



FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME

**The Proposed Development of a 150 MW Concentrated
Solar Power Plant (Parabolic Trough) and Associated
Infrastructure on Remaining Extent of the Farm
Groenwater 453 and Remaining Extent of Portions 4
and 5 of the Farm Groenwater 453 within the
Tsantsabane Local Municipality, Kimberley
Registration Division, Northern Cape Province**

DEA reference: 14/12/16/3/3/2/923

Prepared for: Metsimatala CSP Solar Energy (Pty) Ltd

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Today's Impact | Tomorrow's Legacy

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ABBREVIATIONS

BA	Basic Assessment
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CIA	Cumulative Impact Assessment
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
CPA	Communal Property Association
CRR	Comments and Responses Report
CSP	Concentrated Solar Power
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DENC	Department of Environment and Nature Conservation
DM	District Municipality
DMR	Department of Mineral Resources
DoE	Department of Energy
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
FSR	Final Scoping Report
Ha	Hectares
HTF	Heat Transfer Fluid
I & APs	Interested and Affected Parties
IDP	Integrated Development Plan
IPP	Independent Power Producer
kV	Kilovolt
LED	Local Economic Development
LM	Local Municipality
LSA	Late Stone Age
MAP	Mean Annual Precipitation
MASL	Metres Above Sea Level
MSA	Middle Stone Age
MVA	Megavolt ampere
MW	Megawatt

NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
PFS	Pre-feasibility Study
PPP	Public Participation Process
PUC	Point of Utility Connection
PoSEIA	Plan of Study for Environmental Impact Assessment
REIPPP	Renewable Energy Independent Power Producers Procurement Programme
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SIA	Social Impact Assessment
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
VIA	Visual Impact Assessment
WRYCM	Water Resource Yield Computer Model
WULA	Water Use Licence Application

GLOSSARY OF TERMS

Alien species: A plant or animal species introduced from elsewhere: neither endemic nor indigenous.

Applicant: Any person who applies for an authorisation to undertake an activity or undertake an Environmental Process in terms of the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as contemplated in the scheduled activities listed in Government Notice (GN) No R. 543, 544 and 545.

Biodiversity: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

Cumulative Impact: In relation to an activity, cumulative impact means the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Ecology: The study of the interrelationships between organisms and their environments.

Environment: All physical, chemical and biological factors and conditions that influence an object.

Environmental Impact Assessment: In relation to an application, to which Scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

Environmental Impact Report: In-depth assessment of impacts associated with a proposed development. This forms the second phase of an Environmental Impact Assessment and follows on from the Scoping Report.

Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.

Heritage resources: This means any place or object of cultural significance. See also archaeological resources above

Precipitation: Any form of water, such as rain, snow, sleet, or hail that falls to the earth's surface.

Red Data species: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

Riparian: The area of land adjacent to a stream or river that is influenced by stream induced or related processes.

Soil compaction: Soil becoming dense by blows, vehicle passage or other type of loading. Wet soils compact easier than moist or dry soils.

1 Introduction

The main objectives of the Environmental Management Programme (EMPr) are to describe the proposed mitigation measures associated with identified impacts and to identify the specific people that will be responsible for implementation of the required mitigation measures. This is necessary in order to ensure that potential impacts identified on the environment are minimised and managed at acceptable levels during the construction and operational phases of the proposed development of a new CSP facility.

This EMPr must form part of the contractual agreement between the relevant contractor(s) and the developer.

1.1 NEMA Regulation 23 Report Compliance

Regulation 23 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014 makes reference to its Appendix 4 which provides the content requirements for Environmental Management Programmes. The table below lists the relevant requirements, indicates whether the relevant information is included in this report or not, and provides cross-references as to where the relevant information can be found in this report.

Table 1: Environmental Management Programme requirements in terms of Regulation 23 of the EIA Regulations of 2014.

Reg.	EIA Regulations 2014 - Appendix 4 – Content of Environmental Management programme (EMPr)	Location in this EMPr
(a)	A environmental management programme must comply with section 24N of the Act and include - details of -	
	(i) the EAP who prepared the EMPr; and	Section 2.1
	(ii) the expertise of that EAP to prepare an EMPr, including a Curriculum Vitae	Section 2.2
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 3
(c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;	Appendix B
(d)	a description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	Section 7

Reg.	EIA Regulations 2014 - Appendix 4 – Content of Environmental Management programme (EMPr)	Location in this EMPr
	(i) planning and design;	Section 7
	(ii) pre-construction activities;	Section 7
	(iii) construction activities;	Section 7
	(iv) rehabilitation of the environment after construction and where applicable post closure; and	Section 10
	(v) where relevant, operation activities;	Section 7
(e)	a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 7
(f)	a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to -	Section 7
	(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 7
	(ii) comply with any prescribed environmental management standards or practices;	Section 7
	(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	Section 7
	(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Section 7
(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5 Section 7
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 7
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 4 Section 7
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 7
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 5 Section 7
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 5 Section 7
(m)	an environmental awareness plan describing the manner in which-	Section 6
	(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Section 6
	(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 6

Reg.	EIA Regulations 2014 - Appendix 4 – Content of Environmental Management programme (EMPr)	Location in this EMPr
(n)	any specific information that may be required by the competent authority.	Section 8 Appendix C

1.2 Report Layout

The table below summarises the content layout of this report.

Table 2: Summary of report content layout

Chapter	Chapter Heading	Content Summary
1	Introduction	Provides a brief background to the proposed project, and explains the compliance of this report with regards to Regulation 33 of the NEMA.
2	Environmental Assessment Practitioner	Provides details of the EAP who prepared this EMPr, and provides information on the expertise of the EAP.
3	Project Description and Listed Activities Covered by this EMPr	Provides a description of the project and its location as well as listed NEMA activities triggered by the proposed project.
4	Persons Responsible for Implementing this EMPr	Provides information on the persons who will be responsible for implementing this EMPr, and explains requirements with regards to on-site communication, site instruction entries, method statements, and record keeping.
5	Monitoring, Performance Assessment and Reporting on EMPr Compliance	Provides information on monitoring, performance assessment and reporting on EMPr Compliance, ECO site inspection reports, and photographs.
6	Environmental Awareness Plan	Provides information on environmental awareness and risk training, and basic rules of conduct. Also provides an environmental risk plan.
7	Impacts and Mitigation Measures	Provides EMPrs for the relevant project phases.
8	Management Plans	Discussion on the project specific additional management plans which were compiled.

Chapter	Chapter Heading	Content Summary
9	Recommendations from the Department of Environmental Affairs: Biodiversity and Conservation Directorate	Provides the additional recommendation as received from the directorate with regards to the project management.
10	Emergency Response Plan	Provides information on the emergency response plan.
11	Incident Register	Stipulates the content requirements for incident registers.
12	Decommissioning/refurbishment Phase	Provides a discussion on the processes to be followed if the site is to be decommissioned at the end of its lifespan.
13	Conclusion	EMPr content conclusion.

2 Environmental Assessment Practitioner

This EMPr was prepared by Rikus Lamprecht from Enviroworks, the Environmental Assessment Practitioner (EAP) who is undertaking this BA process. The sections below provide the details of the EAP and explains the EAP's expertise and experience to prepare this EMPr.

2.1 Details of the EAP

Enviroworks was appointed by Metsimatala CSP Solar Energy (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to conduct a full Scoping & EIA process for the proposed project.

Enviroworks, a Small, Medium and Micro-sized Enterprise (SMME) company, was established in November 2002. Although the formal establishment of the company took place in 2002, it is backed by over 70 years of collective professional service and experience in the environmental field. The qualifications, expertise and experience of our professional team form the backbone of the company's continued success.

The vision of Enviroworks is to provide excellent, cutting edge Environmental Management Solutions and Services, underpinned by a team of professional consultants together with our associated network of specialist partners and project managers. Through an integration of skills and expertise, it is envisioned that Enviroworks will deliver exceptional, competitive services for task execution and to meet deliverables.

Enviroworks through our years of experience and industry presence assures the seamless execution and roll out of tasks to achieve projected results on time. The company continuously engages existing and emerging legislation, guidelines and practices, to ensure the execution of qualitative and appropriate studies. Our past experience on renewable energy projects further benefits our understanding of technology-related processes and the impacts thereof.

Table 3: Details of the EAP

Company/entity name:	Rikus Lamprecht (on behalf of Enviroworks)
Physical address:	5 Walter Sisulu Street; Universitas; Bloemfontein; 9301
Postal address:	PO Box X 01; Suite 116; Brandhof; 9324
Contact person:	Rikus Lamprecht
Designation:	Senior Environmental Consultant
Contact number:	072 230 9598

E-mail address: rikus@enviroworks.co.za

Qualifications: M.Env.Sci Ecological Remediation and Sustainable Utilisation

2.2 Expertise of the EAP Representative

Rikus Lamprecht was employed by Enviroworks in 2016 as a Senior Environmental Consultant. Rikus was previously employed by Fraser Alexander Tailings from 2011 to 2015 as an Environmental Contracts Manager where he was responsible for the technical and operational management of all Fraser Alexander Tailings' environmental mining rehabilitation work. He was responsible for all facets of project management as well as implementation of rehabilitation and environmental strategies by planning activities, organizing physical, financial and human resources, delegating task responsibilities, leading people, controlling risks and providing technical support.

Rikus holds a B.Sc Botany and Zoology as well as an M.Env.Sci Ecological Remediation and Sustainable Utilisation degree. His environmental management knowledge and practical experience as well as his enthusiasm, disciplined goal-driven mind-set and high personal standards ensures high quality outputs during the implementation and completion of any environmental projects.

Relevant Project Experience

2016

- Management of the Environmental Authorisation and EIA processes of the proposed Meerkat Hydropower Facility Project in the Orange River in the Northern Cape Province.
- Management of the Environmental Authorisation and EIA processes of the proposed N8 Realignment Project in the Freestate Province.
- Conducting of Environmental Impact Assessment Report for the proposed cultivation of a 500 ha Vineyard for CarpeDiem in the Northern Cape
- Management of the 24G Environmental Authorisation and EIA processes of the Mooihoekdam Project in the Freestate Province.
- Conducting of Waste License and Air Emissions License applications for the 24G process of Clinvet International (Pty) Ltd
- Completion of a specialist vegetation study and report for the proposed Olifantshoek Bulk Water Supply Project in the Northern Cape Province.

- Completion of a specialist vegetation study and report for the proposed N8 gravel quarries in the Freestate Province.
- Completion of a specialist vegetation study and report for the proposed 100 ha vineyard development on the Farm De Eelt, Prieska, Northern Cape Province.

See Appendix A for Curriculum Vitae.

2.3 Details of the Internal Reviewer

Elbi Bredenkamp started her career as a case officer and served as an environmental specialist with the Department of Minerals and Energy gaining extensive knowledge of mining impact and attributing management mechanisms.

From 1997 to 2002 Elbi further developed her knowledge in the environmental field as a case officer working for the Department of Tourism, Environment and Economic Affairs, Free State (DTEEA-FS). Here Elbi was responsible for reviewing environmental impact assessments and developing administrative processes & organizational structures within the department. Through ongoing dealings with Environmental Legislation Elbi familiarized herself with the National Environment Management Act (Act 107 of 1998 “NEMA”) and NEMA EIA Regulations.

In 2002 Elbi established Enviroworks. As the Director of the company, Elbi gained extensive experience in the conducting of Environmental Impact Assessments, Risk Analysis, Auditing and Monitoring and Compiling of Environmental Management Plans for numerous projects. A familiarity with departmental mechanisms and functioning aided towards the success of these projects.

Designation: Company Director
Contact number: 082 562 4134
Email address: elbi@enviroworks.co.za

See Appendix A for Curriculum Vitae.

3 Project Description and Listed Activities Covered by this EMPr

3.1 Brief Project Description

Metsimatala CSP Solar Energy (Pty) Ltd intends to construct a 150 MW CSP (parabolic trough) facility on the project location as discussed above. The principal objective of this project will be for the generation and supply of clean, renewable electricity into the Eskom national power grid, as part of the proposed Renewable Energy Independent Power Producers Procurement Program (REIPPPP).

The development will constitute a total footprint area of 500 ha. This will be comprised of a solar field of parabolic trough collector units connected in parallel throughout a system of insulated pipes; wiring between the CSP mirror panels; an onsite power block where the electricity will be generated; an onsite substation from where electricity will be transmitted; internal access roads; a security guardhouse at the entrance gate to regulate access; relevant office buildings and a storage area. The parabolic trough collector units of the solar field will be positioned in parallel on a north-south axis. This will enable the collector unit surfaces to be facing in an east-west direction in order for them to be able to track the east to west movement of the sun throughout the day for maximum solar radiation collection.

3.2 Project Location

The proposed project facility and associated infrastructure will be established on the Farm Groenwater No 453 which is located directly adjacent to the west of the informal settlement of Metsimatala. The specific farm portions on which the facility will be established are the Remaining Extent of Farm Groenwater No 453 as well as Remaining Extent of Portions 4 and 5 of Farm Groenwater No 453. The properties are owned by the Groenwater Communal Property Association (CPA) members and is situated approximately 22 km north-east of the town of Postmasburg and 17 km north-east of the town of Lime Acres in the Northern Cape Province. The properties are situated in the Tsantsabane Local Municipality which, in turn, forms part of the greater ZF Mgcawu District Municipality. Access to the proposed project area is obtained by way of the R 385 provincial road which lies directly adjacent to the south of the proposed project area and runs between the towns of Daniëlskuil and Postmasburg. The Groenwaterspruit lies to the West of the Farm Groenwater No 453 on a neighbouring farm, while a railroad traverses the Farm Groenwater No 453 on the Remaining Extent of Portion 4 and the Remaining Extent.

Contact details for the relevant Land Owner representative:

Contact person: Kagisho Lekwene
Contact number: 073 776 4775
Email address: kagisholekwene@gmail.com

Details of the farm portions on which the facility of the proposed project will be established area are indicated in the table below:

Table 4: Details of the farm portions on which the proposed project will be located

Farm Name and Number	SG 21 Digit Code	Land owner
Remaining Extent, Farm Groenwater No 453	C03100000000045300000	Groenwater Communal Property Association
Remaining Extent of Portion 4, Farm Groenwater No 453	C03100000000045300004	Groenwater Communal Property Association
Remaining Extent of Portion 5, Farm Groenwater No 453	C03100000000045300005	Groenwater Communal Property Association

The four corner coordinate points for the corners of the proposed project area are as follows:

- North-western corner 28°16'23.74776"S 23°17'11.00848"E
- North-eastern corner 28°16'23.59751"S 23°18'20.35642"E
- South-eastern corner 28°17'49.02900"S 23°18'20.60042"E
- South-western corner 28°17'49.17939"S 23°17'11.23711"E

Management objectives

- Construction activities must be restricted to the proposed footprint area for which environmental authorisation is obtained.
- An environmental authorisation amendment request must first be submitted to the competent authority and approved if any proposed deviation or expansion of footprint area during the construction phase is required.
- Areas surrounding the footprint need to be managed in accordance with the Open Space Management Plan.

- All mitigation measures as recommended the various specialists must be implemented during the construction and operational phases.

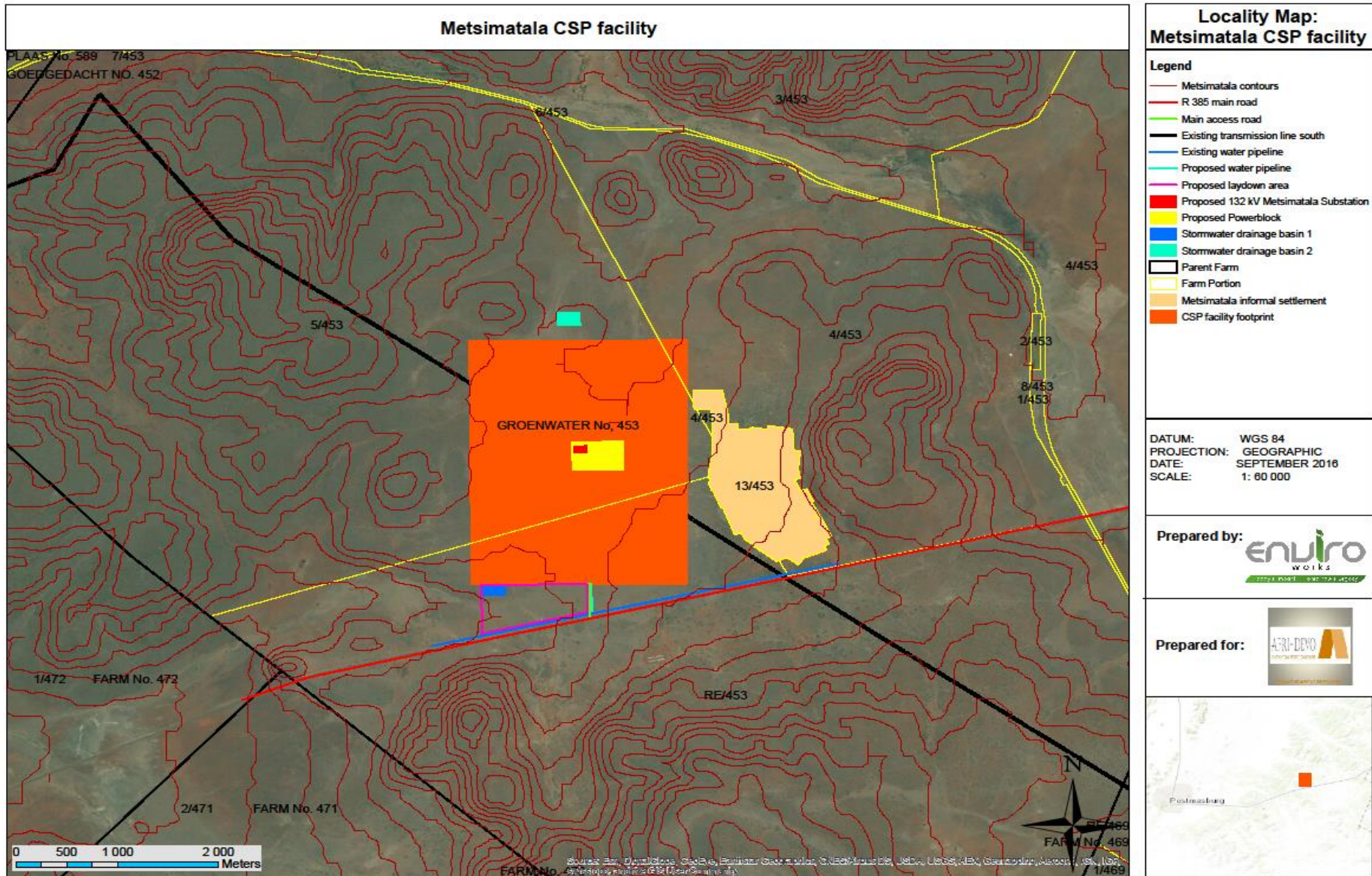


Figure 1: Locality map illustrating the location of the proposed CSP facility development

3.3 Project Phases

Three phases:

- Construction Phase (includes planning, design, pre-construction and construction activities)
- Operational Phase
- Decommissioning/refurbishment Phase

3.4 NEMA Listed Activities Triggered

The proposed project triggers the following listed activities as per the National Environmental Management Act (Act 107 of 1998) Environmental Impact Assessment Regulations, 2014 (Government Notices R983, R984 and R985 in Government Gazette No. 38282 of 04 December 2014):

Table 5: Environmental Impact Assessment Regulations, 2014 listed activities triggered by the proposed project

Regulation	Activity	Description of trigger activity in proposed project
GN. R. 983 (Listing Notice 1)	<p>Activity 11</p> <p>The development of facilities or infrastructure for the transmission and distribution of electricity-</p> <p>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</p>	<p>Transmission/distribution components associated with electricity transmission from the powerblock into the substation will be constructed on the 500 ha footprint area. The substation and powerline form part of a separate environmental authorisation application</p> <p>14/12/16/3/3/1/1625.</p>
	<p>Activity 28</p> <p>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development:</p>	<p>Construction and operation of a CSP (Parabolic Trough) facility with associated infrastructure (power block and internal substation) with a 500 ha footprint and which will</p>

Regulation	Activity	Description of trigger activity in proposed project
	(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	<p>have a power generating capacity of 150 MW.</p> <p>A temporary 38.8 ha laydown area will be situated to the south of the footprint next to the R 385 for the duration of the construction phase.</p> <p>Two 3 ha stormwater basins will be situated to the north and south of the footprint respectively.</p>
GN. R. 984 (Listing Notice 2)	<p>Activity 1</p> <p>The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs within an urban area.</p>	Construction and operation of a CSP (Parabolic Trough) facility with associated infrastructure (power block and internal substation) with a 500 ha footprint and which will have a power generating capacity of 150 MW.
	<p>Activity 15</p> <p>The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for -</p> <p>(i) the undertaking of a linear</p>	Construction and operation of a CSP (Parabolic Trough) facility with associated infrastructure (power block and internal substation) on a natural area with indigenous vegetation covering a

Regulation	Activity	Description of trigger activity in proposed project
	activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	footprint area of 500 ha. The area will be cleared during construction. A temporary 38.8 ha laydown area will be situated to the south of the footprint next to the R 385 for the duration of the construction phase. Two 3 ha stormwater basins will be situated to the north and south of the footprint respectively.
GN. R. 985 (Listing Notice 3)	Activity 4 The development of a road wider than 4 metres with a reserve less than 13,5 metres. (a) In Free State, Limpopo, Mpumalanga and Northern Cape provinces: (ii) Outside urban areas, in: (ee) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	All site roads will require a width of approximately 5 – 6 m and drainage trenches will be installed along the sides of the internal road network. In addition, silt traps will be installed at the outfall of the drainage trenches to existing watercourses. A small portion of the proposed development footprint is classified as CBA.
	Activity 12 The clearance of an area of 300	Construction and operation of a CSP Facility with

Regulation	Activity	Description of trigger activity in proposed project
	<p>square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with the maintenance management plan.</p> <p>(d) In Northern Cape:</p> <p>(ii) Within critical biodiversity areas identified in bioregional plans</p>	<p>associated infrastructure on an area with indigenous vegetation covering a footprint area of 500 ha.</p> <p>A small portion of the proposed development footprint is classified as CBA.</p>
	<p>Activity 18</p> <p>The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre</p> <p>(a) In Free State, Limpopo, Mpumalanga and Northern Cape provinces:</p> <p>ii. Outside urban areas, in:</p> <p>(ee) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</p>	<p>All site roads will require a width of approximately 5 – 6 m and drainage trenches will be installed along the sides of the internal road network. In addition, silt traps will be installed at the outfall of the drainage trenches to existing watercourses.</p> <p>A small portion of the proposed development footprint is classified as CBA.</p>

4 Persons Responsible for Implementing this EMPr

The “Responsibility” columns in the impact and mitigation tables provided below indicate the team member(s) which are responsible for implementation of the identified mitigation measures. These team members include the following:

- Construction contractor(s);
- Construction manager;
- Applicant/Developer representative;
- Environmental Control Officer (ECO)

The section below lists additional measures, which should be implemented by the relevant team members.

During the **construction phase**, the **construction contractor** will:

- Be responsible to have the environmental authorisation and EMPr available on site at all times;
 - Ensure and enforce compliance with all conditions and requirements stipulated in the environmental authorisation and EMPr
 - Ensure that all mitigation measures for which they are responsible, are implemented as described in this EMPr;
 - Ensure that all documentation/filing in terms of environmental information is adequately maintained/updated and readily available on site.
 - Ensure adequate training and awareness of all relevant employees on the environmental authorisation and EMPr
- Provide the applicant and ECO with a “Method Statement” for all significant work/tasks to be performed on site. This will indicate the systematic procedures that will be applied for work/tasks in order to meet the requirements of any aspect of the EMPr;
- Ensure that all findings/issues/problems identified during ECO environmental inspections, are addressed and rectified as soon as reasonably possible.
- Appoint a suitably qualified, skilled and experienced Environmental Officer on site

During the **construction phase**, the **contract project managers** will:

- Manage and oversee the construction phase of the project from a civils and environmental management perspective in order to ensure legal compliance.
- Monitor and enforce contractor obligations to the EA and EMPr;
- Have the authority to stop work and issue fines in the event of environmental non-compliance;
- Appoint a suitably qualified, skilled and experienced ECO on site

- Receive inspection/compliance reports from the ECO and adequately report to the applicant/client on a continual basis;
- Support the ECO in his/her roles and responsibilities.

During the **construction phase**, the **environmental control officer (ECO)** will:

- Conduct a handover of the EA and EMPr with the project manager and contractor and ensure they are made aware of the content, requirements and conditions. Ensure that the all roles and responsibilities are understood by all relevant parties.
- Conduct environmental monitoring and auditing activities on a continual basis to ensure compliance with the EA and EMPr;
 - Complete an ECO checklist after each site inspection and incorporate and distribute this to the project team within 5 days; and
- Provide feedback on auditing activities in the form of site meetings and site inspection reports to the applicant and contractor
- Work collectively with significant role-players on site to achieve desired environmental objectives, but not be influenced in opinion and must report to the applicant only;
- May/must, in the event of there being a serious threat to or impact on the environment, correspond with the contract project manager to stop works and address situation adequately prior to continuation;
- Conduct a final environmental audit of the project on completion of construction and rehabilitation, for submission to the DEA to review.

During the **operational phase** the **applicant/developer**, will be responsible to prevent negative environmental impacts, and as such will be responsible to:

- Be responsible to have the environmental authorisation and EMPr available on site at all times;
 - Ensure and enforce compliance with all conditions and requirements stipulated in the environmental authorisation and EMPr
 - Ensure that all mitigation measures for which they are responsible, are implemented as described in this EMPr;
 - Ensure that all documentation/filing in terms of environmental information is adequately maintained/updated and readily available on site.
 - Ensure adequate training and awareness of all relevant employees on the environmental authorisation and EMPr
- Set aside a budget for maintenance;

- Maintain and manage all facilities and infrastructure in good working order to effectively fulfil its intended purpose and to prevent negative environmental impacts;
- Not construct or modify any additional buildings or infrastructure contrary to the approved environmental authorisation, without performing an environmental impact assessment where listed activities of the 2014 NEMA EIA Regulations are triggered;
 - An environmental authorisation amendment request must first be submitted to the competent authority and approved if any proposed deviation from the environmental authorisation area during the construction or operational phase is required.
- May/must, in the event of there being a serious threat to or impact on the environment, to operational works and address situation adequately prior to continuation;

4.1 On-site Communication and Document control

The following sections describe the significant site communication and document control measures that will need to be implemented.

4.1.1 Site Instruction Entries

The Site Instruction book should be used for the recording of general site instructions as they relate to the works on site. It should also be used for the issuing of **stop work orders** for the purposes of immediately halting any particular activities of the contractor in lieu of the environmental risk that they may pose.

4.1.2 Method Statements

Method statements from the contractor will be required for specific sensitive actions on request by the authorities or the ECO.

Such a method statement forms the baseline information on which work in sensitive environments takes place. This is an interactive “live document” which allows for modifications to be negotiated between the contractor and ECO/Engineer, as circumstances unfold.

A method statement systematically describes the scope of the intended work, step-by-step, in order for the ECO and Engineer to understand the Contractor’s intentions. This will enable them to determine potential environmental impacts and assist in devising any mitigation measures, which would minimise environmental impact during these tasks. For each instance wherein it is requested that the Contractor submit a method statement to the satisfaction of the ECO, the format should clearly indicate the following:

- **What** - a brief description of the work to be undertaken;

- **How** - a detailed description of the process of work, methods and materials;
- **Where** - a description/sketch map of the locality of work (if applicable); and
- **When** - the sequencing of actions with due commencement dates and completion date estimates.

All method statements will form part of the EMPr documentation and are subject to all terms and conditions contained within the EMPr main document.

The contractor must submit the method statements to the ECO prior to the commencement of any significant construction activities. Work may not commence until the method statement has been approved by the ECO and relevant parties.

4.1.3 Documentation control and record keeping

All records related to the implementation of the EA and EMPr must be adequately managed and kept together in a filing system on site where it is safe and can be readily accessed if necessary. These records should be kept for two years and should at any time be available for inspection by any relevant authorities.

The main categories of records to be kept on site include the following:

- All documentation related to the EA and EMPr acceptance
- Weekly Environmental Checklists
- Environmental Audit Reports
- Environmental Site meetings
- Required Method Statements
- Environmental Incident Log (Diary)
- Non-compliance register
- Corrective Action records
- Contractor Environmental Agreements
- Photographic Record
- Complaints Register
- Claims for Damages
- Interaction with affected parties register
- Environmental Audits
- Final Environmental Audit Report

5 Monitoring, performance Assessment and Reporting on EMPr Compliance

Several monitoring actions are proposed which would be undertaken by various project role players.

For detail on these actions, “Responsible Person/Party”, and “Monitoring Frequency” associated with the identified mitigation measures, refer to the “Monitoring” column in the impact assessment tables below.

5.1 Performance Assessment and Reporting on EMPr Compliance

An independent suitably qualified skilled and experienced Environmental Control Officer (ECO) should be appointed by the Applicant/Developer to oversee the commencement, duration and conclusion of the construction phase. The ECO will be responsible for ensuring implementation of mitigation measures and compliance as described in the EA and EMPr.

The ECO should have relevant proven experience as an ECO, or be supported by a qualified ECO. He/she may not be someone appointed by the contractor, engineer or other party involved with this project, other than the Applicant/Developer.

The following applies, amongst others, to the ECO's role:

- The ECO should undertake **weekly site visits** during the **construction phase to ensure EA and EMPr compliance or stop any potentially significant non-compliance**,
- The ECO must **report on site visits and compliance audits** to the Applicant/Developer only.
- Environmental Audit Reports must be sent to the applicant representative.
- The ECO should present an **environmental site induction/awareness training session** to all personnel before work on site commences, as are also described below; and
- After completion of the construction activities, an environmental audit should be undertaken by the ECO, before commencement of the operational phase, in order to determine compliance with the EA and EMPr outcomes. The audit report must also be submitted to the competent authority.
- The ECO has the authority to stop work if in his/her opinion that there is a serious threat to or impact on the environment, caused directly from the construction operations and address situation adequately prior to continuation. This authority is to be limited to emergency situations where consultation with the engineer or applicant is not immediately available. In all such work stoppage situations the ECO is to inform the engineer and applicant of the reasons for the stoppage as soon as possible.

Upon failure by the contractor or his employee(s) to show adequate consideration to the environmental aspects of this contract, the ECO may recommend to the engineer to have the contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the contractor.

5.1.1 ECO Site Inspection Reports

The ECO site inspection reports (also called “ECO checklists”) will report on the compliance of the construction phase with the conditions and mitigation measures contained in the EA and EMPr. The report should be submitted to the applicant, within five (5) days of the ECO site inspection, and should also be made available to the construction contractor. Copies of the inspection reports should be kept on site.

The contractor’s meeting minutes must reflect environmental queries, agreed actions and dates of eventual compliance. These minutes form part of the official environmental record.

5.1.2 Photographs

It is recommended that continual photographs be taken of the site prior to, continually during and immediately after construction as a visual reference. These photographs should be stored along with other records related to this EMPr. If captured in digital format, hard copies, in colour, must be kept with all other records relevant to the implementation of this EMPr.

5.1.3 Conclusion

The main role of the ECO on site is therefore to assist in ensuring the project is managed and operated in an environmentally sustainable and responsible way in accordance with the EA and EMPr.

6 Environmental Awareness Plan

6.1 Environmental Awareness and Risk Training

All contractor employees and other relevant individuals on site involved with the project are to be adequately trained on their obligations towards sufficient environmental management/controls and methodologies with regards to the EA and EMP conditions, prior to work commencing. Continual training interventions and update discussions surrounding the environmental risk management and mitigation on site must also occur. Daily environmental aspects related to the specific task assigned for a day must be conducted in the form of toolbox talks on a daily basis prior to the commencement of any work. A continual systematically structured environmental education and awareness programme should be developed and aimed at all levels of management within the contractor team. This is required in order to include and inform all employment levels of the legal obligations towards site specific environmental management on site as per the EA and EMP requirements.

All new employees must attend an initial environmental awareness/induction presentation prior to commencing with their new work and must then fall into the continual awareness updating structures.

6.1.1 Basic employee rules of conduct

The following list represents the basic *Do's* and *Don'ts* towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

DO:

- Clear your work areas of litter and building rubble at the end of each day – use the waste bins provided and prevent litter from being blown away by wind.
- Report all fuel or oil spills immediately and stop the spill from continuing.
- Dispose of cigarettes and matches carefully, so to prevent veld fires (arson and littering is an offence).
- Confine work and storage of equipment to within the immediate work area.
- Use all safety equipment and comply with all safety procedures.
- Ensure a working fire extinguisher is immediately at hand if any “HOT WORK” is undertaken e.g. welding, grinding, gas cutting etc.
- Prevent excessive dust and noise.

DO NOT:

- Do not litter - report dirty or full facilities, i.e. full dustbins and dirty or blocked toilets.
- Do not make any fires.
- Do not enter any fenced off or demarcated areas.
- Do not allow waste, litter, oils or foreign materials into any storm water channels or drains or watercourses.
- Do not litter or leave food lying around.

7 Impacts and Mitigation Measures

A number of potential environmental impacts that may arise during the project have been identified. These are outlined in the following table below, and guidelines and mitigation measures are provided.

The Contractor must familiarise himself with the requirements of the EMP, keeping in mind that other site-specific requirements as outlined in the Environmental Authorisation must also be complied with.

7.1 Description of Potential Impacts and their Recommended Mitigation Measures

During the Scoping phase the CSP (Parabolic Trough) system was chosen/recommended as the preferred technology alternative due to its significantly lower environmental impact as well as its more efficient surface area: energy generation ratio. The following section provides descriptions of the potential environmental impacts which the proposed project and preferred technology alternative will have as well as the recommended mitigation measures to be implemented for each impact.

7.1.1 Construction Phase

Removal, destruction and transformation of natural vegetation and faunal habitats

Although the proposed project will completely transform the ecology of the site, the area is situated on a flat, degraded plain devoid of water courses and with little ecological value/significance. The site is not situated in any sensitive ecosystem or plant community and the general area is only classified as other natural areas in accordance with the Provincial Spatial Biodiversity Plan (see sensitivity map below). The species richness of the vegetation of the study area is relatively low with a total of only 33 species. No Red Data listed species were found to occur on the site although a small number of provincially protected species occur. The impact of the proposed project on the ecological resources is therefore considered to be low due to the already low current status of the area. This project will also not result in any significant cumulative impact (low - medium) as the vegetation type is classified as least concerned and disturbance of vegetation will be mostly confined to the footprint of the proposed facility. Although approximately 8 large solar energy projects in various stages of the EIA application process fall within this a 50 km radius of the project site, the area and vegetation type is vast. The cumulative sizes of these proposed facilities should not pose a significant cumulative effect on the integrity of the vegetation type as a whole.

Mitigation measures to reduce potential impacts:

- Strictly limit CSP facility and associated infrastructure construction and development to the proposed project footprint.

- Use existing roads as far as possible and limit the number of additional roads constructed.
- Ensure adequate erosion control measures are implemented to reduce the risk of soil erosion during the construction phase.
- Adhere to the guidelines provided in the Open space Management Plan in order to preserve surrounding natural areas.

Destruction/damage to nationally or provincially protected species individuals

In accordance with the National Forests Act (Act 84 of 1998), no person may cut, disturb, damage or destroy an individual of a nationally protected tree except if a permit is obtained for the desired process. No person may also without a permit pick (which includes the definition damage or destroy), import, export, transport, possess, cultivate or trade in a specimen of a provincially protected plant in accordance with the Northern Cape Nature Conservation Act (Act 9 of 2009). Partaking in any such processes will constitute a transgression of the law which is criminally prosecutable.

A small number of nationally and provincially protected plant species are present on the proposed project site and the development of the facility will either destroy or significantly damage such individuals. This project will also not result in any significant cumulative impact (low - medium) as activities revolving around protected species in the province are well and strictly managed and documented through permitting systems.

Mitigation measures to reduce potential impacts:

- A permit application must be submitted to the national and provincial departments for removal/destruction of the individuals prior to the execution of any restricted activities to these individuals.
- Strictly limit CSP facility and associated infrastructure construction and development to the proposed project footprint.
- Adhere to the guidelines provided in the Open space Management Plan in order to preserve surrounding natural areas.

Avifaunal habitat destruction

Clearing activities during the construction phase will remove vegetation and therefore habitat that birds may require for breeding, foraging and roosting. While some of the impact may be temporary in the case of construction offices or laydown areas mitigation through rehabilitation of such areas is possible, however there will also be direct long-term loss of vegetation associated with the footprint of the solar field, operation offices, and access roads. The avifaunal cumulative impacts associated with the construction phase will not be highly significant and will range between low –

medium. The wider area and vegetation type is very homogenous and provides the same habitat opportunities. The mobility of avifaunal species enables them to simply utilise other similar areas in the vast vegetation type in the event that numerous facilities are constructed in the area.

Mitigation measures to reduce potential impacts:

- Strictly limit transmission line and associated infrastructure construction and development to the proposed project footprint.
- Use existing roads as far as possible and limit the number of additional roads constructed.
- A site specific Construction Environmental Management Plan (CEMP) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. All contractors are to adhere to the CEMP and should apply good environmental practice during construction
- High traffic areas and buildings such as offices, batching plants, storage areas etc. should, where possible be situated in areas that are already disturbed;
- Existing roads and farm tracks should be used where possible;
- The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths;
- No off-road driving;
- Environmental Control Officers to oversee activities and ensure that the site specific construction environmental management plan (CEMP) is implemented and enforced; Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the Construction Environmental Management Plan (CEMP).

Avifaunal disturbance and displacement

Resident bird species (particularly sensitive and breeding species) may be disturbed by construction and activities associated with the CSP plant, which may lead to temporary or permanent displacement and/or a reduction in breeding success. It is noted though that due to the uniformity of the broader area, birds may quite easily move off and find similar habitat nearby. The avifaunal cumulative impacts associated with the construction phase will therefore not be highly significant and will range between low - medium due to vast available homogenous habitat even in the event of numerous facilities being constructed.

Mitigation measures to reduce potential impacts:

- Strictly limit transmission line and associated infrastructure construction and development to the proposed project footprint.
- Use existing roads as far as possible and limit the number of additional roads constructed.

- The appointed Environmental Control Officer (ECO) must be trained by an avifaunal specialist to identify the potential Red Data species as well as the signs that indicate possible breeding by these species. The ECO must then, during audits/site visits, make a concerted effort to look out for such breeding activities of Red Data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on site of these species. If any of the Red Data species are confirmed to be breeding (e.g. if a nest site is found), construction activities within 500 m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed.
- Prior to construction, an avifaunal specialist should conduct a site walkthrough, covering the final power line route, to identify any nests/breeding/roosting activity of sensitive species, as well as any additional sensitive habitats. The results of which may inform the final construction schedule in close proximity to that specific area, including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise.

Reduction of agricultural potential of land

Although 500 ha of natural soil and vegetation will be transformed, the arid climate of the study area, coupled with shallow soils, limits the agricultural potential to low intensity grazing. The impact of the proposed project on the agricultural resources is therefore considered to be low due to the already low current status of the area. The cumulative impact of this development is also expected to be low - medium due to the low potential of the land in the area.

Mitigation measures to reduce potential impacts:

- Strictly limit CSP Facility and associated infrastructure construction and development to the proposed project footprint.
- Use existing roads as far as possible and limit the number of additional roads constructed.
- Ensure adequate erosion control measures are implemented to reduce the risk of soil erosion during the construction phase.

Dust generation and emissions

Increased vehicle and machine activity will result in a significant increase in dust emissions into the surrounding environment. This could have a negative impact on adjacent sheep farmers as excessive dust fallout could result in the value of wool decreasing or potential health implications. If managed correctly the cumulative impact of vehicles on dust generation can be limited to low.

Mitigation measures to reduce potential impacts:

- Dust Management as well as Traffic Management measures must be implemented in order to manage and reduce unnecessary traffic movement in the area and subsequently decrease undesired dust emissions.

Destruction of important heritage conservational cemetery sites (MVIA3 site)

Only a single significant archaeological and cultural heritage site, as defined and protected by the NHRA 1999 and previously identified pertains. Site MVIA3, a Later Iron Age / contemporary cemetery is situated at the northern extremity of Metsimatala Village and adjacent to the proposed Metsimatala CSP facility study site. The site will however not be directly impacted by development. Little to no negative cumulative impact will result from the proposed Metsimatala CSP facility development on recorded archaeological and cultural heritage resources, as defined and protected by the NHRA (Act 25 of 1999). The proposed development and mitigation measures will in fact improve the condition of the single cultural heritage site identified.

Mitigation measures to reduce potential impacts:

- Upgrading of the cemetery boundary fence and gates in order to implement access control to the cemetery is recommended.
- If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils (e.g. trace fossils or stromatolites) or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Itumeleng Masiteng/Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings at the expense of the developer. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required at the expense of the developer.

Transformation of early Proterozoic palaeontological heritage

Although the footprint of the proposed facility will transform the surface area which is largely underlain by Postmasburg Group strata (subordinate siliclastic sediments, lava and tillites, Vm, Vo), it is unlikely that the underlying material would be directly impacted by the proposed development since they are mantled by geologically recent superficial deposits (wind-blown sand) considered to be of low palaeontological sensitivity. Direct impact on potential fossil heritage within the CSP facility footprint is considered to be medium - low. The project could hold a low - medium potential cumulative impact due to the combined sizes of various proposed similar facilities in the area.

Mitigation measures to reduce potential impacts:

- It is advised that sites marked for erection of pylons or construction of associated infrastructure, which will require excavation into fresh bedrock sediments of the Campbellrand and Asbestos Hills Subgroup, be mapped and recorded prior to the construction phase of the development.
- Ensure development is restricted to the project footprint.
- If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils (e.g. trace fossils or stromatolites) or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Itumeleng Masiteng/Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings at the expense of the developer. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required at the expense of the developer.

Visual disturbance of natural landscape and sense of place

The construction of the proposed facility within the landscape, of which the majority is currently viewed as natural areas, will cause a direct visual impact on the tranquillity and sense of place of the area to the local community as well as users of the R 385 road. The visual impact will however be mainly restricted to within 3 km of the proposed project area after which the visibility will diminish. Although another similar facility is situated in the nearby vicinity of the proposed project and numerous other projects are proposed within a 50 km radius, the sloping landscape decreases the visibility distance and subsequent impact of the proposed facility and other similar potential facilities. This proposed facility will therefore not significantly contribute to any cumulative visual disturbances along with other facilities.

Mitigation measures to reduce potential impacts:

- Strictly construction and development to the proposed project footprint.
- Use existing roads as far as possible and limit the number of additional roads constructed.
- Adequate planning and management of laydown areas.
- Minimize vegetation removal.
- Adequate rehabilitation of disturbed areas.
- Lighting design, planning and specifications should be conducted to minimise impact on the area.

Job creation, empowerment and skills development

A total of approximately 1 200 construction related employment opportunities are envisaged for the construction phase. A local employment policy will be applied as far as possible in the appointment of low-skilled and semi-skilled construction workers. Preference will be given to skilled workers within the Northern Cape Province. In view of the very high unemployment rates in the local municipality area (64%), these employment figures will make a significant positive contribution. The proposed project will, along with other similar renewable energy projects, cumulatively contribute to reduction in poverty and unemployment figures in the Northern Cape Province.

Influx of construction workers and job seekers and risk of theft and damage to property

It is expected that the influx of construction workers will have a relatively minor impact on the Metsimatala community. This is because most of the low-skilled and semi-skilled workers will be employed from the existing community. Moreover, the lack of basic services and relative distances to local towns will also to some extent deter the influx of outsiders. However, this aspect should be monitored throughout the construction phase. Because of the location of the development near a low income community, theft and damage to infrastructure is a concern. There will be no cumulative impact of the facility on the local informal settlement.

Mitigation measures to reduce potential impacts:

- A designated security company will be appointed to ensure the safety of the facilities.
- Adequately monitor and manage the process throughout the construction phase.

7.1.2 Operational Phase

Continued destruction and transformation of natural vegetation and faunal habitats due to initial construction phase

The initial impact as per the construction phase will continue. This project will not result in any significant cumulative impact (low - medium) as the vegetation type is classified as least concerned and disturbance of vegetation will be mostly confined to the footprint of the proposed facility. Although approximately 8 large solar energy projects in various stages of the EIA application process fall within this a 50 km radius of the project site, the area and vegetation type is vast. The cumulative sizes of these proposed facilities should not pose a significant cumulative effect on the integrity of the vegetation type as a whole.

Mitigation measures to reduce potential impacts:

- Ensure no unnecessary expansion of the project footprint occurs.

Continued destruction/damage to nationally or provincially protected tree species individuals

Activities during the operational phase could still cause harm to individuals of identified protected species if their protection is not managed.

Mitigation measures to reduce potential impacts:

- If any protected individuals are preserved on site through buffering, it is important that the buffer be sufficiently maintained on a continual basis to ensure its integrity and functionality.
- Complete a training and awareness intervention with the employees and any new/additional employees in order to inform them of the protected tree individuals as well as the reasoning behind the protection.

Avifaunal electrocution

Birds may be electrocuted either by the onsite substation or overhead power lines inside the facility footprint. Of particular concern are large raptors (e.g. Martial Eagle, Black-chested Snake Eagle and White-backed Vulture) and storks, which due to their size and nature are prone to electrocution impacts. Approximately 8 large solar energy projects in various stages of the EIA application process fall within this 50 km radius of the project site. Should some or all of these projects be constructed the cumulative impact significance of bird electrocution may increase.

Mitigation measures to reduce potential impacts:

- All on site power cables and power lines to be buried underground as far as possible.
- Within the on-site substation, electrical components are to be properly insulated in line with Eskom standard guidelines. Where possible, clearances between live components should be greater than 2 m.

Avifaunal burning

Birds may fly between the troughs and the receiver unit. The reflective surfaces focus beams of sunlight into a small area resulting in concentrated solar flux which may burn the bird. Approximately 8 large solar energy projects in various stages of the EIA application process fall within this 50 km radius of the project site. Should some or all of these projects be constructed the cumulative impact significance of the residual impacts of burning may increase.

Mitigation measures to reduce potential impacts:

- Attractants to birds, such as open water, foraging and perching opportunities should be limited in the immediate vicinity of the facility.
- A maintenance plan must be developed for all water associated infrastructure, so that any leakages etc. are identified and fixed as soon as possible so that birds in this arid environment are not attracted to a temporary artificial water source.
- Develop and implement an operational monitoring programme for birds in line with applicable guidelines, which must include searching for mortalities.

- Frequent and regular review of operational phase monitoring data and results by an avifaunal specialist.
- The above reviews should strive to identify sensitive locations at the development including that may require additional mitigation. If unacceptable impacts are observed (in the opinion of the bird specialist and independent review), the specialist should conduct a literature review specific to the impact and provide updated and relevant mitigation options to be implemented. As a starting point for the review of possible mitigations, the following may need to be considered:
 - Assess the suitability of using deterrent devices to reduce burning risk.
 - Various approaches to standby aiming of heliostats, which could significantly reduce flux levels.

Avifaunal collision with infrastructure

Birds may be attracted to, and collide with, the reflective surfaces (parabolic troughs) which may be mistaken for large water bodies and can cause disorientation of flying birds, resulting in injury and/or death. Approximately 8 large solar energy projects in various stages of the EIA application process fall within this 50 km radius of the project site. Should some or all of these projects be constructed the cumulative impact significance of collision may increase.

Mitigation measures to reduce potential impacts:

- Where possible, infrastructure should be located away from known bird flight paths or features which are attractive to birds, e.g. natural or man-made open water areas or agricultural fields.
- To limit bird traffic across the site, perch able structures should be avoided where possible.
- Lighting should be kept to a minimum to avoid attracting insects and birds and light sensors/switches should be utilised to keep lights off when not required.
- Lighting fixtures should be hooded and directed downward, to minimize the skyward and horizontal illumination which could attract night-flying birds.
- Where possible, lighting should be intermittent or flashing-beam lights.
- Careful selection of and modifications to solar facility equipment should be made where possible. For instance, white borders could be applied to trough panels to reduce the resemblance that arrays have of waterbodies.
- Develop and implement an operational monitoring programme for birds in line with applicable guidelines, which must include searching for mortalities.
- Frequent and regular review of operational phase monitoring data and results by an avifaunal specialist.

- The above reviews should strive to identify sensitive locations at the development including that may require additional mitigation. If unacceptable impacts are observed (in the opinion of the bird specialist and independent review), the specialist should conduct a literature review specific to the impact and provide updated and relevant mitigation options to be implemented. As a starting point for the review of possible mitigations, the following may need to be considered:
 - Assess the suitability of using deterrent devices to reduce collision risk.

Pollution of water resources

Pollution of water resources used by birds can result from various operational activities such as production of wastewater (brine), which can be difficult to manage and treat. Artificial evaporation ponds attract water birds, the water of which could be chemically altered. This will have a damaging effect on avifauna utilising the sources and could even lead to death. The cumulative impact is expected to be low as it is anticipated that similar facilities developed will also implement adequate monitoring and management measures to prevent such impacts.

Mitigation measures to reduce potential impacts:

- Ensure that birds do not come into contact with evaporation ponds i.e. ponds should be covered with wire mesh or netting to reduce the possibilities of, attracting, drowning, or poisoning birds.
- All cleaning products used on the site should be environmentally friendly and biodegradable.
- Site specific measures for the effective management and treatment of waste water need to be implemented.

Soil erosion

Due to the removal of natural vegetation and alteration of the landscape during the construction phase the potential for loss of soil due to erosion is present and must be monitored. The cumulative impact of this development is expected to be low due to the low potential of the land in the area and the isolated effect that erosion could have on site.

Mitigation measures to reduce potential impacts:

- Ensure adequate erosion control measures are implemented to reduce the risk of soil erosion during the operational phase.

Continued dust generation and emissions

Continued vehicle activity during the operational phase will result in continued dust emissions occurring into the surrounding environment. It will be much less significant than during the construction phase but could have a negative impact on adjacent sheep farmers as excessive dust

fallout could still result in the value of wool decreasing or potential health implications. If managed correctly the cumulative impact of vehicles on dust generation will be limited to low/virtually none.

Mitigation measures to reduce potential impacts:

- Continued Dust Management as well as Traffic Management measures must be kept in place in order to manage traffic movement in the area during the entire operational phase and subsequently decrease undesired dust emissions.

Continued deterioration of important heritage conservational cemetery sites (MVIA3 site)

Continued operational activities of the proposed project might potentially lead to deterioration or decrease in integrity of the MVIA3 Later Iron Age/contemporary cemetery site if continued maintenance is not implemented. Little to no negative cumulative impact will result from the proposed Metsimatala CSP facility development on recorded archaeological and cultural heritage resources, as defined and protected by the NHRA (Act 25 of 1999). The proposed development and mitigation measures will in fact improve the condition of the single cultural heritage site identified.

Mitigation measures to reduce potential impacts:

- Continued maintenance and management to be conducted once the upgrading of the cemetery boundary fence and gates have been completed.

Continued transformation of early Proterozoic palaeontological heritage

The initial impact as per the construction phase will continue. The project could hold a low - medium cumulative impact due to the sizes of various proposed similar facilities in the area.

Mitigation measures to reduce potential impacts:

- Ensure no unnecessary expansion of the project footprint occurs.

Continued visual disturbance of natural landscape and sense of place

The operation of the proposed facility within the landscape will result in continued visual impact on the tranquillity and sense of place of the area to the local community as well as users of the R 385 road. The visual impact will however be mainly restricted to within 3 km of the proposed project area after which the visibility will diminish. Although another similar facility is situated in the nearby vicinity of the proposed project and numerous other projects are proposed within a 50 km radius, the sloping landscape decreases the visibility distance and subsequent impact of the proposed facility and other similar potential facilities. This proposed facility will therefore not significantly contribute to any cumulative visual disturbances along with other facilities.

Mitigation measures to reduce potential impacts:

- Strictly construction and development to the proposed project footprint.

- Use existing roads as far as possible and limit the number of additional roads constructed.
- Adequate planning and management of laydown areas.
- Minimize vegetation removal.
- Adequate rehabilitation of disturbed areas.
- Lighting design, planning and specifications should be conducted to minimise impact on the area.

Job creation and income generation

The unemployment rate for the municipal area in general stands at 64%, which is probably even lower in the Metsimatala community specifically. It is estimated that the proposed development will provide a total of 120 permanent jobs. Taking an average of five dependents per employed individual the potential total effect is estimated at 500 individuals to benefit indirectly from employment generated by the development which is significant within the local context. The development will provide two income streams. The first is a monthly lease amount for the land portions utilised for the solar energy facilities and the second will be from dividends declared by the project company. The Metsimatala community will obtain a share in the development company. The proposed project will, along with other similar renewable energy projects, cumulatively contribute to reduction in poverty and unemployment figures in the Northern Cape Province.

Influx of job seekers and risk of theft and damage to property

The extent of influx of job seekers to the area is very difficult to predict and/or quantify. However, since the development will be located on CPA property and limited housing and related services exist in close proximity, the influx of outsiders could potentially be strictly managed. Experience with other similar projects internationally suggests that due to the isolation of these facilities the influx of outsiders will not be significant.

Mitigation measures to reduce potential impacts:

- A local employment policy will be applied as far as possible in the appointment of permanent workers.
- A designated security company will be appointed to ensure the safety of the facilities.
- Adequately monitor and manage the process throughout the construction phase.

7.1.3 Cumulative Impacts

Approximately 8 large solar energy projects in various stages of the EIA application process fall within this a 50 km radius of the project site. Although various of these solar power generating facilities have been established or are in the process of being established in the Northern Cape Province due to the favourability of the solar belt in the province for this kind of renewable

electricity generation, they are wide apart and rarely in close proximity to each other. The area is vast and the impacts associated with such facilities also seem to be mostly localised and mainly restricted to the footprint areas and immediate vicinities. This renders them unlikely to be significantly contributing to combined cumulative/bio-magnifying impacts along with other similar facilities. The combined area of proposed facilities within the vicinity should not exceed 3000 ha in size (see map below). The cumulative impacts have been rated by the specialists and included in the descriptions and risk rating tables.

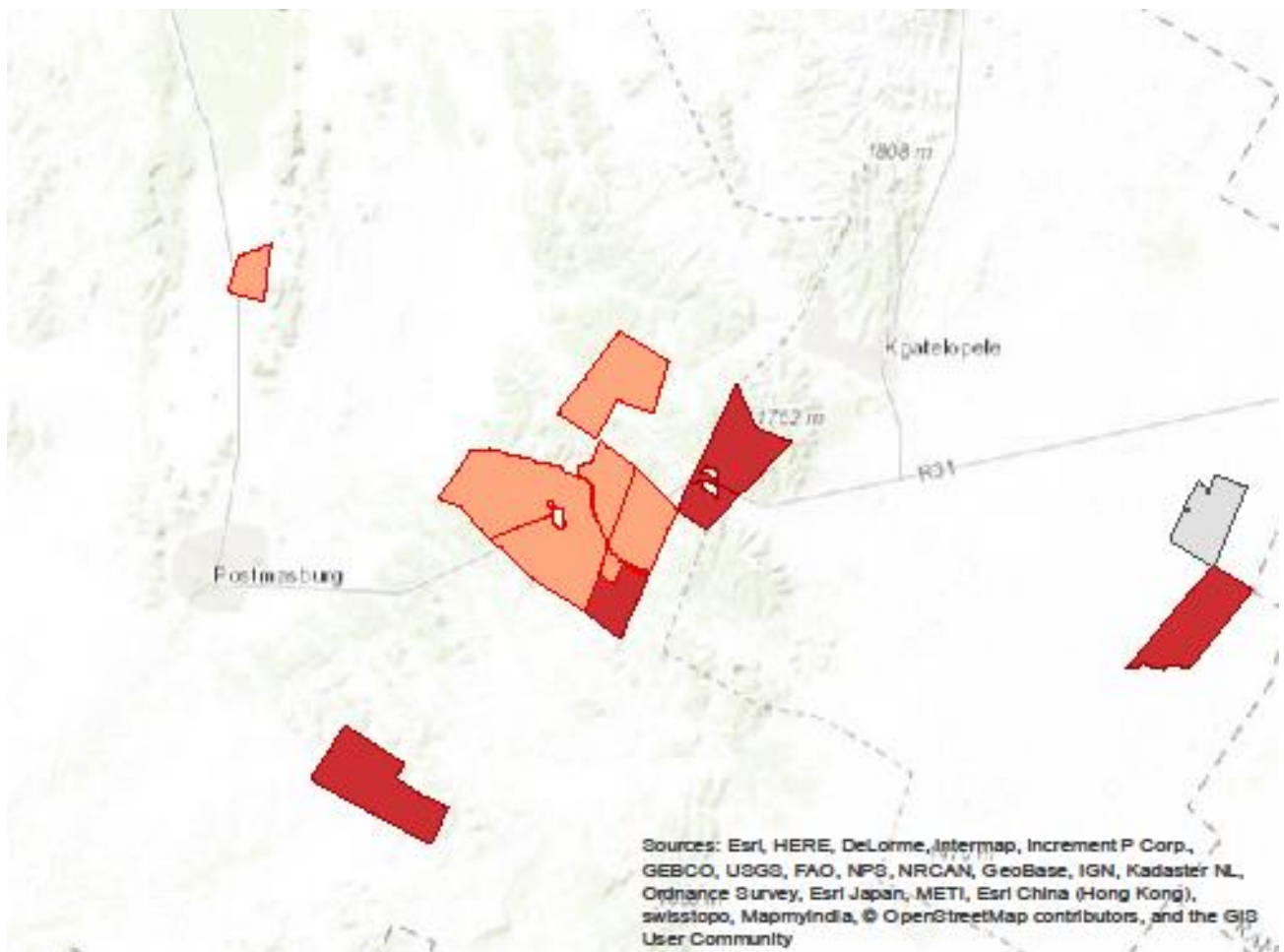


Figure 2: Farm portions of proposed solar power facilities in the Postmasburg area

Terrestrial and Wetland Ecology

This project will not result in any significant cumulative impact (low - medium) as the vegetation type is classified as least concerned and disturbance of vegetation will be mostly confined to the footprint of the proposed facility. The area and vegetation type is vast and the cumulative sizes of these proposed facilities should not pose a significant cumulative effect on the integrity of the vegetation type as a whole.

The project will also not result in any significant cumulative impact (low - medium) on the subsistence of protected species as activities revolving around protected species in the province are well and strictly managed and documented through permitting systems.

The cumulative impact can be regarded as low because the project site is already in an overgrazed and degraded state. The construction of a solar plant at this site would not significantly contribute to a cumulative impact.

Although the proposed project is situated in the zone earmarked for solar farm development in the Northern Cape, the zone is so extensive that in terms of other developments the cumulative impact is also relatively low because the solar power generating facilities are far apart.

Avifauna

All the identified impacts, and particularly those associated with the operational phase of the proposed project, may be intensified to some degree due to the potential cumulative impacts of a number of proposed commercial scale solar energy projects within 50 km of the project site.

The avifaunal specialists undertook the following process to determine the cumulative impact of the proposed project:

- Large scale (i.e. > 10 MW) solar energy projects (proposed or developed) were identified within 50 km of the Metsimatala project site;
- The size, extent, technology (e.g. PV or CSP) and distance from the proposed Metsimatala site were determined and considered;
- The bird species potentially impacted upon by these developments were considered by the specialist. In some cases this was done by considering the specialist report/s for a project, but in most cases the specialist used his knowledge of the broader area and knowledge of four projects- having visited these sites and done work there (i.e. Arriesfontein PV, Lesedi PV, Jasper PV, Humansrus/Redstone CSP).
- The findings and results of the bird surveys done on the proposed Metsimatala project site were considered;
- The cumulative impacts were rated (before and after mitigation) using the same set methodology used to rate the project specific impacts (refer to Appendices 3, 4 and 5).
- The rating was done by considering that five or more of the eight large scale solar projects discussed above are constructed as well as the Metsimatala project.

Approximately eight large solar energy projects in various stages of the EIA application process fall within this 50 km radius of the project site. Should five or more of these projects be constructed the cumulative impact significance of the residual impacts of electrocution and burning may initially be high but will be significantly reduced by proposed mitigation measures. The other impacts are likely to have a residual (i.e. after mitigation) cumulative impact only ranging between low and medium.

The avifaunal cumulative impacts associated with the construction phase will not be highly significant and will range between low – medium. The wider area and vegetation type is very homogenous and provides the same habitat opportunities. The mobility of avifaunal species enables them to simply utilise other similar areas in the vast vegetation type in the event that numerous facilities are constructed in the area.

Agriculture

The cumulative impact of this development is expected to be low due to the low potential of the land in the entire area. The construction of a number of similar facilities within the area will not result in significant agricultural potential losses as these facilities only consume restricted footprints within a vast natural area zoned for stock farming but which has a low agricultural potential specifically so for irrigation and crop production purposes. The potential cumulative economic loss of the use of the land for agricultural purposes will be outweighed by the socio-economic benefits of the construction of the facility.

Archaeology

In accordance with the DEA's Renewable Energy Applications map a number of renewable energy projects have been approved in the general vicinity of the Metsimatala study site, with projects in varying stages of establishment.

Van Ryneveld's (2016) pre-feasibility assessment focussed on a discussion of identified and known heritage resources as recorded in archaeological CRM reports for projects submitted on SAHRIS and the SAHRA Provincial Heritage Site database for the Northern Cape, situated within a rough 25km radius from the proposed Metsimatala study site and including renewable energy application study sites, and by implication also the initial Metsimatala study site. To date the highest number of heritage sites have been reported on by Van Ryneveld (2012), totalling 32 heritage sites, with reference to the initial Metsimatala study sites and including Stone Age, Iron Age and grave / cemetery sites. Similar type sites have been reported on in relevant renewable energy application CRM reports, albeit in much lesser quantities. Site significance ratings and associated heritage recommendations are standard done according to the National Heritage Resources Act, No 25 of 1999 (NHRA 1999), Section 7(1) and the SAHRA (2007) system, thereby

providing a homogeneous standard across CRM reports with reference to development recommendations for heritage sites.

With reference to heritage pre-feasibility information for the Metsimatala 150MW CSP Solar Energy Facility (Van Ryneveld 2016) it can be concluded that renewable energy projects, situated within the rough 25 km radius from the said study site, will in general have a low cumulative impact on heritage resources as defined and protected by the NHRA 1999. Specific attention needs to be afforded to the high number of heritage resources identified and situated on the initially proposed Metsimatala study sites. The amended 2016 development application will ensure that all identified resources will be conserved (aside from a general low density, low significance, Stone Age occurrence), with development impact at most encroaching on an identified Later Iron Age / Contemporary Period cemetery (Site MVIA3), situated along the northern extremity of Metsimatala Village and currently in use as a community cemetery. Accordingly, the 2016 Metsimatala proposal, with its distinctive emphasis on the conservation of heritage resources serves to radically reduce impact, including cumulative impact on heritage resources.

Little to no negative cumulative impact will result from the proposed Metsimatala CSP facility development on recorded palaeontological, archaeological and cultural heritage resources, as defined and protected by the NHRA (Act 25 of 1999). The proposed development and mitigation measures will in fact improve the condition of the single cultural heritage site identified and will also be contributory to living heritage, ensuring the sustainability of the Thlaping people on their tribal by virtue of their recorded history on the property, but with the prospect of a green, economically sustainable future.

Palaeontology

Cumulative Impact on palaeontological heritage refers to the potential damage, disturbance or destruction of fossils preserved at or beneath the surface of the ground, as it relates to the *construction, operational and decommissioning phase* of a project within the proposed development footprint. However, the likelihood of negative palaeontological impact is generally confined to the *construction phase* of solar energy developments, of which 8 large solar energy projects in various stages of the EIA application process fall within a 50 km radius of the Metsimatala project site. Although several of these solar power generating facilities have been established or are in the process of being established in the region, they are wide apart and rarely in close proximity to each other. Thus, given the overall assessment, the cumulative impact on palaeontological heritage, should all the proposed solar energy projects in the region be completed, would probably be medium to low.

Visual Impact Assessment

The potential cumulative visual impact relates specifically to the construction of similar developments (i.e. solar renewable energy facilities) within close proximity to the Proposed Metsimatala CSP site. The region has a very high solar resource and will come under increasing pressure for similar developments. There are two approved (and one in process) PV facilities located in very close proximity to the site. There are also a number of PV facilities planned within the region. These are located beyond 20m from the site, and are not expected to influence the cumulative visual impact.

The location of the Metsimatala CSP site adjacent to two approved PV facilities, in essence consolidates the potential cumulative visual impact to some extent. The premise is that there would already be a visual impact in close proximity to the site, thereby effectively consolidating solar energy generation infrastructure within this area. If the site was located slightly further afield, the cumulative visual exposure would have been spread out over a larger area, thereby worsening the cumulative visual impact.

The potential cumulative visual impact of the proposed Metsimatala CSP facility is generally expected to be of medium to low significance.

Socio-Economic description

The proposed project will, along with other similar renewable energy projects in the vicinity, cumulatively contribute to reduction in poverty and unemployment in the Northern Cape Province. It will cumulatively contribute job creation and sustainable capacity building and skills development and transfer. An estimate of the expected cumulative employment creation suggests that around 8 000 to 12 000 new temporary and 800 to 1200 permanent jobs will be created across the larger region. Considering that the unemployment rate of the municipality is around 64%, this scenario is highly beneficial for the general economy of the region. We are therefore of the opinion that the development of solar facilities in the region will have a net positive cumulative effect.

There will be no negative cumulative impact of the facility on the local informal settlement and wider area due to potential influx of construction workers and job seekers and risk of theft and damage to property.

Conclusion

The potential cumulative impacts of this proposed project have been adequately assessed and no fatal flaws or unacceptable environmental impacts have been identified by specialists due to the cumulative effects in combination with other similar developments in the region which cannot be acceptably mitigated. The highest potential cumulative impacts were identified as potential avifaunal impacts such as electrocution and burning which can be suitably mitigated.

7.2 Construction Phase Environmental Management Programme

The intention of providing EMP's for the planning and design phase, and for the construction phase, is to provide the responsible parties and monitoring agents with guidelines to be used during the planning, design and construction phases of the proposed facility, to safeguard the environment against negative environmental impacts.

CONSTRUCTION PHASE: PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND DIVERSION OF AN EXISTING ESKOM TRANSMISSION LINE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
GENERAL				
1. Activity: Permits and authorisations				
1.1	<p>Aspects: Legislative compliance</p> <p>Impact: Non-compliance with South African environmental legislation.</p> <p>Objective: Ensure compliance with all triggered environmental legislation.</p> <p>Target: Commence site establishment with all permission and approvals received and on hand.</p> <p>Mitigation/Management Measures:</p> <p>a. The Developer is to have the following permits on commencement:</p> <ul style="list-style-type: none"> • Environmental Authorisation • Environmental Management Program • Permits for protected species 	Developer Contractor manager	<p>Monitoring Action: Obtain copies of all permits; Record Keeping</p> <p>Responsible Person/Party: Developer Contractor manager</p> <p>Monitoring Frequency: Once off Keep on site</p>	
2. Activity: Site Layout Planning and site establishment				
2.1	<p>Aspects: Site Layout Plan</p> <p>Impact: Negative impact of inadequate planning placement of infrastructure on the environment. Increase in footprint.</p> <p>Objective: To ensure acceptable impact and management of environmental issues at main site and storage site during construction by proper planning of</p>	Developer Contractor manager Engineer	<p>Monitoring Action: Record Keeping. Adequate and detailed site</p>	

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<p>layout of infrastructure placement. No unplanned/unmanaged increase in project footprint.</p> <p>Target: All areas not demarcated for construction should remain unimpaired and vegetated and impacts should be minimised. No unplanned/unmanaged increase in project footprint.</p> <p>Mitigation/Management Measures:</p> <ol style="list-style-type: none"> Develop and draw up and submit for approval a Site Layout Master Plan. This plan must show the final positions and extent of all permanent and temporary site structures and infrastructure and laydown areas. This must be approved by all relevant parties. The planning for layout must be done in consultation with the ECO. The Open Space Management Plan principles to be implemented during layout planning. 		ECO	<p>layout planning with all relevant parties prior to commencement.</p> <p>Layout plan to be drawn up and approved on site by all relevant parties.</p> <p>Responsible Person/Party:</p> <p>Developer Contractor manager Engineer ECO</p> <p>Monitoring Frequency:</p> <p>Once off. Prior to commencement of any construction.</p> <p>Updated as construction continues.</p>	
3. Activity: Construction Programme/Schedule				
3.1	<p>Aspects: Project construction management</p> <p>Impact: Environmentally unfriendly construction process orders and undesired extended time periods which prolong environmental impacts.</p> <p>Objective: To Provide a clear indication of the order by which key construction activities will occur as well as anticipated timeframes involved.</p> <p>Target: Ensure efficiency of construction processes and order of events in order to reduce impact durations and subsequent significances. Coordinate the availability of any required specialists into the anticipated program in order to enable them to adequately fulfil their advisory duties.</p>	Developer Contractor manager Engineer ECO	<p>Monitoring Action: Layout plan to be drawn up and approved on site by all relevant parties.</p> <p>Meetings; Risk Register;</p>	

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<p align="center">CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND DIVERSION OF AN EXISTING ESKOM TRANSMISSION LINE</p>	<p align="center">RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)</p>	<p align="center">MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY</p>	<p align="center">COMPLIANT? (for use by ECO)</p>
<p>Mitigation/Management Measures:</p> <ol style="list-style-type: none"> Draw up and sign off a project schedule with all relevant parties and service providers to commit to a timeline during which time construction milestones will be completed; Communicate any deviation from this schedule with all parties, so as to provide parties with sufficient opportunity for alternative arrangements to be made; Continually update program accordingly Establish a risk register to identify and monitor potential factors which may result in setbacks/ delays on tasks within the project schedule; Hold management meetings with representatives of the project manager, contractor, engineer and other contributing parties to monitor and anticipate changes; Should circumstances/ incidents arise which may pose a risk to the project schedule, the construction contractor, engineer and ECO are to keep records of this and the latter communicate this in the ECO Bi-monthly Audit Checklist. 		<p>ECO Audit Checklist; Photographs</p> <p>Responsible Person/Party: Developer Contractor manager Engineer ECO</p> <p>Monitoring Frequency: Once off Prior to commencement of any construction. Updated as construction continues.</p>	
<p>4. Activity: Communication with land-owners</p>			
<p>Aspects: Landowner Consent and communication Impact: Disturbance of existing land use (unexpected by owners) Objective: Maintain a conflict-free relationship with landowners/users. Target: No complaints received from landowners/users of affected property.</p> <p>Mitigation/Management Measures:</p> <ol style="list-style-type: none"> Landowners are to be aware and in agreement of site access arrangements; (Part of wayleave consent negotiations and continual communication) The landowner has to be requested to liaise with the site supervisor of the construction contractor prior to entering the construction footprint area for safety purposes and vice versa; All property gates are to be kept closed when not in use (or kept in the open/closed state in which it was found); Any complaint or liaison with regard to environmental aspects, compensation or disorder to economic activities, must not be addressed by the 	<p>Developer Contractor manager</p>	<p>Monitoring Action: Engage in wayleave consent negotiations with land owners prior to project commencement</p> <p>Continual communication with landowners during the construction phase</p> <p>Responsible Person/Party:</p>	

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	<p>contractor. A public complaint register must be kept on site and the contract project manager must inform the Developer and/or ECO to take further action.</p> <p>e. Continual monthly communication with land owners</p>		<p>Developer Contractor manager</p> <p>Monitoring Frequency: Once off wayleave consent negotiations Continual monthly communication with land owners</p>	
5. Activity: Site Establishment				
5.1	<p>Aspects: Demarcation of the site, vegetation removal/clearance and subsequent establishment of required infrastructure</p> <p>Impact: Destruction/transformation of natural vegetation and faunal habitat</p> <p>Objective: Prevent unnecessary habitat destruction. Ensure compliance with approved layout planning, Prevent unmanaged increase in project footprint.</p> <p>Target: All areas not demarcated for construction should remain vegetated and impacts should be minimised. Apply the principles of the Open Space Management Plan.</p> <p>Mitigation/Management Measures:</p> <ol style="list-style-type: none"> No natural surfaces are to be marked other than using droppers, beacons or other artificial object; Ensure the upkeep of demarcation boundaries throughout the period of construction until rehabilitation has been completed; Construction areas must be adequately fenced; this will prevent unmanaged increase of the footprint as well as assist with access control management. Ensure all require national and provincial permits are obtained for protected species prior to site establishment commencement The contractor may only clear vegetation within the construction area. Furthermore, a phased approach should be adopted in the clearing of vegetation where possible; only clear areas as construction development goes along and can keep up No vegetation material may be used for firewood; Cleared material to be adequately and safely disposed of. No fires may occur at or outside of the construction site; 	Contractor manager ECO	<p>Monitoring Action: ECO to take photographs and note environmental conditions of site before clearance; ECO Audit Checklist.</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: Prior to establishment Bi- Monthly</p>	

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	<ul style="list-style-type: none"> h. Restrict construction activities to the boundaries of the development; i. Restrict movement of vehicles and personnel to the footprint of the construction site; j. Apply the principles of the Open Space Management Plan 			
5.2	<p>Aspects: Topsoil stripping and conservation</p> <p>Impact: Deterioration of important topsoil</p> <p>Objective: Conserve and protect topsoil from erosion and deterioration for adequate use during rehabilitation processes.</p> <p>Target: Original topsoil condition/quality maintained.</p> <p>Mitigation/Management Measures:</p> <ul style="list-style-type: none"> a. In the absence of a distinguishable topsoil layer, strip the uppermost 300 mm of soil; b. Stockpile topsoil separately from subsoil, in heaps no higher than 2m; c. Topsoil stockpiles are to be kept free of alien and invasive species; d. Limit unnecessarily prolonged exposure of stripped areas and stockpiles; (this will be linked with the phased vegetation clearance and construction approach) e. Topsoil stockpiles to be placed on a levelled area and erosion control measures are to be implemented to prevent wash away and topsoil loss in the event of heavy rains/storm water; f. Topsoil needs to be stored on designated areas only. This needs to be adequately planned and indicated on the approved site-layout plan; g. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/ earthworks in that area; (phased approach) h. Strip and stockpile herbaceous vegetation, overlying grass and other fine organic matter along with the topsoil; i. Do not strip topsoil when it is wet; j. Do not mix topsoil obtained from different sites, unless the ECO gives permission. k. ECO to be actively involved in advise and recommendation provision during topsoil stripping processes 	Contractor manager ECO	<p>Monitoring Action: ECO Audit Checklist; Photographs;</p> <p>Stripping plans to be drawn up and approved</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: Bi-monthly Continually during significant stripping events</p>	
6. Activity: Earth-works				
6.1	<p>Aspects: Excavations; cut and fill; shaping and trimming.</p> <p>Impact: Alteration of the terrain surface shaping and water flow by civil works</p>	Contractor manager Engineer	Monitoring Action: ECO	

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<p>Objective: Minimise impact to the physical terrain, surface shaping and water flow features of the site.</p> <p>Target: Maintain Civil Works to within the construction footprint area.</p> <p>Mitigation/Management Measures:</p> <p>a. Cut and fill areas must be identified by the Engineer and protection measures provided through an appropriate method and technology;</p> <p>b. The final surface profile which would enable sufficient water drainage must be determined/modelled</p> <p>c. Dispose of excess material at a registered solid waste landfill site;</p> <p>d. Shaping and trimming operations are to be planned to allow for topsoil application, with provision for the specified depth of reapplied topsoil made.</p> <p>Cut and fill plans to be drawn up and approved</p>		ECO	<p>Audit Checklist</p> <p>Cut and fill plans to be drawn up and approved</p> <p>Responsible Person/Party:</p> <p>Contractor manager Engineer ECO</p> <p>Monitoring Frequency:</p> <p>Bi-monthly Continually during significant shaping events</p>	
7. Activity: Site Infrastructure placement and operation				
7.1	<p>Aspects: Structures and lay-down areas</p> <p>Impact: Deterioration of site features and surrounding areas</p> <p>Objective: Prevent the deterioration of site features like soil, rainwater runoff and erosion.</p> <p>Target: The preservation of site conditions evident on establishment of structures and lay-down areas.</p> <p>Mitigation/Management Measures:</p> <p>a. Construct all required structures and storage areas, including potential offices, workshops and stores in approved locations as per the Site Layout Plan;</p> <p>b. The camp with storage and laydown areas are to be kept secure and neat with access control measures adopted during construction;</p> <p>c. Clearly define which activities are to occur within which areas of the site by erecting signage.</p> <p>d. All hazardous substances, such as fuel, oil, diesel, paint, etc., must be stored in a secondary containment system (trays or bund) which is capable of storing at least 110% of the liquid capacity. If bund areas are used, bund areas should be sealed on the inside to avoid seepages.</p>	Developer Contractor manager	<p>Monitoring</p> <p>Action:Photographs; ECO Audit Checklist Approved layout plan development</p> <p>Responsible Person/Party:</p> <p>Developer Contractor manager</p> <p>Monitoring Frequency:</p>	

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	e. A vehicle service area should be in place, for vehicle repairs, in such a way that no spillages will occur into the environment.		Bi-monthly	
8. Activity: Construction site operations				
8.1	<p>Aspects:Security and fencing</p> <p>Impact: Prevent danger to trespassing of persons. Increase of development footprint</p> <p>Objective: Keep the site secure from trespassing or theft and keep animals out. Prevent unmanaged increase of the footprint.</p> <p>Target: Site remains secure during construction with no incidences of trespassing, theft and injury or death to animals. No increase in development footprint.</p> <p>Mitigation/Management Measures:</p> <ul style="list-style-type: none"> a. Be responsive to open or closed status of gates; b. New or the upkeep/maintenance of fences should be adequately and continually managed to establish a sufficient boundary ; c. Limit clearing of vegetation for fencing to the removal of trees and shrubs within 1 m of the fence line. All undergrowth should be maintained; d. Should construction activity require the removal of fences or gates to execute tasks, this must be replaced as soon as possible following completion; e. In all cases, the landowners on whose property any use of fences or gates is being made must be consulted, to ensure that parties are informed of construction activity, schedules and vehicle movement. 	Developer Contractor manager ECO	<p>Monitoring</p> <p>Action:Photographs; ECO Audit Checklist</p> <p>Ensure compliance with layout plan</p> <p>Responsible Person/Party: Developer Contractor manager ECO</p> <p>Monitoring Frequency: Continual during initial fence erection Bi-monthly</p>	
8.2	<p>Aspects:Existing Services and Infrastructure</p> <p>Impact:Damage to existing services and infrastructure</p> <p>Objective:No damages to existing services and infrastructure</p> <p>Target:No damages to existing services and infrastructure</p>	Contractor manager	<p>Monitoring</p> <p>Action:Photographs; ECO Audit Checklist</p> <p>Responsible Person/Party:</p>	

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	<p>Mitigation/Management Measures:</p> <p>a. Take cognisance of the position of existing services and infrastructure (e.g. roads, pipelines, power lines and telephone services) that may get damaged due to construction activities.</p> <p>b. Ensure that existing services are not damaged or disrupted unless required by the contract and with the permission of the project manager.</p> <p>c. In the event that infrastructure is damaged or services interrupted during construction, it will be done at the expense of the Contractor and shall receive top priority over all other activities.</p>		<p>Contractor manager</p> <p>Monitoring Frequency: Bi-monthly</p>	
8.3	<p>Aspects:Traffic</p> <p>Impact:Traffic capacity increase and overload</p> <p>Objective:Minimise the disruption of road users</p> <p>Target:Minimal disruption of road users</p> <p>Mitigation/Management Measures:</p> <p>a. Adhere to traffic management plan recommendations</p> <p>b. Construct sufficient access area from main road</p> <p>c. All vehicles must be road-worthy and drivers must be qualified, made aware of the potential road safety issues, and need for strict speed limits;</p> <p>d. Only authorised roads and access routes may be used by construction personnel and equipment.</p> <p>e. Construction vehicles may not leave the designated roads and tracks and turnaround points must be limited to specific sites.</p> <p>f. Traffic deviations around the construction area must be planned in conjunction with the local authority to ensure safe and free flow of traffic. Safety signs must be utilised.</p>	Contractor manager	<p>Monitoring Action: Incident Register; Photographs; ECO Audit Checklist</p> <p>In accordance with Traffic Management Plan</p> <p>Responsible Person/Party: Contractor manager</p> <p>Monitoring Frequency: Continual during initial access development phase Bi-monthly</p>	
8.4	<p>Aspects:Erosion Control</p> <p>Impact:Loss of topsoil, formation of bare soil and deterioration of habitat quality</p> <p>Objective:Prevent and manage soil erosion</p> <p>Target: No signs of significant soil erosion should be evident on site.</p>	Contractor manager ECO	<p>Monitoring Action: Incident Register; Photographs; ECO Audit Checklist</p> <p>In accordance with Erosion</p>	

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	<p>Mitigation/Management Measures:</p> <ul style="list-style-type: none"> a. Adhere to erosion management plan recommendations b. Disturb as little ground area as possible, stabilize that area as quickly as possible, control drainage through the area, and trap sediment onsite. c. Conserve topsoil with its leaf litter and organic matter, and reapply this material to local disturbed areas to promote the growth of local native vegetation. d. Apply erosion control measures before the rainy season begins and after each season of construction, preferably immediately following construction. e. Maintain and reapply erosion control measures until vegetation is successfully established. Do soil chemistry tests if necessary to determine available soil nutrients. 		<p>Management Plan</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: Bi-monthly Continually</p>	
8.5	<p>Aspects:Rubble and waste rock</p> <p>Impact:The generation of excess waste rock material for disposal</p> <p>Objective: Optimise the disposal and reuse of rubble and waste rock.</p> <p>Target: No soil erosion should take place on site. No excessive waste rock should be present and unmanaged on site.</p> <p>Mitigation/Management Measures:</p> <ul style="list-style-type: none"> a. The storage of inert building rubble and waste rock should be done in a designated, flat area for stockpiling; b. If no on-site disposal opportunities exist, then rubble and waste rock must be disposed of at the nearest registered solid waste disposal facility; 	Contractor manager ECO	<p>Monitoring Action:ECO</p> <p>Audit Checklist</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: Bi-monthly</p>	
8.6	<p>Aspects:Solid Waste Handling</p> <p>Impact:Pollution and site contamination by solid waste</p> <p>Objective: Dispose of solid waste in the appropriate manner. Minimise the generation of solid waste.</p> <p>Target: No record of pollution or site contamination by solid waste.</p> <p>Mitigation/Management Measures:</p> <ul style="list-style-type: none"> a. An adequate number of scavenger proof litter bins are to be placed throughout the footprint; b. Waste sorting, separation and recycling should form part of the environmental induction and awareness programme, to encourage personnel to collect waste paper, glass and metal waste separately; c. Keep all Work Sites including storage areas, offices and workshops neat and tidy; d. Dedicate a demarcated and signposted storage area on site for the collection of construction waste; 	Contractor manager ECO	<p>Monitoring Action:ECO</p> <p>Audit Checklist</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: Bi-monthly</p>	

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CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND DIVERSION OF AN EXISTING ESKOM TRANSMISSION LINE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	<p>e. All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site;</p> <p>f. Care should be taken to ensure that no waste is lost off disposal vehicles on route to the landfill. If needed, a tarpaulin can be utilised;</p> <p>g. Do not dump waste of any nature, or any foreign material in any drainage lines;</p> <p>h. The burning or burying of solid waste on site is prohibited.</p>			
8.7	<p>Aspects:Sewage waste</p> <p>Impact: Pollution and site contamination by sewage.</p> <p>Objective: Provide facilities for appropriate management collection and disposal of sewage. Sewage containment sizes and removal frequencies should be appropriate in order to prevent any potential chances of overflow and environmental contamination.</p> <p>Target: No record of pollution or site contamination by sewage.</p> <p>Mitigation/Management Measures:</p> <p>a. Provide portable chemical toilets, situated at convenient locations in proximity to work areas. This must be in relation to the quantity of users on site, with 1 toilet per 15 users and for each gender;</p> <p>b. Locations for the placement of toilets include the workshop and areas for resting and eating.</p> <p>c. Do not locate a site toilet within the 1:100 year floodline, or within a distance of 100m of any drainage lines;</p> <p>d. Toilets are to be maintained and cleaned regularly to ensure functionality and an adequate level of hygiene; This will assist with disease prevention.</p> <p>e. Removal of sewage from sight should be conducted on an adequate and frequent basis by an accredited contractor.</p> <p>f. Drinking water facilities, comprising a water tank with a manual tap can be combined with hand washing facilities near site toilets; This will assist with disease prevention.</p> <p>g. Only toilet paper is to be flushed down the chemical toilets. Personnel are to be informed on sanitary implementation as part of the environmental awareness.</p>	Contractor manager ECO	<p>Monitoring Action:ECO to take photographs of site before clearance; ECO Audit Checklist</p> <p>Sewage removal proof to be provided by contractors.</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: As per adequate frequency and storage size determinations by removal contractor Bi-monthly</p>	
8.8	<p>Aspects:Dust Generation and visual Impact</p> <p>Impact:Dust nuisance from site operations and visual impact of site operations on surrounding land owners</p> <p>Objective: To avoid dust from excavated materials and construction activity and unnecessary visual impact caused by site operations.</p> <p>Target: Minimise the incidence of dust generation and visual impact related complaints.</p>	Contractor manager ECO	<p>Monitoring Action:ECO to take photographs of site before clearance; ECO Audit</p>	

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CONSTRUCTION PHASE: PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND DIVERSION OF AN EXISTING ESKOM TRANSMISSION LINE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	<p>Mitigation/Management Measures:</p> <ul style="list-style-type: none"> a. Implement dust suppression measures by watering areas to be cleared as well as already exposed surfaces with damaged soil particles, particularly during dry, windy periods; b. Ensure all vehicles remain on designated roads; c. Dust masks are to be supplied to workers if required; d. The transfer of soil or aggregate should be done over the shortest possible distance; e. Access roads are to be kept clean; f. Surface material that is scraped off during construction should be conserved and used for rehabilitation. Any spoil material must be disposed of in a manner that appears natural; g. Lay-down area(s) should be screened with shade cloth in an earth tone or other appropriate neutral colour; h. Site offices and structures should be limited to one location and carefully situated to reduce visual intrusion. Roofs should be grey and non-reflective; i. Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact; j. The minimum amount of topsoil and vegetation should be removed during construction, and should be conserved and used for final rehabilitation. k. Implement a complaints register in order to be made aware of any potential impacts on surrounding areas. 		<p>Checklist</p> <p>Ensure compliance with dust monitoring measures</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: Bi-monthly Continual during construction</p>	
8.9	<p>Aspects:Noise Generation</p> <p>Impact:Noise nuisance from site operations</p> <p>Objective: To avoid excessive noise generation from site operations.</p> <p>Target: Minimise the incidence of noise generation.</p> <p>Mitigation/Management Measures:</p> <ul style="list-style-type: none"> a. Should multiple activities result in the excessive generation of noise, it should be strived to coordinate the incidence of these at the same time; b. Fit machinery with silencers; c. All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where possible; d. The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally; e. Vehicles should avoid use of the reverse gear as far as possible so as to avoid the sounding of sirens. This should not be considered for temporary access routes as disturbance of adjacent vegetation is to be avoided; f. Where recurrent use of machinery is frequent, machines should be shut down during intermediate periods; 	Contractor manager	<p>Monitoring Action:ECO to take photographs of site before clearance; ECO Audit Checklist</p> <p>Responsible Person/Party: Contractor manager</p> <p>Monitoring Frequency: Bi-monthly Continually during construction phase</p>	

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CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND DIVERSION OF AN EXISTING ESKOM TRANSMISSION LINE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	<p>g. Machinery and vehicles are to operate during working hours between 07H00–18H00;</p> <p>h. Vehicles are to abide by speed restrictions on access roads and limit trip generation so as to minimise disturbance to surrounding land users.</p>			
8.10	<p>Aspects:Fire Prevention</p> <p>Impact:Uncontrollable fire damage to areas</p> <p>Objective: Prevent the outbreak of fires emanating from construction activity.</p> <p>Target: No incidences of fires are recorded for the site.</p> <p>Mitigation/Management Measures:</p> <p>a. Adhere to recommendations in the Fire Management Plan</p> <p>b. The potential risk of veld fires is heightened by windy conditions in the area, specifically during the dry, windy winter months;</p> <p>c. Assume acceptable precautions to guarantee that fires are not started as a result of Works on site as specified below: the Contractor will be held responsible for any damage to structures or property on or neighbouring the Site as a result of any fire caused by personnel;</p> <p>d. Contractor should ensure that construction related activities that pose a potential fire risk, such as welding etc., are properly managed and confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include clearing working areas and avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months;</p> <p>e. Contractor should provide fire-fighting training to selected construction staff and take cognisance of the Veld and Forest Fire Act, Act No. 101, 1998;</p> <p>f. As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities;</p> <p>g. Fire breaks are to be established and maintained around the Work Sites as and when specified by the ECO;</p> <p>h. Equip vehicles and site structures with fire extinguishers. Rubber beaters should also be stored on site;</p> <p>i. No open fires are allowed anywhere on site;</p> <p>j. Storage of fuel or chemicals under trees is not permitted; Fuel storage areas must be clear of significant burning fuel</p> <p>k. Gas and liquid fuel is not to be stored in the same place;</p> <p>l. Smoking may only occur at designated areas.</p> <p>m. Fuel, diesel, oil, or any other flammable substance should be stored more than 6 m away from the smoking area.</p> <p>n. MSDS of al flammable products to be readily available</p>	<p>Contractor manager ECO</p>	<p>Monitoring Action: ECO to take photographs of site before clearance; ECO Audit Checklist.</p> <p>Ensure compliance with recommendations in the Fire Management Plan</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: Initially ensure that all required prevention measures are in place prior to commencement of construction phase Bi-monthly</p>	

CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND DIVERSION OF AN EXISTING ESKOM TRANSMISSION LINE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
8.11	<p>Aspects: Local communities</p> <p>Impact: Impact of construction workers on local communities, construction personnel and the local community.</p> <p>Objective: Construction workers should not alter existing social dynamics of local communities.</p> <p>Target: No incidences of conflict in the local settlements</p> <p>Mitigation/Management Measures:</p> <ol style="list-style-type: none"> Where possible, the Employer should make it a requirement for contractors to implement a local employment principle for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks; The Employer should consider the establishment of a Monitoring Forum (MF) for the construction phase. The MF should be established before the construction phase commences and should include key stakeholders, including representatives from the local community, local councillors, farmers, and the contractor. The role of the MF would be to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should also be briefed on the potential risks to the local community associated with construction workers; The Employer and the contractors should, in consultation with representatives from the MF, develop a Code of Conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation; The Employer and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase; The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis; The contractor should make necessary arrangements to enable workers from outside the area to return home over weekends and or on a regular basis during the construction phase. This would reduce the risk posed by non-local construction workers to local family structures and social networks; The contractor should make the necessary arrangements for ensuring that all non-local construction workers are transported back to their place of residence once the construction phase is completed. This would reduce the risk posed by non-local construction workers to local family structures and social networks; No construction workers, will be permitted to stay overnight on the site. Security personnel will be housed in the vicinity of the site. 	Construction contractor	<p>Monitoring Action:ECO Audit Checklist</p> <p>Complaints register to be provided in order to be informed of any potential incidents</p> <p>Responsible Person/Party: Construction contractor</p> <p>Monitoring Frequency: Prior to the commencement of the construction phase Bi-monthly</p>	

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8.12	<p>Aspects:Soil and water contamination</p> <p>Impact:Pollution of soil and water contamination by hazardous waste products</p> <p>Objective: Provide facilities for appropriate management, collection and disposal of hazardous waste to prevent contamination.</p> <p>Target: No record of pollution or site contamination by hazardous waste.</p> <p>Mitigation/Management Measures:</p> <ol style="list-style-type: none"> Adhere to stormwater management plan recommendations. Protect surface and ground water bodies from direct or indirect spills of pollutants such as garbage, sewage, cement, concrete wash out water, oils, fuels, or organic material or any hazardous substances resulting from the Contractor's activities. This must be done by adequate management and isolation of hazardous products through 110 % bunding as well as storage and removal of other waste products. Soil contaminated with oil, diesel, petrol or other foreign matter must be excavated as far as contaminated and disposed of at a licensed hazardous waste disposal site. Proof of such disposal must be kept on site. All equipment on site must be inspected for diesel leaks prior to operation, Leakages must be repaired as soon as possible and drip trays must be placed underneath machinery until such leakages have been repaired, Polluted runoff water must be isolated and not be allowed to enter drainage lines, wetland areas or storm water canals. Topsoil and subsoil must be protected from contamination by means of proper site management, for example collect and recycle lubricants and avoid accidental spills of pollutants, Vehicles and machinery may not be serviced on site. 	Contractor manager ECO	<p>Monitoring Action: Incident Register; Photographs; ECO Audit Checklist</p> <p>Adhere to stormwater management plan recommendations.</p> <p>Obtain proof of removal of waste products from accredited contractor</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: Continually during construction phase Bi-monthly</p>	
8.13	<p>Aspects:Water Conservation</p> <p>Impact: Wasting water as a result of negligence or inadequate usage planning and management</p> <p>Objective: Promote and implement water use efficiency mechanisms through adequate planning and management</p> <p>Target: No Water Wastage. Keep water use within the allocated quantities. Reduce usage as far as possible.</p> <ol style="list-style-type: none"> Implement adequate water planning and management measures in accordance with site requirement and allocated quantities. Re-use water were possible; 	Contractor manager ECO	<p>Monitoring Action: Incident Register; Photographs; ECO Audit Checklist</p> <p>Draw up water planning and management measures for site</p> <p>Responsible Person/Party:</p>	

CONSTRUCTION PHASE: PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND DIVERSION OF AN EXISTING ESKOM TRANSMISSION LINE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
	<p>c. Implement rain catchment strategies;</p> <p>d. Prevent leakages at taps and hoses by means of maintenance;</p> <p>e. Use buckets of water to clean tools instead of running water;</p> <p>f. Adhere to stormwater management plan recommendations.</p> <p>g. Capture and reuse stormwater runoff for site cleaning, truck washing and dust suppression;</p> <p>h. Make sure that sediment, concrete, sand and rubbish does not end up going down the stormwater drain. Cover or filter stormwater inlets and drains;</p> <p>i. Require workers to use a broom rather than a hose to clean paths and gutters. If water use is necessary, use high pressure hoses which are both water efficient and more effective cleaners.</p>		<p>Contractor manager</p> <p>ECO</p> <p>Monitoring Frequency:</p> <p>Initial prior to commencement of construction phase</p> <p>Bi- monthly</p>	
8.14	<p>Aspects: Heritage resources conservation</p> <p>Impact: Damage/destruction to any remains found on site.</p> <p>Objective: No significant damage to any heritage remains found on site</p> <p>Target: No significant damage.</p>		<p>Contractor manager</p> <p>ECO</p> <p>Mitigation:</p> <p>If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils (e.g. trace fossils or stromatolites) or other categories of heritage resources are found during the proposed development,</p>	

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<p>CONSTRUCTION PHASE:PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND DIVERSION OF AN EXISTING ESKOM TRANSMISSION LINE</p>	<p>RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)</p>	<p>MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY</p>	<p>COMPLIANT? (for use by ECO)</p>
		<p>SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Itumeleng Masiteng/Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings at the expense of the developer. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required at the expense of the developer.</p>	

7.3 Operational Phase Environmental Management Programme

The intention of providing an EMPr for the operational phase is to provide guidelines for management of facilities and infrastructure to safeguard the environment against negative environmental impacts.

OPERATIONAL PHASE: PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE AND DIVERSION OF AN EXISTING ESKOM TRANSMISSION LINE		RESPONSIBLE PARTY/PERSON (implementation of mitigation measures)	MONITORING: ACTION, RESPONSIBLE PERSON/PARTY AND FREQUENCY	COMPLIANT? (for use by ECO)
1. Activity: Permits and authorisations				
	<p>Aspects: Legislative compliance</p> <p>Impact: Non-compliance with South African environmental legislation.</p> <p>Objective: Ensure compliance with all triggered environmental legislation.</p> <p>Target: Commence site establishment with all permission and approvals received and on hand.</p>	Developer	<p>Monitoring Action: Obtain copies of all permits; Record Keeping</p> <p>Responsible Person/Party: Developer</p> <p>Contractor manager</p> <p>Monitoring Frequency: Once off</p> <p>Keep on site</p>	
	<p>Mitigation/Management Measures:</p> <p>b. The Developer is to have the following permits on site:</p> <ul style="list-style-type: none"> • Environmental Authorisation • Environmental Management Program • Permits for protected species 			
2. Activity: Operational site operations				
2.1	<p>Aspects: Security and fencing</p> <p>Impact: Prevent danger to trespassing of persons. Increase of development footprint</p> <p>Objective: Keep the site secure from trespassing or theft and keep animals out. Prevent unmanaged increase of the footprint.</p> <p>Target: Site remains secure during operation with no incidences of trespassing, theft and injury or death to animals. No increase in development footprint.</p>	Developer ECO	<p>Monitoring Action: Photographs; ECO Audit Checklist</p> <p>Ensure compliance with layout</p>	

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	<p>Mitigation/Management Measures:</p> <p>f. Be responsive to open or closed status of gates;</p> <p>g. New or the upkeep/maintenance of fences should be adequately and continually managed to establish a sufficient boundary ;</p> <p>h. Limit clearing of vegetation for fencing to the removal of trees and shrubs within 1 m of the fence line. All undergrowth should be maintained;</p> <p>i. Should construction activity require the removal of fences or gates to execute tasks, this must be replaced as soon as possible following completion;</p> <p>j. In all cases, the landowners on whose property any use of fences or gates is being made must be consulted, to ensure that parties are informed of construction activity, schedules and vehicle movement.</p> <p>k. Maintenance of the fence conditions should take place continually during the operation al phase in order to ensure its efficacy.</p>		<p>plan</p> <p>Responsible Person/Party: Developer ECO</p> <p>Monitoring Frequency: Monthly</p>	
2.2	<p>Aspects:Existing Services and Infrastructure Impact:Damage to existing services and infrastructure Objective:No damages to existing services and infrastructure Target:No damages to existing services and infrastructure</p> <hr/> <p>Mitigation/Management Measures:</p> <p>c. Take cognisance of the position of existing services and infrastructure (e.g. roads, pipelines, power lines and telephone services) that may get damaged due to construction activities.</p> <p>d. Ensure that existing services are not damaged or disrupted unless required by the contract and with the permission of the project manager.</p> <p>e. In the event that infrastructure is damaged or services interrupted during construction, it will be done at the expense of the Contractor and shall receive top priority over all other activities.</p>	Developer	<p>Monitoring Action:Photographs; ECO Audit Checklist</p> <p>Responsible Person/Party: Developer</p> <p>Monitoring Frequency: Bi-monthly</p>	
2.3	<p>Aspects:Traffic Impact:Traffic capacity increase and overload Objective:Minimise the disruption of road users Target:Minimal disruption of road users</p> <hr/> <p>Mitigation/Management Measures:</p> <p>g. Adhere to traffic management plan recommendations</p> <p>h. Use sufficient access area from main road</p> <p>i. All vehicles must be road-worthy and drivers must be qualified, made aware of the potential road safety issues, and need for strict</p>	Developer	<p>Monitoring Action: Incident Register; Photographs; ECO Audit Checklist In accordance with Traffic Management Plan</p> <p>Responsible Person/Party: Developer</p>	

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	<p>speed limits;</p> <p>j. Only authorised roads and access routes may be used.</p>		<p>Monitoring Frequency:</p> <p>Monthly</p>
2.4	<p>Aspects:Erosion Control</p> <p>Impact:Loss of topsoil, formation of bare soil and deterioration of habitat quality</p> <p>Objective:Prevent and manage soil erosion</p> <p>Target: No signs of significant soil erosion should be evident on site.</p> <p>Mitigation/Management Measures:</p> <p>f. Adhere to erosion management plan recommendations</p> <p>g. Disturb as little ground area as possible, stabilize that area as quickly as possible, control drainage through the area, and trap sediment onsite.</p> <p>h. Ensure maintenance of implemented erosion management structures and measures</p>	<p>Developer ECO</p>	<p>Monitoring Action: Incident Register; Photographs; ECO Audit Checklist</p> <p>In accordance with Erosion Management Plan</p> <p>Responsible Person/Party:</p> <p>Developer ECO</p> <p>Monitoring Frequency:</p> <p>Bi-monthly Continually</p>
2.5	<p>Aspects:Solid Waste Handling</p> <p>Impact:Pollution and site contamination by solid waste</p> <p>Objective: Dispose of solid waste in the appropriate manner. Minimise the generation of solid waste.</p> <p>Target: No record of pollution or site contamination by solid waste.</p> <p>Mitigation/Management Measures:</p> <p>i. An adequate number of scavenger proof litter bins are to be placed throughout the footprint;</p> <p>j. Waste sorting, separation and recycling should form part of the environmental induction and awareness programme, to encourage personnel to collect waste paper, glass and metal waste separately;</p> <p>k. Keep all Work Sites including storage areas, offices and workshops neat and tidy;</p> <p>l. Dedicate a demarcated and signposted storage area on site for the collection of construction waste;</p> <p>m. All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site;</p> <p>n. Care should be taken to ensure that no waste is lost off disposal vehicles on route to the landfill. If needed, a tarpaulin can be utilised;</p> <p>o. Do not dump waste of any nature, or any foreign material in any drainage lines;</p> <p>p. The burning or burying of solid waste on site is prohibited.</p>	<p>Developer ECO</p>	<p>Monitoring Action:ECO Audit Checklist</p> <p>Responsible Person/Party:</p> <p>Developer ECO</p> <p>Monitoring Frequency:</p> <p>Monthly</p>

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<p>2.6</p> <p>Aspects: Sewage waste</p> <p>Impact: Pollution and site contamination by sewage.</p> <p>Objective: Provide facilities for appropriate management collection and disposal of sewage. Sewage containment sizes and removal frequencies should be appropriate in order to prevent any potential chances of overflow and environmental contamination.</p> <p>Target: No record of pollution or site contamination by sewage.</p> <hr/> <p>Mitigation/Management Measures:</p> <p>h. Provide portable chemical toilets, situated at convenient locations in proximity to work areas. This must be in relation to the quantity of users on site, with 1 toilet per 15 users and for each gender;</p> <p>i. Locations for the placement of toilets include the workshop and areas for resting and eating.</p> <p>j. Do not locate a site toilet within the 1:100 year floodline, or within a distance of 100m of any drainage lines;</p> <p>k. Toilets are to be maintained and cleaned regularly to ensure functionality and an adequate level of hygiene; This will assist with disease prevention.</p> <p>l. Removal of sewage from sight should be conducted on an adequate and frequent basis by an accredited contractor.</p> <p>m. Drinking water facilities, comprising a water tank with a manual tap can be combined with hand washing facilities near site toilets; This will assist with disease prevention.</p> <p>n. Only toilet paper is to be flushed down the chemical toilets. Personnel are to be informed on sanitary implementation as part of the environmental awareness.</p>	<p>Developer ECO</p>	<p>Monitoring Action: ECO to take photographs of site before clearance; ECO Audit Checklist Sewage removal proof to be provided by contractors.</p> <p>Responsible Person/Party: Developer ECO</p> <p>Monitoring Frequency: As per adequate frequency and storage size determinations by removal contractor Monthly</p>	
<p>2.7</p> <p>Aspects: Noise Generation</p> <p>Impact: Noise nuisance from site operations</p> <p>Objective: To avoid excessive noise generation from site operations.</p> <p>Target: Minimise the incidence of noise generation.</p> <hr/> <p>Mitigation/Management Measures:</p> <p>i. Should multiple activities result in the excessive generation of noise, it should be strived to coordinate the incidence of these at the same time;</p> <p>j. All stationary noisy equipment such as compressors and pumps should be contained behind acoustic covers, screens or sheds where possible;</p> <p>k. The regular inspection and maintenance of equipment must be undertaken to ensure that all components function optimally;</p> <p>l. Where recurrent use of machinery is frequent, machines should be shut down during intermediate periods;</p> <p>m. Machinery and vehicles are to operate during working hours between 07H00–18H00;</p>	<p>Developer</p>	<p>Monitoring Action: ECO to take photographs of site before clearance; ECO Audit Checklist</p> <p>Responsible Person/Party: Developer</p> <p>Monitoring Frequency: Monthly Continually during operational phase</p>	

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	<p>n. Vehicles are to abide by speed restrictions on access roads and limit trip generation so as to minimise disturbance to surrounding land users.</p>			
<p>2.8</p>	<p>Aspects: Fire Prevention Impact: Uncontrollable fire damage to areas Objective: Prevent the outbreak of fires emanating from operational activity. Target: No incidences of fires are recorded for the site.</p> <p>Mitigation/Management Measures:</p> <ul style="list-style-type: none"> o. Adhere to recommendations in the Fire Management Plan p. The potential risk of veld fires is heightened by windy conditions in the area, specifically during the dry, windy winter months; q. Assume acceptable precautions to guarantee that fires are not started as a result of Works on site as specified below: the relevant Contractor will be held responsible for any damage to structures or property on or neighbouring the Site as a result of any fire caused by personnel; r. Contractor should ensure that operational related activities that pose a potential fire risk are properly managed and confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include clearing working areas and avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months; s. Contractor should provide fire-fighting training to selected staff and take cognisance of the Veld and Forest Fire Act, Act No. 101, 1998; t. As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or operational activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities; u. Fire breaks are to be established and maintained around the Work Sites as and when specified by the ECO; v. Equip vehicles and site structures with fire extinguishers. Rubber beaters should also be stored on site; w. No open fires are allowed anywhere on site; x. Storage of fuel or chemicals under trees is not permitted; Fuel storage areas must be clear of significant burning fuel y. Gas and liquid fuel is not to be stored in the same place; z. Smoking may only occur at designated areas. aa. Fuel, diesel, oil, or any other flammable substance should be stored more than 6 m away from the smoking area. bb. MSDS of all flammable products to be readily available 	<p>Contractor manager ECO</p>	<p>Monitoring Action: ECO to take photographs of site before clearance; ECO Audit Checklist.</p> <p>Ensure compliance with recommendations in the Fire Management Plan</p> <p>Responsible Person/Party: Contractor manager ECO</p> <p>Monitoring Frequency: Initially ensure that all required prevention measures are in place prior to commencement of operational phase Bi-monthly</p>	

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<p>2.9</p> <p>Aspects:Soil and water contamination</p> <p>Impact:Pollution of soil and water contamination by hazardous waste products</p> <p>Objective: Provide facilities for appropriate management, collection and disposal of hazardous waste to prevent contamination.</p> <p>Target: No record of pollution or site contamination by hazardous waste.</p> <hr/> <p>Mitigation/Management Measures:</p> <ul style="list-style-type: none"> i. Adhere to stormwater management plan recommendations. j. Protect surface and ground water bodies from direct or indirect spills of pollutants such as garbage, sewage, cement, concrete wash out water, oils, fuels, or organic material or any hazardous substances resulting from activities. This must be done by adequate management and isolation of hazardous products through 110 % bunding as well as storage and removal of other waste products. k. Soil contaminated with oil, diesel, petrol or other foreign matter must be excavated as far as contaminated and disposed of at a licensed hazardous waste disposal site. Proof of such disposal must be kept on site. l. All equipment on site must be inspected for diesel leaks prior to operation, m. Leakages must be repaired as soon as possible and drip trays must be placed underneath machinery until such leakages have been repaired, n. Polluted runoff water must be isolated and not be allowed to enter drainage lines, wetland areas or storm water canals. o. Topsoil and subsoil must be protected from contamination by means of proper site management, for example collect and recycle lubricants and avoid accidental spills of pollutants, <p>Vehicles and machinery may not be serviced on site.</p>	<p>Developer ECO</p>	<p>Monitoring Action: Incident Register; Photographs; ECO Audit Checklist</p> <p>Adhere to stormwater management plan recommendations.</p> <p>Obtain proof of removal of waste products from accredited contractor</p> <p>Responsible Person/Party: Developer ECO</p> <p>Monitoring Frequency: Continually during operational phase Monthly</p>	
<p>2.10</p> <p>Aspects:Water Conservation</p> <p>Impact:Wasting water as a result of negligence or inadequate usage planning and management</p> <p>Objective: Promote and implement water use efficiency mechanisms through adequate planning and management</p> <p>Target: No Water Wastage. Keep water use within the allocated quantities. Reduce usage as far as possible.</p> <hr/> <ul style="list-style-type: none"> j. Implement adequate water planning and management measures in accordance with site requirement and allocated quantities. k. Re-use water were possible; l. Implement rain catchment strategies; m. Prevent leakages at taps and hoses by means of maintenance; n. Use buckets of water to clean tools instead of running water; o. Adhere to stormwater management plan recommendations. 	<p>Developer ECO</p>	<p>Monitoring Action: Incident Register; Photographs; ECO Audit Checklist</p> <p>Draw up water planning and management measures for site</p> <p>Responsible Person/Party: Developer ECO</p> <p>Monitoring Frequency: Monthly</p>	

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<p>p. Capture and reuse stormwater runoff for site cleaning, truck washing and dust suppression;</p> <p>q. Make sure that sediment, concrete, sand and rubbish does not end up going down the stormwater drain. Cover or filter stormwater inlets and drains;</p> <p>r. Require workers to use a broom rather than a hose to clean paths and gutters. If water use is necessary, use high pressure hoses which are both water efficient and more effective cleaners.</p>			
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8 Management Plans

Additional management plans were required by the competent authority in order to ensure that the construction and subsequent operational phases of the proposed facility could be adequately managed on a daily basis. Various potential secondary significant environmental impacts were identified which had to be addressed in order to prevent and mitigate their detrimental effects on the proposed project area.

The following additional management plans were developed and are provided in Appendix C of the EMP:

- Traffic Management Plan
- Stormwater and Erosion Management Plan
- Fire Management Plan
- Open Space Management Plan
- Revegetation Management Plan
- Vegetation Search and Rescue Plan
- Alien Invasive Species Management Plan

The following sections will provide the most important summary aspects and recommendations of the management plans which need to be considered and incorporated as part of the management and maintenance structures and procedures of the proposed facility.

8.1 Traffic Management Plan

See Appendix C for the full management plan.

The main conclusions and recommendation from the Traffic Impact Assessment are as follows:

- The development is not expected to generate significant trips, although there will be an increase in traffic, especially in heavy vehicle traffic, during the construction period.
- No road improvements to the road network are required from a capacity point of view.

- Access to the site can be provided from the R385 at the planned access point.
- The access should be constructed with proper turning lanes and a paved bell mouth.
- The layout of internal roads will be determined during construction. It is not expected that activities on the site will have any significant impact on the adjacent properties or the external road network.

In summary, it is believed that, the intended development will not have a significant impact on the area from a traffic point of view. A properly constructed access is nonetheless required, especially to accommodate heavy vehicle activities during the construction stage.

8.2 Stormwater and Erosion Management Plan

See Appendix C for the full management plan.

The proposed development area of the Concentrated Solar Plant is located in the D73A catchment area which is an endorheic (closed hydrologic system). (South African Water Research Commission, 2012). No rivers flow out of this area.

The proposed development area drains mostly to the north with approximately a quarter draining to the east. One drainage line flows through the north-western corner and one drains the centre of the proposed development area.

Two larger drainage lines from the south-east enter and leave the area in the north-eastern corner.

The Parabolic Trough System

The parabolic trough system consists of parallel north-south lines of mirror. The water collected in the mirrors will not be a problem if drained after each mirror. Due to the natural slope to the north the internal road network between the north-south oriented parallel trough lines can be used as barriers to contain and direct the water flow so that runoff water from the different rows are channelled and managed separately and do not converse to form one stream. This will adequately reduce the risk of surface erosion in

combination with the low flow speed expected due to the lack of a high gradient slope in the northerly direction.

Water runoff collected from the parabolic mirrors during rain events or mirror surface cleaning events will therefore be channelled towards the northern boundary of the facility and discharged into lined dirty water separation dam at the northern boundary of the facility. The storage dam must have the ability to safely release the water into the environment, via natural streams, if it has been tested negative for pollutants. If pollution is found in the water a waste classification will be needed in order to determine the correct procedure to dispose of the polluted water.

Storm Water from Outside Development Area

Two drainage lines enter the footprint area from the east, draining the south east and eastern area outside the footprint (See Figure 3). The total catchment area for these drainage lines is 23.9 km². Based on this catchment area the table below gives a summary of the expected flood flows to be expected for different return periods.

Table 6: Expected flood flow

Return period (years)	2	5	10	20	50	100
Expected flood flow (m³/s)	28.20	42.36	52.83	70.44	88.93	108.96
Estimated flow depth (m)	0.56	0.70	0.79	0.93	1.05	1.16

The estimated flow depth was calculated using a trapezoidal channel with a base of 20 m, side slope of 1:10 and a downstream slope of 0.0069 m/m. A manning coefficient of 0.025 was used. If a survey of the area is available an improved estimate of the flow depth can be made.

Most of the flow can be diverted around the proposed development area with a ground filled wall.

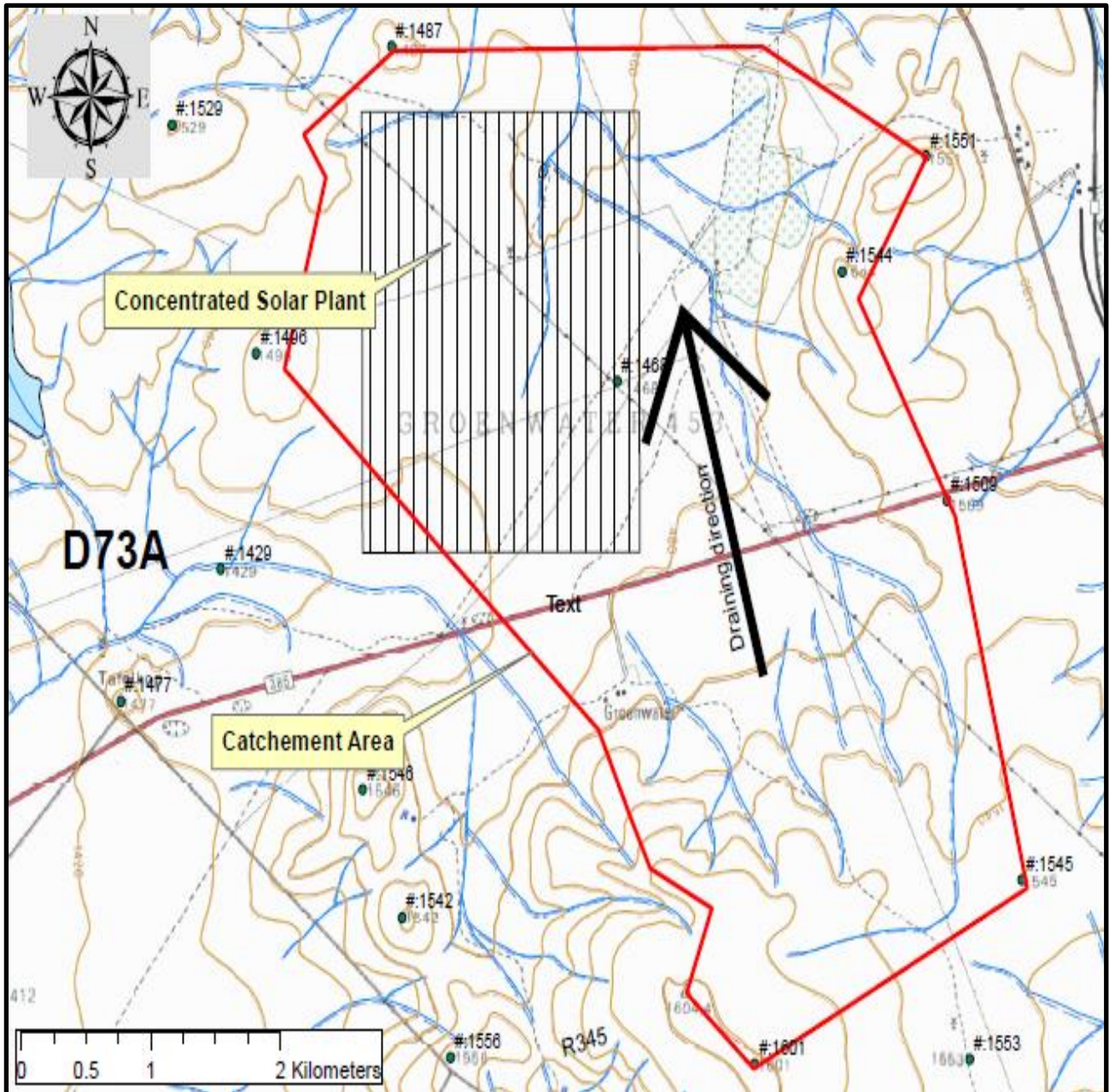


Figure 3: Catchment outside development area

Recommendation

The following is recommended in order to manage possible storm water and to prevent erosion as shown in **Figure 4**. The following is recommended:

- In order to plan and design the storm water and erosion, a detailed survey of the development area plus 500 m border for planning and design purposes is needed.
- It is recommended that the water quality of the ground water be continuously monitored.
- Continued maintenance on the water channelling/diversion and control structures in order to manage storm water (clean dirty water separation) and minimise potential erosion.

Internal storm water

Due to the potential environmental impact if leakage of the chemicals used in the process occurs during a rainfall event the footprint of the Concentrated Solar Plant area is classified as a dirty water area, meaning that the storm water from this internal area must be retained in a storage facility and separated from the clean water of the surrounding natural area outside the facility boundary and subsequent impact zone.

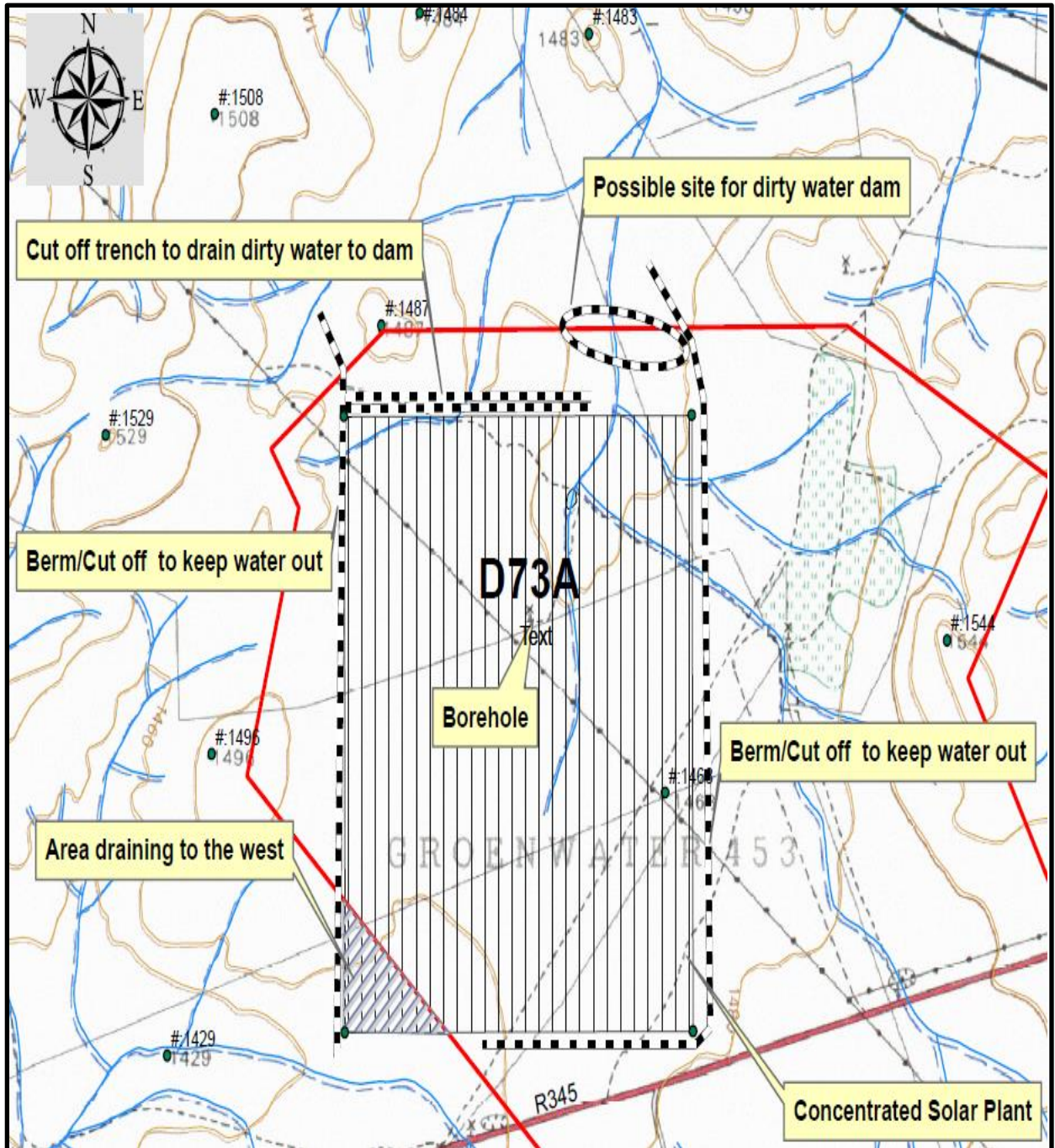


Figure 4: Storm water and Erosion Plan

The following is recommended:

- Adequately cut and fill the indicated area in the south-western corner which drains to the south-west (Figure 4) in order to ensure all water from the facility footprint surface is sufficiently channelled to the North.
- Construct the road networks between the north-south oriented parallel trough lines in order to control, channel and contain the storm water generated inside the development area towards the northern boundary. Construct structures in the north

to channel the storm water from the rows to the lined storage facility.

- Design and construct a lined dirty water storage facility in the vicinity of the northern boundary to capture and contain the channelled dirty storm water from the facility footprint. The storage facility must have the ability to safely release the water into the environment, via natural streams, if it has been tested negative for pollutants. If pollution is found in the water a waste classification will be needed in order to determine the correct procedure to dispose of the polluted water.
- The estimated required size of the dam is based on a point rainfall of 150 mm (100 year return period) which drains 100 % to the dam. The calculated volume for the 600 ha footprint area is 900 000 m³.
- The existing borehole in the development area will be sealed to prevent storm water entering the underground water.

Internal erosion protection

The following is recommended:

- Construct the road networks between the north-south oriented parallel trough lines in order to channel, contain and manage the flow speed of the storm water generated inside the development area. The natural slope is relatively flat and therefore the flow speed of the water will not cause significant erosion in the rows.
- Channels should be kept clear of vegetation and any other potentially obstructive components.

External Storm water

Water from outside the Concentrated Solar Plant area will need to be diverted around the footprint area in order to prevent clean water from entering the footprint and potentially becoming contaminated. The following is recommended:

- Design and construct adequate cut off berms/trenches outside the development area to prevent the storm water from entering the development area. The estimated required size of the berms will be 1.5 to 2 m high with a flow area as described in paragraph 3.2.
- Construct the cut off berms/trenches to direct the water to natural water courses.
 - Berm/trench on the western boundary of the facility footprint will result in the diversion of a drainage line around the facility boundary in order to channel outside clean water around the facility footprint to prevent potential contamination (Figure 4).
 - Berm/trench on the eastern boundary of the facility footprint will in turn result

in the diversion of two drainage lines around the facility boundary in order to channel outside clean water around the facility footprint to prevent potential contamination (Figure 4).

External Erosion protection

The following is recommended:

- Where the water is collected due to the diversion from other areas, the flow speed must be kept low in order to prevent erosion by enlarge the flow area and kept the slope to a minimum. Gras can also be planted in the flow area to protect the soil.
- Where the water is released into natural drainage areas, the outlet must be protected from scouring by managing and minimizing the height difference between the outlet and the area in which the water is released. If the height difference is too significant, structures can be built with gabions to produce stilling basins.
- Stone and gabion protection can be constructed where large flow volumes and flow speeds are expected.

8.3 Fire Management Plan

See Appendix C for the full management plan.

Fire Risk Reduction

In order to minimize the potential hazardous of fires on site, the following prevention procedures must be followed.

Prevention Procedures

Planned permanent fire protection systems must be installed prior to any construction activities taking place. In certain construction phases, temporary protection systems shall be used.

8.3.1 Smoking

Dedicated smoking areas must be identified within contraction camps and construction sites. All smoke must strictly only take place at these areas. These areas may not be located near dry fuel, explosives, liquid fuels and flammable/ combustible materials and must adhere to relevant standards and regulations. A sand backed must also be placed at all dedicated smoking areas.

8.3.2 Wildfires

Construction activities should only take place in the construction footprint where vegetation has been cleared. No open fires are permitted by any employees inside or outside the facility boundary. This will minimize the chances of wildfires taking place. In the event of a wildfire taking place, the following measure must be in place in order to prevent the fire from spreading.

- Firebreaks must be implemented according to the National Veld and Forest Fire Act, Act 101 of 1998. These firebreaks must be long enough and wide enough to prevent the fire from carrying across and must be free of any flammable substances.
- According to the National Veld and Forest Fire Act, Act 101 of 1998, farming communities must establish a fire protection association to prevent and control wildfires. The management entity of the CSP facility must become members of the fire protection association.

8.3.3 Hot works

The principle contractors and sub-contractors shall submit a specific construction method statement for all hot work activities on site. Adequate fire extinguishers should be available when contractors engage in any hot work activities.

8.3.4 Access Roads

All structures, temporary and permanent structures, workers accommodation, laydown areas and all construction site camps must be accessible to fire response equipment by means of roadways. All roadways entering the construction site and roadways within the construction area shall:

- Be at least 6 meters wide and may not be obstructed in any manner. No parking may take place on any roadways and “No Parking” signs must be erected.
- Must have an overhead clearance of at least 5 meters.
- Must be designed in such a way to support expected loads imposed by firefighting equipment.
- Must have turnaround facilities where the road is more than 90 meters long and has a dead-end.

8.3.5 Construction site laydown areas

Adequate fire mitigation and abatement equipment for all laydown areas that are associated with their work scope and work area(s) shall be provided by Prime Contractors.

8.3.6 Heating equipment

All temporary and permanent heating equipment shall be listed, tracked and its place of installation mapped. Heating devices shall be installed in accordance with site standards and manufactures' recommended installation requirements.

8.3.7 Temporary enclosures

During construction, temporary enclosures, including trailers, inside the Powerhouse shall be prohibited except where permitted by the individual responsible for fire prevention and fire protection. Where the floor area of a combustible enclosure exceeds 9.3 m², or where the occupancy presents a fire exposure, the enclosure should be protected with an approved automatic fire extinguishing system (sprinkler protection). The sprinkler protection shall cover the interior and underside of any of these temporary enclosures.

Only non-combustible panels, flame-resistant tarpaulins, or approved materials of equivalent fire-retardant characteristics shall be used.

Temporary enclosures shall be equipped with a minimum of one fire extinguisher suitable for all classes of fires that are expected inside the enclosure. Fire extinguishers shall be located so that travel distance to a fire extinguisher does not exceed 15 m.

8.4 Open Space Management Plan

See Appendix C for the full management plan.

Open space management principals

The following principles are set out to be followed throughout all proposed areas:

Access Control

- Access to the site should be controlled in a strict manner;
- A register should be kept whereby all contractors and visitors will be required to sign-in;
- Signage should be clearly visible at all entrances to site, indicating that any disturbances to fauna and flora is strictly prohibited

Prohibited Activities

- No hunting and or collecting of fauna and flora will be allowed, except where required for the safe operation of work and will only be allowed by the Environmental Control Officer should he/she have obtained the appropriate permits and or permission from the landowner;
- No open fires will be allowed in the site area (smoking will only be permitted in designated areas);
- No driving off demarcated construction roads where possible;
- No collecting of firewood will be allowed on site;
- No swimming or washing of clothes or machinery in natural water resources; and
- No marking/painting on natural features such as rock formations.
- No defecation or urination in uncontrolled natural environments.

Communal areas

The open areas at the Metsimatala CSP Facility not affected by construction is communally owned and is largely used for small stock farming and to a lesser degree, large stock farming. The area set aside for the construction of the CSP facility will be fenced off to keep livestock from entering this area.

The communal area will be largely off limits to the construction personnel and all of the personnel should be made aware of this during site inductions and toolbox talks.

The following should be kept in mind with regard to the communal areas:

- Do not leave any construction or farm management roads to drive in the veld. Tracks may lead to erosion in the long term and unnecessary driving in the veld may destroy valuable grazing.
- Do not hunt or disturb any wild animals, birds or any livestock. Do not collect eggs or disturb any nests you may encounter;
- Do not remove any wood or cut any trees for the use of firewood. Dead trees and branches serves as sediment- and seed traps and play a valuable role in the restoration of natural veld;
- Do not pick any plants, flowers or bulbs for medicinal or garden use;
- Do not enter any of the centre pivot areas to pick maize for food; and
- Do not litter or discard any waste items when travelling through open space to your place of employment.

Ephemeral pans

Ephemeral pans are found throughout the Northern Cape Province and might also be present in the vicinity of the CSP facility. These pans are important collectors of rainwater runoff and serves to replenish groundwater in this semi-arid ecosystem. These pans hold water for a short time only but play a valuable role in the larger ecosystem. They also serve as valuable feeding and resting areas for migrating birds and specialist waders. These pans also serve as breeding areas for frogs and toads when water has collected in them after rains and as grazing for livestock and game when the water has evaporated.

The following is prohibited:

- Driving onto these pans. The integrity of these pans may be jeopardized endangering the biota making use of them; and
- Disturb or catch any migrating or feeding birds found there.

CSP Mirror and administration area

The CSP mirror and administration area is adjacent to the communal area. During the construction and operational phase of the facility these areas must fenced off to prevent access by the community. This is to prevent injury to members of the community or to any livestock belonging to the community.

During the operational phase fire breaks should be made to protect the facility from occasional veld fires that may start on the communal area due to lightning during summer months.

Construction roads must be kept in a good serviceable condition in both construction and operational phases to contain run-off and possible soil erosion. The open areas used during both phases must be kept clear of invasive vegetation by regular control.

Monitoring and follow-up action

Regular monitoring should be conducted throughout the lifespan of the Metsimatala CSP Facility; this should include adaptive management to allow for the early detection of any degradation on the affected ecosystems, whereby early remediation can commence.

The appointed Environmental Control Officer will monitor the compliance of this plan throughout the site as well as monitor the compliance of all contractors on site throughout the construction phase of the Metsimatala CSP Facility. The management of the CSP facility will be responsible for the compliance of this management plan during the operational phase.

The minimum criteria which should be monitored are as follows:

- The stability of surface soils;
- No open spaces affected by invasive vegetation;
- The composition and density of replanted vegetation; and
- The overall establishment of the rehabilitated areas.

Conclusion

This management plan has been compiled to assist the various contractors, the management of the Metsimatala CSP Facility and the Environmental Control Officer with guidelines on the implementation of the plan.

Metsimatala CSP Facility should ensure that the integrity of the open spaces are not affected by construction is maintained. Personnel employed during both the construction- and Operational Phases should be made aware that these areas include mostly communally owned land and that the Community's right and property be acknowledged and left alone. This will ensure that no claims can be directed at the management of the facility.

8.5 Revegetation Management Plan

See Appendix C for the full management plan.

8.5.1 Revegetation of the site

Construction phase

The appointed Environmental Control Officer will be responsible to ensure that all contractors are compliant with this management plan during the construction phase.

Road networks

During the construction phase permanent features such as the access roads can be rehabilitated in sequence with the actual construction. The topsoil removed during the preparation of the footprint area can be spread next to the new roads. This will mean that hardly any topsoil will be lost through wind- or water erosion and the road verges can then quickly recover.

Plants removed ahead of construction should be replanted as close to the original locations as possible.

Spoil areas and Site camps

During the construction phase the main emphasis will be to conserve topsoil for later use in landscaping of the various areas. It must be ensured that the topsoil is kept clear of

alien invasive weeds (refer to Alien Invasive Management plan) and that aspects such as erosion is also addressed.

When construction is completed the initial rehabilitation must include the landscaping of the bare areas to a state as close to the surrounding landscape with no visible sharp edges. The topsoil can then be returned to where it was removed. The rehabilitation of the area must as far as possible be in synchronization with the rainy season to allow for quick emergence of pioneer species. Hydro seeding is not recommended for this area because of the cost implications and the low rainfall and frequency of the rain showers. At all times alien invasive plants must be controlled (refer to Alien Invasive Management plan).

Relocation of plants

Plants removed ahead of construction should be replanted as close to the original location as possible. If the receiving environment is totally different from the original habitat the plant species should be relocated to a location suitable for the long term survival of the species.

Correct amelioration of the topsoil is essential in order to ensure successful re-establishment of vegetation during the rehabilitation phase.

8.5.2 Operational phase

During the operational phase the emphasis should be directed at maintenance of the rehabilitated footprint area. Soil erosion should be monitored and combated on a regular basis and alien invasive plants (refer to Alien Invasive Management plan) as well. During the rainy season the access roads and areas next to the substation and other infrastructure should be cleared of weeds on regular basis.

8.5.3 Monitoring and follow-up action

Regular monitoring should be conducted throughout the lifespan of the Metsimatala CSP Facility; this should include adaptive management to allow for the early detection of any degradation on the affected ecosystems, whereby early remediation can commence.

The appointed Environmental Control Officer will monitor the rehabilitation of the site, during the construction phase, to ensure that all contractors are compliant with this management plan, should the Environmental Control Officer not have the adequate knowledge to monitor the rehabilitation, an ecological sub-contractor will be appointed. As soon as the CSP facility is operational, the management thereof will identify and appoint a suitable entity that will be responsible to take over and maintain the monitoring cycle as well as initiate adaptive management as needed.

The minimum criteria which should be monitored are as follows:

- The emergence of Alien Invasive Species;
- The stability of surface soils;
- The conservation of topsoil;
- The mitigation and or prevention of soil erosion;
- The composition and density of replanted vegetation; and
- The overall establishment of the rehabilitated areas.

8.5.4 Timeframes and duration

Rehabilitation during the construction phase should occur as affected areas become available or where needed to stabilise or prevent erosion.

The revegetation period post construction will be determined by Metsimatala CSP Facility, but note that this period must not exceed 6 months.

The rehabilitation phase should be at least 12 months (depending on the rainfall) to ensure the acceptable establishment of plants is attained. Should the acceptable establishment of plants not be achieved within this timeframe, maintenance on these plants and areas will continue until an acceptable establishment has been attained.

8.5.5 Conclusion

This management plan has been compiled to assist the contractor, Metsimatala CSP Facility and the Environmental Control Officer with guidelines on the implementation of the plan and the implementation of work on the rehabilitation of affected areas.

Metsimatala CSP facility must ensure that the footprint area is left in a state closely resembling the original environment. It is noted that a number of farm management roads are found all over the proposed construction site and that the environment as a whole is has a low species composition. While nothing can be done to the areas upstream of the weir, care should be taken to restore the construction area and areas of permanent infrastructure to a state as close to the original environment as possible.

This can be achieved by responsible environmental management by preserving topsoil for later use, the search and rescue of protected plant species (refer to Search and Rescue Management Plan) and the subsequent re-introduction of these plants to their original habitats.

8.6 Vegetation Search and Rescue Plan

See Appendix C for the full management plan.

8.6.1 CSP Panel area

The area that the CSP plant will take up will be, in its entirety, in the Olifantshoek Plains Thornveld. Two protected trees, namely *Vachellia erioloba* (Camel tree) and *Boscia albitrunca* (Shepherds tree) occurs in this vegetation type. It is expected that, due to the nature of the CSP facility, all vegetation will be removed ahead of construction. This will mean that both of these species will be destroyed by construction.

8.6.2 Construction site camp, access roads and spoil sites

The sites for these management facilities will also be in the Olifantshoek Plains Thornveld. The nature of these facilities will largely be of semi-permanent nature and should be placed in areas where the least damage to the natural environment could occur. Determining the location of the site camp should take the local vegetation in mind and as little disturbing of the vegetation as possible should take place. Access roads should also be planned and constructed by taking the location of the various species in mind.

8.6.3 Plant species affected - construction phase

The following protected plant species could be affected during the construction phase:

***Boscia albitrunca* (Shepherds tree):** This is a protected plant species and occurs in all three of the identified vegetation types. This species will be very difficult to relocate, if impossible and will be lost forever in the CSP plant area. In the general construction area where the site camp will be situated and access roads constructed care should be taken not to remove this species, except where absolutely necessary.



Figure 5: *Boscia albitrunca*

***Vachellia erioloba* (Camel thorn tree):** This tree, also protected, is found in both the Olifantshoek Plains Thornveld and Postmasburg Thornveld but may also occur in sandy patches in the Kuruman Mountain Bushveld. It will also be impossible to relocate this species in the CSP plant area due to its extensive taproot system. The management of this species is the same for the general construction area and power line areas.



Figure 6: *Vachellia erioloba*

***Olea eropaea* (Wild olive)**

This tree species is protected in the Northern Cape Province by Northern Cape Nature Conservation Act 9 of 2009 and its Regulations.

Examples of these trees may be found in all three of the vegetation types affected by the construction of the CSP facility and its associated infrastructure.



Figure 7: *Olea europaea*

***Aloe grandidentata*:** This succulent plant occurs widespread in the Northern Cape Province and while it is of least concern (Red Data List), it should be identified and relocated ahead of construction.



Figure 8: *Aloe grandidentata*

***Aloe hereroensis*:** This succulent plant occurs widespread in the Northern Cape Province and while it is of least concern (Red Data List), it should be identified and relocated ahead of construction.



Figure 9: *Aloe hereroensis*

Methodology

Prior to the implementation of the Search and Rescue Management Plan, it is important to note that the success of this management plan can only be achieved if:

- Endangered or species of conservation concern can be removed with minimal damage to the plant and its root system;
- Plants rescued and removed from their original location are safely stored in conditions favourable to these plants;
- The relocation of such plants must be into a suitable habitat with protection from future harm or disturbances which may influence their re-establishment; and
- These plants must be relocated and planted during the growing season.

CSP plant area

The species found in this area may include all of the species mentioned in Section 5 except for *Aloe hereroensis*, which occurs in more rocky areas. It will be impossible to relocate the Camel thorn and Shepherd's trees due to their very deep tap root system and therefore it is necessary to apply for permits allowing for the removal of these plants.

Other construction areas

Once the construction access roads, site camps and spoil areas have been demarcated by surveying, a dedicated search and rescue operation should take place. During this operation all protected plant species should be individually marked and where possible, removed. A botanist knowledgeable with the local flora should be consulted during this operation.

It must be realized that some of the geophytes might not be visible during certain periods because they might only emerge after rain or have dropped their leaves during periods of prolonged drought. Plants could be relocated immediately to areas outside of the construction footprint or could be kept in a nursery at the main site and then relocated to a position as close to the original one as possible.

It must be remembered that these plants, especially the bulbous plant plays an important role in traditional medicines and are sought after. Management should ensure that none of these species is removed from the nursery areas prior to relocation thereof.

During the construction of the site camps and access roads as few as possible trees should be removed to act as shade trees. Once construction has been completed these trees will also act as micro-ecosystems retaining and providing moisture and protection for new seedlings.

8.6.4 Monitoring and follow-up action

Regular monitoring should be conducted throughout the lifespan of the Metsimatala CSP Facility; this should include adaptive management to allow for the early detection of any degradation on the affected ecosystems, whereby early remediation can commence.

The appointed Environmental Control Officer will monitor the search and rescue of the site, during the construction phase, to ensure that all contractors are compliant with this management plan, should the Environmental Control Officer not have the adequate knowledge to monitor the search and rescue, an ecological sub-contractor will be appointed.

The minimum criteria which should be monitored are as follows:

- Listed endangered species are successfully identified and relocated;
- Identified species are successfully re-established; and
- Loss of local species are prevented or minimized.

8.6.5 Conclusion

Metsimatala CSP Facility should employ the services of a botanist knowledgeable with local flora and ecological conditions to ensure that as few protected plants as possible are affected by construction. Construction teams should also make sure that individual plants that cannot be relocated is not damaged during construction. Where it is necessary to trim trees it must be done with circumspection and trees must not be damaged more than what is acceptable.

It must be ensured that the necessary permits to remove and/or relocate plants are acquired from Northern Cape Nature Conservation in time in order not to delay construction or come into conflict with Provincial Authorities.

8.7 Alien Invasive Species Management Plan

See Appendix C for the full management plan.

8.7.1 Species present on site

A vegetation survey of the area proposed for the construction of the CSP plant was carried out by Prof Johan du Preez of EnviroNiche Consulting. The following listed Alien Invasive Plant Species were found on the property:

- *Archemone mexicana* (Mexican poppy)
- *Datura stramonium* (Common thorn apple)
- *Prosopis glandulosa* (Honey mesquite)

A number of weeds species not listed as AIS were also found but these plants are general agricultural weeds. These are as follows:

- *Bidens bipinnata*
- *Conyza bonariensis*
- *Tagetes minuta*
- *Tridax procumbens*
- *Verbesina encelioides*

Activities that may impact on alien species abundance

Alien plants species usually emerge after disturbance of the footprint area. Of the three species mentioned in Section 6 the emergence of both *Archemone mexicana* and *Datura stramonium* are triggered when the soil is disturbed irrespective of the kind of activity. The Prosopis trees will be removed entirely if it occurs in the proposed CSP area and will not regenerate again once removed.

Within the context of the site, areas disturbed by construction activities which will not be rehabilitated soon, will most likely be most vulnerable to alien invasion. The nature of the precipitation in this area i.e. heavy summer rain showers with sudden extreme runoff, will also promote the invasion of alien species in the event of poor runoff management.

Clearing and guiding principles

- Alien control programs are long-term management projects and should include an eradication plan which includes follow up actions for rehabilitation of the cleared area.
- The lighter infested areas should be cleared first to prevent seed build-up.
- Pre-existing dense areas should be left for last, as they probably will not increase in density or pose a greater threat than they are currently.
- All clearing actions should be monitored and documented to keep track of which are due for follow-up clearing.

Control methods

- Different species require different control methods such as manual, chemical or biological methods or a combination of the two.
- Care should be taken to ensure that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, soil disturbance should be kept to a minimum. The vegetative stage of the plants should also be considered before clearing.
- Fire is not a natural phenomenon in the area and should not be used in general for alien control or vegetation management at the site.
- The best-practice clearing method for each species identified should be used. The preferred clearing methods for most alien species can be obtained from the Department of Water and Agricultural Affairs (DWAF) Working for Water website: <http://www.dwaf.gov.za/wfw/Control/>

Use of herbicides for alien control

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional mechanical disturbance which may stimulate alien invasion and may also be ineffective for many woody species which may re-sprout. Where herbicides are to be used, the impact of the eradication program on the natural environment should be minimised by observing the following:

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control
- Care must be taken to prevent contamination of water bodies. This includes special care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.

- Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable place.
- To avoid damage to indigenous or other desirable vegetation, herbicides that would have the least effect on the indigenous vegetation should be used.
- Droplet nozzles with a coarse spray pattern should be fitted to avoid drift of herbicides onto neighbouring vegetation.
- The appropriate health and safety precautions should be followed regarding the storage, handling and disposal of herbicides.

8.7.2 Alien management plan

CONSTRUCTION PHASE ACTIVITIES

The following management actions are aimed at reducing soil disturbance during the construction phase of the development, as well as reducing the likelihood that alien species will be brought onto site or otherwise encouraged.

Action	Frequency
The ECO have to provide permission prior to any vegetation clearing.	Daily
Clearing of vegetation should be undertaken as the work progress – mass clearing should not occur unless the cleared areas will be affected by construction immediately afterwards.	Weekly
Areas that will be exposed for some time should be protected with packed brush, or appropriately battered with fascine work. Alternatively, jute (Soil saver) may be pegged over the soil to protect it.	Weekly
Cleared areas that have become invaded can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Herbicides with a residual action should not be used in order to encourage the emergence of indigenous plants.	Weekly
Although organic matter is frequently used to encourage regrowth of vegetation on cleared areas, no foreign material such as straw and manure should be brought onto site. Brush of an indigenous nature from cleared areas should be used as much as possible. The use of manure or other soil amendments is likely to encourage invasion.	Weekly
Clearing of vegetation is not allowed in the following instances: <ul style="list-style-type: none"> • Within 32 metres of any wetland; 	

<ul style="list-style-type: none"> • 80m of any wooded area; • Within 1:100 year flood lines; • In conservation servitude areas or; • On slopes steeper than 1:3. <p>Permission should be granted by the ECO to specifically allow construction activities in these areas.</p>	Weekly
<p>Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment.) Stockpiled material should be checked on a regular basis and any weeds emerging from material stockpiles should be removed.</p>	Weekly
<p>Alien vegetation regrowth on areas disturbed by construction must be controlled throughout the entire site during the construction period.</p>	Monthly
<p>The alien plant removal and control method guidelines should adhere to the best practice for the species involved. Such information can be obtained from the DWAF Working for Water website.</p>	Monthly
<p>Clearing activities must be contained within the affected zones and may not spill over into demarcated No Go areas.</p>	Daily
<p>Pesticides may not be used. Herbicides may be used to control listed alien weeds and invaders only.</p>	
<p>Wetlands and other sensitive areas should remain demarcated with appropriate fencing or hazard tape. These areas are no-go areas (this must be explained to all workers) that must be excluded from all development activities.</p>	Daily

MONITORING DURING CONSTRUCTION PHASE

The following monitoring actions should be implemented during the construction phase of the development.

Monitoring action	Indicator	Timeframe
Document all alien species observed at the site	List of alien species	Preconstruction
Document alien plant	Alien plants distribution	3 Monthly

distribution patterns	map within priority areas	
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluate the control success rate	Decline in documented alien plant abundance over time	Bi-annually

OPERATIONAL PHASE ACTIVITIES

The following management actions are aimed at reducing of alien plant species within the site and maintaining non-invaded areas clear of aliens

Action	Frequency
Surveys for alien species should be conducted on a regular basis. Six monthly for the first two years after construction and annually thereafter. All aliens identified should be cleared.	Every 6 months for 2 years and annually thereafter
Where areas of natural vegetation have been disturbed by construction activities, revegetation with indigenous, locally occurring species should take place where the natural vegetation is slow to recover or where repeated invasion has taken place following disturbance	Biannually, but revegetation should take place at the start of the rainy season
Areas of natural vegetation that need to be managed to reduce plant height or biomass, should be controlled using methods that leave the soil protected, such as using a weed-eater to mow above the soil level.	When necessary
No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise species indigenous to the area should be used.	When necessary

MONITORING OPERATIONAL PHASE

The following monitoring and evaluation actions should take place during the operational phase of the development.

Monitoring Action	Indicator	Timeframe
Document alien species distribution and abundance	Alien plant distribution map	Biannually

over time at the site		
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over the time	Biannually
Document rehabilitation measures implemented and success achieved in problem areas	Decline in vulnerable open areas over time	Biannually

8.7.3 Conclusion and recommendations

- The total absence of alien plants in the footprint area will make the control and eradication of emerging plants much easier. By clearing the young emerging seedlings, seed banks will not be allowed to build up, effectively reducing control measures.
- In the short term, soil disturbance will be the main driver of alien invasion or emergence at the site.
- As disturbance is the major driver initial driver of alien species invasion, keeping the disturbance footprint to a minimum is a key element in reducing alien abundance.
- The physical size of the proposed CSP plant makes manual control very expensive, therefore chemical control is recommended. It must be ensured that control is done on windless days to prevent drift of -and contamination of the operators by the chemicals used.

8.8 Leakage and Spillage Detection and Management Plan

- All potential hazardous substances to be utilised or stored on site will be identified and suitable storage facilities will be constructed. Such facilities will prevent the unauthorised handling and potential contamination of areas by such hazardous products. It will also provide the necessary product handling and toxicity information through the ready availability of the relevant MSDS documentation.
- All potential sources of hazardous product leakages and potential contamination points on site will be identified and the risk and severity of potential

leakages/spillages occurring will be determined and assessed. From the likelihood and severity risk assessments, monitoring and maintenance protocols will be implemented in order to continually and frequently monitor and maintain and ensure the adequate conditions of potential risk zones. This will prevent unnecessary leakages/spillages from occurring and will also ensure that once accidental leakages do occur, they will be swiftly detected and dealt with.

- Emergency response management plans will also be developed and implemented based on the likelihood and severity risk of identified potential leakage/spillage components. All relevant employees will be suitably trained on these emergency procedures in order to be able to efficiently detect leakages/spillages, identify the sources and implement containment and contamination prevention strategies.
- This will ensure that the risk of any significant negative environmental impacts occurring due to undesired leakages/spillages is significantly reduced and mitigated.

8.9 Waste Disposal

An accredited contractor such as Waste Man will be appointed to manage and transport waste from site. All solid waste collected shall be disposed of at the registered/licensed municipal landfill site. Skip waste containers and waste collection bins will be maintained on site and the contractor will arrange for them to be collected regularly when needed and transported to the licensed landfill site. Waste separation will be implemented. Under no circumstances will waste be burned or buried on site.

The Tsantsabane Local Municipality has indicated that it shall be able to accommodate general waste at its landfill site. The National Environmental Management: Waste Act, 2008 (Act No.59 Of 2008) will not be triggered as general waste quantities will fall below the threshold.

It is not anticipated that any significant hazardous waste will be generated during the construction or operational phases. An accredited hazardous waste contractor will however be appointed to manage and transport hazardous waste from site. All hazardous waste collected shall be disposed of at an appropriate registered/licensed hazardous waste landfill site. Clearly marked (hazardous waste) skip waste containers and waste collection bins will be maintained on site and the contractor will arrange for them to be collected regularly when needed and transported to the licensed landfill site.

8.10 Conclusion

The effectiveness of the implementation and mitigation of these management plans in achieving their management objectives will be adequately audited on a continual basis during the construction phase. Results from these audits will be provided to the competent authority.

9 Recommendations from the Department of Environmental Affairs: Biodiversity and Conservation Directorate

From the feedback/comment letter received from the Department of Environmental Affairs: Biodiversity and Conservation Directorate on 21 September 2016, the following recommendations for inclusion in the Environmental Authorization were provided for this particular project:

- All populations of Near Threatened and Threatened plant taxa must be conserved in situ and protected with a buffer zone in accordance with guidelines as set out in die National Environmental Management Act (Act 10 of 2004) and the Northern Cape Nature Conservation Act (Act 9 of 2009).
 - Reply: A final ecological walkthrough will be conducted prior to commencement of construction in order to verify the potential presence or absence of any Red Data Listed species.
- An Ecological Management Plan must be compiled in respect of all actions that affect populations of Red List Plant Species.
 - Comment: Once a final ecological walkthrough has been completed a site specific management plan will be compiled for the Red Data Listed Species.
- The development must take place in an already disturbed area with a low sensitivity rating.
 - Comment: The majority of the proposed project area is located on an area which has been degraded by overgrazing practises.
- A 250m buffer around Southern Kalahari Salt Pans must be maintained during construction and operational phase.
 - Comment: No wetlands or pans were identified by the ecological specialist.
- Provincial comments must be considered during the Environmental Authorization for this project.
 - Comment: No comments were received from the Northern Cape Department of Environment and Nature Conservation after various email and telephonic attempts to obtain feedback. See number 10 under heading 3.5., 3.5.1 and 4.4. Final request sent on 15 September 2016.
- Erosion gullies must be rehabilitated and the areas prone to erosion must be protected and topsoil must also be protected and stabilized by planting local grass/vegetation and prohibit grazing until such time that the surface is stabilized.

- A Stormwater and Erosion Management Plan for the proposed project is available in Appendix C of the EMPr.
- For all species protected in terms of National and Provincial Legislation within the proposed development areas, permits must be obtained from relevant authorities before construction commence.
 - Comment: A Vegetation Search and Rescue Plan is available in Appendix C of the EMPr. Once a final ecological walkthrough has been completed permits will be applied for, for any protected species identified.
- Rehabilitation using local vegetation after construction is recommended to maintain the functionality and importance of these biodiversity areas. Continuous monitoring of the rehabilitation should be conducted.
 - A Revegetation Plan is available in Appendix C of the EMPr.
- If the soil cover under the panels is to remain in as natural state as possible, we would appreciate annual follow-up vegetation studies for 5 or more years done in the rainy season, in order to identify both positive and negative impacts of this kind of development, and submitted to the Branch: Biodiversity & Conservation for information.
 - Comment: The request is noted.
- The mitigation measures proposed in the EMPr and specialist studies are supported and must be adhered to during construction and operational phase.
 - Comment: Specialist recommendations and mitigation measures have been incorporated into the EMPr.

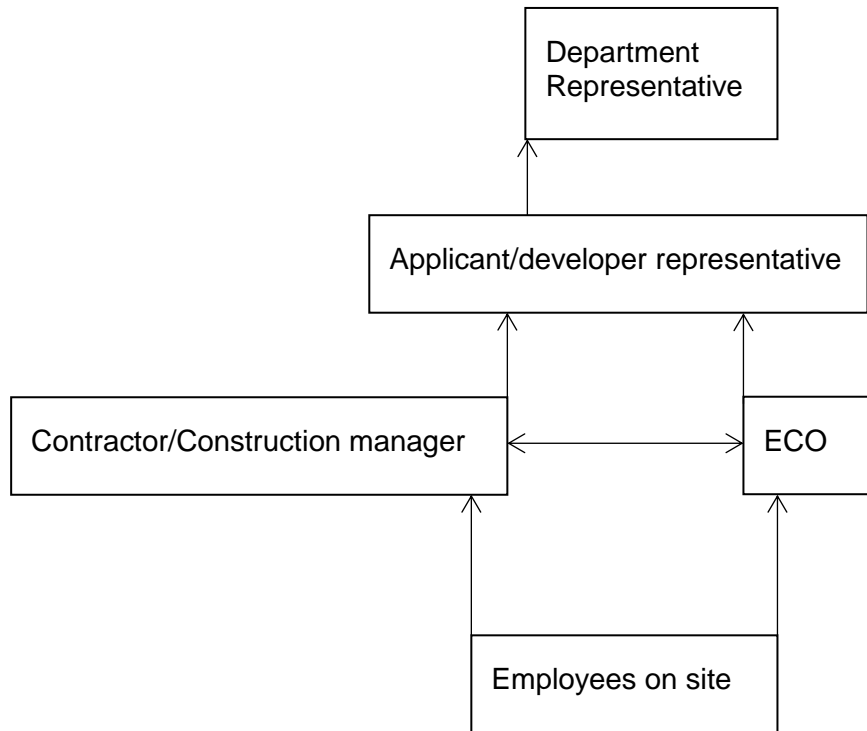
10 Emergency Response Plan

The following table is provided to assist the ECO and contractor manager with remedial work options and problem solving in the event of potential environmental emergencies occurring on site:

Observation or Event	Action by Inspector or Observer	Action by Contractor manger
Spillage of hazardous substances	<p>Immediately report to contractor manager.</p> <p>Immediately put emergency response plan into action</p>	<p>Immediate action will be required by following the next steps: See responsibility organogram below.</p> <ul style="list-style-type: none"> • Immediately stop work and isolate the contaminated area as soon and well as possible • Isolate source of contamination in order to prevent increase in pollution footprint or severity. • Inform the relevant construction manager and ECO. The construction manager must in turn inform the developer. • Construction manager and ECO to implement clean-up procedure • Dig down into the soil to see how far down the pollution penetrated, • If less than 300mm penetrated: <ul style="list-style-type: none"> ○ Turn the soil over to expose it to the air. ○ Apply Mono Ammonium Phosphate (MAP) at a rate of 58gr/m² to the overturned soil. ○ Water enough to keep the soil moist. • If penetration is greater than 300 mm: <ul style="list-style-type: none"> ○ Remove the affected soil and spread in a layer not more than 300 mm thick. ○ Apply MAP at a rate of 50gr/m². ○ Water enough to keep the soil moist. • Repeat the above steps every 6 weeks or until the soil is clean. • Inform the relevant governmental department of the incident
Fire outbreak	<p>Immediately report to contractor manager who in turn must inform all relevant local emergency authorities as per the Fire Management Plan.</p>	<p>Action will be required ASAP by following the next steps: Immediately put fire management measures as per Fire Management Plan in place. Inform all relevant local emergency authorities as per the Fire Management Plan.</p>

Observation or Event	Action by Inspector or Observer	Action by Contractor manger
	Immediately put emergency response plan into action as per Fire Management Plan.	

Responsibility and Reporting Organogram in the event of an emergency



11 Incident Register

INCIDENT REGISTER: PROPOSED DEVELOPMENT OF A CSP facility					
NAME OF PERSON REPORTING THE INCIDENT	INCIDENT	DATE OF INCIDENT IDENTIFIED	HOW WAS INCIDENT ADDRESSED?	DATE OF RECTIFICATION	SIGNATURE

12 Decommissioning/refurbishment Phase

The operational phase will be followed either by retrofitting and upgrading (preferred) or decommissioning. Continuous maintenance will be conducted on the facility in order to ensure its prolonged adequate operation. At the end of the technological lifetime of the facility, the newly available technology at that time will be reviewed and appropriate technology alternatives and improvements will be investigated. The most viable upgrading alternative for the facility will be identified and the facility can be upgraded accordingly in order to continue its efficient operations.

In the event of decommission, the footprint area needs to be suitably rehabilitated. It will entail infrastructure removal; site clean-up and environmental rehabilitation of the area to a suitably functional ecological state. The underlying aim of this phase is therefore to return the landscape to a suitable self-sustainable landscape.

Key aspects within this process include the:

- Removal of structures and infrastructure;
- Handling of inert waste and rubble;
- Handling of hazardous waste and pollution control;
- Final shaping of the terrain profile in line with the natural topography and water catchment and drainage
- Topsoil replacement and soil amelioration;
- Soil cultivation (ripping and scarifying of surfaces)
- Amelioration and grassing of adequate indigenous vegetation
- Adequate follow up amelioration and maintenance for a period as indicated by a specialist.

A Revegetation Management plan is provided in Appendix C which provides a comprehensive overview of the processes to be followed. The final shaping designs as well as amelioration and grassing recommendation should be determined and provided by suitably qualified specialists only once the rehabilitation stage is reached.

13 Conclusion

The management and subsequent monitoring measures and recommendations as indicated in this EMP document need to be adequately implemented and continually enforced by the assigned responsible role-players. This will ensure the successful management and minimisation of environmental risks and potential impacts associated with the proposed project. The development needs to be completed and operated in any environmentally sustainable and responsible manner in accordance with the EA and EMP requirements.