatures, followed with hot and wetter summer months. Frost is rare in the area however, it does occur occasionally most years at low rates of severity.

Table 12: Average monthly temperatures and humidity for the Upington area

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max Temp °C	41.30	39.90	38.74	34.36	31.16	26.60	27.26	32.00	36.38	38.32	39.14	40.16
Min Temp °C	14.04	15.96	11.48	6.92	1.66	-2.78	-2.16	-2.10	2.42	6.00	10.72	14.04
Avg Temp °C	28.22	28.37	25.76	21.24	16.80	12.62	12.42	14.10	18.64	22.95	25.45	27.41
Humidity %	31.42	36.00	41.84	50.39	46.22	47.97	41.22	38.96	32.95	30.07	32.27	26.65

6.3.1.3 Solar Radiation

Most areas in South Africa average more than 2,500 hours of sunshine per year, with average annual solar radiation levels ranging from 6,000-9,500 MJ/m2 (Figure 16). The Northern Cape has the highest solar radiation intensity anywhere in southern Africa (Sherman, 2001). The Upington area falls predominantly within the 9,000 to 9,500 MJ/m^2 band.

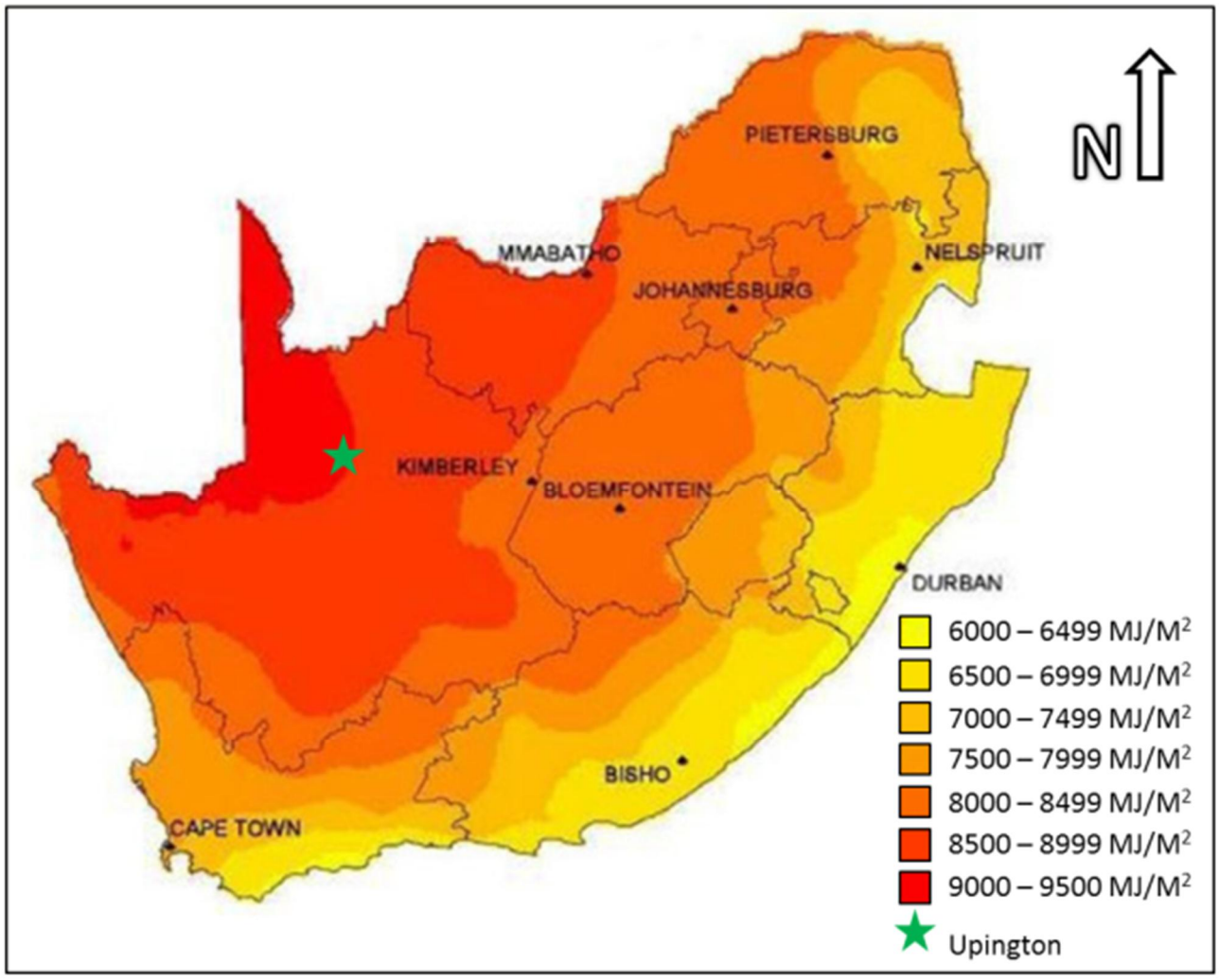

Figure 16: Solar radiation for South Africa (per annum) (after Solarvision, 2010)

6.3.1.4 Wind

From the total wind frequency distribution it can be observed that the predominant wind direction is mainly from the north, with a smaller component from the south-south-west (Figure 17). Wind speeds range from 0.5 to 11.1 m/s, with the highest speeds experienced from the north. Winds that have the potential to raise airborne dust, that is wind speeds in excess of 5.4 m/s, occur for approximately 16% of the time for all wind directions. Therefore it can be assumed that wind-blown dust would originate mostly from the north. Calm conditions where wind speeds are less than 0.5 m/s occur for approximately 3% of the time.

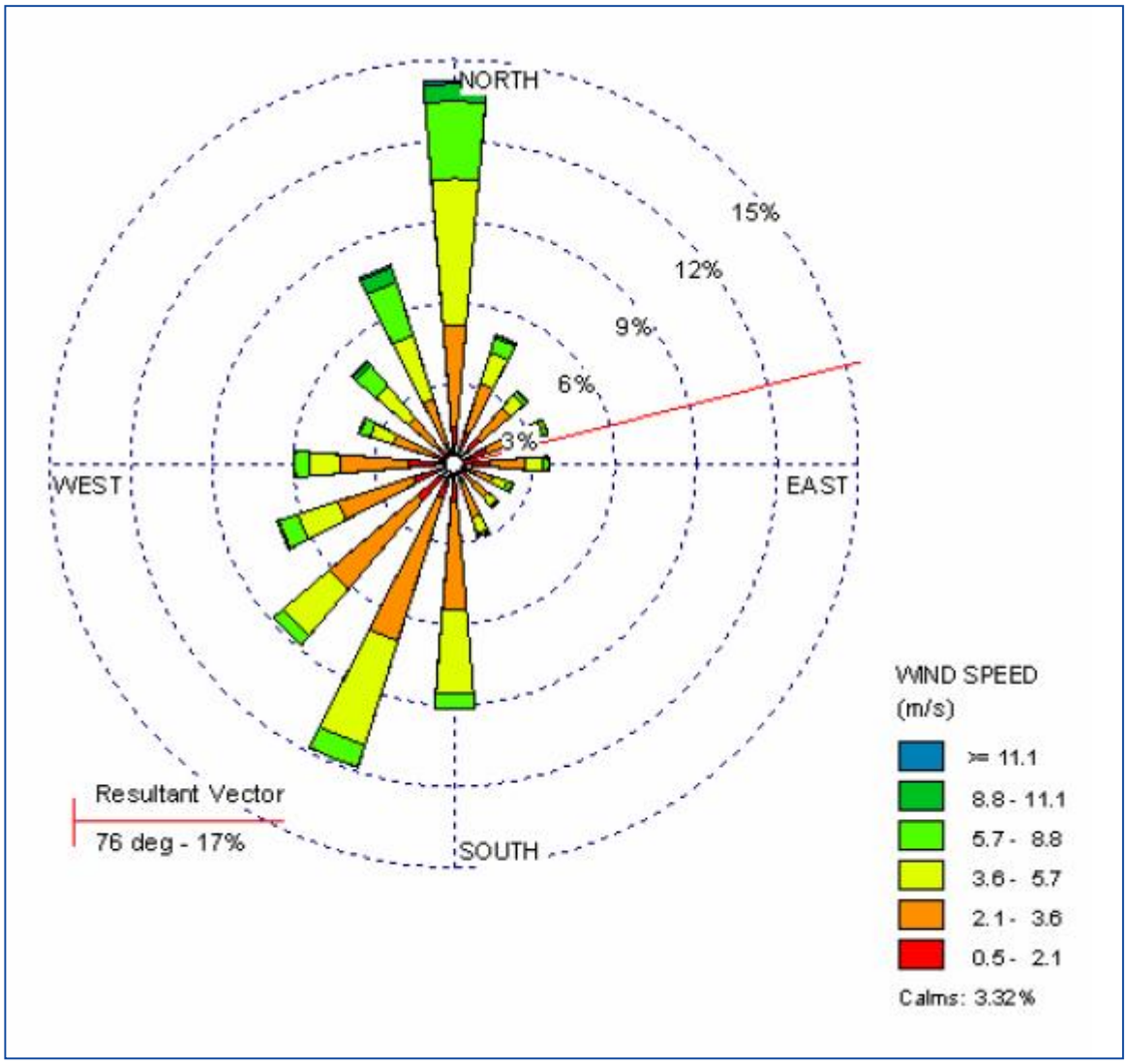

Figure 17: Surface wind rose plot showing the average wind speed and wind direction in Upington for the years (2001 – 2005)

6.3.2 Air Quality

Priority pollutants, as defined in the National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA), are sulphur dioxide (SO_2), nitrogen dioxide (NO_2), respirable particulate matter (particles with aerodynamic diameter of 10 micron or less (PM10), ozone (O_2), benzene (C6H6), lead (Pb) and carbon monoxide (CO). Within the study area there are no major emitters of these priority pollutants, other than particulate matter. There are no major sources of air pollution in the vicinity of the proposed site, the nearest being a clay quarry and brickworks is located approximately 3 km away to the north west of the proposed site.

6.3.3 Noise

Noise levels are typically elevated during the construction phase of a project. Noise during operation will come from the generator and turbine. This will be assessed in the EIA Phase in terms of the specifications of generator and turbine in relation to allowable noise levels for the adjacent area.

6.3.4 Geology and Soils

The geology of the area is covered by Quaternary red-brown Aeolian sands of the Gordonia Formation, Kalahari Group (Anderson, 2009). Localised areas of the site are underlain by quartz-rich and mafic calc-silicate rocks and stauroliteschists of the Bietjiespoorts Group in addition to magmatic, biotite-rich and aluminous gneisses of the Areachap Group. A prominent northwest-southeast trending fault runs through the centre of the investigation area with a second northeast-southwest trending fault running approximately 2 km to the south of Van Roois Vley (SRK consulting, 2012).

The soils in the Upington area are generally poorly structured with low organic content. As a result the soil surface is susceptible to wind and water erosion which is exacerbated when vegetation cover is sparse. The red, eutrophic and excessively drained soil predominately overlies a thick layer of calcrete. The average clay content of the topsoil is less than 10 -15 % and with a depth of 400 to 750 mm

6.3.5 Topography

The proposed area is characteristic of a typical Kalahari landscape with flat to slightly undulating plains and is, generally, an area of little topographical relief. The elevation of the proposed site ranges from 946 metres above sea level (msal) to 881 masl, indicative of a relatively flat topography. Figure 18 illustrates the cross profile of the Van Roois Vley site as indicated from north to south and east to west. The north to south profile represented by the Y-axis has an average slope of -0.8 % with point ‘c’ noted to be 937 masl and point ‘d’ 885 masl. The west to east profile is represented by the X-axis has an average slope of 0.3%, with an altitude at point ‘a’ being 922 masl and ‘b’ of 894 masl.

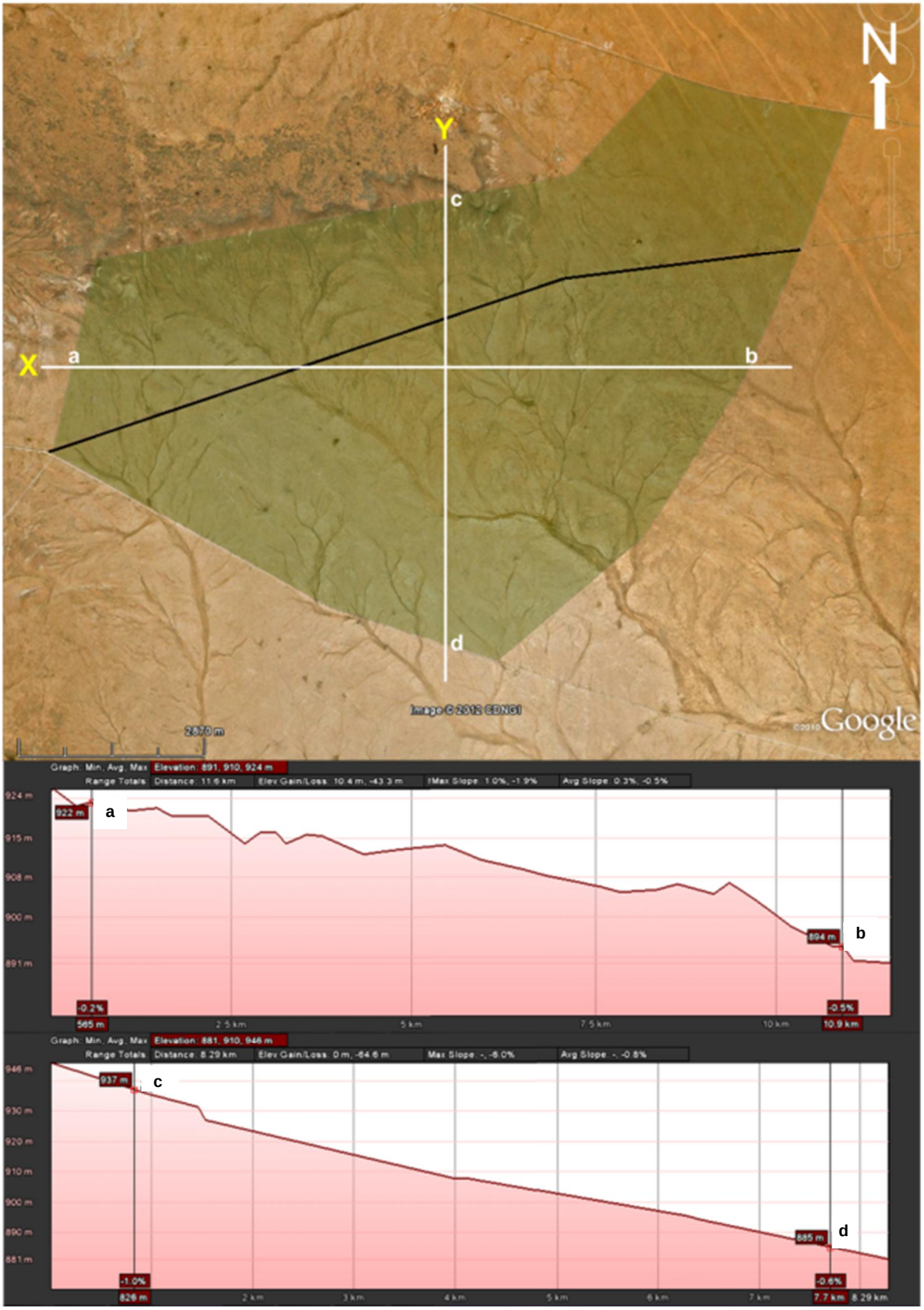

Figure 18: Cross section of the Van Roois Vley site (Google earth, 2012)

6.3.6 Land Use and Land Capability

According to the Siyanda District Municipality Environmental Management Framework (EMF) (2008) and the Kai! Garib Local Municipality Integrated Development Plan (IDP) (2009), agriculture is the main economic sector within the municipality with the largest potential for economic growth. Farming in the area is characterised by grazing (cattle and sheep).

The Van Roois Vley site is located approximately 15 km from the Orange River. The current land use is predominately small-scale sheep farming (Figure 19). The agricultural potential of the site can be described as low and this is attributed to the low rainfall experienced in the area. The grazing potential of the area is also described as low as a result of the climatic conditions.

Figure 19: Photograph taken on Van Roois Vley indicating sheep farming

6.3.7 Hydrology

Three ephemeral rivers drain the site: The Helbrandleegte and Helbrandkloofspruit and an unnamed watercourse (Figure 20). These originate from a plateau located on the northern boundary of the site. Due to the climate, these non-perennial watercourses are expected to only flow directly after heavy rainfall events. The Helbrandleegte drains the majority of the site including the central and north-eastern portions, and flows in a south-eastern direction.

The Helbrandkloofspruit drains the southern portion of the site, confluences with the Helbrandleegte 18 km south-east of the site, and contributes to the Orange River, 21 km south-east of the site. The non-perennial watercourse drains the western extremity, flows in a southern direction, and contributes to the Orange River 29km south of the site boundary.

Based on topographical mapping and aerial imagery two farm dams are located within the central portion of the study area, associated with the Helbrandleegte. In addition, a quarry located on the unnamed watercourse on the south-western boundary, is expected to be filled with water after rainfall events. Ephemeral pans are located towards the north and south-west of the property associated with each of the three watercourses. Wind

pumps associated with the Helbrandleegte drainage line are located to the north-west and south-east of the study area. Various small water storage reservoirs are located to the west of the study area in the vicinity of the railway line.

Figure 20: Picture depicting an ephemeral river bed on site

6.3.8 Geohydrology

According to the DWAF 1:4,000,000 Groundwater Resources of the Republic of South Africa Map Series, the regional aquifer is classified as “fractured” contained within igneous and metamorphic rock formations. Primary porosity in the region is low to very low due to high grade regional metamorphism which would have recrystallised existing sedimentary rocks, reducing both porosity and permeability. Such formations include the staurolitеschists of the Bietjiespoorts Group and aluminous gneisses of the Areachap Group. The only stratigraphy likely to support a primary aquifer includes shallow saturated residual and transported Quaternary red-brown Aeolian sands of the Gordonia Formation. Regional groundwater is controlled predominantly by secondary porosity of jointed and fractured bedrock and is the main source of water abstraction. Aquifer harvest potential is limited by the volume of effective storage due to low substrate permeability (storativity).

Groundwater from the area typically has a hydrochemical composition of between 30 to 40% (Ca, Mg) (Na, Ka) with 500 to 1000 mg/ℓ total dissolved solids (TDS). This high TDS may affect certain intended water uses and effectively reduce groundwater exploitability.

The groundwater component of base flow for the region is negligible with a mean annual recharge of 1 – 5 mm/annum. Groundwater reserves occur at depths between 30 to 50 meters below ground level. Based on published information the underlying aquifer is considered least vulnerable and has low susceptibility to anthropogenic contamination.

6.3.9 Flora and Fauna

6.3.9.1 Flora

The Van Roois Vley site falls within the Nama Karoo biome, and consists primarily of low-shrub vegetation and grasslands (Mucina and Rutherford, 2006). The area is predominantly covered by the Kalahari Karroid Shrubland vegetation type which is defined by karroid shrubland on flat gravel plains with the characteristic shrub vegetation (Mucina and Rutherford, 2006).Figure 21 gives an indication of the typical vegetation cover on the site.

6.3.9.2 Fauna

Typical fauna species diversity in the study area is relatively low as a result of the climatic conditions of the area. As part of the broader Nama Karoo, faunal species one small mammal forms part of the endemic species to the ecoregion and is namely, Visagie's golden mole (*Chrysochlorisvisagiei*,) which is Critically Endangered. There are also five near endemic species that exist in the ecoregion, namely: Grant's rock mouse (*Aethomysgranti*), Shortridge's rat (*Thallomysshortridgei*), the Riverine rabbit (*Bunolagusmonticularis*, which is Endangered), Bushy-tailed hairy-footed gerbil (*Gerbillurusvallinus*) and the Brukkaros Pygmy Rock Mouse (*Petromyscusmonticularis*), of which the most vulnerable is the Riverine rabbit which is classified as endangered according to South Africa's Red Data Book (WWF, 2008).

The faunal components of the region are highly impoverished due to persecution, habitat transformation and poor grazing management. Mammals previously noted within the study area include: Red veld rat, Porcupine, Scrub hare/Cape hare, Springbok, Ground squirrel, Yellow mongoose, slender mongoose and Kalahari tent tortoise. Various reptile and bird species can also be found within the study area.

6.3.10 Sites of Archaeological, Cultural and Heritage Significance

The geographical area in which the site is situated is not well-known as one containing many prehistoric sites, therefore indicating that research in the area has been limited in the past. The SAHRA Database for historic or prehistoric sites gives no indication of such site being present on the Van Roois Vley site. As a result of limited information regarding historical and archaeological sites in the area it can be deduced that no Early Stone Age sites occur on the proposed site or within the immediate geographical region. Middle and Late Stone Age tools have however, been previously recorded in the Northern Cape region.

Late Stone Age sites and tools are associated with the San people, it is known knowledge that the San people were nomadic hunters and gathers and as a result of their continuous movement's traces of their existence can be found in various places. It is unlikely that Early or Middle Iron Age sites exist within the Van Roois Vley site. The only known site of historical importance in the study area is the Rebellion tree which is situated on the Van Roois Vley site, which originated from events during the 1914 rebellion of Boers against the government. It is anticipated the Stone Age sites and tools will be found in the area.

6.3.11 Aesthetic Environment (visual)

The Van Roois Vley site and surrounding area is generally flat, with low hills and low valleys therefore contributing to high visual quality of the landscape. Being a semi-arid region with low land capabilities, development is concentrated along the Orange River. The Van Roois Vley site falls within the Nama Karoo biome (Mucina and Rutherford, 2006) with a Kalahari Karroid Shrubland vegetation type. Figure 21 illustrates the general landscape of the site. Potentially sensitive visual receptors include:

- National and Regional roads;
- Secondary and minor dirt roads;
- Railway lines; and
- Nearby towns (Upington).

Figure 21: Typical landscape of Van Roois Vley site

6.3.12 Socio-economic Structure

6.3.12.1 Regional Socio-Economic Context

A socio-economic scoping investigation was done by WSP. The proposed project is primarily located within the Kai! Garib (NC082) local municipality and borders the //Khara Hais (NC082) local municipality, within the Siyanda District Municipality of the Northern Cape (Figure 1). The Northern Cape is one of South Africa's largest provinces (~30% of total land mass), however, it has the smallest population of 1,096,731 (Stats SA, 2011). The population density of the province is therefore low (~2 people per square kilometre).

On a geographical basis, the province shares borders with Namibia in the northwest and Botswana in the north and stretches as far as the Atlantic Ocean in the west. The Northern Cape also shares borders with the Western Cape to the south, the Eastern Cape and Free State to the east and the North West Province to the north. The largest centres in the Northern Cape are Kimberley and Upington. Kimberly was founded on the mining industry, but most mineshafts in Kimberley have been closed, thus the traditional economic base of the city has been eroded, and there is a need to look for alternative activities to sustain its local economy. Upington' s local economy is based on services, agriculture and agro-industry, and long-term sustainability is not a particular issue. It is, however, an issue in the northern areas of the province where mining has taken over from extensive agriculture.

The sparse, arid landscape is dominated by sheep rearing and mining. The Orange River, however, provides a source of fertile land and water within the northern region of the province. The areas immediately adjacent to Orange River are therefore characterised by a concentration of vineyards and other agricultural activities, producing products such as export-quality table grapes, wine, dried and preserved fruit. The region has a strong tourism component, which supplements the local economy, and comprises agri-tourism, adventure tourism, as well as scenic and historical tourism.

6.3.12.2 Local Socio-Economic Context

The service levels within the //Khara Hais Local Municipality are adequate, with the municipality providing the majority of households with waste removal, piped water and electricity. This is likely due to the concentration of populations within urban areas (Upington) and the linear development corridor and farming areas associated with the Orange River. Education levels are characteristic of most South African municipalities, with 34% having some secondary schooling, 21% with high school qualifications, and 6% with tertiary education. Employment is low by comparison with the national levels, with 35% of the labour force being unemployed. The main employment sectors are: agriculture; wholesale and retail trade; community; social and personal services; and private households.

The Kai! Garib Local Municipality has relatively lower service provision rate, when compared with the //Khara Hais municipality. There is marginally lower water provision, refuse removal and electricity provision. This is likely to be product of the local context, the predominantly rural nature of the area, and sparse population. The education levels are fairly low, with 14% having had no schooling, 10% with a grade 10, and only 2% with tertiary education levels. Employment levels are, however, higher than the //Khara Hais Local Municipality, with 82% of the labour force being employed (only 18% unemployment rate). The key economic sectors, in which the labour force is employed, are skilled agricultural sector (12%) and elementary occupations (63%). This is reflective of the low education levels and predominantly agricultural nature of the local municipality.

6.3.12.3 Site Context

The town of Upington has a population of approximately 47000 people (Stats SA, 2007), and lies 20km south-east of the proposed site. Upington and Keimoes (20km south of the site) are the closest communities to the site, as the arid environment limits development to these areas. The site is located in an area of sheep farming, and has little connection to other features in the area, except for the national highway (N10) which runs near to the north-east border of the site. The N10 links Upington to Nakop on the Namibian border (approximately 100km north-west of the site). Key tourism features in the area include the Augrabies Falls National Park (60km south-west), the Kgalagadi Transfrontier Park (220km north and the Orange River (20km south).

7 Stakeholder Engagement Conducted in the Scoping Phase

The NEMA EIA Regulations (Sections 54-57) require that an inclusive, transparent process of engagement – sharing of information, receipt of comments, expression of issues and concerns, and response and feedback regarding issues and concerns – be undertaken that allows participation by any and all persons and entities who may be affected by and/or have an interest in a proposed project. Procedures for informing stakeholders about a project and engaging their participation have become standard practice.

The initial round of stakeholder consultation process was undertaken in English and Afrikaans. All subsequent rounds of public participation, apart from presentations at the public meetings, will be in English. The following sections outline the required tasks that have been undertaken as part of the stakeholder consultation process.

7.1 Compilation of stakeholder database

The identification and registration of stakeholders has been an on-going activity during the course of this study. Neighbouring farms, local communities and groupings, as well as authorities and state departments having jurisdiction in respect of any aspect of the activity where identified. WSP developed and maintained an electronic database for the duration of the project where stakeholder details were captured and automatically updated as and when information was received. Refer to **Appendix 6.1** for a copy of the database for this project.

7.2 Public Participation

7.2.1 Site notices

The NEMA EIA Regulations require that a site notice be fixed at a place conspicuous to the public at the boundary or on the fence of the site where the activity to which the application relates is to be undertaken and on any alternative sites. Nine site notices were placed at the following locations (Refer to **Appendix 6.2** for a copy of the Site Notice placed and Site Photographs):

- //Khara Hais Local Municipality in Upington (English and Afrikaans);
- Kai! Garib Local Municipality in Keimoes (English and Afrikaans);
- //Khara Hais Public Library in Upington (English and Afrikaans);
- The boundary of the proposed site: Van Roois Vley (English and Afrikaans); and
- Piet Thole Hall, public meeting venue (Afrikaans);

The purpose of the site notices was to notify the public of the project and to invite the public and interested and/ or affected parties to register as stakeholders for the project and to attend the public meeting. Five of the site notices were published in Afrikaans and the remaining four were published in English.

7.2.2 Background information documents and letters of notification

According to the NEMA EIA Regulations, written notice must be given to the:

- Owner or person in control of that land if the applicant is not the owner;
- Occupiers of the site where the activity is to be undertaken, including all alternate sites;
- Owners and occupiers of land adjacent to the site where the activity is to be undertaken, including all alternate sites;
- Owners and occupiers of land within a 100 m radius of the boundary of the project;
- Municipal ward councillor in which the site and alternate site is situated;
- Municipality who has jurisdiction of the area;
- Any organ of state having jurisdiction in respect of any respect of the activity; and
- Any other party as required by the competent authority.

The purpose of the BID was to provide background information on the proposed project, outlining the environmental process, notifying stakeholders of the date and venue of the public meeting and providing an opportunity for registration of other stakeholders. A copy of the BID is contained in **Appendix 6.3**.

The BID's were distributed to all landowners and tenants that could be affected by the proposed project.

Authorities and stakeholders were notified in July via the following methods of contact:

- Email notification (2-8 May 2012); and
- SMS notification (2- 8 May 2012).

7.2.3 Advertisements

The NEMA EIA Regulations require that an advertisement be placed in either a local newspaper or a Government Gazette. Should the project have a potential impact that extends beyond the boundaries of the metropolitan or local municipality, the project should be advertised within at least one provincial or national newspaper. For the proposed project, WSP is required to place an advertisement in two local newspapers. To ensure that the stakeholder consultation was comprehensive, an advertisement was placed in two local newspapers (The Kalahari Bulletin and The Northern Cape Express), and one national newspaper (The Star),

thereby ensuring that a wider range of people were informed. Refer to **Appendix 6.4** for a copy of the newspaper advertisements.

The proposed facility project advertised through the press in the following local newspapers:

- The Kalahari Bulletin – 2 May 2012;
- Northern Cape Express – 3 May 2012; and
- The Star – 3 May 2012.

7.3 Public Meeting

A public meeting was held at the Piet Thole Hall on 22 May 2012 from 17h30 to 19h00. The aim of the meeting was to outline the details of the project and provide an opportunity for stakeholders to raise issues, concerns and queries related to the proposed project. The meeting also established a line of communication between the stakeholders and project team.

Lodewyk Jansen on behalf of Catherine Greengrass, from WSP presented the proposed project and the environmental processes associated with the project in Afrikaans. The design details of the proposed project were also discussed during the meeting. The floor was then opened for discussion and for the attendees to raise questions, concerns and issues. All discussions, questions, concerns and issues were noted and included in the Issues Trail. A copy of the meeting minutes is contained in **Appendix 6.5**.

All adjacent landowner were invited to individual meetings on 22 and 23 May. Meetings with individual landowners who were available were conducted between and telephone discussions with those who were not available were held whereby they were invited to send any comments or issues to WSP. Issue raised by adjacent landowners are recorded in **Appendix 6.6**.

7.4 Authorities Consultation

The first Authorities Meeting was held on 15 May 2012 with the DEA. The objectives of the meeting were to gain clarification on requirements set out in the acknowledgement letter received from DEA on date.

All the relevant issues, questions and concerns were noted, and a copy of the meeting minutes was distributed to the DEA (**Appendix 6.7**).

The second Authorities Meeting was held on 22 May 2012 at Piet Thole Hall in Upington with representatives from the following regulatory authorities:

- Masina Litsoane (Department of Environmental Affairs);
- Yolande de Jager (Kai! Garib Local Municipality); and
- Patrick Wells (Kai! Garib Local Municipality).

Project information, in the form of a presentation and potential environmental impacts, was presented to the authorities in order to ensure that they were adequately informed about the project. A site visit was undertaken in order to allow authorities to familiarise themselves with the site and the proposed project. All discussions, questions, concerns and issues were documented and included in the issues trail. A copy of the minutes is included in **Appendix 6.8**.

7.5 Public Review

The draft Scoping Report for the proposed facility will be placed on public review between 13 June and 4 July at the following venues:

- Kai Garib Local Municipality
- Kai Garib Library

- Khara Hais Local Municipality
- Khara Hais Libraries (all three libraries in Upington)
- WSP Website: www.wspenvironmental.co.za

7.6 Issues trail

An issues trail was developed that details the outcomes of all engagement and consultation with authorities and stakeholders. This issues trail was developed at the onset of the project and as such includes all comment and responses received (**Appendix 6.6**)

During consultation with the surrounding landowners the following comments and concerns were raised:

- Increases in stock theft due to influx of people during construction and operation phases.
- Concerns were raised about the possibility of construction and/or operational staff being housed on site.
- Increase risk of veld fires.
- Scouring and soil erosion by rain water running off the heliostats.
- Some landowners indicated their interest in linking into proposed infrastructure such as pipelines and substations.

These concerns were noted and conveyed to the applicant and responses will be included in the Issues Trail (**Appendix 6.6**)

8 Potential Environmental Impacts

The over-arching objective of the Scoping Phase is to identify record and describe the *potential* environmental issues associated with the proposed Commercial CSP facility. This enables the specialist studies to be clearly focused on aspects of significant concern. It also provides a framework for the assessment of the impacts that the proposed project will have on the environment, and of the impacts the environment will have on the proposed project. Based on inputs from the project team, stakeholders, I&APs and specialists the environmental (biophysical, social and cultural) impacts in Table 13 have been identified as potentially associated with the proposed development and will be investigated during the EIA phase of the process.

Table 13: Impacts potentially associated with the proposed CSP facility

Environmental Aspect	Potential Impact	Proposed method of investigation
Soil, Land Use and Land Capability	Loss of agricultural capacity	Land Capability Assessment (Agriculture and soils)
	Loss of grazing capacity	
Biodiversity	Loss of terrestrial habitat	Botanical Impact Assessment, Faunal Impact Assessment, Avifaunal Impact assessment
	Loss of ephemeral habitat	
	Disturbance and displacement of fauna / avifaunal species	
	Faunal interaction with structures, servitudes and personnel	
	Impact on surrounding habitat and species	
	Increase in environmental degradation	

Environmental Aspect	Potential Impact	Proposed method of investigation
	Loss of Red data / protected floral species	
	Introduction / spread of alien species	
	Loss of species diversity	
Surface and Ground-water	Soil erosion from changes in surface water flow due to construction of infrastructure	Hydrological and Geohydrological Impact Assessment
	Soil erosion due to storm water runoff from heliostats	
	Impact on water users downstream of proposed abstraction point in the Orange River	
Air Quality	Particulate matter (dust) impacts during construction phase	Air Quality Impact Assessment
	Air quality impacts due to burning of diesel in auxiliary boiler	
Visual	Light reflection from heliostats into surrounding properties and traffic routes	Visual Impact Assessment
	Light reflection from heliostats into the sky (aviation safety)	
	Visual impact from viewpoints overlooking the proposed site	
	Visual impact of power tower structure	
Noise	Noise impact during construction	Noise specifications on experiment will be investigated during the EIA Phase
	Noise from steam turbine	
Traffic	Construction vehicles using the existing road networks to access the proposed site	Traffic Impact Assessment
	Increase in the number of vehicles on the existing networks during operation	
Culture and Heritage	Loss of significant archaeological sites	Heritage Impact assessment (including Phase I archaeological investigations)
	Loss of significant cultural / heritage resources	
Air Space	Physical obstacle to aircraft	Consultation with the Civil Aviation Authority
Socio-Economic	Job creation	Social Impact Assessment
	Expansion of local skill	
	Small business opportunities	
	Economic development	
	Increased potential for stock theft	
	Visual disturbance	
	Security risks	
	Noise intrusion	
	Dust intrusion	
	Light intrusion	
	Increased potential for fires	

9 Plan of Study for Environmental Impact Assessment

The plan of study for EIA describes the process for the detailed impact assessment and development of an Environmental Management Programme. The plan of study is the final product of the scoping phase, because it must ensure that all issues raised during the stakeholder engagement process and technical scoping are captured in the scope of work for the EIA such that they will be addressed, if found significant, in the management plans.

Submission and approval of this Scoping Report represents the initiation of the EIA phase. The EIA phase considers the impacts of the proposed project on the environment, and will consider the following project development phases in detail:

- Construction phase;
- Operation phase; and
- Normal, abnormal and emergency conditions.

The impact assessment will assess the significance of direct, indirect and cumulative impacts on the receiving biophysical and socio-economic environment. The EIA will utilise the specialist studies described below, an impact assessment methodology and management and mitigation measures to assess the significance of potential impacts on the environment.

9.1 EIA Methodology

The EIA process will be undertaken in line with the requirements of the promulgated EIA Regulations of the NEMA.

The outcomes of the plan of study for EIA include the following:

- Provide a description of the tasks that are undertaken as part of the EIA process, including any specialist reports or specialised processes, and the manner in which such tasks were undertaken;
- Provide an indication of the stages at which the competent authority will be consulted;
- Provide a description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity;
- Overview of the stakeholder engagement that was conducted during the EIA process; and
- Include any specific information required by the competent authority.

The purpose of the EIA and draft EMP is to provide/determine:

- An assessment of the environments likely to be affected by the proposed project;
- An assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the proposed project;
- A comparative assessment of the identified land use and development alternatives and their potential environmental, social and cultural impacts;
- The appropriate mitigation measures for each significant impact of the proposed project;
- Details of the stakeholder engagement process followed during the course of the assessment and an indication of how the issues raised have been addressed;
- Identification of knowledge gaps and reporting on the adequacy of predictive methods, underlying assumptions and uncertainties encountered in compiling the required information;
- A description of the arrangements for monitoring and management of environmental impacts; and
- Inclusion of technical and supporting information as appendices, if available.

The EIA report that is submitted for stakeholder review and for approval by the responsible authority (DEA) will include the following:

9.1.1 Impact Assessment Methodology

The potential environmental impacts will be evaluated according to their severity, duration, extent and significance of the impact. Furthermore, cumulative impacts will also be taken into consideration. WSPs risk assessment methodology will be used for the ranking of the impacts.

This system derives environmental significance on the basis of the consequence of the impact on the environment and the likelihood of the impact occurring. Consequence is calculated as the average of the sum of the ratings of severity, duration and extent of the environmental impact. Likelihood considers the frequency of the activity together with the probability of an environmental impact occurring.

9.1.1.1 Consequence

Table 14: Assessment and Rating of Severity

Rating	Description
1	Negligible / non-harmful / minimal deterioration (0 – 20%)
2	Minor / potentially harmful / measurable deterioration (20 – 40%)
3	Moderate / harmful / moderate deterioration (40 – 60%)
4	Significant / very harmful / substantial deterioration (60 – 80%)
5	Irreversible / permanent / death (80 – 100%)

Table 15: Assessment and Rating of Duration

Rating	Description
1	Less than 1 month / quickly reversible
2	Less than 1 year / quickly reversible
3	More than 1 year / reversible over time
4	More than 10 years / reversible over time / life of project or facility
5	Beyond life of project of facility / permanent

Table 16: Assessment and Rating of Extent

Rating	Description
1	Within immediate area of activity
2	Surrounding area within project boundary
3	Beyond project boundary
4	Regional / provincial
5	National / international

Consequence is calculated as the average of the sum of the ratings of severity, duration and extent of the environmental impact.

Table 17: Determination of Consequence

Determination of Consequence (C)	= (Severity + Duration + Extent) / 3

9.1.1.2 Likelihood

Table 18: Assessment and Rating of Frequency

Rating	Description
1	Less than once a year
2	Once in a year
3	Quarterly
4	Weekly
5	Daily

Table 19: Assessment and Rating of Probability

Rating	Description
1	Almost impossible
2	Unlikely
3	Probable
4	Highly likely
5	Definite

Likelihood considers the frequency of the activity together with the probability of the environmental impact associated with that activity occurring.

Table 20: Determination of Likelihood

Determination of Likelihood (L) =	(Frequency + Probability) / 2

9.1.1.3 Impact Significance

Impact significance is the product of the consequence and likelihood values.

Table 21: Determination of Environmental Significance

Environmental Significance (Impact) = C × L	Description
L (1 – 4.9)	Low environmental significance
LM (5 – 9.9)	Low to medium environmental significance
M (10 – 14.99)	Medium environmental significance
MH (15 – 19.9)	Medium to high environmental significance
H (20 – 25)	High environmental significance. Potential fatal flaw.

9.1.2 Specialist Studies

The following represents the plan of study to be undertaken for the specialist studies that will be conducted as part of the EIA Phase.

9.1.2.1 Land Capability Assessment (Agriculture and soils)

A desktop study will be conducted to determine the land capability and grazing capacity of the proposed site. The land capability will be described based on eight classes of soil capability, outlining the arable potential (ranging from very high to non-arable) and the grazing potential (ranging from moderate to low). The grazing potential will be described based on the number of animals that can be sustained without deterioration of the natural resources (expressed in hectares per livestock unit). This will be described based on the grazing potential mapped for the area in 2007.

Based on the desktop study, the land capability and grazing potential for the proposed site will be described. Based on the grazing capacity determined for the study site, the potential economic cost for the loss of grazing land will be estimated. The report will be accompanied by relevant mapping.

9.1.2.2 Hydrological and Geohydrological Impact Assessment

Available hydrological and geohydrological information pertinent to the area will be sourced, reviewed and described. In particular this will include any water quality data for the surface water and groundwater resources within the area. A hydrocensus of all groundwater wells within a 2 km radius of the proposed development will be conducted to determine borehole location, use, yield and water quality (if available).

Based on available project related information, a conceptual model of the surface water and groundwater resources will be developed. This will define the relationships between the resource and associated users. These information sources will be used to describe potential impacts of the site (both to surface water and groundwater) and to determine potential water supply options. The need for any water use licence requirements associated with the project will be assessed.

9.1.2.3 Botanical Impact Assessment

A desktop study of the area will initially be undertaken, this will include the examination of maps, satellite visuals, researching and checking database to understand the existing environment and what animals are typically found in the area. A site investigation will subsequently be undertaken to identify keystone species in the immediate and surrounding areas and identify red and endangered (Red Data, ToPS and CITES Listed) species.

A detailed faunal specialist report will be compiled and will include the following:

- Mammalogical, ornithological, herpetological (reptiles and amphibians) and selected arachnid species tables for the site and immediate surrounds with relevant discussions;

- Detailed mitigation proposals for construction and operational phases of the project; and
- Potential offset project possibilities

A floral assessment will be undertaken which will include the following:

- Species composition;
- Cover estimation of each species according to the Braun-Blanquet scale;
- Amount of bare soil and rock cover;
- Presence of biotic disturbances, e.g. grazing, animal burrows, etc.
- Produce an integrated ecological site sensitivity map whereby each vegetation type unit will be ranked in terms of conservation importance in terms of provincial biodiversity priorities, as well as ecological sensitivity;
- Identify any areas that may be considered 'no-go' areas from a biodiversity perspective;
- Evaluate the alternate properties in terms of relative sensitivity; and
- Suggest possible management measures to prevent/minimise/manage the identified impacts, namely the position of the proposed infrastructure, relocation and rehabilitation plans, monitoring programmes etc.

9.1.2.4 Faunal Impact Assessment

A faunal assessment will be undertaken and will include the following:

- A pre-site preparation – examination of maps, satellite visuals and reference searches etc ;
- A site investigation where the following will be identified:
  - Keystone species in the immediate and surrounding areas; and
  - Rare and endangered (Red Data, ToPS and CITES Listed) species.
- A review of known data, field trip reports and museum specimen data for the area;
- A detailed faunal specialist report including:
  - Mammalogical, ornithological, herpetological (reptiles and amphibians) and selected arachnid species for the site and immediate surrounds with relevant discussions;
  - Detailed mitigation proposals for construction and operational phases of the project; and
  - Potential offset project possibilities.

Arachnological assessment will be limited to high risk or protected species.

9.1.2.5 Avifaunal Impact Assessment

An initial desktop review will be undertaken of available literature to better understand the impacts associated with the CSP facility, as well as impacts on birds, the predominant avifaunal communities present in the area and the general biogeochemical histories of the site. A risk assessment will be undertaken for the species present and expected based on the literature reviews and site inspections. Multi-seasonal surveys of the site and surrounding areas will be conducted to establish presence/absence of all species, as well as to inspect habitat suitability and regional-level movement patterns. Mitigation measures and recommendations will be thoroughly investigated and proposed, based on literature review, the risk assessment, site inspections and a meeting with Bird Life South Africa.

During a site visit an assessment will be undertaken using the conventional line transect method which consists of walking a fixed-length transect within a given time and recording all bird species seen or heard within a specified transect width. Wherever larger waterbodies or good observation areas are encountered, extensive scanning with a field telescope will be undertaken in an attempt to detect larger terrestrial birds, waterbirds and raptors that may not otherwise be detected during the line-transect methodology. Driving to and from the survey

sites before and after sunrise will also be undertaken in an attempt to locate any nocturnal birds, which would be absent from the diurnal survey schedule.

9.1.2.6 Visual

A qualitative assessment of visual impacts in relation to critical viewing points, such as neighbouring farms and prominent view sites within a 5 km radius will be undertaken. This will be done through a baseline description including a field study will initially be undertaken to determine the locality of the site and the surrounding receptors. The purpose of this baseline study is to investigate the topography and land cover of the area and survey locations to verify the visibility.

Extensive use of GIS and 3D modelling technology will be used. Furthermore, photo montages will be used as a photographic representation of the proposed landscape modification as viewed from a specific location. To ensure that this representation is ethical, the Proposed Interim Code of Ethics for Landscape Visualisation (CALP, July 2003) will be applied. Once studies have been concluded impacts will be assessed and mitigation and management measures will be recommended for the construction and operation phases.

9.1.2.7 Traffic Impact Assessment

An access road will be developed for this project and therefore a traffic impact assessment will be undertaken. The assessment will include a data collection phase whereby a traffic survey will be undertaken and information will be gathered regarding existing and future roads and intersections. This phase will include a site visit to observe current travel patterns and to gain an understanding of the area. A meeting and correspondence with the local authority will provide clarification on the scope of the traffic study and determine what current developments are taking place. Traffic counts will be undertaken during relevant peak hours to determine the magnitude of traffic in the area and latent rights in the area will be sourced.

The traffic study will include:

- Description of proposed development and other proposed developments;
- Comments on the existing road network;
- Traffic surveys and data;
- Trip generation, distribution and assignment;
- Capacity analysis at relevant intersections and accesses.
- Assessment of operational conditions of relevant intersections;
- Preparation of a study report with findings, conclusions and recommendations.

9.1.2.8 Cultural and Heritage Impact Assessment

Based on archaeological and historical research and various heritage assessments in the region of the proposed site, the occurrence of paleontological and archaeological heritage resources is anticipated.. A cultural heritage assessment is proposed, which will comprise:

- Baseline studies (mapping and significance assessment of heritage resources) of the development site;
- A field study to obtain and assessment/definition of impacts (by construction and operation) on identified heritage resources;
- Interviews with local people, if necessary, in an effort to further understand the area being surveyed;
- All sites, objects, features and structures;
- Formulation of possible heritage management measures before and during construction; and
- Recommended design responses to preserve and/or memorialise significant heritage resources.

9.1.2.9 Air quality Impact Assessment

This study will focus on the construction phase dust impacts, however, potential impacts during operational lifespan of the project will also be considered. The latter would include increased dust release from the removal of vegetation from the site footprint as well as possible sulphur dioxide (SO2) or nitrogen oxide (NOx) emissions as a result of the fuel powered boiler that will be on site.

Models will be developed using data from the South African Weather Services weather station and dust monitoring will take place to provide additional data and information to the study. An emissions inventory will also be compiled which will include key emission sources during construction and operation of the facility.

An Atmospheric Emissions Licence will also be applied for, for the burning of diesel in the auxiliary boiler.

9.1.2.10 Socio-economic Impact Assessment

In order to develop a social profile of the project area a desktop review of existing information on the surrounding areas (Upington and Keimoes) will be undertaken, followed by a site visit.

Primary data collection is deemed necessary to contribute to the evaluation of the potential impacts of the proposed facility. Primary data will be collected through a process of interviews with key local stakeholders so as to determine the magnitude and extent of the socio-economic impact at a local level. The aim will be to obtain data which will assist with the identification and description of the key potential socio-economic issues and impacts associated with the project.

The socio-economic issues will be analysed from the information collected through the primary data collection and desktop phases. It is envisaged that the issues associated with the proposed facility would be considered both positively and negatively. In addition a sensitivity map showing those communities and/or resources that will be most affected by the proposed facility will be developed. Recommendations for mitigation measures to be considered in the design and operation of the project will be developed and added to the final report.

9.1.3 EIA report (including draft EMP)

The contents of the EIA report will include the following:

- Details of the EAP who compiled the report and their expertise to carry out an EIA;
- Detailed description of the proposed activity;
- Description of the property on which the activity is to be undertaken and the location of the activity on the property;
- A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity (pre-development description of the environment);
- Details of the stakeholder engagement conducted during the scoping phase and the on-going consultation during the EIA phase;
- Description of the need and desirability of the proposed activity and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;
- An indication of the methodology used in determining the significance of potential environmental impacts;
- A description and comparative assessment of all alternatives identified during the EIA process;
- A summary of the findings and recommendations of any specialist report or report on a specialised process;
- A description of all environmental issues that were identified during the EIA process, and assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;

- An assessment of each identified potentially significant impact including cumulative impacts, the nature of the impact, the extent and duration of the impact, the probability of the impact occurring, the degree to which the impact can be reversed; the degree to which the impact may cause irreplaceable loss of resources, and the degree to which the impact can be mitigated;
- A description of assumptions, uncertainties and gaps in knowledge;
- An opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- An environmental impact statement which contains a summary of the key findings of the environmental impact assessment and a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;
- A draft EMP; and
- Compilation of a specialist volume as an Appendix.

9.1.4 Draft Environmental Management Programme

During the compilation of the EIA, a draft EMPr will be compiled in accordance with the NEMA EIA Regulations. The draft EMP will provide the actions for the management of identified environmental impacts emanating from the proposed project and a detailed outline of the implementation programme to minimise and/or eliminate the anticipated negative environmental impacts. The draft EMP will provide strategies to be used to address the roles and responsibilities of environmental management personnel on site, and a framework for environmental compliance and monitoring.

The draft EMP will include the following:

- Details of the person who prepared the draft EMP and the expertise of the person to prepare and draft EMP;
- Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in the EIA report, including environmental impacts or objectives in respect of planning and design, pre-construction and construction activities, operation or undertaking of the activities, rehabilitation of the environment and closure where relevant;
- A detailed description of the aspects of the activity that are covered by the draft EMP;
- An identification of the people who will be responsible for the implementation of the measures;
- Where appropriate, time periods within which the measures contemplated in the draft EMP must be implemented; and
- Proposed mechanisms for monitoring compliance with the draft EMP and reporting thereon.

9.1.5 Draft EIA and Draft EMP submission and review

The final draft EIA and EMP reports will be submitted to the DEA in Pretoria in September for 2012 review and approval.

In terms of the accelerated schedule for the EIA process proposed for NERP projects, public review of the final draft EIA and EMP reports will occur simultaneously with the authority review of the document. The NERP schedule thus allows a total of 40 days from submission of the report to the issuing of a decision by DEA.

The report will then be amended to incorporate DEA's and other stakeholders' comments.

The final draft EIA and EMP reports will be made available in hard copy and CD for public review at public venues in the vicinity of the proposed site.

Requests by individual stakeholders for copies will be considered only if they are able to accept electronic copies.

9.1.6 Final EIA and draft EMP submission

DEA has 40 days in which to circulate the report to relevant authorities for review, to review the document and comments received on it and to provide a decision.

10 Conclusion

The scoping phase was undertaken in line with the requirements of the NEMA EIA regulations. The information contained in this Scoping Report provides a comprehensive description of the aim and purpose of the proposed establishment of the Commercial CSP facility. The aim of the environmental investigations and, in particular, the EIA phase is to ensure that any negative impacts are eliminated or reduced as far as possible. The plan of study for the EIA contained in this report, describes the proposed way in which this will be done. During the EIA phase, the issues identified during the scoping phase will be addressed in greater detail and assessed to identify significant impacts and appropriate mitigation measures.

An important part of any scoping phase is stakeholder engagement. The stakeholder engagement was initiated from the onset of the project to ensure that all stakeholders were adequately and effectively consulted. Stakeholder engagement is a continuous process for the duration of the S&EIA. Future actions will include the notification of the availability of the Draft EIA report for public review, as well as a public presentation on the findings of the EIA phase during the review period.

Some of the key issues and concerns raised by stakeholders during the Scoping Phase include:

- Impacts on agricultural resources;
- Hydrological and Geohydrological impacts;
- Impacts on fauna and flora, including avifauna;
- Possible visual impacts;
- Impacts on traffic and road infrastructure;
- Impacts on cultural and heritage resources;
- Socio-economic impacts including potential increases in stock theft and influx of people from outside areas;
- Increases in stock theft;
- Potential for fires; and
- Impacts on storm water flow and possible erosion.

A plan of study for the EIA has been included as part of this Scoping Report (Section 9) that indicates the purpose of the EIA and provides the framework for the next phase of the authorisation process. It includes the methodologies for the proposed specialist studies; a description of the risk rating methodology to be used and details the overall deliverables (i.e. EIA and EMP reports).

During the EIA phase the following specialist studies will be conducted in order to further investigate potential impacts on the environment as a result of the proposed Commercial CSP facility:

- Land Capability Assessment (Agriculture and soils);
- Hydrological and Geohydrological Impact Assessment;
- Botanical Impact Assessment;
- Faunal Impact Assessment;
- Avifaunal Impact Assessment;
- Traffic Impact Assessment;
- Cultural and Heritage Impact Assessment;
- Air Quality Impact Assessment; and

- Socio-economic Impact Assessment.

11 References

Banks, D. and Schaffler, J., 2006. The potential contribution of renewable energy in South Africa. Prepared for Sustainable Energy & Climate Change Project and Earthlife Africa.

CSIR Environmental, 2004.Northern Cape State of the Environment Report, Atmosphere and Climate Specialist Report.

DEA, 2008.Guideline on Environmental Impact Assessments for Facilities to be Included in the Electricity Response Plan, Government Notice 162, Government Gazette 32970.

Dey, C.J, 2004, "Heat transfer aspect of an elevated linear absorber".Solar Energy 76 (2004).

Midgley, D.C., Pitman, R.V. and Middleton, B.J. 1994.Surface water resources of South Africa 1990 Volume III. Water Research Commission Report No. 298/3.2/94.

NER, 2012. NextEra energy Resources. http://www.nexteraenergyresources.com/home/index.shtml

Romm, J., 2011. How to use solar power at night.http://thinkprogress.org/climate/2011/01/16/207337/how-to-use-solar-energy-at-night-concentrated-solar-thermal-power-with-storage/?mobile=nc.

Schulze, R.E. 1997. South African atlas of agrohydrology and climatology. Report TT82/96. WRC, Pretoria.

Sherman, R. 2001. Strategy for Renewable Energy in South Africa.Consensus Draft. [Online] Available: http://www.sessa.org.za/restrategy2203200.pdf.

Solarvision, 2010. South African Renewable Energy Resource Database – Annual Solar Radiation [Online] Available: http://www.solarvision.co.za/images/map.jpg

SSI, 2012.Environmental Screening for the Proposed Commercial Concentrated Solar Power (CSP) Tower Project in Upington District: Northern Cape. Prepared for Sasol New Energy Holdings.

United Nations Framework Convention on Climate Change, 2010.Copenhagen Accord.

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