



SOLARRRESERVE SOUTH AFRICA (PTY) LTD

**Proposed Construction of Two (2) 132kV
Power Lines and Associated Infrastructure
for the Redstone Solar Thermal Power
Project near Lime Acres, Northern Cape
Province**

**Draft Environmental Management
Programme (EMPr)**


Redstone Solar Thermal Power Project to Olien MTS: DEA Reference Number: 14/12/16/3/3/1/1201

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Author:	Veronique Evans
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Checked by:	Andrea Gibb (Environmental Assessment Practitioner)
Approved:	Kelly Tucker
Signature:	
For:	SiVEST Environmental Division

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SOLARRESERVE SOUTH AFRICA (PTY) LTD

PROPOSED CONSTRUCTION OF TWO (2) 132kV POWER LINES AND ASSOCIATED INFRASTRUCTURE FOR THE REDSTONE SOLAR THERMAL POWER PROJECT NEAR LIME ACRES, NORTHERN CAPE PROVINCE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

Contents	Page
1 INTRODUCTION	7
1.1 Overview of the proposed projects	8
1.2 Project Responsibilities	13
1.2.1 Project manager.....	14
1.2.2 Environmental Control Officer.....	14
1.2.3 Contractor	15
1.2.4 Proponent	15
1.2.5 The Environmental Liaison Officer (ELO)	15
1.2.6 Environmental Audits	20
1.3 Layout of Environmental Management Programme.....	23
1.3.1 Introduction	23
1.3.2 Pre-construction (Site establishment).....	23
1.3.3 Construction	23
1.3.4 Operation	24
1.3.5 Decommissioning Phase	24
1.4 Objectives of an EMPr	25
1.4.1 Environmental monitoring	25
1.5 Compliance with the EMPr	26
1.5.1 Method Statements.....	27
1.5.2 Non- compliance	27
1.5.3 Training and awareness.....	28
1.6 Applicable Legislation, Development Strategies and Guidelines	28
2 MITIGATION GUIDELINES.....	29
2.1 Introduction	29
2.2 Pre Construction Phase	29
2.2.1 Site preparation.....	29
2.2.2 Consultation	34
2.2.3 Site Clearing	34
2.3 Construction Phase	36
2.3.1 Construction Camp	36
2.3.2 Construction traffic and access.....	41
2.3.3 Environmental Education and Training.....	44
2.3.4 Soils and Geology.....	46
2.3.5 Erosion Control	51
2.3.6 Water Use and Quality.....	53

2.3.7	Surface and Groundwater.....	56
2.3.8	Waste Management.....	60
2.3.9	Biodiversity.....	64
2.3.10	Air Quality	69
2.3.11	Noise and Vibrations	71
2.3.12	Energy use	72
2.3.13	Employment.....	73
2.3.14	Occupational Health and Safety	74
2.3.15	Security.....	82
2.3.16	Social Environment.....	84
2.3.17	Community Engagement.....	88
2.3.18	Visual Impact	88
2.3.19	Heritage and Cultural Resources	90
2.4	Operation Phase.....	93
2.4.1	Construction Site Decommissioning	93
2.4.2	Rehabilitation and Maintenance	95
2.4.3	Operation and Maintenance	97
2.4.4	Air Quality	98
2.4.5	Biodiversity.....	98
2.4.6	Surface Water Resources.....	100
2.4.7	Health and Safety	101
2.4.8	Visual Impact	102
2.5	Decommissioning phase.....	104
2.5.1	Ongoing Stakeholder involvement.....	104
2.5.2	Community health and safety	105
2.5.3	Waste Management.....	106
2.5.4	Surface and Groundwater.....	106
2.5.5	Biodiversity.....	107
2.5.6	Air Quality	108
3	CONCLUSION	109
3.1	Pre-Construction Phase	109
3.2	Construction Phase	109
3.3	Operational Phase.....	109
3.4	Decommissioning Phase.....	110

List of Tables:

Table 1: Responsibilities.....	15
Table 2: Environmental Management Responsibilities	18
Table 3: Example of Procedure for Conducting Audits	20
Table 4: Site preparation	29
Table 5: Consultation.....	34
Table 6: Site Clearing	34
Table 7: Construction Camp.....	36
Table 8: Construction Traffic and Access.....	41
Table 9: Environmental Education and Training	44
Table 10: Soils and Geology	46

Table 11: Erosion Control	51
Table 12: Water Use and Quality	53
Table 13: Surface and Groundwater	56
Table 14: Waste Management	60
Table 15: Biodiversity	64
Table 16: Air Quality	69
Table 17: Noise and Vibrations	71
Table 18: Energy use	72
Table 19: Employment.....	73
Table 20: Occupational Health and Safety.....	74
Table 21: Security.....	82
Table 22: Social Environment.....	84
Table 23: Community Engagement	88
Table 24: Visual Impact	88
Table 25: Heritage and Cultural Resources	90
Table 26: Construction Site Decommissioning.....	93
Table 27: Rehabilitation and Maintenance	95
Table 28: Operation and Maintenance	97
Table 29: Air Quality	98
Table 30: Biodiversity	98
Table 31: Health and Safety	101
Table 32: Visual Impact	102
Table 33: Ongoing Stakeholder involvement	104
Table 34: Community health and safety	105
Table 35: Waste Management	106
Table 36: Surface and Groundwater	106
Table 37: Biodiversity	107
Table 38: Air Pollution	108

List of Figures

Figure 1: Option 1 route overview	9
Figure 2: Option 2 route overview	10
Figure 3: Tower Type	12

Glossary of terms:

Construction Phase: The activities pertaining to the preparation for and the physical construction of the proposed development.

Contractor: Persons/organisations contracted by SolarReserve to carry out parts of the work for the proposed development.

Decommissioning: Means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned.

Engineer (E) / Project Manager (PM): Person/organisation appointed by the Contractor to oversee the work of all consultants, sub-developers, contractors, residents and visitors.

Environment: NEMA defines "environment" as "the surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any interrelationships among and between them and the physical, chemical aesthetic and cultural properties and conditions that influence human health and well-being".

Environmental Control Officer (ECO): Person/organisation appointed by the Contractor who will provide direction to the Project Manager concerning the activities within the Construction Zone, and who will be responsible for conducting the environmental audit of the projects during the construction phase of the projects according to the provisions of the Environmental Management Plan.

Environmental Management Programme (EMPr): The EMPr is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a projects. The EMPr contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPr specifies how the construction of the projects is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle.

Operational Phase (Post Construction): The period following the Construction Phase, during which the proposed development will be operational.

Pre-Construction Phase: The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase will be undertaken.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was in before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

Site Manager: The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase. The Site Manager will liaise with the Project Manager in order to ensure that the projects are conducted in accordance with the Environmental Management Programme.

Abbreviations:

BA	Basic Assessment
C	Contractor
EA	Environmental Authorisation
ECO	Environmental Control Officer
ELO	Environmental Liaison Officer
EMPr	Environmental Management Programme
EA	Environmental Authorisation
I&APs	Interested and Affected Parties
kV	Kilovolt
MC	Main Contractor
SO	Safety Officer
PM	Project Manager
MSDS	Material Safety Data Sheets

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1 INTRODUCTION

In order to connect the proposed 100MW Redstone Solar Thermal Power Project onto the national grid, SolarReserve South Africa (Pty) Ltd (hereafter referred to as SolarReserve) are assessing various alternative connection points and route alignment alternatives. The Department of Environmental Affairs (DEA) granted an Environmental Authorisation (EA) on 26 June 2013 for a 132kV power line from the proposed Redstone Solar Thermal Power Project to connect to the Silverstreams Distribution Station (DS) (DEA Ref. No.: 14/12/16/3/3/1/523). Subsequently, discussions with Eskom have suggested that the connection onto the national grid will be made at the Olien MTS. As such, this project is being proposed in support of efforts to secure a firm supply by connecting the power generated at the Redstone Solar Thermal Power Project onto the national grid at the preferred Olien MTS. This option allows for a shorter alignment from the Redstone Solar Thermal Power Project to Olien MTS.

- **Option 1:** Apply for environmental Authorisation for a new power line corridor from the proposed Redstone Solar Thermal Power Project site to Olien MTS
- **Option 2:** Apply for Environmental Authorisation to extend the already authorised power line corridor from Silverstreams DS to Olien MTS.

SolarReserve has appointed SiVEST, as the EAPto undertake the required Basic Assessment (BA) processes for the above-mentioned proposed projects. Two application forms have been submitted to the Department for Environmental Affairs (DEA).

It should be noted that SolarReserve will appoint a vendor who will be responsible for constructing the power lines and associated infrastructure. However after the construction phase is complete, the ownership of the power lines and associated infrastructure will be handed over to Eskom Holdings SOC Limited (hereafter referred to as Eskom) who will maintain the power line and associated infrastructure during the operational phase. As such, SolarReserve will be responsible for the activities related to the preconstruction and construction phases of the project and Eskom will be responsible for all activities related to operation and decommissioning phases of the project.

This EMPr has been compiled in line with the recommendations from the Basic Assessment (BA) being undertaken for the proposed projects, as well as from issues identified by SiVEST Environmental Division. This EMPr will be updated with the conditions of the Environmental Authorisation (if approved) and re-submitted to the DEA for final approval prior to the commencement of construction on the project sites. Additional details will also be provided by the appointed contractors and engineers once the detailed design has been completed.

1.1 Overview of the proposed projects

▪ Option 1 – Redstone Solar Thermal Power Project to Olien MTS

The project is being proposed in order to connect the power generated at the Redstone Solar Thermal Power Project onto the national grid at Olien MTS.

The proposed project would comprise of the following:

- Construction of up to two (2) (double circuit) three-phase 132kV Kingbird power lines (or technically similar) from the proposed Redstone Solar Thermal Power Plant site to the Olien MTS, and/or as approved by Eskom's Technical Evaluation Forum (TEF);
- Expansion (if needed) and installation of up to two (2) 132kV feeder bays and associated infrastructure at the Olien MTS;
- Construction of a 3x40MVA or 1 x 120MVA (or technically similar) 11/132kV step-up substation with up to 2x132kV feeder bay/s (or technically similar) at the proposed Redstone Solar Thermal Power Project site (located outside the solar field);
- Construction of up to two (2) switchyards (100mx100m) at the proposed Redstone Solar Thermal Power Project site (located outside the solar field); and
- Possible restringing of the existing power line and construction of a temporary bypass line.
- Establishment of all associated infrastructure as required by Eskom (including but not limited to access roads, control rooms, security systems etc.)

Four (4) route corridor alternatives, that are approximately 1km wide, will be assessed during the BA for the proposed 132kV power lines (Figure 1). These are as follows:

- Alternative 1 – approximately 35km
- Alternative 2 – approximately 34km
- Alternative 3 – approximately 36km
- Alternative 4 – approximately 36km

The approximately 1km wide corridors have been proposed for each route alternative to allow flexibility when determining the final route alignments, however only 31m wide servitudes would be

required for each proposed 132kV power line. As such, the 31m wide servitudes would be positioned within the approved 1km wide corridor.

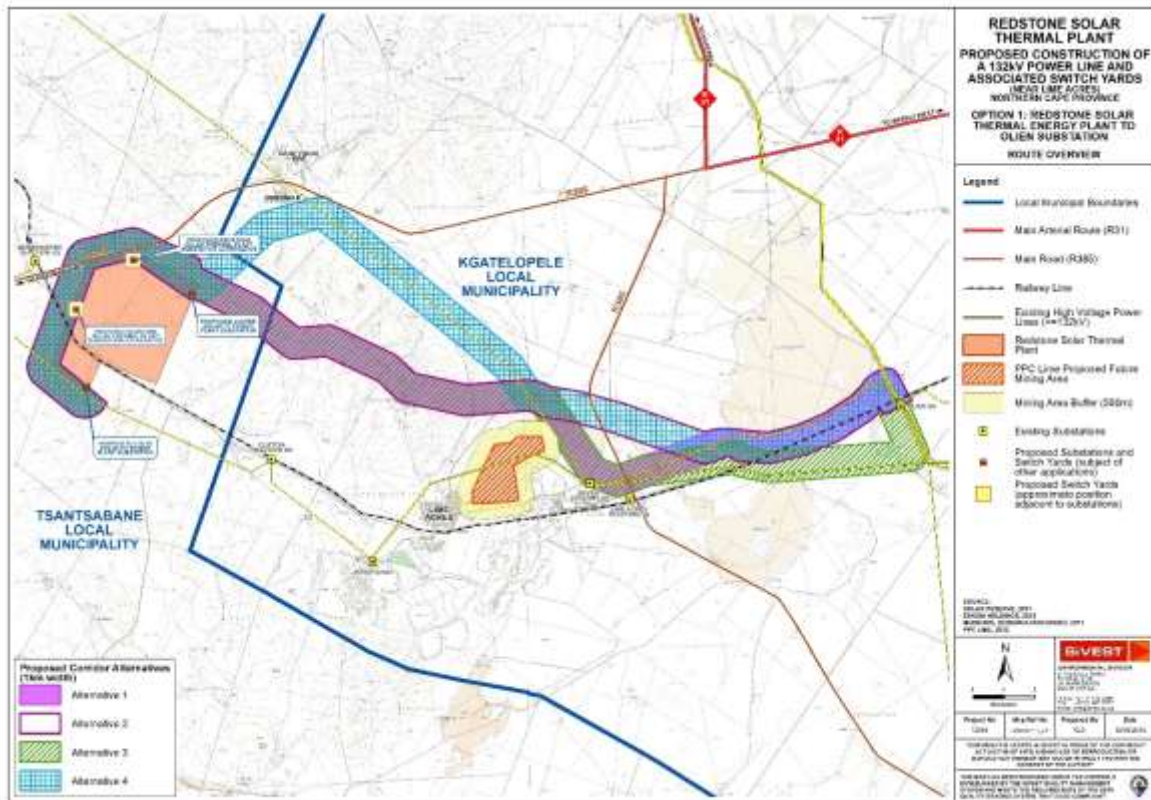


Figure 1: Option 1 route overview

- **Option 2 – Silverstreams DS to Olien MTS**

The project is being proposed in order to extend the already authorised power line corridor from Silverstreams DS to Olien MTS, so that the the power generated at the Redstone Solar Thermal Power Project can connect onto the national grid at Olien MTS.

The proposed project would comprise of the following:

- Construction of up to two (2) (double circuit) three phase 132kV Kingbird power lines, (or technically similar), from the proposed Redstone Solar Thermal Power Plant site to the Olien MTS, and/or as approved by Eskom’s Technical Evaluation Forum (TEF);;
- Expansion (if needed) and installation of up to two (2) 132kV feeder bays at the Olien MTS and Silverstreams DS;
- Construction of a 3x40MVA or 1 x 120MVA 11/132kV (or technically similar) step-up substation with up to 2x132kV feeder bays, or technically similar, at the proposed Redstone Solar Thermal Power Project site (located outside the solar field);

- Construction of up to two (2) switchyard (100mx100m) at the proposed Redstone Solar Thermal Power Project site (located outside the solar field);
- Possible restringing of the existing power line and construction of a temporary bypass line; and
- Establishment of all associated infrastructure as required by Eskom (including but not limited to access roads, control rooms, security systems etc.)

Two (2) route corridor alternatives, that are approximately 1km wide, will be assessed during the BA for the proposed 132kV power lines (Figure 1). These are as follows:

- Alternative 2A – approximately 11km
- Alternative 2B – approximately 12km

The approximately 1km wide corridors have been proposed for each route alternative to allow flexibility when determining the final route alignments, however only 31m wide servitudes would be required for each proposed 132kV power line. As such, the 31m wide servitudes would be positioned within the approved 1km wide corridor.

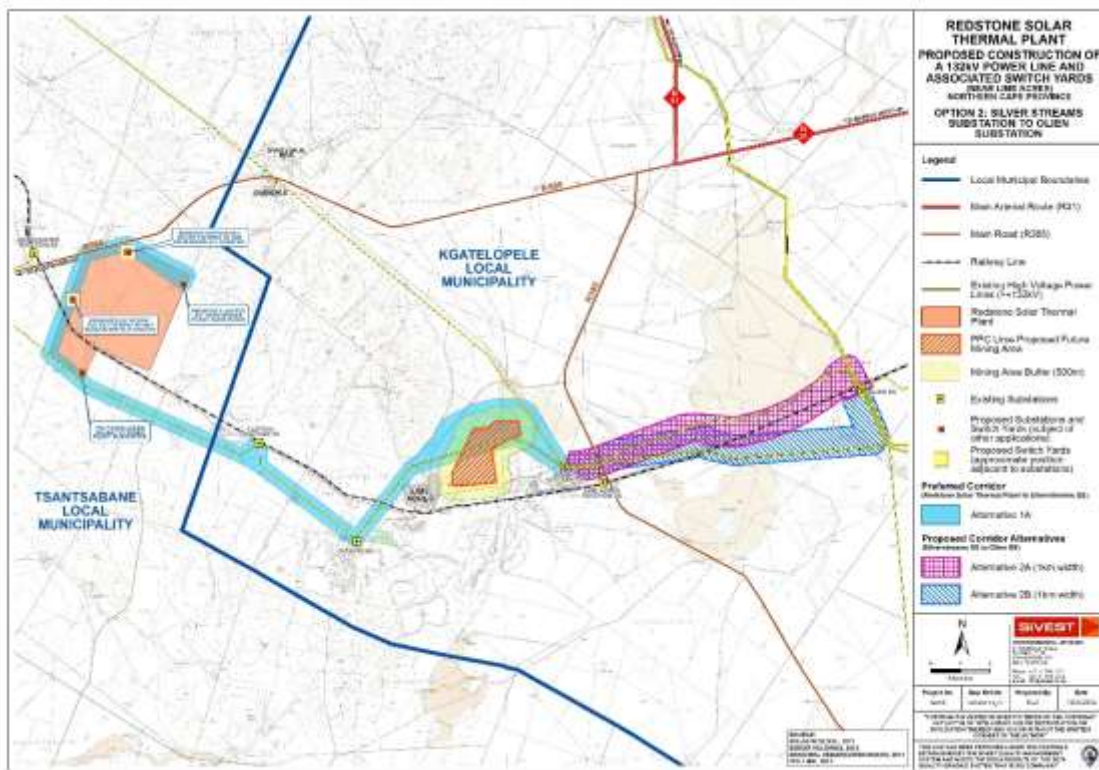


Figure 2: Option 2 route overview

The exact location of the proposed switchyards will be determined according to the layout of the Redstone Solar Thermal Power Project which was informed by the Environmental Impact Assessment (EIA) and environmental sensitivity mapping analysis undertaken by WorleyParsons for the proposed solar plant.

An EA was granted for the Redstone Solar Thermal Power Project by the DEA on 06 August 2012 (DEA Ref. No.: 12/12/20/2316). The footprint of each proposed switchyard would be approximately 100mx100m.

The power lines will consist of a series of towers located approximately 500-200m apart, depending on the terrain and soil conditions. The exact tower type to be used will be determined (based on load and other calculations) during the final design stages of the power lines, as approved by Eskom TEF. It is however likely that the bird friendly mono-pole self-supporting intermediate suspension (single steel pole) structure (e.g. ESKOM D-DT 7649) will be used in combination with various other structures which are usually applied as follows:

- The mono-pole guyed intermediate suspension structures (D-DT-7641) are normally installed at obvious rocky terrains, where the foundations can have a huge cost impact.
- The mono-pole angle suspension structures (D-DT-7613) are used on slight angles up to 23°.
- The mono-pole strain structures (D-DT-7615) are used as 0° in-line strainers with four diagonal stays and at angles from 1° to 110° with a variety of stay configurations to suit the specific application. The structure is also used as a terminal in situations where lines approach towards the substation feeder bay at an angle larger than 45°.
- The H-pole (D-DT-7805; 7808; 7811 and other structures from the 78-Series) are used for horizontal applications to cross over or under existing power lines where clearances are a problem and are used as terminal structures with an in-line approach to the substation feeder bay.
- The 3-pole strain structures (D-DT-7618) are normally used at very long spans crossing rivers, valleys, etc. These are very expensive structures, therefore it is not used very often.

The height of the single steel pole structure ranges between 18m and 26.5m in height. Where the proposed power lines are aligned parallel to an existing power line the option of restringing the existing line as an alternative to building a new power line will be investigated. Sections of the existing power line where restringing is possible will be determined during the final design stages. The option of using a double-circuit configuration for the two (2) 132kV power lines and the exact location of the towers will also be investigated during the final design stages of the power lines.



Figure 3: Tower Type

Eskom is proposing to construct a double circuit 400kV power line from Ulco Substation to Olien Substation (part of the Eskom Kimberley Strengthening Phase 4 Project). An EIA is currently underway for the proposed 400kV power line and one of the alternative corridors being assessed as part of the EIA traverses the corridor alternatives being assessed as part of the BAs. As such, the possibility of connecting onto the national grid at this proposed 400kV power line will be investigated during the final design stages, once a corridor alternative has been authorised by the DEA. Connecting onto the national grid at the proposed 400kV power line would also require the construction of up to two switchyards (2) where the proposed 132kV power lines connects with the 400kV power line. Should this option be feasible, the length of the two (2) proposed double circuit 132kV power lines would be significantly shorter.

A detailed process was followed in the BAs, which included thorough consultation with landowners, residents as well as key stakeholders. During the BAs it was established that **alternative 4** is the environmentally preferred route alignment for the proposed power lines from the Redstone Solar

Thermal Power Project to Olien MTS and **alternative 2A** is the environmentally preferred route alignment for the proposed power lines from Silverstreams DS to Olien MTS.

The two route corridor alternatives cross various biophysical and social features which may or may not be affected by the proposed power line. Detailed mitigation measures have been developed for the routes based on the specialist studies that were conducted for the projects. The following studies were conducted for the proposed projects:

- Biodiversity (fauna, flora and avifauna)
- Surface water
- Agricultural potential and soil
- Heritage
- Visual
- Social
- Geotechnical

This EMPr has been compiled to ensure good environmental compliance during the construction of the power lines and associated infrastructure. The EMPr will be strictly implemented during the construction phase of the projects and will be consulted regularly during the lifespan of the projects until decommissioning.

1.2 Project Responsibilities

Several professionals will form part of the construction team. The most important from an environmental perspective are the Project Manager, the Environmental Control Officer (ECO) and the contractor.

The Project Manager is responsible for the implementation of the EMPr on the site during the pre-construction and construction phases of the projects.

The ECO is responsible for monitoring the implementation of the EMPr during the design, pre-construction and construction phases of the projects.

The contractor is responsible for abiding by the mitigation measures of the EMPr which are implemented by the Project Manager during the construction phase.

The contractor is responsible for the implementation of the EMPr during the operational and decommissioning phases of the projects. It is unlikely that the proposed power lines will be decommissioned.

1.2.1 *Project manager*

The Project Manager is responsible for overall management of projects and EMPr implementation. The following tasks will fall within his / her responsibilities:

- Be aware of the findings and conclusions of the Basic Assessment and the conditions stated within the environmental authorisation (EA).
- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures.
- Monitor site activities on a daily basis for compliance.
- Conduct internal audits of the construction site against the EMPr.
- Confine the construction site to the demarcated area.
- Rectify transgressions through the implementation of corrective action.

1.2.2 *Environmental Control Officer*

The Environmental Control Officer is responsible for the implementation of the EMPr during the construction phase and liaison between the Contractor and the Landowners. The ECO will liaise and report to the Contractor, landowners and authorities. The following tasks will fall within his / her responsibilities:

- Be aware of the findings and conclusions of the Basic Assessment and the conditions stated within the environmental authorisation.
- Be familiar with the recommendations and mitigation measures of this EMPr.
- Conduct monthly audits of the construction site according to the EMPr and EA.
- Educate the construction team about the management measures of the EMPr and EA.
- Regular liaison with the construction team and the project leader.
- Recommend corrective action for any environmental non-compliance incidents on the construction site.
- Compile a regular report highlighting any non-compliance issues as well as good compliance with the EMPr.
- All negotiations for any reason shall be between the ECO, the affected parties, and the Contractor. No verbal agreements shall be made. All agreements shall be recorded in writing and all parties shall co-sign the documentation.
- The affected parties shall always be kept informed about any changes to the construction programme should they be involved. If the ECO is not on site the Contractor should keep the affected parties informed. The contact numbers of the Contractor and the ECO shall

be made available to the affected parties. This will ensure open channels of communication and prompt response to queries and claims.

1.2.3 Contractor

The contractor is responsible for the implementation and compliance with recommendations and conditions of the EMPr.

- Ensure compliance with the EMPr at all times during construction
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
 - Public involvement / complaints
 - Health and safety incidents
 - Hazardous materials stored on site
 - Non compliance incidents

The Contractor shall under no circumstances interfere with the property of landowners or nearby communities.

1.2.4 Proponent

SolarReserve South Africa will be responsible for constructing the power lines and therefor they will assume ultimate responsibility for the projects and all activities related to the construction process i.e. non compliance, penalties etc.

1.2.5 The Environmental Liaison Officer (ELO)

The ELO will be appointed by the Contractor to implement the EMPr and monitor activities on site on a daily basis. The ELO will be the ECO's representative on the site and will report back on all audit trips. The ELO must report any major incidents immediately to the ECO.

Table 1: Responsibilities

Function	Responsibility
Project Manager (PM) SolarReserve	<ul style="list-style-type: none">▪ Overall management of projects and EMPr implementation

Function	Responsibility
Senior Site Supervisor/ Contract Manager (CM) SolarReserve	<ul style="list-style-type: none"> ▪ Oversee site works, liaison with Contractor (ELO), PM and ECO
Environmental Control Officer (ECO) (independent) – Appointed by SolarReserve	<ul style="list-style-type: none"> ▪ Implementation of EMPr, and monitoring of compliance with the requirements of the CEMP. ▪ Liaison between SolarReserve, Contractor and Landowners, including negotiation of access plan. ▪ Maintains close communication with the ELO, and oversees the ELO's environmental control, remediation and rehabilitation actions (including checking that the complaints register and register of environmental incidents are being maintained by the ELO). ▪ Environmental awareness training of the contractor and select main construction staff ▪ Settlement of damage claims and completion of Damage Release Forms ▪ Negotiating and acquiring release forms from affected landowners at the end of the construction period.
Contractor (MC)	<ul style="list-style-type: none"> ▪ Ensures the implementation and compliance with recommendations and conditions of the EMPr as well as the EA; Appoints dedicated person (ELO) to work with ECO
Contractor-appointed Environmental Liaison Officer (ELO)	<ul style="list-style-type: none"> ▪ Monitoring of compliance with EMPr, environmental control of site actions, adjusting of environmental quality of works performed by construction staff, remediation and rehabilitation work. ▪ Reports back to the ECO through compilation of regular site inspection reports. ▪ Ensures compliance of construction activities with relevant environmental legislation. ▪ Maintains the complaints register that is kept on-site. ▪ Keeps record of all environmental incidents and ensures that corrective action is taken. ▪ Compiles method statements from the project-specific EMPr. ▪ Environmental awareness training of all staff. ▪ Day-to-day management of landowner requirements and landowner liaison; ensures all landowner special conditions are met.

Function		Responsibility
Environmental (SolarReserve)	Advisor	<ul style="list-style-type: none"> ▪ Environmental advice and internal auditing

- The ELO will be the responsible party for all compliance of this EMPr during the construction phase.
- The monitoring party will be the ECO.
- Method of record keeping will be monthly audits.
- Audit Technique will be the review of records that will be kept on site by the ELO and/ or site inspections.
- SolarReserve will bear the ultimate responsibility during the pre-construction and construction phases.
- Eskom will bear ultimate responsibility during the operation and decommissioning phases.

Table 2: Environmental Management Responsibilities

ITEM	PROJECT COMPONENT AND ACTIVITY	RESPONSIBLE PARTY	MONITORING PARTY	AUDIT TECHNIQUE
1.1	PRE-CONSTRUCTION (SITE ESTABLISHMENT)			
1.1.1	Site preparation	MC, ELO	ECO	SITE VISIT
1.1.2	Consultation	MC, ELO	ELO,ECO	SITE VISIT
1.2	CONSTRUCTION ACTIVITIES			
1.2.1	Site Clearing	MC	ELO,ECO	SITE VISIT
1.2.2	Construction traffic and access	MC, ELO	ECO	SITE VISIT
1.2.3	Construction Camp	MC, ELO	ECO	SITE VISIT
1.2.4	Environmental Education and Training	MC, ELO,ECO	ECO	SITE VISIT
1.2.5	Soils and Geology	MC, ELO	ECO	SITE VISIT
1.2.6	Erosion Control	ELO	ECO	SITE VISIT
1.2.7	Water Use and Quality	ELO	ECO	SITE VISIT
1.2.8	Surface Water and Groundwater	ELO	ECO	RECORDS REVIEW
1.2.9	Waste Management	ELO	ECO	SITE VISIT
1.2.10	Flora	ELO	ECO, Ecologist (When necessary)	SITE VISIT
1.2.11	Fauna	ELO	ECO, Ecologist (When necessary)	RECORDS REVIEW, SITE VISIT
3.1.12	Air Pollution	ELO	ECO	RECORDS REVIEW, SITE VISIT

ITEM	PROJECT COMPONENT AND ACTIVITY	RESPONSIBLE PARTY	MONITORING PARTY	AUDIT TECHNIQUE
3.1.13	Noise and Vibrations	ELO	ECO	RECORDS REVIEW, SITE VISIT
3.1.14	Energy use	ELO	ECO	RECORDS REVIEW, SITE VISIT
3.1.15	Agricultural Potential	ELO	ECO	RECORDS REVIEW, SITE VISIT
3.1.16	Employment	SOLARRESERVE, MC	ECO	RECORDS REVIEW, SITE VISIT
3.1.17	Occupational Health and Safety	MC, ELO	ECO, Safety Officer	SITE VISIT
3.1.18	Security	MC, ELO	ECO	SITE VISIT
3.1.19	Socio-economic Environment	MC, ELO	ECO	RECORDS REVIEW, SITE VISIT
3.1.20	Community Engagement	ELO	ECO	SITE VISIT
3.1.21	Visual Impact	ELO	ECO	SITE VISIT
4.1	OPERATION ACTIVITIES			
4.1.1	Construction Site Decommissioning	ESKOM		RECORDS REVIEW
4.1.2	Operation and Maintenance	ESKOM		RECORDS REVIEW
4.1.3	Surface and Groundwater	ESKOM		RECORDS REVIEW
4.1.4	Air Quality	ESKOM		RECORDS REVIEW
4.1.5	Noise	ESKOM		
4.1.6	Pollution Control	ESKOM		
4.1.7	Biodiversity	ESKOM, ELO		

ITEM	PROJECT COMPONENT AND ACTIVITY	RESPONSIBLE PARTY	MONITORING PARTY	AUDIT TECHNIQUE
4.1.8	Waste Management	ELO		
4.1.9	Health and Safety	ELO, SO		
4.1.10	Visual Impact	ELO		
5.1	DECOMMISSIONING ACTIVITIES			
5.1.1	Ongoing Stakeholder involvement	ELO		SITE VISIT
5.1.2	Community health and safety	ELO		
5.1.3	Waste management	ELO		
5.1.4	Surface and groundwater	ELO		
5.1.5	Biodiversity	ELO		

1.2.6 Environmental Audits

Table 3 below provides an outline of the generic process involved in the auditing process. It briefly describes the activities of the process initially beginning with defining the objectives and scope of the auditing process as well as the responsibilities of the various parties. The procedure for the auditing process is explained through to the production of audit findings and the compliance (or non-compliance) of the audit findings.

The Independent auditor will undertake the following:

- Conduct audits
- Submit audit reports to ECO and relevant authority
- Engage specialist sub consultants when required.

Table 3: Example of Procedure for Conducting Audits

Objective	To ensure that formal audits of the EMPr are scheduled and performed so as to verify compliance with the requirements of the EMPr.
Scope	This procedure describes the sequence of events required to perform a compliance audit

	and the verification of implemented corrective action
Responsibilities	<p>The ECO or a person authorised and appointed by him, is responsible for the maintenance of the Environmental Audit System</p> <p>The ECO is responsible for the scheduling and execution of the audit, as well as the verification of the implementation of corrective action. At his/her discretion, this authority may be delegated to responsible company personnel or to an independent Environmental Auditing Authority to perform the audit on his/her behalf.</p> <p>Auditors shall have no direct responsibility in the area/system being audited. They will be trained in techniques for auditing environmental systems.</p> <p>The head of department (HOD)/supervisor for an area/system to be audited (or a responsible person nominated by him/her) will assist the audit team in the execution of the audit. The HOD will also be responsible for timely corrective actions based on the findings of the audit.</p>
Procedure	
Planning the audit	<p>The ECO or his authorised delegate, shall plan the audit of a particular environmental area or system as follows:</p> <ul style="list-style-type: none"> ▪ He shall inform, in writing, the division to be audited of the intention to conduct an audit at least two weeks prior to the audit. This notification should include the audit objective, scope and duration and any assistance required from the division. ▪ On completion of the audit, an audit findings sheet shall be prepared and

	<p>submitted to company senior management as well as to the Department/section, which was audited.</p> <ul style="list-style-type: none"> ▪ Corrective actions shall be implemented, within eight weeks after the audit, where possible.
Audit External Schedule	The external environmental audits will be scheduled annually.
Audit Check List	Auditing will be performed by collecting evidence for verification through interviews, relevant documentation and observation of activities and conditions. Instances of non-conformity to EMPr criteria should be recorded. An environmental audit checklist can be used as a guide to address all relevant issues.
Audit Compliance	See below.
Audit Findings and Reporting of non-compliances	<p>The audit team shall review all evidence of their audit findings to decide on non-compliance. Audit findings of non-compliance must be documented and supported by evidence in the Audit Findings Report.</p> <p>The non-compliance findings will be communicated to the Project Manager and his representatives during an audit feedback meeting.</p> <p>The person responsible for corrective action, will sign the audit findings report sheet to indicate acceptance and commitment to the required corrective action</p>

1.3 Layout of Environmental Management Programme

1.3.1 Introduction

This EMPr addresses both generic issues as well as specific issues. The generic and specific issues in the EMPrs are separated into different phases. Each phase has specific issues unique to that period of the development and operation of the power lines and associated infrastructure. The impact is identified and given a brief description. The phases of the development are then identified as below:

- Pre-construction (Site Establishment)
- Construction (including associated rehabilitation of affected environment)
- Operation Phase
- Decommissioning of power lines

This EMPr seeks to manage and keep to a minimum the negative impacts of a development and at the same time, enhance the positive and beneficial impacts.

The EMPr specifies mitigation measures for the following environmental aspects:

1.3.2 Pre-construction (Site establishment)

- Site preparation
- Consultation
- Site clearing

1.3.3 Construction

- Construction Camp
- Construction Traffic and Access
- Environmental Education and Training
- Soils and Geology
- Erosion Control
- Water Use and Quality
- Surface and Groundwater
- Waste Management
- Flora

- Fauna
- Air Pollution
- Noise and Vibrations
- Energy use
- Climate Change
- Agricultural Potential
- Employment
- Occupational Health and Safety
- Security
- Social Environment
- Community Engagement
- Visual Impact
- Cultural and Heritage Artefacts

1.3.4 Operation

- Construction Site Decommissioning
- Operation and Maintenance
- Surface and Groundwater
- Air Quality
- Noise
- Biodiversity
- Waste Management
- Health and Safety
- Visual Impact

1.3.5 Decommissioning Phase

- Ongoing Stakeholder involvement
- Community health and safety
- Waste Management
- Surface and Groundwater
- Biodiversity
- Air pollution

1.4 Objectives of an EMPr

The objectives of this EMPr are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels.
- To identify measures that could optimize beneficial impacts.
- To create management structures that address the concerns and complaints of I&APs with regards to the development.
- To establish a method of monitoring and auditing environmental management practices during all phases of development.
- Ensure that the construction and operational phases of the projects continues within the principles of Integrated Environmental Management and Environmental Management System (EMS) ISO 14001 Principles.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the projects.
- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.
- Specify time periods within which the measures contemplated in the environmental management plan must be implemented, where appropriate.

The EMPr Seeks to highlight the following:

- Avoiding impacts by not performing certain actions.
- Minimising impacts by limiting aspects of an action.
- Rectifying impacts through rehabilitation, restoration, etc of the affected environment.
- Compensating for impacts by providing substitute resources or environments.
- Minimising impacts by optimising processes, structural elements and other design features.
- Provide ongoing monitoring and management of environmental impacts of a development and documenting of any digressions /good performances.

The EMPr is a legally binding document that all parties involved in the projects must be made aware of.

1.4.1 *Environmental monitoring*

A monitoring programme will be implemented for the duration of the construction phase of the projects. This programme will include:

- Monthly audits will be conducted by the Environmental Control Officer, which are according to the EMPr and ROD's conditions. These audits can be conducted randomly and do not require prior arrangement with the project manager.
- Compilation of an audit report with a rating of the compliance with the EMPr. This report will be submitted to the relevant authorities.

The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. A register shall be kept of all complaints from the landowner or community (Annexure A). All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.

A copy of the EMPr must be kept on site during the construction phase. The EMPr will be made binding on all contractors operating on the site and must be included within the Contractual Clauses. Those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

1.5 Compliance with the EMPr

The Contractor is deemed not to have complied with the EMPr if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence;
- The contractor fails to comply with corrective or other instructions issued by the ECO or Authorities within a specified time; or
- The Contractor fails to respond adequately to complaints from the public.

SolarReserve / Eskom is deemed not to have complied with the EMPr if:

- Within the boundaries of the site there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence; or
- They fail to respond adequately to complaints from the public.

1.5.1 Method Statements

It is standard practice that method statements for various construction-related activities be produced by the contractor's Environmental Liaison Officer (ELO). These method statements will outline in detail how various activities should be undertaken so as not to cause any environmental damage / impacts. It is very important that these method statements be signed off by the ECO. Any changes to the method statements that are made during the construction period must be approved by the ECO. Method statements must be kept on site as part of the official environmental documentation.

1.5.2 Non-compliance

Non-conformance will be issues to the Contractor for incidents of non-compliance. The Contractor (through the Environmental Officer) shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement. The Contractor is also advised that the imposition of non-conformance does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. The Contractor shall be required to make good any damage caused as a result of the infringement at his own expense. A preliminary list of infringements for which non-conformance will be imposed is as follows:

- Using areas outside the working areas without permission/accessing "no-go areas";
- Clearing and/or leveling area outside of the working areas;
- Littering of the site and surrounds;
- Burying/burning waste on site and surrounds;
- The undertaking of informal ablutions
- Making fires on site;
- Spillage onto the ground or water bodies of oil, diesel, or any other potential pollutants;
- Picking/damaging plant material, especially that from the residual areas of natural bush on the site;
- Damaging/killing wild or domestic animals/birds;
- Discharging effluent and/or stormwater onto the ground or into surface water;
- Repeated contravention of the specification or failure to comply with instruction

The Senior Site Supervisor, on recommendation from the ECO, may also order the Contractor to suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the EMPr (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

1.5.3 Training and awareness

- Training of construction workers

The Construction Workers must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be appraised of the EMPr's requirements.

- Contractor performance

The Contractor must ensure that the conditions of the EMPr are adhered to. Should the Contractor require clarity on any aspect of the EMPr the Contractor must contact the Environmental Control Officer for advice.

1.6 Applicable Legislation, Development Strategies and Guidelines

The following legislation applies:

- Atmospheric Pollution Prevention Act (Act No. 45 of 1965)
- Conservation of Agricultural Resources Act (Act No 43 of 1983)
- Constitution of South Africa (Act No. 108 of 1996)
- Environment Conservation Act (Act No 73 of 1989)
- Hazardous Substances Act (Act No. 15 of 1973)
- National Environmental Management Act (Act No 107 of 1998) – NEMA
- National Environmental Management: Air Quality Act (Act No. 39 of 2004)
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
- National Forests Act (Act No 84 of 1998)
- National Heritage Resources Act (Act No 25 of 1999)
- National Veld and Forest Fire Act (Act No 101 of 1998)
- National Water Act (Act No 36 of 1998)
- Northern Cape Nature Conservation Act (Act No 9 of 2009)
- Occupational Health and Safety Act (Act No 85 of 1993)
- Protected species – provincial ordinances

2 MITIGATION GUIDELINES

2.1 Introduction

Mitigation guidelines are addressed through four phases namely Pre-construction (Site Establishment) Phase; Construction Phase (and associated rehabilitation of affected environment); Operational Phase (Post-Construction) as well as Decommissioning Phase. Each phase has specific issues unique to that period of the development and operation of the proposed infrastructure. The impact is identified and given a brief description. The four phases of the development are then identified as below:

- Pre-construction
- Construction
- Post Construction
- Decommissioning

2.2 Pre Construction Phase

2.2.1 Site preparation

Table 4: Site preparation

IMPACT	SITE PREPARATION This section deals with the preparation of the site and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	SITE ESTABLISHMENT	MC, ELO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	Specialist Investigations 1. It is advised that a preconstruction walk-through of power line routes and support structure positions and use micro-siting to reduce local impact especially in relation to the provincially protected <i>Olea europea</i> subsp. <i>africana</i> tree species. This should be done by the biodiversity specialist. 2. A final walk-down wetland specialist assessment will need to be undertaken to inspect each tower position. Additionally, the walk-down assessment will need to include the present ecological status	

IMPACT	SITE PREPARATION This section deals with the preparation of the site and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	SITE ESTABLISHMENT	MC, ELO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>(PES), ecological importance and sensitivity (EISC), functional services and a risk assessment of any of the affected wetlands to satisfy the information requirements of the Water Use License.</p> <p>Appoint construction team and suitable manager</p> <p>3. Appoint an Environmental Control Officer and Environmental Liaison Officer. The ELO is appointed on the contractor's behalf while the ECO is appointed on the proponent's behalf.</p> <p>4. The Contractor must draw up method statements for relevant construction activities. The ECO must approve all of the method statements before they become operational.</p> <p>Site demarcation and compliance</p> <p>5. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable and practical.</p> <p>6. All tower positions must be pegged by a qualified surveyor prior to the onset of construction.</p> <p>7. All existing boreholes within the power line corridor have to be identified and surveyed.</p> <p>8. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage shall be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp should be controlled by a guard or otherwise monitored, to prevent unlawful access.</p> <p>9. The contractor and ECO must ensure compliance with conditions described in the EA.</p>	

IMPACT	SITE PREPARATION This section deals with the preparation of the site and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	SITE ESTABLISHMENT	MC, ELO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>10. All no-go areas on the servitude must be properly fenced off and signage placed prior to the onset of construction. If this is not practical (such as where the area is too large to fence off), the area should be demarcated with barrier tape and signage should be erected.</p> <p>11. Records of compliance / non-compliance with the conditions of the authorisation must be kept and be available on request.</p> <p>12. Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the projects execution.</p> <p>Labour</p> <p>13. All unskilled labourers should be drawn from the local market and where possible use should be made of local semiskilled and skilled personnel.</p> <p>Training of site staff</p> <p>14. Environmental awareness training for all construction staff must be undertaken by the ELO prior to construction starting.</p> <p>15. The ECO must undertake training of the contractor and other main contractors (training of other staff is the responsibility of the ELO).</p> <p>16. All stakeholders and key personnel should undergo an archaeological induction course, as part of their overall training. The course should highlight the appropriate communication channels to managers and educate workers with regard to recognising artefacts, features and significant sites.</p>	

IMPACT	SITE PREPARATION This section deals with the preparation of the site and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	SITE ESTABLISHMENT	MC, ELO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>17. Project manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks.</p> <p>18. Staff operating equipment (such as excavators, cranes, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.</p> <p>19. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.</p> <p>20. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts must be undertaken by the ELO.</p> <p>21. Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.</p>	
SITE SPECIFIC MITIGATION MEASURES		
MITIGATION / METHOD STATEMENT	<p>22. If there are construction camps or other areas that require night-lighting, this should use low-UV type lights (such as most LEDs), which do not attract insects. The lights should also be of types which are directed downward and do not result in large amounts of light pollution.</p> <p>Additionally recommendations from the DAFF</p>	

IMPACT	SITE PREPARATION This section deals with the preparation of the site and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	SITE ESTABLISHMENT	MC, ELO, ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>23. The preconstruction walk-through study undertaken by the biodiversity specialist should be undertaken in the rainy season. It should address the potential impact of the final alignment on avifauna and mammals utilising the woodland, protection against predators, foraging and breeding. The edge effect should also be considered and mitigated, where possible.</p> <p>24. Tree clearing should be limited to 4m on either side of the line(s) as per agreement with Eskom.</p> <p>25. As far as possible, avoid disturbance to the <i>Olea europea subsp. africana</i> woodland in the east.</p> <p>26. A valid Floral Permit would be required to remove the provincially protected <i>Olea europea subsp. africana</i> trees.</p> <p>27. If any protected trees are to be damaged, disturbed, cut or destroyed a license must be obtained from the DAFF.</p> <p>28. A special condition should be included in the EA stating that offsite mitigation is required through the implementation of a greening plan. For every single <i>Olea europea subsp. 33peciali</i> tree removed in terms of the valid Flora Permit (to be obtained), three of the same specie must be planted to compensate for the loss. The seedlings should be maintained and replaced should they die.</p>	

2.2.2 Consultation

Table 5: Consultation

IMPACT	CONSULTATION This section deals with the public consultation of the site and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	PRE-CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	Consultation <ol style="list-style-type: none"> 1. Engage in thorough, open, and constructive consultation with any and all land owners. 2. The Landowners shall be informed of the starting date of construction as well as the phases in which the construction shall take place. 3. Provide a mechanism through which information could be exchanged between the projects proponent and stakeholders. 4. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction. 5. Solicit views and concerns from the public and allow them to suggest mitigations and enhancement measures. 	

2.2.3 Site Clearing

Table 6: Site Clearing

IMPACT	SITE CLEARING This section deals with site clearing and actions that need to be implemented before construction commences	RESPONSIBILITY
PHASE	PRE-CONSTRUCTION	MC
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION/ METHOD STATEMENT	Site clearing <ol style="list-style-type: none"> 1. Site clearing must take place in a phased manner, as and when required. 2. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. 	

	<ol style="list-style-type: none"> 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 5. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. 6. Conduct construction walk down prior to construction to conduct a search and rescue exercise. 7. Demarcation of sensitive areas prior to construction activities starting. 8. In terms of surface water, potential negative impacts are related primarily to vegetation clearing activities in the riparian habitat, wetlands and drainage lines. Mitigation measures should be strictly implemented. 	
SITE SPECIFIC MITIGATION MEASURES		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 9. Affected individuals of protected species which cannot be avoided should be translocated to a safe area on the site prior to construction. This does not include trees which cannot be translocated, which should be trimmed to a minimum height of 0.5m rather than removed completely. 10. Relevant provincial permits should be obtained before translocation of listed and protected plant species takes place and before construction commences. 	

2.3 Construction Phase

2.3.1 Construction Camp

Table 7: Construction Camp

IMPACT	CONSTRUCTION CAMP This section deals with construction camp and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO / ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Site of construction camp</p> <ol style="list-style-type: none"> 1. Choice of site for the Contractor's camp requires the Project Manager and ECO's permission and must take into account location of local residents and / or ecologically sensitive areas, including flood zones. A site plan must be submitted to the Project Manager for approval. 2. The size of the construction camp should be minimized (especially where natural vegetation or grassland has had to be cleared for its construction). 3. Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion. 4. Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented. <p>Construction Camp</p> <ol style="list-style-type: none"> 5. The ECO and Contractor must inspect the Construction Camp site to confirm and note any environmental sensitivity. 6. The construction camp layout plan must be provided to the ECO for approval prior to the construction of the camp. 	

IMPACT	CONSTRUCTION CAMP This section deals with construction camp and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO / ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>7. The construction camp must be fenced off and on-site security should be put in place prior to commencing with the construction activities.</p> <p>8. The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to SolarReserve if this does not already exist on the site.</p> <p>9. Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site.</p> <p>10. All construction equipment must be stored within this construction camp or the farm under lease.</p> <p>11. All associated oil changes etc (no servicing) must take place within this camp on a sealed surface such as a concrete slab or a similar appropriate surface.</p> <p>12. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment</p> <p>13. All Construction Camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible.</p> <p>14. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and shall conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems shall be allowed and toilets may not be situated within 50 meters of any surface water body or 1:100 year flood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area.</p>	

IMPACT	CONSTRUCTION CAMP This section deals with construction camp and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO / ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>15. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed.</p> <p>16. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter.</p> <p>Storage of materials (including hazardous materials)</p> <p>17. Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.</p> <p>18. Storage areas must be designated, demarcated and fenced if necessary.</p> <p>19. Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by unauthorised persons i.e. children / animals etc.</p> <p>20. Fire prevention facilities must be present at all storage facilities.</p> <p>21. Proper storage facilities for the storage of oils, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage</p>	

IMPACT	CONSTRUCTION CAMP This section deals with construction camp and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO / ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>area(s). These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume, and this should be sited away from drainage lines in a site with the approval of the Project Manager. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential stormwater events.</p> <p>22. All fuel storage areas must be roofed to avoid creation of dirty stormwater</p> <p>23. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.</p> <p>24. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.</p> <p>25. Storage areas containing hazardous substances / materials must be clearly signposted.</p> <p>26. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.</p> <p>27. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment</p>	

IMPACT	CONSTRUCTION CAMP This section deals with construction camp and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO / ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>in case of spillages or accidents and have received the necessary training.</p> <p>28. All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site.</p> <p>29. All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately and the cause of the spill investigated. Preventative measures must be identified and submitted to the ECO for information. Emergency response procedures to be followed and implemented.</p> <p>Drainage of construction camp</p> <p>30. Surface drainage measures must be established in the Construction Camps so as to prevent</p> <ul style="list-style-type: none"> ▪ Ponding of water; ▪ Erosion as a result of accelerated runoff; and, ▪ Uncontrolled discharge of polluted runoff 	

2.3.2 Construction traffic and access

Table 8: Construction Traffic and Access

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS This section deals with construction traffic and access and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Construction traffic</p> <ol style="list-style-type: none"> 1. All equipment moved onto site or off site during a project is subject to the legal requirements as well as SolarReserve specifications for the transport of such equipment. 2. The Contractor shall meet these safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place. 3. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident. 4. Construction routes and required access roads must be clearly defined 5. No new access roads to be created through wetlands and drainage lines. Existing tracks must be used. 6. Delivery of equipment must be undertaken with the minimum amount of trips to reduce the carbon footprint of these activities. 7. Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. 8. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance. 9. Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc. 	

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS This section deals with construction traffic and access and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>10. Servicing must be done in dedicated service areas on site or else off site if no such area exists.</p> <p>11. Oil changes must take place on a concrete platform and or over a drip tray to avoid pollution.</p> <p>12. Soils compacted by construction shall be deep ripped to loosen compacted layers and re-graded to even running levels.</p> <p>13. Any temporary access roads to be rehabilitated prior to contractors leaving the site.</p> <p>Access</p> <p>14. The main routes on the site must be clearly signposted and printed delivery maps must be issued to all suppliers and Sub-Contractors.</p> <p>15. Planning of access routes to the site for construction purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a "NO ENTRY for construction vehicles" sign.</p> <p>Road maintenance</p> <p>16. The ECO must establish and agree maintenance responsibilities with the landowner.</p> <p>17. All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties.</p> <p>18. Where necessary suitable measures shall be taken to rehabilitate damaged areas.</p> <p>19. Contractors should ensure that access roads are maintained in good condition by attending to</p>	

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS This section deals with construction traffic and access and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>potholes, corrugations and storm water damages as soon as these develop.</p> <p>20. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt.</p> <p>General</p> <p>21. The contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place.</p> <p>22. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken.</p> <p>23. Care for the safety and security of community members crossing access roads should receive priority at all times.</p> <p>24. It is not necessary to clear the 31m wide servitude of all vegetation. Clearance should be kept to a minimum. 'Only those woody vegetation directly under the line are allowed to be removed and an additional strip of 3 to 6 meters on both sides of the line'.</p>	

2.3.3 Environmental Education and Training

Table 9: Environmental Education and Training

IMPACT	ENVIRONMENTAL EDUCATION AND TRAINING This section deals with the environmental training of construction employees.	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Environmental training</p> <ol style="list-style-type: none"> 1. The project manager must appoint an ECO prior to construction 2. Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics covered should include: <ul style="list-style-type: none"> ▪ What is meant by “Environment” ▪ Why the environment needs to be protected and conserved ▪ How construction activities can impact on the environment ▪ What can be done to mitigate against such impacts ▪ Awareness of emergency and spills response provisions ▪ Social responsibility during construction e.g. being considerate to local residents ▪ Specific mitigation measures stipulated in the EMPr and EA. 3. Environmental awareness training for all construction staff must be undertaken by the ELO prior to construction starting. 4. The ECO must undertake training of the contractor and other main contractors (training of other staff is the responsibility of the ELO). 5. Project manager shall ensure that the training and capabilities of the Contractor’s site staff are adequate to carry out the designated tasks. 	

IMPACT	ENVIRONMENTAL EDUCATION AND TRAINING This section deals with the environmental training of construction employees.	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>6. It is the Contractor's responsibility to provide the site foreman with no less than 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.</p> <p>7. Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. Translators are to be used where necessary.</p> <p>8. Use should be made of environmental awareness posters on site.</p> <p>9. The need for a "clean site" policy also needs to be explained to the workers.</p> <p>10. Staff operating equipment (such as cranes, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks.</p> <p>11. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.</p> <p>12. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts must be undertaken by the ELO.</p> <p>13. Staff must be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.</p> <p>Monitoring of environmental training</p> <p>14. The Contractor must monitor the performance of construction workers to ensure that the points</p>	

IMPACT	ENVIRONMENTAL EDUCATION AND TRAINING This section deals with the environmental training of construction employees.	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended.	

2.3.4 Soils and Geology

General guidelines for management of soils are provided in Annexure B

Table 10: Soils and Geology

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>General</p> <ol style="list-style-type: none"> 1. Minimise disturbance of natural vegetation on the sites. 2. Access routes must ideally be planned on areas less susceptible to erosion/ destabilization/ compaction or appropriate action must be taken to minimise impact, e.g. planning of new access routes along contour lines and minimizing of cutting and filling operations. 3. Rehabilitate soil and vegetation. 4. Implement effective erosion control measures. 5. The ECO shall ensure that all agreements reached with the Landowner are fulfilled, and that such areas be rehabilitated once construction is completed. Should any claim be instituted against 	

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>SolarReserve, due to the actions of the Contractor at a batching plant site, SolarReserve shall hold the Contractor fully responsible for the claim until such time that the Contractor can prove otherwise with the necessary documentation.</p> <p>6. The main mitigation would be to ensure that physical disturbance caused by soil removal and/or re-distribution is kept to a minimum. In such an area of low rainfall and hot conditions, vegetation is fragile and often difficult to re-establish. Occasional intense, erosive rainfall does still occur, and if bare soils are impacted, water erosion may result. To avoid this, specific soil conservation measures, such as soil covering by geotextiles, construction of berms, terraces and run-off channels may be necessary, especially in areas with steeper slopes. In addition, the relatively sandy nature of the soils means that if exposed, there is a real hazard of soil removal by wind erosion, especially in the dryer winter months. To combat this, any bare soil should be re-vegetated as soon as possible and preventative measures, such as soil covering and windbreaks, may also be required.</p> <p>7.</p> <p>Topsoil</p> <p>8. The contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. Due to the length of the line, this will have to be undertaken in a number of locations due to the likely variability of soils along the route.</p>	

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>9. The full depth of topsoil should be stripped from areas affected by construction (tower positions) and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas.</p> <p>10. At any tower sites where conventional foundations are installed, the Contractor shall remove the topsoil separately and store it for later use during rehabilitation of such tower sites. During backfilling operations, the Contractor shall take care not to dump the topsoil in the bottom of the foundation and then put spoil on top of that.</p> <p>Soil Stripping</p> <p>11. No soil stripping must take place on areas within the site that the contractor does not require for construction works or areas of retained vegetation.</p> <p>12. Subsoil and overburden in all construction and lay down areas should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</p> <p>13. Construction vehicles must only be allowed to utilize existing tracks or pre-planned access routes.</p> <p>Soil Stockpiles</p> <p>14. Stockpiles should not be situated such that they obstruct natural water pathways.</p> <p>15. Stockpiles should not exceed 2m in height unless otherwise permitted by the Engineer.</p> <p>16. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the</p>	

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</p> <p>17. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</p> <p>18. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage / leakage occur should be attained and given to the project manager.</p> <p>Fuel storage</p> <p>19. Topsoil and subsoil to be protected from contamination. This should be monitored on a monthly basis by a visual inspection of diesel/oil spillage and pollution prevention facilities.</p> <p>20. Fuel and material storage must be away from stockpiles.</p> <p>21. Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material.</p> <p>22. Use and or storage of materials, fuel and chemicals which could potentially leak into the ground must be controlled.</p> <p>23. The Contractor (monitored by the ECO and ELO) should be responsible for ensuring that potentially harmful materials are properly stored in a dry, secure, ventilated environment, with concrete or sealed flooring and a means of preventing unauthorised entry.</p>	

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>24. Contaminated wastewater must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility.</p> <p>25. A oil holding dam must be installed or the existing one expanded to accommodated for the potential leakage events.</p> <p>Concrete mixing</p> <p>26. The concrete batching plant must be contained within a bunded area.</p> <p>27. Concrete mixing must only take place within designated areas.</p> <p>28. Ready mixed concrete must be utilised where possible.</p> <p>29. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Run-off from the batch plant must not be allowed to enter the storm water system.</p> <p>Washing</p> <p>30. No vehicles transporting concrete to the site may be washed on site.</p> <p>Earthworks</p> <p>31. Soils compacted during construction should be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil should be re-spread over landscaped areas.</p>	

2.3.5 Erosion Control

Table 11: Erosion Control

IMPACT	EROSION CONTROL This section deals with erosion and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. The main mitigation would be to ensure that physical disturbance caused by soil removal and/or re-distribution is kept to a minimum. In such an area of low rainfall and hot conditions, vegetation is fragile and often difficult to re-establish. Occasional intense, erosive rainfall does still occur, and if bare soils are impacted, water erosion may result. To avoid this, specific soil conservation measures, such as soil covering by geotextiles, construction of berms, terraces and run-off channels may be necessary, especially in areas with steeper slopes. In addition, the relatively sandy nature of the soils means that if exposed, there is a real hazard of soil removal by wind erosion, especially in the dryer winter months. To combat this, any bare soil should be re-vegetated as soon as possible and preventative measures, such as soil covering and windbreaks, may also be required. 2. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion, if any. 3. Other erosion control measures that can be implemented are as follows: <ul style="list-style-type: none"> ▪ Brush packing with cleared vegetation ▪ Mulch or chip packing ▪ Planting of vegetation ▪ Hydroseeding / hand sowing 4. Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented. 	

IMPACT	EROSION CONTROL This section deals with erosion and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<ol style="list-style-type: none"> 5. All erosion control mechanisms need to be regularly maintained. 6. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 7. Retention of vegetation where possible to avoid soil erosion 8. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 9. Re-vegetation of disturbed surfaces should occur immediately after construction activities are completed. This should be done through seeding with indigenous grasses. 10. No impediment to the natural water flow other than approved erosion control works is permitted. 11. To prevent stormwater damage, the increase in stormwater run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings. 12. Implement site drainage and landscaping, to prevent surface ponding, where subsequent ingress into foundations has the potential to cause destabilisation over time. 13. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion. 14. No new access roads to be construction through drainage lines and wetlands. Only existing roads must be used. <p>Run-off</p>	

IMPACT	EROSION CONTROL This section deals with erosion and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>15. Culverts should be constructed under roadways that cross the natural flow of water in order to prevent damming.</p> <p>16. Oil traps should be installed to remove the bulk of the oil from the water, which water can then be used on haul roads for dust suppression or as wash down water in the wash bays.</p> <p>Ecosystem degradation concerns</p> <p>17. Measures should be put in place during construction to ensure that water movement on steep slopes is properly regulated and dispersed off of tracks and other disturbed areas. In addition the footprint of the power lines should be kept to a minimum. If possible a single access track should be used for both lines.</p>	

2.3.6 Water Use and Quality

Table 12: Water Use and Quality

IMPACT	WATER USE AND QUALITY This section deals with water use and quality and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO
MITIGATION / METHOD STATEMENT	<p>Water Use</p> <ol style="list-style-type: none"> 1. Develop a sustainable water supply management plan to minimize the impact to natural systems by managing water use, avoiding depletion of aquifers and minimizing impacts to water users. 2. No water must be abstracted from a natural water body unless authorised under a General Authorisation under the National Water Act, or unless authorised by the Department of Water 	Engineer

IMPACT	WATER USE AND QUALITY This section deals with water use and quality and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO
	<p>Affairs through a water use licence if such a licence is required.</p> <ol style="list-style-type: none"> 3. Water must be reused, recycled or treated where possible. 4. Water saving measures must be implemented. 5. Consultation with key stakeholders to understand any conflicting water use demands and the communities' dependency on water resources and conservation requirements within the area. 6. A water use licence is likely to be required with regards to water uses (c) and (i) of the NWA. (Recommended from the specialists report) <p>Water Quality.</p> <ol style="list-style-type: none"> 7. Discharge to surface water should not result in contaminant concentrations in excess of DWA standards. 8. Efficient oil and grease traps or sumps should be installed and maintained at refuelling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans. <p>Stormwater</p> <ol style="list-style-type: none"> 9. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants. 10. Silt fences should be used to prevent any soil entering the stormwater drains. 11. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration. 12. Promote a water saving mind set with construction workers in order to ensure less water wastage. 	

IMPACT	WATER USE AND QUALITY This section deals with water use and quality and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO
	<p>13. New stormwater construction must be developed strictly according to specifications from engineers in order to ensure efficiency.</p> <p>14. Hazardous substances must be stored at least 20m from any water bodies on site to avoid pollution.</p> <p>15. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase.</p> <p>16. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.</p> <p>17. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.</p> <p>18. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.</p>	

2.3.7 Surface and Groundwater

Table 13: Surface and Groundwater

IMPACT	SURFACE WATER AND GROUNDWATER This section deals with surface and groundwater and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO / Main Contractor
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. 2. Municipal water (or another source approved by the ECO) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc. 3. Relevant departments and other emergency services should be contacted in order to deal with spillages and contamination of aquatic environments. 4. Ensure that stream flow can bypass construction site. 5. Ensure that contaminants are safely stored and away from construction site. 6. Disturbed surfaces must be kept to a minimum. All surfaces must be rehabilitated with indigenous vegetation, especially grass species, as soon as construction activities are complete. 7. Storm water management must be enforced by monitoring runoff levels. At the start of erosion, accelerated run-off must be diverted away from bare soil. 	
SITE SPECIFIC MITIGATION MEASURES		

IMPACT	SURFACE WATER AND GROUNDWATER This section deals with surface and groundwater and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO / Main Contractor
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Recommendations should infrastructure be placed within the watercourse and associated buffer zone areas:</p> <p>8. A construction method statement must be supplied to a suitably qualified wetland or aquatic specialist in order for suitable site specific mitigation measures to be devised for the construction phase, in addition to the measures specified here.</p> <p>9. Vehicle access into or through watercourses may only be allowed where absolutely necessary and after the requisite environmental authorisation and water use license has been obtained.</p> <p>10. Vehicles must be restricted to smaller vehicles where possible and not heavy vehicles to limit compaction impacts. The number of trips into or through the watercourses must be limited to the absolute minimum.</p> <p>11. In order to limit the amount of damage caused by vehicles, activity must be limited to a narrow track or "Right of Way" (ROW) only. This track should not be more than 5m wide.</p> <p>12. Heavy machinery and vehicles must be checked for oil leaks before operating in the watercourse or the associated buffer zones. Additionally, no fuelling or re-fuelling is allowed to take place in the watercourses and the associated buffer zone areas.</p> <p>13. The removal of excavated sub-soils or substrate of the watercourses for the foundations of the towers must take place only if completely necessary (i.e. if the excavated soil cannot be re-instated due to it being an</p>	

IMPACT	SURFACE WATER AND GROUNDWATER This section deals with surface and groundwater and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO / Main Contractor
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>unsuitable grade of backfill for the foundation of the structure etc.). Removed excavated soils will need to be dumped at a registered landfill that has sufficient capacity.</p> <p>14. Soil stockpiles should separate topsoil's from sub-surface soils. Where excavated soils can be re-instated, the order of soils horizons should be backfilled correctly (i.e. sub-surface soils first, topsoil last).</p> <p>15. All stockpiled soils should preferably be placed outside the identified watercourses. However, where this is not practical, the stockpiled soils should be placed next to the excavation pits. The stockpiles must be bunded by suitable material that can resist heavy rains and prevent increased run-off (for example fixed wooden planks or bricks).</p> <p>16. Any mixing of cement must either only take place over a covered surface nearby or beside the excavation pit. Cement mixing can take place in the load bin of a vehicle. It is important that no cement spills unnecessarily in the area around the tower construction area for risk of entering the watercourses.</p> <p>17. Importantly portable sanitary facilities are to be used and must be placed outside of the watercourse and associated buffer zone areas.</p> <p>18. Watercourses must be cordoned off around the construction areas and the RoW to prevent any unnecessary access by unauthorised personnel or vehicles. These areas must be identified as "no-go" zones.</p> <p>19. Vegetation must not to be damaged or removed unless they are located within the</p>	

IMPACT	SURFACE WATER AND GROUNDWATER This section deals with surface and groundwater and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO / Main Contractor
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>construction footprint of the towers or RoW tracks. Where sensitive vegetation is identified in the foot print of a tower, the relevant authority must be contacted and must advise on the most appropriate plan of action (i.e. removal and/or translocation).</p> <p>20. Stringing operations must be undertaken by hand where possible and not vehicles to limit ingress and associated damage through and across wetlands.</p> <p>21. The fitment of bird anti-collision devices over the watercourse sections of the power lines must take place on the ground prior to stringing to prevent the need for vehicles to undergo operations in problematic areas (i.e. through watercourses).</p> <p>22. A site-specific post-construction wetland rehabilitation plan must be compiled by a suitably qualified wetland or aquatic specialist to rehabilitate and monitor the affected watercourses and associated buffer zones where construction impacts have been caused.</p>	

2.3.8 Waste Management

Table 14: Waste Management

IMPACT	WASTE MANAGEMENT This section deals with waste management and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Litter management</p> <ol style="list-style-type: none"> 1. The contractor should take steps to ensure that littering by construction workers does not occur. 2. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. 3. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill. 4. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site. 5. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. 6. In general, any litter must be cleared immediately. 7. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite. 8. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly. 9. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours. 	

IMPACT	WASTE MANAGEMENT This section deals with waste management and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>10. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management.</p> <p>11. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.</p> <p>12. Under no circumstances may solid waste be burnt on site.</p> <p>13. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</p> <p>14. It is important that the contractors (and sub-contractors by implication) and workers must be informed of the facilities and procedures available for the disposal of waste.</p> <p>Hazardous waste</p> <p>15. Any hazardous substances must be stored at least 20m from any of the water bodies on site.</p> <p>16. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of off site at a licensed landfill site, where practical. Incineration may be used where relevant.</p> <p>17. Contaminants must be stored safely to avoid spillage.</p> <p>18. Machinery must be properly maintained to keep oil leaks in check.</p> <p>19. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated.</p>	

IMPACT	WASTE MANAGEMENT This section deals with waste management and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>Sanitation</p> <p>20. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers).</p> <p>21. It is preferable to install flush toilets at the construction camp which feeds into the municipal sewage system.</p> <p>22. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed.</p> <p>23. Ablution facilities shall be within 50m from workplaces and not closer than 50m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce (minimum requirement 1: 15 workers). Male and females must be accommodated separately where possible.</p> <p>24. Toilets must be serviced regularly and the ECO must inspect toilets regularly.</p> <p>25. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer.</p> <p>26. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility.</p> <p>27. The construction of “Long Drop” toilets is forbidden. Toilets connected to the sewage treatment plant or chemical toilets are preferable.</p> <p>28. Potable water must be provided for all construction staff.</p>	

IMPACT	WASTE MANAGEMENT This section deals with waste management and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>Remedial actions</p> <p>29. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</p> <p>30. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.</p> <p>31. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.</p> <p>32. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</p> <p>33. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</p> <p>34. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.</p> <p>35. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.</p>	

2.3.9 Biodiversity

Table 15: Biodiversity

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Existing vegetation</p> <ol style="list-style-type: none"> 1. There should be a preconstruction walk-through of the power line route to identify species of conservation concern that should be avoided or translocated. 2. It should not be necessary to clear the whole servitude and the existing lines in the area have not cleared the olive trees. As these trees are evergreen, they do not pose a fire risk and clearing the trees will in fact increase the fire risk as the grassland that will replace them is more prone to fires than the trees. The footprint should be restricted to a temporary access road for construction and the pylon foundations. 3. Vegetation removal must be limited to the construction corridor. 4. Vegetation clearing on tower sites must be kept to a minimum. Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed. Stumps shall be treated with herbicide. 5. Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping. Any vegetation cleared on a tower site shall be removed or flattened and not be pushed to form an embankment around the tower. 6. Trees and vegetation not interfering with the statutory clearance to the conductors can be left under the line. Dense vegetation under the 	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>line which could cause a fire hazard, particularly in the middle third of the span in the vicinity of the lowest point of the conductors, will be considered as a separate case.</p> <ol style="list-style-type: none"> 7. Upon completion of the stringing operations and before handover, the servitude must be inspected and all vegetation interfering with the safe operation of the line shall be removed / cut down. 8. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step. 9. Materials should not be delivered to the site prematurely which could result in additional areas being cleared or affected. 10. Tall trees within the servitude must be pruned/ trimmed. <p>Fauna occurring in the study area</p> <ol style="list-style-type: none"> 11. Use of appropriate construction techniques is critical. 12. Rehabilitation to be undertaken as soon as possible after construction has been completed. 13. No trapping or snaring to fauna on the construction site is allowed. 14. No faunal species must be harmed by maintenance staff during any routine maintenance at the development. 15. Pits and excavations must be regularly checked for animals that may have fallen in. 16. Animals occurring on site must be left alone. The ECO must be consulted and before removing any animals obstructing construction 	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>activities. The ECO will provide assistance in their removal.</p> <p>Demarcation of construction and laydown areas</p> <p>17. All plants not interfering with the construction shall be left undisturbed clearly marked and indicated on the site plan.</p> <p>18. The construction area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint.</p> <p>19. Vegetation removal must be phased in order to reduce impact of construction.</p> <p>20. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.</p> <p>21. Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.</p> <p>Utilisation of resources</p> <p>22. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.</p> <p>Exotic vegetation</p> <p>23. All exotic vegetation must be removed from the site (if present).</p> <p>24. Alien vegetation on the site will need to be controlled.</p>	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>25. The contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</p> <p>26. The spread of exotic species occurring throughout the site should be controlled. Emergence of alien invasive species must be avoided.</p> <p>Herbicides</p> <p>27. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.</p> <p>28. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.</p>	
SITE SPECIFIC MITIGATION		
MITIGATION / METHOD STATEMENT	Erosion control 29. Measures should be put in place during construction to ensure that water movement on steep slopes is properly regulated and dispersed off of tracks and other disturbed areas. 30. The footprint of the power lines should be kept to a minimum. If possible a single access track should be used for both lines.	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>Fauna</p> <p>31. The footprint of the power lines should be kept as low as possible and construction staff should undergo environmental induction to ensure that they are aware of fauna-related issues and that no fauna are harmed during construction.</p> <p>32. Any fauna encountered during construction should be removed to safety by the ECO or other suitably qualified person.</p> <p>Avifauna</p> <p>33. The sections of the line over ridges and near wetlands and pans should be fitted with bird flight diverters (flappers) and the live components should be insulated to reduce electrocution problems.</p> <p>Additional recommendations from DAFF</p> <p>29. The preconstruction walk-through study undertaken by the biodiversity specialist should be undertaken in the rainy season. It should address the potential impact of the final alignment on avifauna and mammals utilising the woodland, protection against predators, foraging and breeding. The edge effect should also be considered and mitigated, where possible.</p> <p>30. Tree clearing should be limited to 4m on either side of the line(s) as per agreement with Eskom.</p> <p>31. As far as possible, avoid disturbance to the <i>Olea europea subsp. africana</i> woodland in the east.</p>	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>32. A valid Floral Permit would be required to remove the provincially protected <i>Olea europea subsp. africana</i> trees.</p> <p>33. If any protected trees are to be damaged, disturbed, cut or destroyed a license must be obtained from the DAFF.</p> <p>34. A special condition should be included in the EA stating that offsite mitigation is required through the implementation of a greening plan. For every single <i>Olea europea subsp. lxxxiipeciali</i> tree removed in terms of the valid Flora Permit (to be obtained), three of the same specie must be planted to compensate for the loss. The seedlings should be maintained and replaced should they die.</p>	

2.3.10 Air Quality

Table 16: Air Quality

IMPACT	AIR QUALITY This table deals with mitigation measures to prevent air pollution	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Dust control</p> <p>1. Wheel washing and damping down of un-surfaced and un-vegetated areas must occur in areas close to potential receptors of dust pollution. The ECO and ELO must identify these areas prior to construction starting in that particular area or prior to construction traffic</p>	

IMPACT	AIR QUALITY This table deals with mitigation measures to prevent air pollution	RESPONSIBILITY
	<p>needing to move along un-surfaced roads in certain areas.</p> <ol style="list-style-type: none"> 2. Vegetation must be retained where possible in order to reduce dust travel. 3. Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. 4. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to sensitive receptors such as landowners and neighbouring communities. 5. Dust generation must be kept to a minimum and suppressed on access roads and construction areas during dry periods. This can be accomplished by the regular application of water or a biodegradable soil stabilisation agent. 6. Speed limits on un-surfaced roads must not be exceeded. 7. Speed limits for construction vehicles must be clearly signposted and must be monitored by the ELO and ECO. 8. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the ELO under the supervision of the ECO. 	

2.3.11 Noise and Vibrations

Table 17: Noise and Vibrations

IMPACT	NOISE This section deals with noise and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. The construction phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. 2. Truck traffic should be routed away from noise sensitive areas, where possible. 3. Noise levels must be kept within acceptable limits. 4. Noisy operations should be combined so that they occur where possible at the same time. 5. Construction activities are to be contained to reasonable hours during the day and early evening. Night-time activities near noise sensitive areas must not be allowed. 6. Construction workers to wear necessary ear protection gear. 7. Noisy activities to take place during allocated construction hours. 8. Noise from labourers must be controlled. 9. Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the contractor may be instructed to remove the offending vehicle or machinery from site. 10. The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible 	

IMPACT	NOISE This section deals with noise and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>labour shall be transported to and from the site by the contractor or his Sub-Contractors by the contractors own transport.</p> <p>11. Apply regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.</p> <p>12. Should blasting be required, the contractor will need to obtain a blasting permit. Moreover, the contractor must make the public aware of when blasting is to take place as well as the specific times of blasting. Blasting activities must take place at reasonable times and during daily working hours.</p>	

2.3.12 Energy use

Table 18: Energy use

IMPACT	ENERGY USE This section deals with energy use and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. Energy saving lighting must be implemented across the board. 2. Minimal lighting, while maintaining health and safety regulations, must be kept on during the night operations. 3. Equipment not in use must be switched off and unplugged to save on unnecessary energy costs and carbon footprint. 	

2.3.13 Employment

Table 19: Employment

IMPACT	EMPLOYMENT This section deals with employment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Labour</p> <ol style="list-style-type: none"> 1. The use of labour intensive construction measures should be used where appropriate. 2. Labour must be trained to benefit individuals beyond completion of the projects. <p>Recruitment Plan</p> <ol style="list-style-type: none"> 3. All unskilled labourers should be drawn from the local market i.e. and where possible use should be made of local semi-skilled and skilled personnel. 4. Local suppliers to be used where possible. 5. Ensure adequate advertising in the project community areas, local papers for skilled labour. Adverts will be placed in each area where the public meetings were conducted. 6. Local community leaders as well as the Local Municipalities must be utilised to source labour. 7. The recruitment process must be equitable and transparent. A concerted effort will be made to guard against nepotism and/or any form of favouritism during the process. 8. The informal daily recruitment of workers at the construction camp must be avoided in order to prevent the congregation and loitering of job seekers at the construction camp. 9. The recruitment of skilled labour will follow standard advertising process in national newspapers and interview based selection. 	

IMPACT	EMPLOYMENT This section deals with employment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	10. Record of official complaints by employees to authorities must be kept i.e. Labour and Social Security (Annexure A for complaints record sheet).	
SITE SPECIFIC MITIGATION		
	11. Ensure that local employment is used as far as possible. 12. Ensure that SolarReserve adhere to local employment intentions. 13. Effectively communicate the number and types of jobs available to surrounding communities.	

2.3.14 Occupational Health and Safety

Table 20: Occupational Health and Safety

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION METHOD STATEMENT	Worker safety 1. Safety measures for work procedures must be implemented. 2. First aid kits must be available and accessible on site. 3. A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up by the	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>Contractor and approved by the ECO to ensure worker safety.</p> <ol style="list-style-type: none"> 4. Workers should be thoroughly trained in using potentially dangerous equipment. 5. Contractors must ensure that all equipment is maintained in a safe operating condition. 6. A safety officer must be appointed. 7. A record of health and safety incidents must be kept on site. 8. Any health and safety incidents must be reported to the Project Manager immediately. 9. First aid facilities must be available on site at all times and a number of employees trained to carry out first aid procedures. 10. Workers have the right to refuse work in unsafe conditions. 11. The Contractor must take all the necessary precautions against the spreading of disease such as measles, foot and mouth, etc. especially under livestock. 12. A record must be kept of drugs administered to construction staff or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against SolarReserve or the Contractor. 13. The contractor must ensure that all construction workers are well educated about HIV/ AIDS and the risks surrounding this disease. The location of the local clinic where more information and counselling is offered must be indicated to workers. 	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>14. Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents.</p> <p>Worker facilities</p> <p>15. Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.</p> <p>16. Fires are not to be allowed outside controlled areas.</p> <p>17. Ablution facilities must be well maintained.</p> <p>Hazardous substances</p> <p>18. Working areas should be provided with adequate ventilation and dust/fume extraction systems to ensure that inhalation exposure levels for potentially corrosive, oxidizing, reactive or siliceous substances are maintained and managed at safe levels.</p> <p>19. Eye wash and emergency shower systems should be provided in areas where there exists the possibility of chemical containment of workers and the need for rapid treatment.</p> <p>Electrical Safety and isolation</p> <p>20. Use of electrical safety devices on all final distribution circuits and appropriate testing schedules applied to such safety systems.</p> <p>21. All sources of hazardous energy or hazardous substances should have written procedures for isolation, identifying how the</p>	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>system, plant or equipment can be made and kept safe.</p> <p>Physical Hazards</p> <p>22. Geotechnical safety - All structures must be planned, designed and operated such that the geotechnical risks are appropriately managed.</p> <p>Machine and Equipment</p> <p>23. Use must be made of contrast colouring on equipment/machinery including the provision of reflective markings to enhance visibility.</p> <p>24. Use must be made of moving equipment/machinery equipped with improved operator sight lines.</p> <p>25. Workers must be issued with high visibility clothing.</p> <p>26. Use must be made of reflective markings on structures, traffic junctions, and other areas with a potential for accidents.</p> <p>27. Safety barriers must be installed in high risk locations.</p> <p>Fitness for work</p> <p>28. Shift management systems must minimize risk of fatigue. Establish alcohol and other drug policy for the operation.</p> <p>Travel and remote site health</p> <p>29. Develop programs to prevent both chronic and acute illnesses through appropriate sanitation and vector control systems.</p>	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>30. Food preparation areas should be provided with adequate washing facilities.</p> <p>31. Where food is prepared, food preparation storage and disposal should be reviewed regularly and monitored to minimise risk of illness.</p> <p>Protective gear</p> <p>32. Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs etc.</p> <p>33. No person is to enter the site without the necessary PPE.</p> <p>Site safety</p> <p>34. The construction camp must remain fenced for the entire construction period.</p> <p>35. Potentially hazardous areas are to be demarcated and clearly marked.</p> <p>36. Adequate warning signs of hazardous working areas must be in place.</p> <p>37. Emergency numbers for local police and fire department etc must be placed in a prominent area.</p> <p>38. Fire fighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank.</p>	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>39. Suitable conspicuous warning signs in English and all other applicable languages must be placed at all entrances to the site.</p> <p>40. All speed limits must be adhered to.</p> <p>Construction equipment safety</p> <p>41. All equipment used for construction must be in good working order with up to date maintenance records.</p> <p>Hazardous Material Storage</p> <p>42. Staff that will be handling hazardous materials must be trained to do so.</p> <p>43. Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor.</p> <p>44. All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. These areas should be roofed to avoid contamination of stormwater.</p> <p>45. Material Safety Data Sheets (MSDS) which contain the necessary information pertaining to a specific hazardous substance must be present for all hazardous materials stored on the site.</p> <p>Procedure in the event of a petrochemical spill</p> <p>46. A spill kit needs to be kept on site to address any unforeseen spillages.</p>	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>47. The individual responsible for or who discovers the petrochemical spill must report the incident to the Project Manager, Contractor or ECO.</p> <p>48. The problem must be assessed and the necessary actions required will be undertaken.</p> <p>49. The immediate response must be to contain the spill.</p> <p>50. The source of the spill must be identified, controlled, treated or removed wherever possible.</p> <p>Fire management</p> <p>51. Fire fighting equipment should be present on site at all times.</p> <p>52. All construction staff must be trained in fire hazard control and fire fighting techniques.</p> <p>53. All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances.</p> <p>54. No open fires will be allowed on site.</p> <p>55. Smoking may only be conducted in demarcated areas.</p> <p>56. Contact should be made with the local Fire Protection Agency (FPA) if one exists.</p> <p>Safety of surrounding residents</p> <p>57. All I&AP's should be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are:</p>	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<ul style="list-style-type: none"> ▪ Earthworks / earthmoving machinery on steep slopes above houses / infrastructure; ▪ Risk to residence along haulage roads / access routes. <p>Emergency evacuation plan</p> <p>58. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.</p> <p>59. All permanent staff must undergo safety training.</p> <p>Maintenance</p> <p>60. The corridor and surrounding areas are to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.</p>	

2.3.15 Security

Table 21: Security

IMPACT	SECURITY This section deals with security and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC /SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. A security company should be employed to guard the construction site and monitor access. This company should also be utilised for the operation phase. 2. Labour should be transported to and from the site to discourage loitering in adjacent areas and possible increase in crime or disturbance. 3. Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling and prostitution on site shall be prohibited. Any persons found to be engaged in such activities should receive disciplinary or criminal action taken against them. 4. Only pre-approved staff must be permitted to stay within the staff accommodation which will be provided. 5. The site shall be fenced, where necessary to prevent any loss or injury to persons during the construction phase. 6. During periods of temporary site closure, the site should be secured to ensure no access to the site. This applies to the construction camp as well. 7. No alcohol / drugs to be present on site. 8. No firearms allowed on site or in vehicles transporting staff to / from site (unless used by security personnel). 	

IMPACT	SECURITY This section deals with security and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC /SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>9. No harvesting of firewood from the site or from the business property adjacent to it without prior consent from the ECO.</p> <p>10. Construction staff are to make use of the facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility are forbidden).</p> <p>11. Trespassing on private / commercial properties adjoining the site is forbidden.</p> <p>12. All employees must undergo the necessary safety training and wear the necessary protective clothing.</p> <p>13. The ELO must timeously inform affected landowners where construction is to occur of the onset of the construction process.</p> <p>14. Driving under the influence of alcohol is prohibited.</p> <p>15. The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.</p>	

2.3.16 Social Environment

Table 22: Social Environment

IMPACT	SOCIAL ENVIRONMENT This section deals with social environment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION METHOD STATEMENT	<ol style="list-style-type: none"> 1. All contact with the affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times. 2. The successful completion of the projects depends a lot on the good relations with the landowners. The Contractor's Environmental Liaison Officer will thus be the liaison officer for the entire contract. 3. The ELO shall be available to investigate all problems arising on the work sites concerning the landowners. 4. All negotiations (if required) for any reason shall be conducted between the ECO the landowners and the Contractor (ELO) with the ECO present. 5. No verbal agreements shall be made. All agreements shall be recorded properly and all parties shall co-sign the documentation. 6. The landowners shall always be kept informed by the ELO about any changes to the construction programme should they be affected. 7. The contact numbers of the ELO and the SolarReserve ECO shall be made available to the landowners. This will ensure open channels of communication and prompt response to queries and claims. 8. A complaints register should be kept on site (A complaints record sheet is provided in annexure A). Details of complaints should be 	

IMPACT	SOCIAL ENVIRONMENT This section deals with social environment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>incorporated into the audits as part of the monitoring process. This should be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the Contractor.</p> <p>9. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site.</p> <p>10. All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect.</p> <p>11. Care must be taken not to damage irrigation equipment, lines, channels and crops, as this could lead to major claims being instituted against SolarReserve and the Contractor.</p>	
SITE SPECIFIC MITIGATION		
MITIGATION METHOD STATEMENT	<p>Temporary loss of agricultural land</p> <p>12. Compensation should be paid to landowner for production losses during the construction phase and to enable landowner to replant crops in the servitude, where such crops are permitted.</p> <p>13. Build a 'good neighbour' relationship with landowners by informing them upfront of when and where construction will take place on their property and stick to agreed timeframes and places as far as possible.</p>	

IMPACT	SOCIAL ENVIRONMENT This section deals with social environment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>14. Construction teams, construction vehicles and construction material should only access the construction site via demarcated access roads where practical and should not be allowed to cut across fields or vacant (agricultural) land. Where this does occur, damages should be restored immediately.</p> <p>Temporary employment</p> <p>15. Where unskilled labour is required, it should be sourced from the local communities. Locals should be permanent residents from Lime Acres, Shaleje, Metsimatala, Danielskuil and the greater Postmansburg area, whichever is the closest to the construction site. As so far that it is within the contractors' control, unskilled jobs should not be allocated to jobseekers from elsewhere.</p> <p>16. Where project activities lead to the creation of informal job opportunities such as food stalls, contractors should be encouraged to allow such activities as long as it does not interfere with the construction activities itself or the safety of the construction site, the informal vendor and/or the construction workers.</p> <p>Accommodation for construction workers</p> <p>17. Construction workers should only be housed in rooms within formal houses, i.e. no 'backyard shacks' should be permitted.</p> <p>18. A formal application process should be developed whereby households can apply if they wish to house a construction worker.</p>	

IMPACT	SOCIAL ENVIRONMENT This section deals with social environment and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>The house must be a formal house and meet certain minimum criteria such as running water, ablution facilities, electricity, furnished room, etc.</p> <p>Conflict</p> <p>19. Problem areas that are brought under the attention of the contractor should be rectified immediately. If the contractor is unable to do so, this should be communicated to the landowner along with a plan on how and when the problem will be addressed. The landowner should be given regular feedback on the matter.</p> <p>Implementation of HIV/AIDS prevention plan</p> <p>20. SolarReserve or its contractor should appoint a service provider or local NGO to develop, implement and manage an HIV/AIDS prevention programme. The service provider or NGO should specialise in the field of HIV/AIDS.</p>	

2.3.17 Community Engagement

Table 23: Community Engagement

IMPACT	COMMUNITY ENGAGEMENT This section deals with surrounding community and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION	<ol style="list-style-type: none"> 1. A communication guideline to be drafted and agreed upon with authority representatives and affected communities. 2. Open and transparent community engagement to be followed as culturally appropriate. 3. Records (written) to be kept of all community engagements (e.g. complaints, resolutions, etc) 	

2.3.18 Visual Impact

Table 24: Visual Impact

IMPACT	VISUAL This section deals with visual issues and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION METHOD STATEMENT	<p>General</p> <ol style="list-style-type: none"> 1. Construction activities must not occur at night and lighting should only be erected where absolutely necessary. 2. Construction camps and equipment storage facilities are to be shielded with shade netting. 3. Construction traffic must not deviate from designated routes or access roads. 	

	<ol style="list-style-type: none"> 4. Construction areas are to be kept clean and tidy. 5. Measures must be taken to suppress dust arising from construction activities. 6. Labour being transported to the site must take cognisance of litter and waste concerns. 7. Equipment being transported to the site must be covered with tarpaulins. 8. Topsoil stockpiles must be well managed and seeded when possible if not utilised within three months. 9. It is recommended that equipment be stored discreetly so as not to increase visual impacts. 10. Construction must be conducted in the shortest possible time in order to reduce visual impacts. 	
SITE SPECIFIC MITIGATION MEASURES		
MITIGATION METHOD STATEMENT	<ol style="list-style-type: none"> 11. Carefully plan to reduce the construction period. 12. Locate construction camp and storage areas in zones of low visibility i.e. behind tall trees or in lower lying areas. 13. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 14. Maintain a neat construction site by removing rubble and waste materials regularly. 15. Make use of existing gravel access roads where possible. 	

2.3.19 Heritage and Cultural Resources

Table 25: Heritage and Cultural Resources

IMPACT	HERITAGE AND CULTURAL RESOURCES This section deals with heritage and cultural issues as well as actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. A heritage monitoring program that will identify finds during the construction will be able to mitigate the impact on the finds through scientific documentation of finds and provide valuable data on any finds made. 2. In the event that the sites cannot be excluded from the corridor, a pylon placement and/or a grave relocation process, as described in Section 5 of the specialist report, needs to be implemented. 3. A responsible archaeologist must be appointed to inspect the operational areas of the site in order to identify any significant material being unearthed, and to make the correct judgment on actions to be taken. 4. A permit in terms of section 34 of the National Heritage Resources Act 1999 (Act 25 of 1999) must be obtained, if any archaeological resources, such as built structures older than 60 years, sites of cultural significance associated with oral histories, burial grounds or graves and cultural landscapes, are discovered during the construction phase of the projects and which will be damaged, destroyed, altered, or disturbed as a result of the projects. 5. A destruction permit will be required for the farmstead and structure ACO02 under the Section 34 of the NHRA. 6. An archaeologist must immediately be appointed should any artefacts be unearthed during construction. 	

	<p>7. Should substantial fossils be uncovered they should be left <i>in situ</i>, safeguarded by the Environmental Control Officer and reported to SAHRA and a professional palaeontologist.</p> <p>8. A poster reminding workers of the possibility of finding archaeological sites, should be kept on site.</p> <p>9. An archaeological monitoring and feedback strategy must be developed to ensure effective monitoring of the site and to provide feedback reports to the client and SAHRA.</p>	
SITE SPECIFIC MITIGATION		
	<p>Cemeteries and Possible Cemeteries</p> <p>10. Prior to construction activities commencing, the fence around the cemetery should be repaired or a proper fence must be built with a 10 meter buffer.</p> <p>11. In the event that the cemeteries cannot be incorporated in to the development the graves should be relocated after a full grave relocation process that includes comprehensive social consultation has been undertaken.</p> <p>Historical Structures</p> <p>12. If the development cannot avoid the farm worker site (ACO13 in the Heritage Assessment Report) a watching brief and monitoring is required to ascertain the presence of infant burials at these sites.</p> <p>13. A destruction permit will be required under Section 34 of the NHRA if the following structures cannot be avoided:</p> <p>14. The old farmstead and its associated farmstead structure (ACO012 in the Heritage Assessment Report),</p> <p>15. Silverstreams Station,</p> <p>16. The farmstead at site (HR02 in the Heritage Assessment Report),</p>	

	<p>17. The stone circle (HR04 in the Heritage Assessment Report), and</p> <p>18. The mine shaft.</p> <p>General</p> <p>19. A monitoring plan must be agreed upon by all the stakeholders for the different phases of the project focussing on the areas where earthmoving will occur.</p> <p>20. If during construction any possible finds are made, the operations must be stopped and the qualified archaeologist be contacted for an assessment of the find.</p> <p>21. Should substantial fossil remains (e.g. well-preserved fossil fish, reptiles or petrified wood) be exposed during construction, however, the ECO should carefully safeguard these, preferably in situ, and alert SAHRA as soon as possible so that appropriate action (e.g. recording, sampling or collection) can be taken by a professional palaeontologist.</p> <p>22. A management plan must be developed for managing the heritage resources in the surface area impacted by operations during construction and operation of the development. This includes basic training for construction staff on possible finds, action steps for mitigation measures, surface collections, excavations, and communication routes to follow in the case of a discovery.</p>	
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2.4 Operation Phase

2.4.1 Construction Site Decommissioning

Table 26: Construction Site Decommissioning

IMPACT	CONSTRUCTION SITE DECOMMISSIONING This section deals with the demolishing of the construction camp and the actions that need to be implemented	RESPONSIBILITY
PHASE	OPERATION	Main contractor / Developer / ECO / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Removal of equipment</p> <ol style="list-style-type: none"> 1. All structures comprising the construction camp are to be removed from site. 2. The area that previously housed the construction camp is to be checked for spills of substances such as oil etc, and these shall be remediated. 3. All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and regressed using the guidelines set out in the re-vegetation that forms part of this document. <p>Temporary services</p> <ol style="list-style-type: none"> 4. The Contractor must arrange the cancellation of all temporary services. 5. A copy of all weigh-bridge certificates from waste disposed are to be presented to the ECO. 6. Temporary roads must be closed and access across these, blocked. 7. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO. 	

IMPACT	CONSTRUCTION SITE DECOMMISSIONING This section deals with the demolishing of the construction camp and the actions that need to be implemented	RESPONSIBILITY
PHASE	OPERATION	Main contractor / Developer / ECO / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>Associated infrastructure</p> <ol style="list-style-type: none"> 8. Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer. 9. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed. 10. All rubble is to be removed from the site to an approved disposal site as approved by the Engineer. Burying of rubble on site is prohibited. 11. The site is to be cleared of all litter. 12. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. 13. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer. 14. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer. 15. All leftover building materials must be returned to the depot or removed from the site. 16. The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management. 	

IMPACT	CONSTRUCTION SITE DECOMMISSIONING This section deals with the demolishing of the construction camp and the actions that need to be implemented	RESPONSIBILITY
PHASE	OPERATION	Main contractor / Developer / ECO / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	Rehabilitation plan 17. Rehabilitate and re-vegetate cleared areas with indigenous plant species.	

2.4.2 Rehabilitation and Maintenance

Table 27: Rehabilitation and Maintenance

IMPACT	REHABILITATION This section deals with the issues relating to rehabilitation after construction	RESPONSIBILITY
PHASE	OPERATION	Developer
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION METHOD STATEMENT	Rehabilitation <ol style="list-style-type: none"> 1. All damaged areas shall be rehabilitated upon completion of the contract 2. A mixture of vegetation seed can be used provided the mixture is carefully selected to ensure the following: <ul style="list-style-type: none"> ▪ Annual and perennial species are chosen. ▪ Pioneer species are included. ▪ All the species shall not be edible. ▪ Species chosen will grow in the area under natural conditions. ▪ Root systems must have a binding effect on the soil. ▪ The final product should not cause an ecological imbalance in the area. 3. To get the best results in a specific area, it is advisable to consult with a vegetation specialist. Seed distributors can also give 	

IMPACT	REHABILITATION This section deals with the issues relating to rehabilitation after construction	RESPONSIBILITY
PHASE	OPERATION	Developer
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>valuable advice as to the mixtures and amount of seed necessary to seed a certain area.</p> <ol style="list-style-type: none"> 4. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 5. All natural areas impacted during construction must be rehabilitated with locally indigenous grasses typical of the representative botanical unit. 6. Rehabilitation must take place in a phased approach as soon as possible. 7. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. 8. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 9. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. <p>Maintenance</p> <ol style="list-style-type: none"> 10. The servitude needs to be monitored on a monthly basis for the first year to identify the emergence of alien species and any erosion concerns. 	

2.4.3 Operation and Maintenance

Table 28: Operation and Maintenance

IMPACT	OPERATION AND MAINTENANCE This section deals with the potential impacts that could result from the operation and maintenance of the line.	RESPONSIBILITY
PHASE	OPERATION	ESKOM
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	Maintenance <ol style="list-style-type: none"> 1. All applicable standards, legislation, policies and procedures must be adhered to during operation. 2. Regular ground inspection of the servitude must take place to monitor their status. 3. Landowner conditions for accessing the servitude must be adhered to, and all gates must be kept open / closed subject to landowner requirements. 4. Only authorised Eskom personnel must access the servitude and properties that are required to be traversed in order to access the servitude 5. No new roads to be constructed through wetlands and drainage lines. Public awareness <ol style="list-style-type: none"> 6. The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise. 	

2.4.4 Air Quality

Table 29: Air Quality

IMPACT	AIR POLLUTION This section deals with the issues relating to air pollution during operation	RESPONSIBILITY
PHASE	OPERATION	Developer
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Dust management</p> <p>1. Any dirt roads utilised to access the sites must be regularly maintained to ensure that dust levels are controlled.</p> <p>Litter management</p> <p>2. Remove unwanted materials and litter on a regular basis to avoid potential odours.</p>	

2.4.5 Biodiversity

Table 30: Biodiversity

IMPACT	BIODIVERSITY (FAUNA AND FLORA) This section details with the issues relating to biodiversity during operation	RESPONSIBILITY
PHASE	OPERATION	Developer
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<p>Vegetation</p> <p>1. Indigenous vegetation must be maintained and all exotics removed as they appear and disposed of appropriately.</p> <p>2. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.</p> <p>3. Vegetative re-establishment shall, as far as possible, make use of indigenous or locally occurring plant varieties within the servitude.</p>	

IMPACT	BIODIVERSITY (FAUNA AND FLORA) This section details with the issues relating to biodiversity during operation	RESPONSIBILITY
PHASE	OPERATION	Developer
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>4. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas during and following rehabilitation.</p> <p>5. No streams, wetlands or riparian areas outside of agreed access routes must be traversed as part of operational work unless emergency access to the servitude in the areas is required.</p> <p>6. Herbicides to clear emergent bushy vegetation under the lines must not be used; instead vegetation control must be through mechanical means. No herbicides must be used within 150m of any surface water feature.</p> <p>Other fauna</p> <p>7. No faunal species must be harmed by maintenance staff during any routine maintenance at the development.</p>	
SITE SPECIFIC MITIGATION		
MITIGATION METHOD STATEMENT	Loss of habitat for red data / general species <p>8. Vegetation control along servitudes should be by manual clearing and herbicides should not be used except to control alien plants in the prescribed manner</p> <p>9. In recognition of the sensitivity of the <i>Olea europea subsp. Africana</i> woodland, the proposed power line servitudes should not be cleared in areas where these trees prevail.</p> <p>10. The <i>Olea europea subsp. africana</i> trees should not be cleared during maintenance activities. If there are trees present which</p>	

IMPACT	BIODIVERSITY (FAUNA AND FLORA) This section details with the issues relating to biodiversity during operation	RESPONSIBILITY
PHASE	OPERATION	Developer
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	<p>are deemed to be too tall, these can be trimmed a lower height which complies with safety standards and it should not be necessary to remove trees.</p> <p>Weed Control</p> <p>11. Annual monitoring for alien plant species - with follow up clearing</p> <p>12. All exotic vegetation must be removed from the site (if present).</p> <p>Erosion control</p> <p>13. Annual site inspection for erosion or water flow regulation problems – with follow up remedial action where problems are identified</p> <p>Birds Collisions and Electrocutions</p> <p>14. Monitoring for avifaunal mortality along the power lines during maintenance activities and additional mitigation measures such as bird flight diverters should be fitted if there are places where regular mortality occurs.</p>	

2.4.6 Surface Water Resources

IMPACT	SURFACE WATER This section deals with the issues relating to surface water during operation	RESPONSIBILITY
PHASE	OPERATION	Developer
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION METHOD STATEMENT	<p>Site Access</p> <ul style="list-style-type: none"> ○ It is crucial that existing roads are used so that damage is limited. Where new service roads are required in the watercourses and 	

	<p>the necessary environmental authorisations and water use licences are obtained, these roads must be limited in extent (i.e. go directly to the desired tower) and will need to be maintained for erosion.</p> <ul style="list-style-type: none"> ○ Ideally, if service roads are required inside the watercourses, coarse gravel should be used as the infill. This material will not erode away after rainfall events and will provide a relatively solid foundation when surface water accumulates. Additionally, erosion will be limited by this material as opposed to exposed dirt roads. ○ If dirt roads will be the means of access, these will have to be regularly checked for erosion. This should be done on a weekly to monthly basis and after short or long periods of heavy rainfall or after long periods of sustained rainfall. <p>Erosion control</p> <ul style="list-style-type: none"> ○ Where erosion begins to take place, this must be dealt with immediately to prevent severe erosion damage to the wetlands. Should severe erosion occur, a rehabilitation plan will be required and Input from a suitably qualified wetland or aquatic specialist must be obtained. 	
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2.4.7 Health and Safety

Table 31: Health and Safety

IMPACT	HEALTH AND SAFETY This section deals with the issues relating to health and safety during operation	RESPONSIBILITY
PHASE	OPERATION	Developer
ENVIRONMENTAL MANAGEMENT PROGRAMME		

IMPACT	HEALTH AND SAFETY This section deals with the issues relating to health and safety during operation	RESPONSIBILITY
MITIGATION / METHOD STATEMENT	<p>Emergency evacuation plan</p> <p>1. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.</p> <p>Maintenance</p> <p>2. The servitude is to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.</p> <p>Storage and handling of hazardous waste</p> <p>3. A spill kit needs to be kept on site to address any unforeseen spillages.</p> <p>4. Transport of all hazardous substances must be in accordance with the relevant legislation.</p> <p>Security</p> <p>5. It must be ensured that no gates are left open and no padlocks are damaged during maintenance operations to ensure the safety of the farm on which the power line servitude traverses.</p>	

2.4.8 Visual Impact

Table 32: Visual Impact

IMPACT	VISUAL IMPACT This section deals with the issues relating to visual impacts during operation	RESPONSIBILITY
PHASE	OPERATION	Developer
ENVIRONMENTAL MANAGEMENT PROGRAMME		

IMPACT	VISUAL IMPACT This section deals with the issues relating to visual impacts during operation	RESPONSIBILITY
MITIGATION METHOD STATEMENT	<p data-bbox="537 317 862 348"><i>Maintenance and lighting</i></p> <ol data-bbox="586 348 1105 1087" style="list-style-type: none"> <li data-bbox="586 348 1105 695">1. High standards of maintenance and management of the landscaping should be carried out in accordance with the best possible practice to ensure that the landscaping ensures that the power lines blends in with the current visual environment, by enhancing natural features such as trees and vegetation as much as possible. <li data-bbox="586 695 1105 814">2. The servitude and surrounds must be kept clean, tidy and well maintained to reduce negative visual impacts. <li data-bbox="586 814 1105 934">3. Rehabilitation of surrounding areas must take place with indigenous species. <li data-bbox="586 934 1105 1010">4. Surrounding roads must be well maintained. <li data-bbox="586 1010 1105 1087">5. Regular maintenance of the associated infrastructure must be undertaken. 	

2.5 Decommissioning phase

Mitigation measures implemented during construction with regards to the construction camp and equipment will remain the same for the decommissioning phase when a construction camp will need to be established again.

2.5.1 Ongoing Stakeholder involvement

This is the process that is recommended if the power lines are decommissioned.

Table 33: Ongoing Stakeholder involvement

IMPACT	ONGOING STAKEHOLDER INVOLVEMENT This section relates to the stakeholder involvement that needs occur during decommissioning	RESPONSIBILITY
PHASE	DECOMMISSIONING	ESKOM
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g: <ul style="list-style-type: none"> ▪ Proposed decommissioning start date; and ▪ Process to be followed. 2. Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them: <ul style="list-style-type: none"> ▪ What activities will take place during the decommissioning phase. ▪ How these activities will impact upon the communities and/or their properties. ▪ Regarding the timeframes of scheduled activities 3. Regular interaction between Eskom and community leader(s) during the decommissioning phase 4. A reporting office / channel to be established should community members experience problems with contractors / sub-contractors during the decommissioning phase. 	

	5. A register to be kept of problems reported by community members and the steps taken to address / resolve it.	
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2.5.2 Community health and safety

Table 34: Community health and safety

IMPACT	COMMUNITY HEALTH AND SAFETY This section deals with the issues relating to health and safety during decommissioning	RESPONSIBILITY
PHASE	DECOMMISSIONING	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. Demarcated routes to be established to ensure the safety of communities, especially in terms of road safety and communities to be informed of these demarcated routes. 2. Where dust is generated by trucks passing on gravel roads, dust mitigation to be enforced. 3. Excavated areas to be fenced off and regularly inspected to ensure that humans and animals do not have access to the site. 4. Any infrastructure that would not be decommissioned, must be appropriately locked and/or fenced off to ensure that it does not pose any danger to the community. 	

2.5.3 Waste Management

Table 35: Waste Management

IMPACT	WASTE MANAGEMENT This section deals with the issues relating to waste management during decommissioning	RESPONSIBILITY
PHASE	DECOMMISSIONING	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. All contaminated soils to be removed from the property and to be disposed of as hazardous waste.	

2.5.4 Surface and Groundwater

Table 36: Surface and Groundwater

IMPACT	SURFACE AND GROUNDWATER This section deals with the issues relating to surface and groundwater during decommissioning	RESPONSIBILITY
PHASE	DECOMMISSIONING	ESKOM
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. Remove of any historically contaminated soil as hazardous waste. 2. Removal of all substances which can result in groundwater (or surface water) contamination. 3. Re-vegetation of exposed soil surfaces to ensure no erosion in these areas. 4. No new access roads through wetlands and rivers. 	

2.5.5 Biodiversity

Table 37: Biodiversity

IMPACT	BIODIVERSITY This section deals with the issues relating to biodiversity during decommissioning	RESPONSIBILITY
PHASE	DECOMMISSIONING	
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. Rehabilitation of exposed surfaces with indigenous species, preferably large trees. 2. Adherence to surface and groundwater mitigation measures to prevent secondary impacts on biodiversity. 3. Prevent expansion of the current footprint(s). 4. Retain large trees to keep nesting and roosting habitat. 	
SITE SPECIFIC MITIGATION		
	<p>Loss of habitat for red data / general species</p> <ol style="list-style-type: none"> 5. Maintain footprint strictly during decommissioning. 6. Existing access roads must be used. 7. All infrastructure must be removed from the site. 8. A rehabilitation plan must be compiled by a qualified ecologist. 9. Re-vegetation of affected areas must be made a priority to avoid erosion. 10. Suitable storm water / wind controls must be put in place until rehabilitation is complete. 11. Constant removal of alien invasive species in and around plant. <p>Weed Control</p> <ol style="list-style-type: none"> 12. The contractor should be responsible for implementing a programme of weed control 13. The spread of exotic species occurring throughout the site should be controlled. 	

	14. All exotic vegetation must be removed from the site (if present).	
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2.5.6 Air Quality

Table 38: Air Pollution

IMPACT	AIR POLLUTION This section deals with the issues relating to air quality during decommissioning	RESPONSIBILITY
PHASE	DECOMMISSIONING	
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> 1. Damping down exposed surfaces regularly to reduce dust emissions. 2. Maintain equipment to reduce exhaust emissions. 	

3 CONCLUSION

The environmental and social impacts of the projects were spread through the four project phases. There were both positive and some negative project impacts identified through the BAs. The following section briefly describes some of the major impacts and the proposed mitigation measures within each of the project phases.

3.1 Pre-Construction Phase

The first site activities before mobilization of equipment will be a survey, required for final design of the switchyard and power line structures. It is advisable all walk downs by the biodiversity and surface water specialists be undertaken, and be used to inform the final tower locations prior to the finalisation of tower positions. In addition, the biodiversity walk down should be undertaken in the flowering season once the tower positions have been pegged in order to identify any affected RDL floral species should be removed and rescued. There could be negative impacts on land associated with the construction of camps (temporary loss) and storage of construction materials especially if such construction is carried out on agriculturally productive land. Expectations of improvement in livelihood among locals must be addressed through public participation. Construction contracts will include environmental monitoring and management procedures and requirements. These must be in place prior to the commencement of any construction activities.

3.2 Construction Phase

This phase of the activity will have both positive and negative impacts. The positive impacts are some employment opportunities offered to the construction workers and any other labourer who will be hired to provide their services during the construction phase. The negative impacts would include wastes generated, accidents, health and safety, air, dust and noise pollution, vegetation clearance, soil erosion, socio-environmental issues, loss of trees, and compaction of soil. Most of the negative impacts are minor and temporary. To mitigate negative impacts, the contractor shall ensure that all staff have adequate protective clothing and are adequately trained. The whole range of mitigation measures are however, outlined in the EMP in this regard.

3.3 Operational Phase

The proposed projects will have minimal negative effects which mainly relate to loss of aesthetic value and habitat as well as nuisance to affected landowners.

3.4 Decommissioning Phase

As with any project, the facilities used in these projects will have a lifespan after which they may no longer be cost effective to continue with operation or may degrade and become inoperable. At that time, the projects would be decommissioned, and the existing equipment removed and most likely replaced. The mitigation measures highlighted in the construction phase will once again become applicable as the construction of new infrastructure would essentially be associated with similar activities and would likely result in similar impacts.

The disposal of materials from the decommissioned plant is not viewed as high risk. Much of the material would be recyclable (steel structures) or inert (insulators, concrete foundations, etc.). These materials would however, need to be disposed of at a formal waste disposal or recycling centre.

Based on the above information, it is unlikely that the projects will have many adverse social and environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the projects such that the overall benefits from the projects will greatly outweigh the few adverse impacts. All the negative impacts will either be moderate or lesser in rating and could be easily mitigated. Generally, the proposed power lines will result in appreciable benefits to the people in the projects area of influence and bring opportunities for development in the area.

COMPLAINTS RECORD SHEET

Complaints Record Sheet

COMPLAINTS RECORD SHEET	File Ref:	DATE:
	Page of
COMPLAINT RAISED BY:		
CAPACITY OF COMPLAINANT:		
COMPLAINT RECORDED BY:		
COMPLAINT:		
PROPOSED REMEDIAL ACTION:		
ECO: _____ Date: _____		
NOTES BY ECO:		
ECO: _____ Date: _____ Site Manager: _____ Date: _____		

Annexure B

MANAGEMENT OF SOILS: GUIDELINES

Topsoil

Source of topsoil

- Topsoil shall be striped from all areas that are to be utilised during the construction period and where permanent structures and access is required. These areas will include temporary and permanent access roads, construction camps, and lay down areas. Topsoil shall be striped after clearing of woody vegetation and before excavation or construction commences.
- The topsoil is regarded as the top 300mm of the soil profile irrespective of the fertility appearance, structure, agricultural potential, fertility and composition of the soil.

Topsoil stripping

- Soil shall be stripped to a minimum depth of 150mm and maximum depth of 300mm or to the depth of bedrock where soil is shallower than 300mm. Herbaceous vegetation, overlying grass and other fine organic matter shall not be removed from the stripped soil.
- No topsoil which has been stripped shall be buried or in any other way be rendered unsuitable for further use by mixing with spoil or by compaction using machinery.
- Topsoil shall preferably be stripped when it is in a dry condition in order to prevent compaction.

Topsoil stockpiling

- The Consulting Engineer or Environmental Control Officer shall stockpile stripped topsoil in areas, which have been approved. Soil stockpiles may take the form of windows.
- To prevent erosion, material stockpiled for long periods (2 weeks) should be retained in a bermed area.
- Topsoil, mulch and subsoil stockpiles must be placed in higher-lying areas of the sit, and must not be positioned within stormwater channels or areas of ponding.
- Topsoil stripped from different soil zones shall be stockpiled separately and clearly identified as such. Under no circumstances shall topsoil obtained from different soil zones be mixed.
- Soil stockpiles shall not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.
- No vehicles shall be allowed access onto the stockpiles after they have been placed. Topsoil stockpiles shall be clearly demarcated in order to prevent vehicle access and for later identification when required.
- Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation in the soil.

- After topsoil removal has been completed, the Contractor shall apply soil conservation measures to the stockpiles where and as directed by the Consulting Engineer or Environmental Control Officer. This may include the use of erosion control fabric or grass seeding.

Topsoil replacement

- Topsoil shall be replaced to a minimum depth of 75mm over all areas where it has been stripped and over disused borrow pits, after construction in those areas has ceased. Topsoil placement shall follow as soon as construction in an area has ceased.
- All areas onto which topsoil is to be spread shall be graded to the approximate original landform with maximum slopes of 1:25 and shall be ripped prior to topsoil placement. The entire area shall be ripped parallel to the contours to a minimum depth of 300mm.
- Topsoil shall be placed in the same soil zone from which it had been stripped. However, if there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil may be brought from other soil zones at the approval of the Consulting Engineer or Environmental Control Officer.
- Where topsoil that has been stripped by the Contractor is insufficient to provide the minimum specified depth, the Contractor shall obtain suitable substitute material from other sources at no cost to the employer. The suitability of the substitute material shall be determined by means of soil analyse, which are acceptable to the Consulting Engineer or Environmental Control Officer.
- No vehicles shall be allowed access onto or through topsoil after it has been reinstated.
- After topsoil reinstatement is complete, cleared and stockpiled vegetative matter shall be spread randomly by hand over the top soiled area. The vegetative material must be replaced on the areas from where it has been removed.

Annexure C

ESKOM REQUIREMENTS FOR WORK IN OR NEAR ESKOM SERVITUDES.

- 1) Eskom's rights and services must be acknowledged and respected at all times.
- 2) Eskom shall at all times retain unobstructed access to and egress from its servitudes.
- 3) Eskom's consent does not relieve the developer from obtaining the necessary statutory, land owner or municipal approvals.
- 4) Any cost incurred by Eskom as a result of non-compliance to any relevant environmental legislation will be charged to the developer.
- 5) If Eskom has to incur any expenditure in order to comply with statutory clearances or other regulations as a result of the developer's activities or because of the presence of his equipment or installation within the servitude restriction area, the developer shall pay such costs to Eskom on demand.
- 6) The use of explosives of any type within 500 metres of Eskom's services shall only occur with Eskom's previous written permission. If such permission is granted the developer must give at least fourteen working days prior notice of the commencement of blasting. This allows time for arrangements to be made for supervision and/or precautionary instructions to be issued in terms of the blasting process. It is advisable to make application separately in this regard.
- 7) Changes in ground level may not infringe statutory ground to conductor clearances or statutory visibility clearances. After any changes in ground level, the surface shall be rehabilitated and stabilised so as to prevent erosion. The measures taken shall be to Eskom's satisfaction.
- 8) Eskom shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of the encroachment or of the use of the servitude area by the developer, his/her agent, contractors, employees, successors in title, and assignees. The developer indemnifies Eskom against loss, claims or damages including claims pertaining to consequential damages by third parties and whether as a result of damage to or interruption of or interference with Eskom's services or apparatus or otherwise. Eskom will not be held responsible for damage to the developer's equipment.
- 9) No mechanical equipment, including mechanical excavators or high lifting machinery, shall be used in the vicinity of Eskom's apparatus and/or services, without prior written permission having been granted by Eskom. If such permission is granted the developer must give at least seven working days' notice prior to the commencement of work. This allows time for

arrangements to be made for supervision and/or precautionary instructions to be issued by the relevant Eskom Manager

- 10) Note: Where an electrical outage is required, at least fourteen work days are required to arrange it.
- 11) Eskom's rights and duties in the servitude shall be accepted as having prior right at all times and shall not be obstructed or interfered with.
- 12) Under no circumstances shall rubble, earth or other material be dumped within the servitude restriction area. The developer shall maintain the area concerned to Eskom's satisfaction. The developer shall be liable to Eskom for the cost of any remedial action which has to be carried out by Eskom.
- 13) The clearances between Eskom's live electrical equipment and the proposed construction work shall be observed as stipulated by Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993).
- 14) Equipment shall be regarded electrically live and therefore dangerous at all times.
- 15) In spite of the restrictions stipulated by Regulation 15 of the Electrical Machinery Regulations of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), as an additional safety precaution, Eskom will not approve the erection of houses, or structures occupied or frequented by human beings, under the power lines or within the servitude restriction area.
- 16) Eskom may stipulate any additional requirements to highlight any possible exposure to Customers or Public to coming into contact or be exposed to any dangers of Eskom plant.
- 17) It is required of the developer to familiarise himself with all safety hazards related to Electrical plant.
- 18) Any third party servitudes encroaching on Eskom servitudes shall be registered against Eskom's title deed at the developer's own cost. If such a servitude is brought into being, its existence should be endorsed on the Eskom servitude deed concerned, while the third party's servitude deed must also include the rights of the affected Eskom servitude.
- 19) Eskom request that any wind turbine structures be placed at least four (4) times the blade diameter of the wind turbine to be used away from any Eskom High voltage power line servitudes (220kV and above). This is to allow for future possible expansion of the Eskom servitude to allow for additional power lines to be constructed parallel to existing lines, upgrading of existing lines to higher voltage Transmission power lines in future, combat the effects of turbulence from the turbines on the power lines, limit the possible effect of electromagnetic interference and to decrease the risk of catastrophic failure of the turbine to impact on the power line. Eskom does a lot of live line maintenance work on High Voltage lines and thus use helicopters in close proximity to high voltage lines. Turbines in close proximity to Eskom

Microwave radio sites and substations should also not be placed within the line of site of the antennae on such sites and towers.

John Geeringh (Pr Sci Nat)

Senior Environmental Advisor
Eskom GC: Land Development

SiVEST Environmental Division

51 Wessels Road, Rivonia. 2128. South Africa
PO Box 2921, Rivonia. 2128. South Africa

Tel + 27 11 798 0600
Fax +27 11 803 7272
Email info@sivest.co.za
www.sivest.co.za

Contact Person: Andrea Gibb
Cell No.: +27 11 798 0638
Email: andrea@sivest.co.za