ENVIRONMENTAL MANAGEMENT PLAN

THE PROPOSED CONSTRUCTION OF A 50MW PV SOLAR PARK PROJECT ON PORTIONS 15, 27 AND 28 OF FARM SCHIETFONTEIN 437 JQ WITHIN THE MADIBENG LOCAL MUNICIPALITY, NORTH WEST PROVINCE

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PROJECT DETAIL

DEA REFERENCE NO. DWS REFERENCE NO	*DEA Ref: 14/12/16/3/3/2/850* *DWS Ref* T618/2015
PROJECT TITLE	The proposed construction of a 50MW PV solar park project on portions 15, 27 and 28 of farm Schietfontein 437 JQ within the Madibeng Local Municipality, North West Province
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CLIENT	Zolograph Investments (RF) Proprietary Limited
REPORT STATUS	Draft Environmental Impact Assessment report
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Definitions

The definitions and interpretations in the main Construction Contract document shall apply. The definitions contained within this section are for the benefit of this document for explanatory purposes only. In the event that any conflict occurs between the definitions contained herein and those contained within the main Construction contract document, those within the contract document shall prevail.

Construction Activity: A Construction activity is any action taken by the Contractor, his subcontractors, suppliers or personnel during the Construction process.

***Contractor*:** Any legal entity or consortium contracted to undertake the activity associated with the Construction of the 50MW PV Solar Park.

Environmental Control Officer (ECO): The person to be appointed by the Contractor, with the approval of and the Engineer, to oversee the Construction phase of the 50MW PV Solar Park and to ensure that all environmental specifications and EMP obligations are met during these phases. The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMP by the Contractor.

Engineer*:* Engineer refers to the person appointed by the Employer to act as the Engineer person or entity to oversee the implementation of the contract between the Contractor and for the purposes of the Contract.

Environment: Environment means the surroundings within which humans exist and that could be made up of:

- ✓ the land, water and atmosphere of the earth;
- ✓ micro-organisms, plant and animal life;
- ✓ any part or combination of (i) and (ii) and the interrelationships among and between them; and
- ✓ The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Aspect: An environmental aspect is any component of a Contractor's Construction activity that is likely to interact with the environment, and cause harm to it.

Environmental Impact: An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a Construction Activity between the limits that define the construction site. An impact may be the direct or indirect consequence of a Construction Activity.

Environmental Impact Assessment (EIA): The process of examining the environmental effects of a development. The assessment requires detailed/specialist studies of significant issues that have been identified

Environmental Management Plan (EMP): A detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.

Independent Environmental Consultant: A suitably qualified and experienced Independent Environmental Consultant (IEC) appointed by the Contractor to perform the obligations specified in the Contract. The IEC shall provide reports to the Contractor and the Engineer.

Interested and Affected Parties (I&APs): People that are to be negatively affected by the Construction or gain from the Construction

Acronym

CA	COMPETENT AUTHORITY
CBA	CRITICAL BIODIVERSITY AREA
CPV	CONCENTRATED PHOTOVOLTAIC
DEA	DEPARTMENT OF ENVIRONMENTAL AFFAIRS
DEA&DP	DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING
DOE	DEPARTMENT OF ENERGY
DNI	DIRECT NORMAL IRRADIANCE
EA	ENVIRONMENTAL AUTHORISATION
EAP	ENVIRONMENTAL ASSESSMENT PRACTITIONER
EAPSA	ENVIRONMENTAL ASSESSMENT PRACTITIONER FOR SOUTH AFRICA
EIA	ENVIRONMENTAL IMPACT ASSESSMENT
EMPR	ENVIRONMENTAL MANAGEMENT PROGRAMME
EMS	ENVIRONMENTAL MANAGEMENT SYSTEM
ESA	ECOLOGICAL SUPPORT AREA
GDS	GROWTH AND DEVELOPMENT STRATEGY
GHI	GLOBAL HORIZONTAL IRRADIATION
GIS	GEOGRAPHIC INFORMATION SYSTEMS
I&AP	INTERESTED AND AFFECTED PARTIES
IDP	INTEGRATED DEVELOPMENT PLAN
IPP	INDEPENDENT POWER PRODUCER
IRP	INTEGRATED RESOURCE PLAN
KV	KILOVOLT
MW	MEGAWATT
NFEPA	NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREA
O&M	OPERATION AND MAINTENANCE
PGDS	PROVINCIAL GROWTH AND DEVELOPMENT STRATEGY

PPA	POWER PURCHASE AGREEMENT
PPP	PUBLIC PARTICIPATION PROCESS
PSEIA	PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT
PV	PHOTOVOLTAIC
REDZ	RENEWABLE ENERGY DEVELOPMENT ZONES
REIPPPP	RENEWABLE ENERGY INDEPENDENT POWER PRODUCER PROCUREMENT PROGRAMME
S&EIR	SCOPING AND ENVIRONMENTAL IMPACT REPORTING
SARERD	SOUTH AFRICAN RENEWABLE ENERGY RESOURCE DATABASE
SEA	STRATEGIC ENVIRONMENTAL ASSESSMENT
SDF	SPATIAL DEVELOPMENT FRAMEWORK
SIP	STRATEGIC INFRASTRUCTURE PLAN
TOR	TERMS OF REFERENCE

Contents

1. INTRODUCTION

Environmental Management Plan is implemented in order for environmental damage to be minimized, impacts need to be identified and mitigation measures defined, implemented and their effectiveness monitored. The purpose of this document is to describe how generally occurring negative environmental impacts during the life cycle of the proposed project will be managed, rehabilitated and monitored and how positive impacts maximized and describes the roles and responsibilities of the various role players. This document proposes generic mitigation measures to minimize and manage such impacts.

The provisions of this EMP are binding on the Contractor during the life of the contract. They are to be read in conjunction with all the documents that encompass the suite of documents for this contract. In the event that any conflict occurs between the terms of this EMP and the project specifications, the terms herein shall be subordinate. Any third party appointed by Contractor in terms of the design and construction must ensure compliance with the conditions of this EMP.

The EMP is a dynamic working document subject to similar influences and changes as are wrought by variations to the provisions of the project specification. Any substantial changes shall be submitted to the environment authorities in writing for approval.

The EMP identifies the following:

- ✓ Construction activities that could impact on the environment.
- ✓ Standards and guidelines that are required to be achieved in terms of environmental legislation.
- ✓ Specifications with which the Contractor shall comply in order to protect the environment from the identified impacts.
- ✓ Actions that shall be taken in the event of non-compliance.

1.2 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The objectives of the EMP are to:

- ✓ Ensure that environmental concerns and impacts are taken into account during the project planning stages.

- ✓ Ensure that design alternatives are considered to minimise potential impacts on the environment.
- ✓ Ensure environmental compliance with the findings of the document during the construction and operational phase.
- ✓ Describe measures to mitigate and rehabilitate environmental degradation and pollution, resulting from the project.
- ✓ Define organisational and administrative arrangements for environmental management and monitoring of the various works contracts, including defining the responsibilities of staff and co-ordination, liaison and reporting procedures.
- ✓ Facilitate discussions regarding potential environmental concerns, between the Contractor, the Consulting Engineer and Interested & Affected Parties (I&APs.)
- ✓ Define procedures for environmental control, in the event of pollution or similar events.
- ✓ Raise environmental awareness and promote cultural tolerance with affected communities.

1.3 BRIEF DESCRIPTION OF THE PROJECT

Phakanani Environmental (Phakanani) has been appointed as an Environmental Assessment Practitioners (EAP'S) by Zolograph Investments (RF) Proprietary Limited to facilitate the Environmental Impact Assessment (EIA) process and also obtain environmental authorization for the proposed establishment of a 50MW PV Solar Park plus the establishment of a 88KV transmission line that will transmit electricity from the 50MW power station into the national grind. The Department of Environmental Affairs (DEA) REF for the 50MW development is *14/12/16/3/3/2/850*

An application for authorization for the 88KV transmission line infrastructure that will be linked to the above mentioned activity has been conducted independently, *DEA ref: 14/12/16/3/3/1/1496*

Zolograph Investments (RF) Proprietary Limited is owned by Blue Falcon 194 Trading (Pty) Ltd, which is wholly owned by SunEdison (Appendix 2a) Zolograph Investments (RF) Proprietary Limited is proposing to establish a 50MW PV Solar Park plus associated 88KV transmission line on a 183.9147 ha of land on portions 15, 27 and 28 of the farm Schietfontein 437 JQ, 3km south west of DeWildt within Madibeng Local Municipality, North West Province. However the transmission line will be restricted to portion 15 of the farm Schietfontein 437 JQ

2. LOCATION

The proposed site is located west of DeWildt along the R566 road. The coordinates for proposed site are 25°37'56.53"S and 27°55'38.78"E

Figure 2-1: Site google image

3. ADMINISTRATION OF ENVIRONMENTAL OBLIGATION

3.1 ADMINISTRATION

Before the Contractor begins each construction activity the ECO shall give to the Engineer a written statement (Method Statement), prepared on behalf of the Contractor, setting out the following:

- ✓ The type of construction activity.
- ✓ Locality where the activity will take place.
- ✓ Identification of the environmental aspects and impacts that might result from the activity.
- ✓ Methodology for impact prevention for each activity or aspect.
- ✓ Methodology for impact containment for each activity or aspect.
- ✓ Emergency/disaster incident and reaction procedures.
- ✓ Treatment and continued maintenance of impacted environment.

The Contractor may provide such information in advance of any or all Construction activities provided that new submissions shall be given to the Engineer whenever there is a change or variation to the original.

The Engineer may provide comment on the methodology and procedures proposed by the ECO, but he shall not be responsible for the Contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the Contractor shall demonstrate at inception and at least bi-annually once during the contract that the approved measures and procedures function properly.

3.2 GOOD HOUSEKEEPING

The Contractor shall undertake "good housekeeping" practices during construction process. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole.

Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment. Any site-specific measures should be highlighted by the ECO to the Contractor.

3.3 MANAGEMENT STRUCTURE

The Contractor must compile an organogram illustrating their environmental management structure as part of the EMS. This organogram shall depict the organizational structure of the Contractor, including the ECO and must contain supporting documentation to demonstrate the environmental responsibilities, accountability and liability of the Contractor's employees.

The Contractor should assign responsibilities for the following:

- Reporting structures.
- Actions to be taken to ensure compliance.
- Actions to be undertaken in the event of non-compliance.
- Overall design, development and implementation of the EMP.
- Documenting the environmental policy and strategy.
- Implementing the EMP in all stages/phases of the project.
- All the aspects which require action under the other core elements and sub-elements of the EMP.

All official communication and reporting lines including instructions, directives and information shall be channelled according to the organizations structure.

3.4 AUTHORITY CONSULTATION IN THE APPLICATION FOR AUTHORISATION

Authority consultation in the application for authorization

The first step of the EIA process involves consultation with the relevant authority involved with the decision making process concerning the authorization of the proposed project. The main purpose of this was to clarify the requirements of the regulations and procedures to be followed. At this stage the authorities also registered the activity. Authority involvement undertaken during this exercise has included the following:

- A project application was submitted to DEA National, Pretoria. The purpose of the application was to introduce the authority concerned to the proposed project and to register the project with DEA.

Relevant Legislation

Relevant administrative, legal and policy requirements which the developer will be responsible for carrying out during the further construction and operation of the 50MW PV Solar Park:

Co-operative governance (Constitution Act 108 0f 1996)

The constitution states that:*'…everyone has the right to an environment that is not harmful to their health or well-being: and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that 1) prevent pollution and ecological degradation; 2) promote conservation; and 3) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development'.*

National Environmental Management Act (No. 107 of 1998)

Any actions taken by the developer must be done in accordance with constitutional principles, the common law, the overarching policy principles set out in section 2 of NEMA and the principles applicable to environmental assessment.

- Development must be environmentally, socially and economically sustainable. Sustainable development requires the consideration of inter alia the following factors:
  - that pollution and degradation of the environment is avoided, or, where they cannot be altogether avoided, are minimised and remedied;
  - that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
  - that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;
  - that the development, use and exploitation of renewable resources and the eco-systems of which they are part do not exceed the level beyond which their integrity is jeopardised; and
  - That negative impacts on the environment and on peoples' environmental rights be anticipated and prevented, and where they cannot be altogether prevented are minimised and remedied.

- Environmental management must place people and their needs at the forefront of its concern, therefore any environmental impacts resulting from the development activities are not distributed in such a manner as to unfairly discriminate against any persons, particularly vulnerable and disadvantaged persons.
- The developer is required to undertake Environmental Impact Assessments (EIA) for all projects listed in the EIA regulations in order to control activities which might have a detrimental effect on the environment. Such activities will only be permitted with written authorization from DEA.

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

In terms of the Biodiversity Bill, the developer has a responsibility for:

- The conservation of endangered ecosystems and restriction of activities according to the categorization of the area (not just by listed activity as specified in the EIA regulations).
- Promote the application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all development within the area are in line with ecological sustainable development and protection of biodiversity.
- Limit further loss of biodiversity and conserve endangered ecosystems.

National Water Act 36 of 1998

Section 19 of the National Water Act, (Act No. 36) of 1998

States that: *Where an activity or process is or was performed or undertaken or any other situation exists which has caused or is likely to cause pollution of a water resource, all responsible steps must be taken to prevent such pollution from occurring or to remedy the effects of the pollution and effects on the river bed or banks.*

- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, or other conduit requires registration and licensing with DWAF and monitoring of nearby surface and groundwater must be done.

- Licences are required for all water uses listed in Section 21 unless the water use is permissible in terms of schedule 1 to the Act, falls within the general authorizations in terms of Section 39 of the Act or is an "existing lawful water use". The water uses that require registration and licensing include the following: taking water from a water resource; storing water; discharging waste or water containing waste into a water resource through a pipe, canal, sewer, and other conduit; disposing of waste in a manner which may detrimentally impact on a water resource.
- Further, Section 22.2 of the Water Act *"A person who uses water (a) must use the water subject to any condition of the relevant authorization of that use; (b) is subject to any limitation, restriction or prohibition in terms of this Act or any other applicable law (c) in the case of the discharge or disposal of water or water containing waste contemplated in section 21(f),(g), (h) or (j) must comply with any applicable waste standards or management practices prescribed under section 26(I)(h) and (i), unless the conditions of the relevant authorization provide otherwise: (d) may not waste that water: and (e) must return any seepage, run-off or water containing waste which emanates from that use, to the water resource from which the water was taken, unless the responsible authority directs otherwise or the relevant authorization provides otherwise.*

General Authorizations in Terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998)

- 4.12.(1) A person who disposes of wastewater in terms of this authorisation must submit a registration form obtained from the Department, for registration of the water use before the commencement of the disposal if more than 50 cubic metres of domestic wastewater or biodegradable industrial wastewater is disposed of on any given day.
- 4.13. Wastewater storage dams and wastewater disposal sites must be located-
  a) outside of a watercourse;
  b) Above the 100 year flood line, or alternatively, more than 100 meters from the edge of a water resource or a borehole which is utilized for drinking water or stock watering; and
  c) On land that is not, or does not overlie, a Major Aquifer (identification of a Major Aquifer will be provided by the Department upon written request).

- 4.14.(1) The registered user, with the exception of a local authority, must ensure the establishment of monitoring programmes to monitor the quantity and quality of the wastewater prior to storage or disposal, as follows-

Conservation of Agricultural Resources Act 43 of 1983 and Conservation of Agricultural Resources Regulations.

In terms of section 6 of the Act, the Minister may prescribe control measures with which all land users have to comply. The control measure may relate to the following:

- the regulating of the flow pattern of run-off water;
- the control of weeds and invader plants;
- the restoration or reclamation of eroded land or land which is otherwise disturbed or denuded;

Forest Act 122 of 1984

Protected trees

The Forest Act provided for the protection of trees on private land by providing that 'no person may cut, damage, destroy, disturb or remove any *protected tree* from the land in question, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any part or produce thereof'. The Minister was authorized, in respect of any land not forming part of a State forest, to declare a particular tree, a particular group of trees, or trees belonging to a particular species occurring on that land, to be a protected tree or trees (Appendix E) Regulations published under the Act list 58 species of protected trees to which these prohibitions apply. Although the NFA has repealed the old Forest Act, the majority or regulations promulgated under the Act still remain in force until such time they are replaced by new regulations under the NFA.

National Forests Act 84 of 1998

Protected trees

The Minister may declare a tree, group of trees, woodland or a species of trees as protected. The Minister is required to publish a list of all species protected under this Act, an appropriate warning of the prohibitions set out and the consequences of its infringements, annually in the Government Gazette. The prohibitions provide that ' no person may cut, damage, disturb, destroy or remove any *protected tree*, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister'.

National Heritage Resources Act 25 of 1999

- No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.
- No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.
- The protection of archaeological and paleontological sites and material is the responsibility of a provincial heritage resources authority and all archaeological objects, paleontological material and meteorites are the property of the state. Any person who discovers archaeological or paleontological objects or material or a meteorite in the course of development must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.
- No person may, without a permit issued by SAHRA or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. “Grave” is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
- A permit will only be granted if SAHRA is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents and reached agreement with the affected communities regarding the future of such grave or burial ground.

3.5 CONSULTING ENGINEER

The duties and powers of the Consulting Engineer (CE) or his representative are to:

- Implement and enforce the EMP during the planning and design phases of the project.
- Ensure constant consultation with the IEC during the planning and design phases of the project.
- Comply with the findings of the site-specific study and the EMP

3.6 INDEPENDENT ENVIRONMENTAL CONSULTANT (IEC)

The duties and powers of the IEC are:

- Ensure compliance with the environmental requirements of the EMP.
- Ensure complete compliance with the EIA regulations for listed activities.
- Ensure compliance with the Environmental Management Impact System for non-listed activities.
- Ensure compliance with all conditions of the Record of Decisions.
- Complete the Environmental Compliance Checklist according to the site-specific investigation.
- Give site instructions to the Contractor when stated in the record of decision that the Contractor be monitored.

3.6.1 The Engineer

The Employer shall appoint the Engineer who shall carry out the duties assigned to him in the Contract. The Engineer's staff shall include suitably qualified Engineers and other professionals who are competent to carry out these duties.

The Engineer shall have no authority to amend the Contract.

The Engineer may exercise the authority attributable to the Engineer as specified in or necessarily to be implied from the Contract. If the Engineer is required to obtain the approval of the Employer before exercising a specified authority, the requirements shall be as state in the Particular Conditions. The Employer undertakes not to impose further constraints on the Engineer's authority, except as agreed with the Contractor.

However, whenever the Engineer exercises a specified authority for which the Employer's approval is required, then (for the purposes of the Contract) the Employer shall be deemed to have given approval.

Except as otherwise stated in these Conditions:

a. Whenever carrying out duties or exercising authority, specified in or implied by the Contract, The Engineer shall be deemed to act for the Employer.

b. The Engineer has no authority to relieve either Party of any duties, obligations or responsibilities under the Contract.

c. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test or similar act by the Engineer (including absence of disapproval) shall not relieve the Contractor from any responsibility he has under the Contract, including responsibility for errors, omissions, discrepancies and non-compliances.

3.6.2 The Contractor

The Contractor is responsible for implementing the identified mitigation measures during the construction phase of the project and is answerable to the IEC for non-compliance with the EMP.

The Contractor may appoint a Contractors Representative (CR) who could be the site agent, the site engineer, a dedicated environmental officer, independent consultant, or external auditor. However, the Contractor must ensure that the appointed CR is suitably qualified to perform the necessary tasks and is appointed at a suitable level to interact effectively with other site contractors, labourers and the public. Specific responsibilities of the CR are:

- Know the background of the project and monitor the implementation of the EMP.
- Act as a guide and advisor to the Contactor on environmental issues.
- Ensure continuous auditing of the project for adherence to the EMP, identification of problem areas and provision of action plans to avoid costly stoppages and/or further environmental damage.
- Ensure transparent and open communication for reporting significant environmental incidents to the relevant authorities.
- Ensure that all complaints and concerns from the public and other I&APs are resolved and addressed immediately.
- Establish a liaison, co-ordination and reporting framework involving I&APs.
- Ensure that any modifications to the document are communicated to the I&APs.

3.6.3 Environmental Control Officer (ECO)

The ECO will oversee the Construction phase of the project on the ground, and ensure that all environmental specifications and EMP requirements are met at all times. The ECO shall initially be a dedicated officer, tasked with ensuring environmental compliance with the EMP. Should the ECO's

workloads diminish over time and as the contract progresses, then the ECO could be permitted to take on non-environmentally related tasks on written approval of the Engineer.

The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMP by the Contractor. The ECO's duties in this regard will include, *inter alia*, the following:

- Ensuring that all the environmental authorizations and permits required in terms of the applicable legislation have been obtained prior to Construction commencing.
- Monitoring and verifying that environmental impacts are kept to a minimum.
- Reviewing and approving Construction method statements with input from the independent environmental consultant and Engineer, where necessary, in order to ensure that the environmental specifications contained within this EMP are adhered to.
- Assisting the Contractor in finding environmentally responsible solutions to problems.
- Keeping accurate and detailed records of all activities on site.
- Inspecting the site and surrounding areas on a regular basis regarding compliance with the EMP and Contract specifications.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel on site.
- Ensuring that activities on site comply with all relevant environmental legislation.
- Ordering the removal of, or issuing spot fines for person/s and/or equipment not complying with the specifications of the EMP.
- Keeping a register of complaints on site and recording community comments and issues, and the actions taken in response to these complaints.
- Ensuring that the required actions are undertaken to mitigate the impacts resulting from non-compliance.
- Reporting all incidences of non-compliance to the Engineer.

The ECO must have:

- a good working knowledge of all relevant environmental policies, legislation, guidelines and standards;
- the ability to conduct inspections and audits and to produce thorough and informative reports;
- the ability to manage public communication and complaints;
- the ability to think holistically about the structure, functioning and performance of environmental systems; and

- proven competence in the application of the following integrated environmental management tools:
  * EIAs
  * EMPs
  * Environmental auditing.
  * Mitigation and optimization of impacts.
  * Monitoring and evaluation of impacts.
  * EMSs

3.6.4 Traffic Safety Officer

The Contractor shall nominate knowledgeable members of staff on site who shall be the responsible persons for the arrangement and maintenance of all traffic accommodation measures required for the duration of the contract. The Traffic Safety Officer shall liaise with the ECO in order to ensure adequate and appropriate traffic arrangements

3.6.5 Incident Reporting and Remedy

If a leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident. The following information must be provided:

- the location;
- the nature of the load;
- the extent of the impact; and
- the status at the site of the accident itself (i.e. whether further leakage is still taking place, whether the vehicle or the load is on fire).

Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences.

3.7 PUBLIC COMMUNICATION AND LIAISON WITH INTERESTED AND AFFECTED PARTIES

Communication must include liaising with the local communities.

The Contractor shall comply with the requirements for public consultation as required by the Constitution Act, 1996 (Act No 108 of 1996) and the NEMA, 1998 (Act No 107 of 1998).

During the Construction phase of the project, the Contractor shall be responsible for erecting information boards, in English, Afrikaans and SeSotho, in the position, quantity, design and dimensions approved by the Engineer. The information boards shall contain relevant information regarding the construction activity and the relevant contact details to assist persons who wish to submit complaints regarding construction activities.

The Contractor shall ensure that a complaints register is kept on site. The register shall contain all contact details of the person who made the complaint and information regarding the complaint itself, the date of submission as well as responsible person who is dealing with complaint. The complaints register must be kept in accordance with the requirements of the ECO.

3.8 TRAINING

a) Environmental Control Officer

The ECO must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

b) Environmental Awareness Course

The Contractor shall ensure that its employees and any third party, who carries out all or part of the Contractor's obligations under the 50MW PV Solar Park Contract, are adequately trained with regard to the implementation of the EMP, as well as regarding environmental legal requirements and obligations.

A training needs analysis shall be conducted by the ECO to identify the appropriate environmental and health training programmers, and the appropriate target groups amongst the employees of the Contractor.

Environment and health awareness training programs should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. Environmental awareness training programmers shall contain the following information:

- The names, positions and responsibilities of personnel to be trained.
- The framework for appropriate training plans.
- The summarised content of each training course.
- A schedule for the presentation of the training courses.

The Contractor shall ensure that records of all training interventions are kept in accordance with the record keeping and documentation control requirements as set out in this EMP. The training records shall verify each of the targeted personnel's training experience.

The Contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness and the content of the EMP. The presentation needs to be conducted in the language of the employees to ensure it is understood. The environmental training shall, as a minimum, include the following:

- The importance of conformance with all environmental policies.
- The environmental impacts, actual or potential, of their work activities.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements.
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities.
- Environmental legal requirements and obligations.
- The importance of not littering.
- The importance of using supplied toilet facilities.
- The need to use water sparingly.
- Details of and encouragement to minimize the production of waste and re-use, recover and recycle waste where possible.

In the case of permanent staff the Contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the Contractor shall inform the Engineer when and how it intends concluding its environmental training obligations.

4. RESTORATION OF THE DISTURBED STEEP SLOPE AND OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

4.1 RESTORATION

The removed vegetation and any bare ground within the site layout boundaries including its access paths will have to be rehabilitated at the project proponent's expense, such as the translocation of plants and re-vegetating bare ground with indigenous plants.

Any soil excavated and not utilized in the process of constructing the 50MW PV Solar Park should be spread over a large area in the vicinity of the excavation. No large mounds of soil should be left behind after the construction period.

4.2 REVEGETATION

Re-vegetation of disturbed areas consists of the following steps:

1. Spreading of stored topsoil i.e. that which has been removed from the site for the purposes of construction.
2. Planting of indigenous plant species, using a combination of grass species and other species on steep slopes.
3. Watering of newly planted plants. The amount and duration of watering will be dependent on the season in which the plants are planted.
4. Regular audits and maintenance programmers to ensure that plants are growing and serving the purpose for which they were planted (i.e. to prevent erosion).

The species recommended are bush species as these are generally fast growing or pioneer species and would therefore develop well in disturbed areas. Rehabilitation should be advised by a suitably qualified person to assess the needs for the area.

Once the grass cover is in place, the natural succession processes should result in the incorporation of bush species. During this process however the encroachment of alien plant species should be prevented by active removal.

4. 3 SITE REHABILITATION

The Contractor shall be responsible for rehabilitating any areas cleared or disturbed for construction purposes at the completion of construction. He will also be responsible for repairing any damage to fences and other infrastructure as a result of construction activities.

All construction equipment and excess aggregate, stone, gravel, concrete, etc. shall be removed from the site upon completion of work. No discarded materials shall be buried. Locally indigenous vegetation, only, shall be used for rehabilitation. The Contractor and Project Manager should agree for how long the Contractor will be responsible for erosion control.

The Contractor shall be responsible for the elimination of alien plants and weeds in the areas disturbed by construction for the duration of the contract, and the first month thereafter, after which time the project proponent will be responsible.

4.4 ACCESS ROADS

The existing access track will be used. Site guests during construction will arrive by car, will be met at the reception, they will park at a designated area away from the construction site.

The parking area will be decided upon by the project manager on site. The project proponent will be responsible for rehabilitation on any disturbed areas caused during construction; furthermore any previously used access paths not currently used will be rehabilitated.

5. GENERAL OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

5.1 OPERATIONAL EMP

5.1.2 INTRODUCTION

The purpose of the Operational Environmental Management Plan is to provide specifications for "good environmental practice" for application during operation of the 50MW PV Solar Park. The EMP provides specifications that the Project Manager shall adhere to, to minimize adverse environmental impacts associated with operational activities. The Environmental Management Plan (EMP) associated with the operational activities is known as the Operational Environmental Management Plan.

Guidelines for execution of the Operational EMP include the following:

- Responsibilities for the environmental performance of the 50MW PV Solar Park are known by the operational and maintenance staff,
- Communications channels to report on environmental performance, problems and priorities are in place,
- A monitoring schedule is established to identify potential negative environmental impacts associated with the operation of the 50MW PV Solar Park (vegetation control, herbicide management etc),
- Monitoring programmer or schedule is developed to track the plans that have been implemented so as to ensure the effectiveness of the plan.

5.1.3 Environmental policy

5.1.3.1 Operational ENVIRONMENTAL POLICY

The contractor (contractor is defined as principal contractor, sub-contractors and any employees retained on this project) is required to be familiar with the operational environmental policy and all that it implies, and to adopt and implement the policy throughout the course of operation.

The environmental policy is as follows:

- The environmental specifications and intentions of the specifications must be upheld.
- Natural resources will not be degraded, and no unnecessary environmental degradation must take place.

- Site activities will be conducted in a manner that does not create a nuisance, risk or hazard to the natural environment.
- Employees and visitors safety must be considered a priority.

Table 5-1: General Environmental Specifications

Identified or Potential Environmental Impacts Requiring Mitigation	Mitigation Measures	Monitoring Actions and Methods
VEGETATION		
• Disturbance of natural vegetation.	• Environmental awareness and appropriate behaviour, e.g. not straying into the bush around site, must be encouraged and enforced where necessary. • Encourage visitors to keep to pathways. • Remove existing and new alien vegetation immediately. • Train camp management in alien vegetation identification and management. • Site clearing along the wayleave will be limited to the width of the proposed wayleave	• Ensure that no trampling of vegetation takes place. • Review alien vegetation management.
• Biodiversity in the area will increase with additional protection provided by the development.	• Education of staff and visitors.	• Monitor camp management knowledge of conservation and value of biodiversity DURING construction
SOIL EROSION		

Identified or Potential Environmental Impacts Requiring Mitigation	Mitigation Measures	Monitoring Actions and Methods
• Erosion is anticipated to be minimal and mostly restricted during the construction phase	• Re-route and rehabilitate eroded sections. • Revegetate disturbed areas	• Monitor frequently used access paths. • No soil must be left exposed. It must be covered with mulch or vegetated. • Innovative design to reduce surface run-off and soi erosion. • Parking area and access paths properly demarcated and maintained.
FAUNA		
• Disturbance of animal habitat, especially of breeding specimens, through increased human movement in the area.	• Environmental awareness and appropriate behaviour, e.g. not straying into neighbouring properties without the necessary permission must be encouraged and enforced where necessary. • Encourage visitors to keep to the designated pathways.	• Identify any animals which may require relocation, such as snakes • Should stray animals from the neighbouring properties be found on site, the owner needs to be notified and safe relocation needs to be arranged
SOLID WASTE DISPOSAL		

Identified or Potential Environmental Impacts Requiring Mitigation	Mitigation Measures	Monitoring Actions and Methods
• Storage site for solid waste may cause visual impact if not properly situated or screened. • Flies and odour may become a problem if the storage site and compost heaps are not well managed.	• A system must be put in place to provide for the separation and sorting of organic and inorganic waste. • Waste bins with lids and external closing mechanisms to be scavenger proof and to prevent their contents blowing out must be used. • Solid waste must be removed regularly to avoid odour problems developing. • Organic waste may be composted or fed to livestock • Compost heap must be turned regularly to avoid fly breeding problems. The household responsible for this must be trained. • The inorganic materials will be taken to a dumpsite. • If inorganic solid waste is incinerated, the operator must be trained in responsible use. Burn during the evenings only.	• Monitoring of solid waste is critical, to ensure that secondary impacts do not occur. • Ensure that solid waste storage area is fenced and that fence and gate are in a good state of repair.

Identified or Potential Environmental Impacts Requiring Mitigation	Mitigation Measures	Monitoring Actions and Methods
GROUND AND SURFACE WATER POLLUTION		
• Hydrocarbon leakage from machinery and vehicles operating on site may contaminate the ground and surface water •	• All vehicles and machinery need to be well maintained and serviced	• Maintenance log needs to be kept on site for all machines and vehicles
ARCHAEOLOGICAL		
• Discovery of sites of archaeological significance on the property.	• Do not damage any archaeologically significant sites as stipulated by the National Heritage Resources Act No 25 of 1999. • Appoint a qualified archaeologist	• Ensure that no damage to archaeological remains takes place.
VISUAL		
•	• Limit burning of wood fires to evenings. • Non-reflective material will be used for the construction of the power lines	• Continuous monitoring • Motorists will spend very little time in the region and they will focus only briefly on features in the landscape,
ACCESS PATHS		

Identified or Potential Environmental Impacts Requiring Mitigation	Mitigation Measures	Monitoring Actions and Methods
• Eroding access paths	• Maintain and stabilise access paths. • Restrict access leading to the construction site	• Ensure that a plan has been prepared for access path maintenance. • Assess visual impact of access path infrastructure and possible screening mechanisms.
• Erosion of the existing access • Erosion of access paths	• Minimize travelling on site • Maintain and stabilize tracks. • Invest in access paths maintenance and stabilization of degraded areas. • Maintain access paths.	• Monitor access paths for areas which are causing environmental impacts but have not been stabilized / maintained. / re-routed.
ENERGY		
• Transport and storage of LPG gas and paraffin may pose explosion/fire risk, if used.	• Any use of LPG and paraffin must be handled with care to minimize risk of uncontrolled fire or explosion during transport or storage. • Storage areas which are protected from heat and fires must be designated. • Store fire extinguisher	• Monitor transport facilities for LPG bottles and paraffin. • Ensure that a suitable area has been designated for storage of flammable chemicals. • Ensure fire extinguisher maintenance
NOISE		

Identified or Potential Environmental Impacts Requiring Mitigation	Mitigation Measures	Monitoring Actions and Methods
• Loitering and noise by construction labourers • Noise from construction machinery and vehicles	• Use low decibel pumps, where the pump noise is contained to audible levels within 50m of the pump.	• The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the contractor or his Sub-Contractors. • Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order • . Should the vehicles or equipment not be in good working order, the contractor may be instructed to remove the offending vehicle or machinery from site;

6. COMPREHENSIVE WASTE MANAGEMENT PLAN

6.1 INTRODUCTION

6.1.1 Purpose

This document describes the strategy for the comprehensive management of solid waste at the operational phase of the 50MW PV Solar Park

This document, developed by Phakanani, is the official submission of the Comprehensive Waste Management Plan to the Department of Environmental Affairs (DEA). This document aims to reduce both the generation and the environmental impact of waste.

6.1.2 Objective and scope

This management plan represents a statement of intent by the project proponent and outlines the developer's commitment to addressing the potential negative environmental impacts associated with the construction of the 50MW PV Solar Park. This plan therefore addresses the activities necessitated for the proper and efficient management of waste throughout the project.

The management plan achieves this by presenting management guidelines and specifications to guide the operational phases of the development.

6.2 WASTE MANAGEMENT PLAN DEVELOPMENT

The waste management plan provides a framework to ensure that:

- Management of waste is put into effect during the operation of the project;
- Roles and responsibilities are identified.

This Comprehensive Waste Management Plan is designed to ensure that:

- *During operation:* all constraints, restrictions and actions required to minimise impacts of operation are assessed, developed, implemented and monitored for all areas.
- *During the life of project:* The project proponent intends to enhance positive impacts and ensure mitigation for negative impacts. An important component of this is monitoring,

evaluation and communicating findings; and to ensure that the management plan is continually improved and updated, where and if necessary.

This management plan forms part of the project proponents overall environmental management system, and will be reviewed internally and updated periodically.

6.3 POLICIES, LEGISLATION AND STANDARDS

The project proponent must ensure that all South African legislation concerning the natural environment, pollution and the built environment is strictly enforced. Such legislation must include, but is not limited to the:

- Constitution of the Republic of South Africa Act No. 108 of 1996.
- National Waste Management Act (1999)
- National Water Act No. 36 of 1998.
- Water Services Act (108 of 1997)
- National Environmental Management Act No. 107 of 1998.
- Hazardous Substances Act No. 15 of 1973.

6.4 ENVIRONMENTAL POLICY

The project proponent is committed to achieving compatibility between economic development and the maintenance of the environment. It therefore seeks to ensure that, throughout the construction phase, the labourers will give proper consideration and care of the flora, fauna, air, land and water, and to the community which may be affected by these activities.

To fulfil this commitment, the project proponent will observe all environmental laws and, consistent with the principles of sustainable development, will:

- Integrate environmental factors into operational decisions and processes, such as the guidelines set out in the Operational Management Plan (Section C of table 7.1 below).
- Assess the potential environmental effects of its activities, and regularly monitor and audit its environmental performance.

- Seek to continually improve its environmental performance, including reducing the effect of pollution, developing opportunities for recycling, and using energy, water and other resources more efficiently.
- Progressively rehabilitate the environment affected by removal of plants for construction (Section C of table 7.1 below).
- Promote environmental awareness among company personnel and contractors to increase understanding of environmental matters

7. SOLID WASTE MANAGEMENT

7.1 TYPE OF WASTE PRODUCED

The type of waste produced from the construction site is categorised 'General Waste' and 'Hazardous Waste' (National Waste Management Strategy', 1999). General waste is sub-divided into paper, metals, glass, plastic, organic and inert materials (such as builder's rubble and garden refuse).

Due to its composition and characteristics general waste does not pose a significant threat to public health or the environment, if managed properly. Hazardous waste is categorised according to the nine classes and four hazardous ratings, as described in the DWAF Minimum Requirements documents (Second Edition). These will include substances such as detergents or washing-up liquids etc. The majority of the waste, however, produced will be of the 'general waste' category.

7.2. FORMAT OF THE WASTE MANAGEMENT PLAN

The Waste Management Plan for the 50MW Solar Park is presented below (Table 5-1). The table presents actions, identified during the site visits, to overcome identified possible negative environmental impacts or to enhance positive impacts (e.g. recycling). These actions represent the project proponents commitment to good environmental practice and the table sets out specific "management statements of intent" (or proposed mitigation measures) that identify how the labourers will manage specific waste-associated impacts that will arise as a result of the operation of the development.

7.3. ENVIRONMENTAL IMPACTS

Identified environmental issues resulting from the production of waste are summarized below. The mitigation measures (Table 7-1), relevant to these issues, present specifications on how to manage these impacts.

7.3.1. Restoration and rehabilitation: waste

If insignificant amounts of waste have been generated during the construction phase. The main waste generated is general waste. Potential negative impacts to soil and ground and surface water could occur, therefore this needs to be cleared and disposed of.

7.3.2. Operation Phase: Process Waste

During the operation phase process, there won't be any waste generated from the transmission line.

Table 7-1: Table 7.1: Waste disposal Issues: Activities and associated environmental impacts for the key issue of waste control. The statement of intent describes the management intervention required to lower the significance of the impact.

A. RESTORATION AND REHABILITATION: WASTE			
Activity	**Potential Impacts/ Environmental Issue(s)**	**Mitigation measures / Statement of Intent (Actions)**	**Responsibility**
Waste (general waste, which includes waste generated during the construction of the powerline infrastructure.	• Pollution of soil and water. • Health threats arising • Visual impacts of solid waste.	• Refuse • discharge of construction equipment; • Site Rehabilitation.	Contractor
B. OPERATION PHASE: SOLID WASTE			
Management disposal of all general / solid wastes generated during construction	1) Infiltration of pollutants into ground and surface water.	1. The project proponent to ensure the construction of a separate 'waste sorting & storage depot', on-site. 1.1) The depot must be situated away from drainage lines.	1. Project Proponent 1.1) Contractor

		1.2) The depot must be lined with non-permeable lining or concrete to prevent infiltration/seepage of pollutants into groundwater. 1.3) Further it must be lined or constructed so as to avoid surface run off exiting the separate waste disposal depot, for example: a low wall constructed i.e. run-off and storm water control measures. 1.4) The depot must be regularly cleaned in order to prevent seepage into groundwater or run-off into other areas within the site	1.2) Contractor 1.3) Contractor
	3) Scavengers may become a problem if the storage site for waste is not well managed	3.1 The waste disposal depot must be suitably enclosed / fenced to prevent entrance by scavengers. 3.2 Suitable enclosure must be maintained.	3.1 Project proponent & Contractor (Restoration).

8. IMPLEMENTATION OF THE WASTE MANAGEMENT PLAN

Implementation of the Waste Management Plan (WMP) will be achieved through appropriate staffing. This section outlines the suggested organisational structures and other activities that will be required to implement the WMP.

8.1 ORGANISATIONAL STRUCTURE

Effective waste disposal management during the construction phase will require trained and organised staff.

Site Manager (SM)

The role of the SM, with respect to waste disposal issues, will be to ensure that all personnel on site abide by the requirements of the WMP and that the project operates in such a manner that it meets all specified legal and environmental requirements.

Cleaning or Maintenance Staff

A designated individual must be appointed from the cleaning or maintenance team to ensure the proper management of waste disposal activities. This individual (designated staff member) must be held responsible for the proper maintenance (cleanliness, quality maintained) of the waste disposal depot and the efficient management of waste removal and disposal from site. The rest of the cleaning staff will be responsible for the timeous removal of waste and proper sorting of recyclable waste.

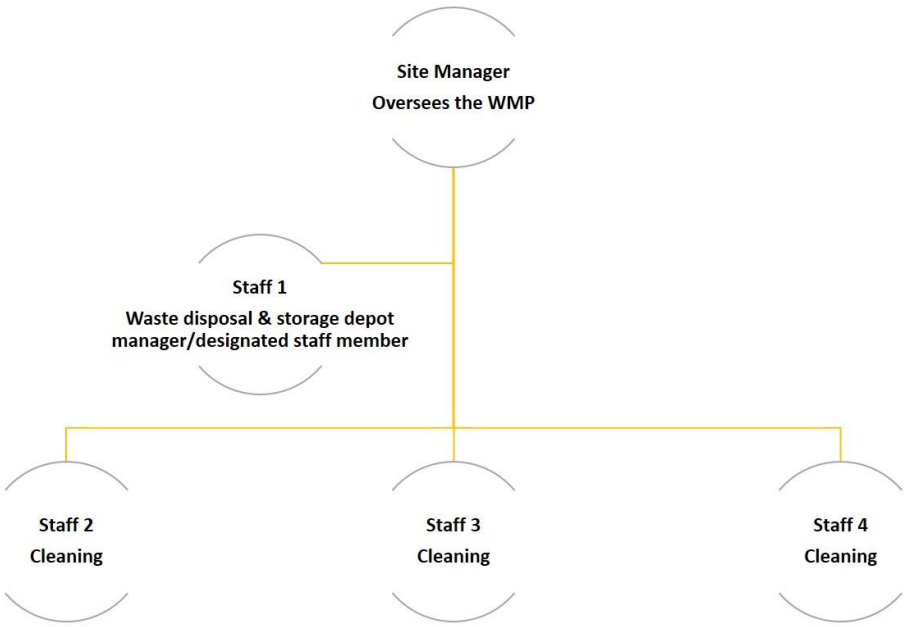

Figure 8-1: Line of Responsibility

Site Manager (SM)

It is the responsibility of the **SM** to ensure that the roles and responsibilities of the staff are clearly understood and that the necessary equipment (e.g. waste bins with lids) is available.

8.2 TRAINING AND AWARENESS PROGRAMMES

All personnel will undergo a training and awareness programs on waste disposal management prior to commencing activities. A procedure for training will be developed which will layout in detail the methodology used to present environmental awareness, waste disposal and induction training. The procedure will state the range of topics that will be covered in environmental training. These will include:

- The construction site Environmental Policy.
- The construction site Statement of Environmental Commitment.
- The construction site Environmental Objectives and Targets, including Key Performance Indicators (KPIs), e.g. cleanliness of the depot, volumes of waste collected, returns on recycled waste, etc.
- Aspects of routine or day-to-day activities, which can have environmental impacts
- Identify environmental hazards, which could arise from non-routine situations and corrective actions.
- Organizational structure and responsibilities, e.g. Lines of responsibility.
- The importance of Environmental Hazard Incident reporting and completion of appropriate reports.
- Channels of communication for discussing and reporting waste disposal issues.
- Documentation systems so that appropriate records of waste disposal matters are maintained.

A site Waste Disposal Handbook will be developed and distributed to all literate personnel. This handbook will cover some of the information presented in the training session.

9. WASTE MANAGEMENT PROGRAMME

Steps undertaken:

1. Daily removal of refuse from the site.
2. Daily sorting and cleaning of solid waste into recyclable and non-recyclable waste by cleaning staff at the on-site waste disposal depot.
3. Refuse is then stored in black bags in bins with lids that are scavenger proof within the enclosed on-site waste disposal depot. This is the responsibility of the cleaning staff.
4. Daily maintenance of the on-site waste disposal depot to ensure adequate cleanliness and identification of 'leaks'.
5. Weekly removal of non-recyclable and hazardous waste to the registered waste disposal site by the designated staff member.
6. Weekly collection or removal of recyclable goods to the recycling depot or the designated staff member respectively.
7. Where accidental spillage has occurred, immediate remedial action applied and rehabilitation implemented, if necessary, by maintenance staff. Rehabilitation implemented with the advice of a skilled horticulturist.
8. All collection or removal of waste must be documented in a weekly time-table to enable proper management of these activities.

10. MONITORING OF WASTE DISPOSAL ACTIVITIES

The objectives of the monitoring programme are to:

- Demonstrate that personnel are managing the removal and production of waste efficiently and that control structures and programmes are operating consistently with the mitigation measures put in place.
- Provide timely, relevant and appropriately presented information within the company (manager and maintenance staff) and regulatory authorities (where and if necessary) on the performance of the operation with respect to the management of waste

The following will be monitored:

- The level of waste produced and stored, to ensure the timeous removal of waste to the 'Waste Disposal Site'.
- Suitability of the waste disposal time-table or programmer.
- The condition or quality of the on-site waste disposal site, namely is it kept clean regularly, is the infrastructure still of good quality, are the bins in good working condition.
- Staff duties are being maintained according to a regular time-table with respect to the removal and separation of waste.

11. CONTINUOUS IMPROVEMENT

Continuous improvement will form a key component of the WMP. Documents associated with the WMP will be regularly reviewed and updated. Patrons will be provided with a comments book in order to ensure a high standard level is maintained.

12. AUDITING AND REVIEW

Audits of the construction site and personnel will be undertaken over the construction period. The purpose of the audits will be to assess compliance with the conditions of the WMP.

The findings will be recorded and items requiring action will be identified from the recommendations made. Comments received from visiting patrons will also provide input in this regard. The implementation of these actions will be assessed in the following audit.

13. COMPLIANCE AND PENALTIES

The Contractor shall act immediately when such notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings.

The following violations, and any others determined during the course of work, shall be penalised per event:

- Hazardous chemical/oil spill and/or dumping in non-approved sites.
- Uncontrolled/unmanaged erosion.
- Pollution of water sources.
- Unnecessary removal or damage to trees.

The Engineer's decision with regard to what is considered a violation, its seriousness and the penalty imposed shall be final.

In addition to penalties, the Engineer has the power to remove from site any person who is in contravention of the EMP, and if necessary, the Engineer can suspend part of or all of the works, as required.

14. CONCLUSION

The construction of the 50MW PV Solar Park will not have a detrimental impacts or even continuous environmental impacts on condition that the mentioned mitigation measures and implementation of this EMP is adhered to.