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PROJECT NAME:
THE PROPOSED 10MWAC GROOTFONTEIN AGROVOLTAIC SOLAR ENERGY FACILITY NEAR CALA WITHIN THE SAKHISIZWE LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE.

REPORT TITLE:
DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

DEDEAT REFERENCE: EC138/CH/LN1/M/26-13

DWS REF: WU51623

DATE: 03 NOVEMBER 2026

ENVIRONMENTAL ASSESSMENT PRACTITIONER:
ABANTU ENVIRONMENTAL SERVICES (PTY) LTD

PREPARED FOR:
ILINGE ENERGY AUTOMATION (PTY) LTD



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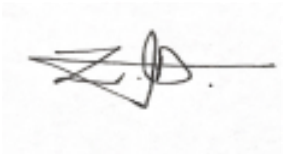
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DATE	July – October 2026	July – October 2026	November 2026

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TERMS AND DEFINITIONS

TERMS	DEFINITION
AUDIT	Regular inspection and verification of Construction activities for implementation of the approved EMP
CONSTRUCTION ACTIVITY	A Construction activity is any action taken by the contractor, his subcontractors, suppliers or personnel during the Construction process.
CONTRACTOR	Construction companies are appointed on behalf of the client to undertake the Construction activities, as well as their subcontractors and suppliers.
DEFF	Department of Environment, Fisheries and Forestry.
DEVELOPMENT SITE	Boundary and extent of development works and infrastructure.
EMPR	Environnemental Management Programme Report. The EMPR for the project sets out general instructions that will be included in a contract document for the Construction phase of the project. The EMPR will ensure the Construction activities are conducted and managed in an environmentally sound and responsible manner.
EMP	Environmental Management Plan.
ENVIRONMENT	The environment means the surroundings within which humans exist and that could be made up of water, air, soil, sand, plants and animals.
ENVIRONMENTAL ASPECT	An environmental aspect is any component of a contractor's Construction activity that is likely to interact with and on the environment.
EAP	Environmental Assessment Practitioner.
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. An impact may be the direct or indirect consequence of a Construction activity.
ENVIRONMENTAL CONTROL OFFICER	A qualified person nominated by the appointed contractor and/or client who will ensure the day-to-day implementation of the EMP by contractors during Construction and operation of the project.
ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project. This EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

TERMS	DEFINITION
GENERAL WASTE	Domestic waste, commercial waste, non-hazardous industrial waste and builders rubble e.g. paper, plastics, food, tins, wood, etc.
HAZARDOUS WASTE	It is any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.
HERITAGE RESOURCES	This means any place or object of cultural significance, including all human-made phenomena and intangible products that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources, as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa
HERITAGE	That which is inherited and forms part of the National Estate (historical places, objects, fossils as defined by the National Heritage Resources Act, 1999 (Act No. 25 of 1999).
IEM	Integrated Environmental Management.
IMPACT	A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
NEMA	National Environmental Management Act.
NEMAQA	National Environmental Management Air Quality Act
REHABILITATION	Rehabilitation is defined as the return of a disturbed area, feature or structure to a state that approximates to the state (where possible) that it was prior disruption, or to an improved state.
PALAEONTOLOGY	Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.
POLLUTION	The National Environmental Management Act, 1998 (Act No. 107 of 1998) defined pollution to mean any change in the environment caused by – substances; radioactive or other waves; or noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
PROJECT/SITE MANAGER	A person who represents the client and is responsible for enforcing the technical and contractual requirements of the project.

TERMS	DEFINITION
SAHRA	South African Heritage Resource Agency
SOLID WASTE	All solid waste, including Construction debris, chemical waste, excess cement/concrete, wrapping material, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
TOPSOIL	The layer of soil covering the earth which provides a sustainable environment for the germination of seeds, allows water penetration, and is a source of micro-organisms and plant nutrients.
WASTE	**:** Waste means any substance, whether or not that substance can be reduced, re-used, recycled and recovered • that is surplus, unwanted, rejected, discarded, abandoned or disposed of; • which the generator has no further use of for the purposes of production; • that must be treated or disposed of; or • that is identified as a waste by the relevant Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but— • a by-product is not considered waste; and • any portion of waste, once re-used, recycled and recovered, ceases to be waste.
WASTE DISPOSAL FACILITY	Waste disposal facility means any site or premise used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premises.
WATER POLLUTION	The National Water Act, 1998 (Act No. 36 of 1998 defined water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it – less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful to the welfare, health or safety of human beings; to any aquatic or non-aquatic organisms; to the resource quality; or to property.
WATERCOURSE	A natural channel or depression in which water flows regularly or intermittently in which water flows regularly or intermittently. Or a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998).
WUL	Water Use License.

ENVIRONMENTAL ASSESSMENT PRACTITIONER

Abantu Environmental Services (Pty) Ltd is an independent environmental consultancy appointed to undertake the required Basic Assessment Process for the proposed project. Refer to **Table** below for EAP's details.

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Table 1. EAP Details

EAP:	Mr Sive Mlamla
Expertise:	Sive Mlamla is an environmental scientist with 11 years of experience in scientific research, lecturing and environmental consulting. His key expertise includes environmental impact assessments, environmental compliance auditing, waste planning, proposal & business development, project management, strategic planning, research design & execution, remote sensing & GIS applications for land use/cover change mapping and fluvial geomorphology. **Qualifications** • M.Sc. Geography (Catchment Hydrology) • B.Sc. Honours Environmental Geography • B.Sc. Environmental Sciences (Botany and Geography) **Professional registrations:** • Registered Professional Natural Scientist (Pr. Sci.Nat) - Reg. No. 118495 – SACNASP • Registered Environmental Assessment Practitioner (Reg. EAP (EAPASA)) - Reg. No. 2022/5204 **Training:** • Practical Implementation of Environmental Auditing and Monitoring (2025) • WET-Health Tool & WET-EcoServices for Level 1B and Level 2 assessment (2025) • WET-Health Tool for Level 1A assessment (2025) • Environmental Impact Assessments (2025) • Introduction to Synthetic Aperture Radar and Applications (2024) • Earth Observation Data Analysis with Google Earth Engine (2023) • People Management Skills (2017) • Biodiversity spatial data management, acquisition, and analysis (2018) • Water Use Licence Applications via e-WULAAS (2020) • Remote Sensing (land use/cover classification) and SWAT hydrologic modelling (2017) **Registrations and memberships:** • Member of the South African Wetlands Society Reg. No. S9BPP477 • Member of the Southern African Association of Geomorphologists • Institute of Waste Management of Southern Africa (IWMSA) Reg No. 40120001

1. INTRODUCTION

1.1 PROJECT LOCATION AND DESCRIPTION

Abantu Environmental Services (Pty) Ltd has been appointed by Ilinge Energy Automation (Pty) Ltd, to apply for an environmental Authorisation (EA) by way of a Basic Assessment process for the proposed Grootfontein Agrovoltaic Solar energy facility within the Sakhisizwe Local Municipality in the Eastern Cape.

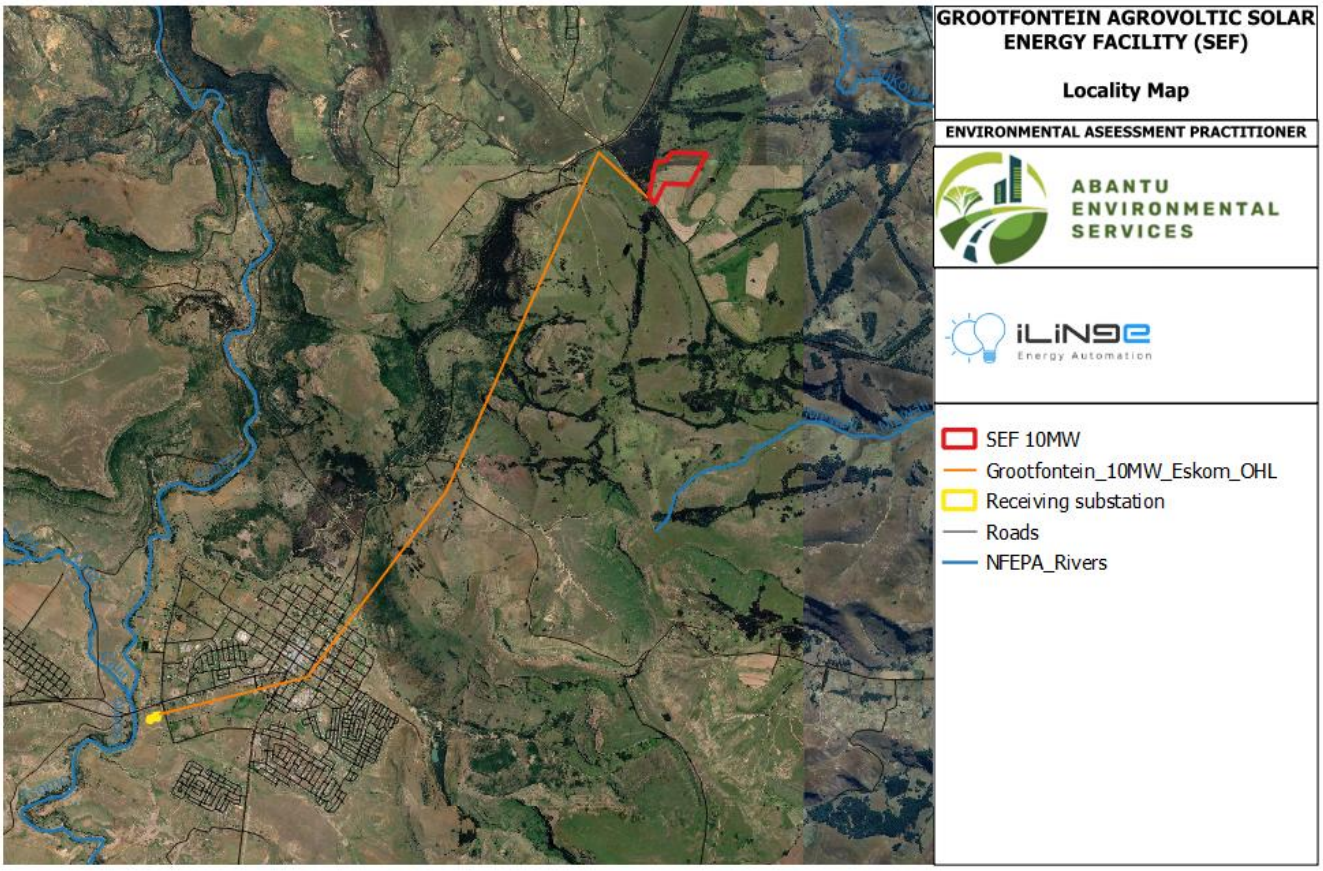


Figure 1. Locality map of the proposed development.

EMPR: PROPOSED 10MWAC GROOTFONTEIN AGROVOLTAIC SOLAR ENERGY FACILITY NEAR CALA.

iLinge Energy Automation (Pty) Ltd proposes the development of the Grootfontein Agrovoltaic Solar Energy Facility (SEF) is a grid-connected photovoltaic (PV) power plant designed to generate up to 10 MWac of clean electricity at the point of injection into the Eskom distribution network. The project incorporates an agrovoltaic design philosophy, allowing for compatible agricultural activities beneath and between the PV array rows. The development will consist of the following key components;

Infrastructure Element	Description
SEF	
PV Array Field	11.85 MWdc enclosed within the blue boundary polygon. Single-axis horizontal E-W tracker configuration.
Total Number of Modules	17 793 units
Tracker Type	Single-axis, horizontal East-West axis tracking
Tracker Tilt Range	-/+ 55° from horizontal
Total Module Area	**55 271 m² (5.53 hectares development footprint)**
Total Cell Area	51 788 m²
Associated infrastructure	
O&M Building	Located at the southern edge of the array field, adjacent to the IPP Switching Station. Houses inverter control, SCADA, and maintenance facilities.
IPP Switching Station	On-site IPP-owned 22 kV switching station providing grid isolation, protection and metering for the SEF.
Eskom Macangceni SS	Eskom 22 kV switching station located at the site access road. Point of Common Coupling (PCC) for the project.
Internal Access Road	**Gravel internal access road (5 m wide) circling the site for maintenance vehicle access and security patrol.**
Agrovoltaic Buffer Zone	Clearance maintained between rows to allow compatible agricultural activities (grazing, low crops).

The following civil and structural works are associated with the Grootfontein SEF:

- Site clearing and grading limited to access roads and building pads to minimise land disturbance
- Driven or screw-pile foundations for single-axis tracker structures (no concrete excavations required for array structure)
- Concrete strip or pad foundations for the O&M building and IPP Switching Station
- Gravel internal access road (5 m wide) encircling the site perimeter for maintenance and security access
- Cable trench excavation for underground 22 kV MV cable route from array to IPP SS
- Stormwater drainage channels at site perimeter and access road interfaces
- Security perimeter fencing (2.4 m palisade or electrified game fence) with access control gate



Figure 2. Grootfontein SEF Site Layout - 11.85MWdc / 10MWac (Source: iLinge Energy Automation, 2026).

1.2 ENVIRONMENTAL APPROVALS, LICENSES AND PERMITS

There were no Environmental approvals previously applied for the proposed agrovoltaic solar energy facility. The proposed project requires Environmental Authorization via a Basic Assessment prior to construction commencement.

1.3 STRUCTURE OF THE EMPR

For the holistic approach to the management of environmental impacts during the construction and operation of the proposed agrovoltaic solar energy facility, this EMPr sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved.

Layout of the EMPr

The EMPr is divided into four phases of development. Each phase has specific issues unique to that period of construction and operation. The impacts are identified and given a brief description. The phases of the development are identified as below:

Table 2. Development phases and their descriptions

Phases	Description
Planning and Design	This section will provide guidelines on Planning and Design activities such as complying with relevant legal environmental and social authorisations; site establishment and security; public safety; environmental induction and training and awareness; site access and health and safety.
Construction	This section will provide guidelines on the construction methods and considerations. Environmental actions, procedures and responsibilities as required during the construction phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these.
Rehabilitation	This section of the EMPr provides management principles for the rehabilitation phase of the Development. This will include best practice, procedures and responsibilities as required for various associated activities.
Operation	This section will provide guidelines on the practice and responsibility required for various activities during operation.

1.4 RECEIVING ENVIRONMENT

1.4.1 CLIMATE

Sakhisizwe Local Municipality experiences a temperate interior climate that is strongly influenced by its location within the foothills of the Drakensberg Mountains and its varying topography. The municipality lies at elevations ranging from approximately 750 m to 2 600 m above sea level, resulting in climatic variation across the area. Higher-lying areas generally experience cooler temperatures and greater rainfall than the lower-lying western regions (Sakhisizwe Local Municipality, 2024).

The municipality experiences warm, wet summers and cold, dry winters, which are characteristic of the summer rainfall region of the Eastern Cape. Approximately 70 to 80% of the annual rainfall occurs during the summer months, mainly in the form of high-intensity convective thunderstorms that are occasionally accompanied by hail. Winter rainfall contributes only 20 to 30% of the annual total, with snowfall occurring periodically in the higher elevation areas during the winter months (Sakhisizwe Local Municipality, 2024). Rainfall distribution varies considerably across the municipality due to differences in altitude and topography. The higher eastern areas receive approximately 700–800 mm of rainfall annually, while the drier western areas receive between 200 mm and 300 mm per year.

1.4.2 TOPOGRAPHY & HYDROLOGY

The proposed development area is located on gently undulating agricultural terrain. Elevations range from approximately 1 502 m to 1 508 m above mean sea level. The land gradually rises from the western portion of the site to a broad, gently rounded crest near the center, before gradually sloping downward towards the eastern boundary. No steep slopes, ridges, or deeply incised drainage features are evident within the site.

1.4.3 GEOLOGY & SOILS

The geology of the study area is predominantly underlain by mudstones and sandstones of the Tarkastad Subgroup and the Molteno Formation of the Karoo Supergroup, with intrusive Jurassic-age dolerite bodies also occurring throughout the area (Mucina & Rutherford, 2006). Soils derived from this sedimentary parent material are well drained, exceed 800 mm in depth and have a clay content ranging from 15% to 55%. These soils are predominantly represented by the Hutton, Clovelly, Griffin and Oatsdale soil forms. In areas underlain by dolerite, the dominant soil forms include the Balmoral, Shortlands and Vimy soil forms, which are generally characterised by higher clay contents and greater inherent fertility than soils developed on sedimentary parent material (Soil Classification Working Group, 2018).

The study area is primarily associated with the Ac and Fa land types (Land Type Survey Staff, 2006). The Ac land type typically occurs on gently undulating plains and low hills where deep, well-drained apedal soils dominate. These soils have moderate to high agricultural potential and support extensive grassland vegetation, although productivity varies according to rainfall and management practices. The Fa land type is associated with terrain influenced by dolerite intrusions and comprises moderately deep to deep clay-rich soils with relatively high natural fertility. These land types also occur on gently sloping to undulating landscapes and support grazing and cultivated agriculture where climatic conditions are favourable. Variations in parent material, soil depth and clay content across the Ac and Fa land types, influence drainage characteristics, vegetation composition, erosion susceptibility and overall land capability within the study area.

1.4.4 BIODIVERSITY

According to SANBI (Vegetation Map, updated in 2024) the site is located in Drakensberg Foothill Moist Grassland and the Tsomo grassland which form part of the Grassland biome (Figure 4). This vegetation also falls within the Sub-Escarpment Grassland Bioregion. The Drakensberg Foothill Moist vegetation type occurs around KwaZulu Natal and Eastern Cape provinces on gently undulating plains and foothills, while the Tsomo grassland occurs in the Queenstown basin in towns such as Tsomo, Cala and Engcobo. The vegetation is characterised by species-rich, mesic grassland dominated by perennial grasses, including *Themeda triandra, Tristachya leucothrix, Eragrostis curvula* and *Heteropogon contortus*. Forb diversity is typically high, particularly in areas that have experienced limited agricultural transformation. Woody vegetation is generally sparse and largely confined to drainage lines, rocky outcrops and sheltered slopes, where scattered shrubs and small trees may occur (Mucina & Rutherford, 2006; SANBI, 2018). The vegetation develops on moderately deep to deep, well-drained soils derived primarily from sandstone, mudstone and dolerite geology (Mucina & Rutherford, 2006). Significant portions of the Drakensberg Foothill Moist Grassland have been transformed through cultivation, commercial forestry and livestock grazing, resulting in fragmentation and habitat loss. It is classified as Least Threatened with a conservation target of 23%. Only 2-3% of the vegetation is statutorily conserved in the uKhahlamba Drakensberg Park, Ntsikeni Wildlife Reserve as well as in the Karkloof, Mount Currie,Coleford, Fort Nottingham, Impendle, Ngeli, and Umgeni Vlei Nature Reserves. It is also threatened by alien woody species such as Black wattle (*Acacia dealbata*) (Figure 5B) and *Solanum mauritianum*.

The Tsomo grassland is classified as Vulnerable (Mucina and Rutheford, 2006) with a conservation target of 23%. None of the vegetation is statutorily conserved, only 1% of the vegetation is conserved in private reserves. According to Mucina and Rutheford (2006) 27% of the vegetation has been transformed for cultivation and by dense concentrations of rural settlements. It is further threatened by the increased occurrence of alien *Schkuhria pinnata* and *Tagetes minuta* and high rates of erosion.

1.4.5 SITE SENSITIVITY

(a) Plant Species Sensitivity

According to the Screening Report, the plant sensitivity of the development sites is Medium for both the SEF and the overhead powerline and identifies the following sensitive species as potentially occurring within the site. Although there are sensitive species identified on vegetation within the site has been significantly transformed as a result of ongoing agricultural activities. Consequently, the remaining indigenous vegetation is in a state of secondary succession, characterised by reduced biodiversity sensitivity compared to intact natural vegetation. The ecological sensitivity of the site is further reduced by the presence of dense stands of the invasive alien species, black wattle (*Acacia mearnsii*), which surrounds the site. The encroachment of this invasive species suppresses indigenous vegetation regeneration, alters habitat structure and contributes to a further decline in local biodiversity value.

(b) Terrestrial Biodiversity Sensitivity

According to the Screening Report, the terrestrial biodiversity sensitivity is Very High for the SEF and it also falls within an Ecological Support Area (ESA 2) as per the Eastern Cape Biodiversity Conservation Plan (ECBCP), 2019.

The proposed solar photovoltaic facility incorporates an agrovoltaic design, whereby agricultural activities will continue beneath and between the solar panel arrays. The site is already utilised for agricultural production and has consequently undergone significant anthropogenic transformation, resulting in the modification of the original vegetation and a reduction in ecological integrity. **The continuation of agricultural land use beneath the solar panels is expected to maintain the existing land use character and limit the scale of transformation. As a result, the terrestrial biodiversity sensitivity of the development footprint is considered to be Low.**

(c) Animal Terrestrial Biodiversity

The Screening Tool flagged the animal species theme relative to the proposed overhead powerline to be of 'High' sensitivity due to the potential presence of the following species:

- *Aves-Gyps coprotheres*
- *Aves-Falco biarmicus*
- *Subject to confirmation*
- *Aves-Balearica regulorum*
- *Mammalia-Hydrictis maculicollis*
- *Mammalia-Mystromys albicauda*

The animal sensitivity of the SEF was identified as Medium due to the potential presence of the following animal species:

- *Mammalia-Hydrictis maculicollis*
- *Mammalia-Mystromys albicaudatus*

The proposed SEF is proposed on existing agricultural field. The receiving environment are likely to be devoid of suitable habitat for the species. Aquatic species may be prevalent in watercourses/rivers, however, the proposed development poses no impacts to these habitats.

(d) Aquatic Biodiversity Sensitivity

As reported in the Screening Report, the aquatic biodiversity sensitivity on the SEF is high which correlates with the site being designated ESA 1 and falling within the Eastern Cape Drakensburg SWSA for surface water. Additionally, the SEF encroaches a 100 buffer of a stream and a 500m buffer of a NFEPA wetland as well as the powerline closer to the receiving station in Cala. Therefore, the High rating of the Screening tool is supported by this sensitivity report, and a full aquatic study will be undertaken.

2. PURPOSE OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

The EMPr forms part of the contractual obligations to which all contractors/employees involved in construction, maintenance, or decommissioning work must be committed. It serves as a guideline and baseline information document for the construction and operations of the proposed project and aims to comply with section 24N of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as well as the Environmental Impact Assessment Regulations, 2014 as amended.

This section outlines the environmental management guideline measures as encompassed in **Appendix 4** of the EIA Regulations as amended that will be undertaken to avoid or minimize impacts on the environment throughout all phases of the proposed development.

The content of the EMPr prepared in terms of the Regulations is outlined in **Table 3** below. The relevant sections of the EMPr in which the requirements are addressed, is also outlined.

Table 3. Alignment to Amended NEMA 2014 EIA Regulations, Appendix 4 of GNR 326 of 2017

Prescribed content of an EMPr	Reference in the EMPr
1. (1) An EMPr must comply with section 24N of the Act and include- (a) details of – (i) the EAP who prepared the EMPr. (ii) the expertise of that EAP to prepare an EMPr, including curriculum vitae.	Before Section 1
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Section 1.3
(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 should be avoided, including buffers.	Section 1, Figure 1.
(d) a description of the impact management outcomes, 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- (i) planning and design. (ii) pre-construction activities. (iii) construction activities. (iv) rehabilitation of the environment after construction and where applicable post closure. (v) where relevant, operation activities.	Section 5, 6, 7 & Section 8
(f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to – (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation. (ii) Comply with any prescribed environmental management standards and practices. (iii) Comply with any applicable provisions of the Act regarding closure, where applicable. (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Section 5, 6, 7 & Section 8

Prescribed content of an EMPr	Reference in the EMPr
(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Section 5, 6, 7 & Section 8
(h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Section 5, 6, 7 & Section 8
(i) An indication of the persons who will be responsible for the implementation of the impact management actions.	Section 9
(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.	Section 5, 6, 7 & Section 8
(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).	Section 10
(l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Section 10
(m) An environmental awareness plan describing the manner in which – (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work. (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Section 9.2 & Section 10
(n) Any specific information that may be required by the competent authority.	Not applicable
1. (2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	Not applicable

The main objectives of this EMPr are therefore to:

- Outline environmental management measures related to project activities and provide project contractors with guidelines for carrying out Construction activities in such a way as to minimize environmental impacts;
- Be used as a foundation for the specific environmental management instructions contained in Construction contract documents, where compliance will be a contractual obligation for contractor(s);
- Be used as an educational tool, for orientation and training of project personnel and contractors;
- To outline functions and responsibilities of responsible persons;
- To state standards and guidelines, which are required to be achieved in terms of environmental legislation;
- To outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimize the extent of environmental impacts, and to manage environmental impacts associated with the proposed project; and
- To prevent long-term or permanent environmental degradation.

2.1 ENVIRONMENTAL CODE OF CONDUCT

One of the objectives of the EMPr is to ensure that all the workforce, contractors, sub-contractors, and construction staff understand environmental issues and potential impacts on-site activities. This environmental code of conduct provides the basic rules that must be strictly adhered to.

It is the responsibility of the Site Environmental Officer, the Environmental Officer and ECO (as appointed) to ensure that each contractor, sub-contractor, and workforce understand and adhere to the Code of Conduct.

All persons are obliged to keep to the rules of this code of conduct. Ignorance, negligence, recklessness, or a general lack of commitment resulting in environmental degradation or pollution must not be tolerated.

Environmental Rules

- Do not waste electricity, water, or consumables;
- Only use authorised accesses;
- Do not litter;
- Dispose solid waste to the correct waste containers provided;
- Prevent pollution;
- Use the toilet facilities provided;
- Do not dispose contaminated wastewater to the storm water or the environment;
- Immediately report any spillage from containers, plant, or vehicles;
- Do not burn or bury any waste in the sand;
- Do not trespass onto private properties;
- Strictly leave all animals alone. Never tease, catch, or set devices to trap or kill any animal;
- Never damage or remove any trees, shrubs, or branches unless it forms part of working instructions;
- Do not deface, draw, or cut lettering or any other markings on trees, rocks or buildings in the area;
- Know the firefighting procedure and locations of firefighting equipment; and
- Know the environmental incident procedures.

2.2 CONTRACTUAL OBLIGATION

This EMPr must be included in all tender and contract documentation associated with the development. Note that notwithstanding the Companies Act, 2008 (Act No. 71 of 2008), or the Close Corporations Act, 1984 (Act No. 69 of 1984), the directors of a company or members of a close corporation are jointly and severally liable for any negative impact on the environment, whether advertently or inadvertently caused by the company or close corporation which they represent, including damage, degradation or pollution.

3. MANAGEMENT AND MONITORING PROCEDURE

3.1 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITY

This section indicates the party responsible for implementing the environmental measures and action plans laid out in this EMPr.

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Proponent, Project Manager, Site Manager/Engineer, Contractor/Operator and Environmental Control Officer are as detailed below.

Project Manager shall:

- Be fully acquainted with the EMPr for the project;
- Ensure that the Developer and the Contractor are aware of all specifications, legal constraints, standards, and procedures pertaining to the project specifically with regard to the environment;
- Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and the Contractor
- Monitor the implementation of the EMPr throughout the project by means of regular site visits and meetings; and
- Order the removal of any person(s) and/or equipment in contravention of the specifications of the EMPr.

The Developer shall:

- Be fully conversant with the EMPr;
- Ensure compliance with the EMPr;
- Have overall responsibility for the implementation of the EMPr;
- Liaise with the Project Manager and Contractor on matters concerning the environment;
- Prevent actions that will harm or may cause harm to the environment, and take steps to prevent pollution of the site;
- Implement remedial measures in the event of pollution incidents or environmental impacts;
- Monitor and verify that environmental impacts are kept to a minimum;
- Review and approve construction methods where necessary; and
- Order the removal of any person(s) and/or equipment in contravention of the specifications of the EMPr.

The Contractor shall:

- Be fully conversant with the EMPr;

- Ensure compliance with the EMPr;
- Ensure that all the environmental specifications contained within this EMPr are adhered to at the site;
- Regularly liaise with the Site Manager on matters relating to the environment; and
- Confine activities to the demarcated construction site.

The above responsibilities listed for the Contractor will also apply to any appointed sub-consultants.

The Environmental Control Officer (ECO) shall:

- Be fully conversant with the EMPr;
- Be fully conversant with all environmental legislation and ensure compliance;
- Ensure that all the environmental specifications contained within this EMPr are adhered to at the site;
- Regularly liaise with the Site Manager on matters relating to the environment; and
- Compile monthly reports as to the progress of the construction phases and report to all parties involved (Site Manager, Project Proponent).

3.2 ENVIRONMENTAL AWARENESS TRAINING

Training and environmental awareness is an integral part of a complete EMPr. The overall aim of the training will be to ensure that all site staff is informed of their relevant requirements and obligations pertaining to the relevant authorizations, licences, permits and the approved EMPr and protection of the environment. Environmental awareness training courses should be run for all personnel on site. Two types of courses should be run, one for the Contractor's and Subcontractor's management and one for all site staff and labourers. Courses shall be run in the morning during normal working hours at a suitable venue provided by the Contractor. All attendees shall remain for the duration of the course and sign an attendance register on completion that clearly indicates participant’s names, a copy of which shall be handed to the ECO.

- The size of each session shall be limited to 30 people. The Contractor shall allow for sufficient sessions to train all personnel. Subsequent sessions shall be run for any new personnel coming onto site. A Method Statement with respect to the organization of these courses shall be submitted.
- Notwithstanding the specific provisions of this clause, it is incumbent upon the Contractor to convey the sentiments of the EMPr to all personnel and Subcontractors involved with the Works.

4.2.1 Training Course for Management and Foremen

- The environmental awareness training course for management shall include all management staff and foremen. The course, which will be presented by the ECO, will be of approximately one-hour duration.

- The initial course shall be undertaken not less than 7 days prior to commencement of work on site. Subsequent courses shall be held as and when required.

4.2.2 Training Course for Site Staff and Labour

- The environmental awareness training course for site staff and labour shall be presented by the Contractor's SHE Officer from material provided by the ECO unless otherwise required by the Project Specification. The course will be approximately one-hour long.
- The course shall be run not more than 7 days after commencement of work on site with sufficient sessions to accommodate all available personnel. Subsequent courses shall be held as and when required.

4.2.3 Construction Personnel Information Posters

- The Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with the EMPr. Construction personnel information posters shall be laminated and erected in all eating areas, workshops, and site offices. The Contractor shall ensure that the construction personnel information posters are not damaged in any way and shall replace them if any part becomes illegible.
- Examples of these posters will be supplied to the Contractor by the ECO in electronic format.

4.2.4 The Environmental Awareness Training Programme

The environmental awareness training programme should include:

- The induction of all construction and operation staff;
- Signing by all persons, an acknowledgement of receiving and understanding the induction;
- Identification of environmental risks and job specific training on addressing these risks; and training on the implementation of emergency procedures (where necessary).

4.2.5 Topics Covered by the Environmental Awareness Programme

Various topics to be entailed by environmental awareness programmes include by not limited to:

- What is meant by "Environment"?
- Why does the environment need to be protected and conserved?
- How can construction activities impact on the environment?
- What can be done to mitigate against such impacts?
- Awareness of emergency and spills response provisions.

4. LEGISLATIONS AND GUIDELINES

All the applicable environmental standards contained within the environmental legislation will be adhered to. Below are applicable legislations and guidelines for the proposed development and have been identified as applicable:

The Constitution of South Africa, 1996 (Act No.108 of 1996).

The Constitution of the Republic of South Africa, 19961 provides that, everyone has a right to an environment that is not harmful to their health or well-being. It further provides that, the environment should be protected for future generations through the implementation of the reasonable legislative and other measures that prevent pollution and ecological degradation.

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

The National Environmental Management Act, 1998 (Act No.107 of 1998) (NEMA) is a 'principles based Act' and is an overarching statute regulating various aspects of natural resources use, integrated environmental management and pollution control. The Act provides for the right to an environment that is not harmful to the health and wellbeing of the South African people; sustainable development, environmental protection, equitable distribution of natural resources; and the formulation of environmental management frameworks. Its definition of the environment includes the land and water of the earth, microorganisms, plant and animal life or a combination of those things, and the inter relationships among them. The Act aims to provide for cooperative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance, and procedures for coordinating environmental functions exercised by organs of state. Section 24 Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.

Environmental Impact Assessment Regulation, 2014 as Amended

The Environmental Impact Assessment (EIA) Regulations promulgated under NEMA in 2014 provide a list of activities which are subject to an Environmental Authorisation (EA) process prior to construction or implementation. In accordance with the 2014 EIA Regulations, (as amended) an EIA process is required owing to the applicability of the activities listed in Table 2. According to the NEMA Regulations these activities may not commence without environmental authorization from the competent authority which requires the

investigation, assessment and statement of potential impact of activities and must follow the procedure as described in the EIA Regulations.

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

The National Environmental Management: Biodiversity Act (NEM:BA) makes provisions for achieving the objectives of the United Nation's Convention on Biological Diversity, to which South Africa is a signatory. The Bill promotes management, conservation and sustainable use of indigenous biological resources, and provides for:

- the management and conservation of biological diversity;
- the use of indigenous biological resources in a sustainable manner; and
- the fair and equitable sharing of benefits arising from the commercialization through bio-prospecting of traditional uses and knowledge of generic resources.

The Bill gives effect to international agreements relating to biodiversity which are binding on the Republic and provides for co-operative governance in biodiversity management and conservation, and provides for a National Biodiversity Institute to assist in achieving the above objectives. The Act gives wide powers to the National Biodiversity Institute to inter alia protect flora and fauna in appropriate enclosures, the collection of information, undertaking and promotion of research on indigenous biodiversity and the sustainable use of indigenous biological resources, the prevention, control or eradication of listed invasive species, biodiversity planning and other functions. This act lists all critically endangered, vulnerable and protected species. The potential occurrence of any such species will be investigated in the BA process.

National Water Act, 1998 (Act No.36 of 1998).

In terms of chapter 3 section 12-20, water resources are to be protected, used, developed, conserved, managed and controlled. This Act recognizes that water is a scarce resource; it is a natural resource that belongs to all of South Africa's people. The National Department of Water and Sanitation is responsible for the nation's water resource and also the Minister of Department of Water and Sanitation ensures that the water resource is "protected, used, developed, conserved, managed and controlled" through the implementation of this Act (National Water Act 36 of 1998).

This Act makes provisions for the protection of surface water and groundwater resources and their sustainable management for the prevention and remediation of the effects of pollution, and for the control of emergency occurrences. Section 21 of the National Water Act (NWA) lists water uses for which a Water Use Licence will be required.

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

The main objective of the Air Quality Act (NEMAQA) is the protection of the environment and human health in a sustainable (economic, social and ecological) development framework, through reasonable measures of air pollution control.

Occupational Health and Safety Act, 1993 (Act No.85 of 1993).

The Occupational Health and Safety Act make provisions in regulations Section 8 for the general duties of employers to their employees. The act provides for the health and safety of people at work utilising machinery and the protection of others against health and safety risks associated with activities on site/work. General Administrative Regulations (2003) describe the administration of the various OHS Regulations, including the designation of health and safety committees, the reporting and recording of incidents and occupational diseases. This Act is applicable to all contractors during the planning, construction and operational phases of the project.

To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work.

Hazardous Substance Act (No15 of 1973).

Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.

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

During construction waste will be produced, in either liquid, solid and/or hazardous state, and this waste will be required to be adequately and appropriately disposed of. There are several Regulations or Acts that are applicable to the proposed development in terms of waste management. To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

This EMPr process also takes consideration the following legislation

- South African National Standard SANS 10103:2008 (The Measurement and Rating of Environmental Noise with Respect to Annoyance and Speech Communication).
- National Noise Control Regulations (1998).

5. PLANNING, DESIGN AND PRE-CONSTRUCTION PHASE

This section of the EMPr provides management principles and mitigation measures for the pre-construction phase of the project. The environmental actions, procedures and responsibilities as required during the pre-construction phase are specified below.

Table 4. Impacts and Mitigation Measures in Planning and Design Phase

Impacts	Mitigations measures	Responsible Party	Frequency of Action
Direct			
Legal and environmental compliance	• Ensure environmental authorisations namely EA is obtained for the development • A n independent Environmental Control Officer (ECO) to be appointed to monitor compliance with permits conditions • All health and safety permits and certification to be in place • A health and safety plan in terms of the Occupational Health and Safety Act (Act No 85 of 1993) must be drawn up by the HSE officer prior to construction to ensure workers safety • Environmental files to be compiled prior to commencement of construction activities. An Environmental Management plan should be incorporated in the file. • Environmental file to be compiled prior to commencement of construction activities and the file to contain records of: o EA copy o Approved EMPr o Approved plans o Method statements o Ablutions servicing manifests o Waste disposal manifests o Safety data sheets o Daily plant and vehicle checklist o ECO audit reports • Compile all methods statements for ECO approval o Site establishment o Environmental awareness and training o Dust pollution control	• Developer • Contractor • ECO	• Once-off • As required

Impacts	Mitigations measures	Responsible Party	Frequency of Action
	○ Concrete batching ○ Hazardous material handling ○ Material and soil stockpiling ○ Solid waste management ○ Vegetation clearing and rehabilitation		
Poor site establishment	• The layout should be amended to ensure; ○ that the northern boundary of the development footprint is located outside the recommended 100 m buffer of the northern drainage line. ○ The O&M building and any planned sanitation system should be located outside the any regulated water areas • Stormwater management plan for construction phase should be compiled and implemented • Construction site to be selected by the contractor in conjunction with the consulting engineer and the ECO. • Full-time security officers are to be appointed to safeguard the site, its personnel, plant and equipment. • The site to be clearly and firmly demarcated using appropriate methods. • No-go areas to be clearly and firmly barricaded using appropriate techniques • Necessary health and safety as well as road construction signage to be installed.	• Developer • Contractor • ECO	• Once-off • As required
Inadequate stormwater management design	• Develop a storm water drainage design during detail design development stage. • Storm water management designs and slope stabilization must be in accordance with generally accepted design standards. • A storm water management plans or mitigation to be developed prior to commencement of construction activities	• Developer • Contractor	• Once-off • As required
Loss of cultivated agricultural land	• Maintain adequate spacing between solar panel rows to allow continued access and operation of agricultural machinery • Strip, stockpile and protect topsoil separately from subsoil in areas to be disturbed, and reuse it during rehabilitation to maintain soil fertility. • Rehabilitate all temporarily disturbed areas immediately following construction and restore them to a condition suitable for continued agricultural production • Prevent soil compaction, erosion and contamination through the implementation of appropriate soil conservation and stormwater management measures.	• Developer • Contractor	• Once-off • As required

Impacts	Mitigations measures	Responsible Party	Frequency of Action
Inadequate rehabilitation and maintenance of the natural environment	• Development of a rehabilitation plan to foster phased rehabilitation during and post construction. • Rehabilitate all disturbed areas (if present / if required) immediately after the completion of construction works.	• Developer • Contractor	• Once-off
Land-use compatibility issues	• Minimise vegetation clearance and confine to the infrastructural footprint • Implement systematic and incremental rehabilitation • Regular monitoring of implementation of this plan for the rehabilitation of disturbed areas must be conducted throughout the duration of the construction/decommissioning phase.	• Developer • Contractor	• Once-off • As required • Ongoing
Environmental awareness training	• Undergo environmental induction for all staff and foremen prior to commencement of work on site to cover all identified project impacts and linked activities. • A training programme to be presented by ECO on possible environmental risks that may result from construction activities and how to deal with these (including a reporting structure) must be made available prior to construction commencing.	• Contractor • ECO	• As required • Ongoing
Indirect			
Fragmentation of the cultivated fields	• Maintain adequate spacing between solar panel rows to accommodate the movement and operation of agricultural machinery in accordance with the agrovoltaic design. • Use existing farm roads and access tracks where possible to minimise the need for new access routes • Rehabilitate all temporarily disturbed cultivated areas immediately after construction and restore them to a condition suitable for continued agricultural production. • Ensure that construction activities are coordinated to minimise disruption during critical planting and harvesting periods, where practicable. • Restrict the activities and movement of construction workers and vehicles to the immediate development footprint and existing access roads.	• Developer • Contractor	• As required • Ongoing
Cumulative			
Progressive reduction of productive agricultural land	• Position permanent infrastructure (e.g. inverter stations, substations, battery storage facilities (if applicable) and overhead powerline support structures) in less productive areas, along field boundaries or in areas that minimise disruption to farming operations.	• Developer • Contractor	• Once-off • As required

Impacts	Mitigations measures	Responsible Party	Frequency of Action
	• Optimise the layout of access roads by utilising existing farm roads where practicable and minimising the construction of new roads. • Design the spacing and orientation of solar panel rows to accommodate the movement of agricultural machinery and support ongoing cultivation. • Avoid unnecessary fragmentation of cultivated fields by consolidating infrastructure within a compact development footprint		
Increased long-term operational costs	• Design an effective stormwater management system to prevent erosion, flooding and infrastructure damage, thereby reducing long-term repair costs. • Incorporate appropriate vegetation management strategies into the design to minimise the frequency and cost of vegetation control during operation. • Develop a preventative maintenance programme during the design phase to ensure the timely inspection and servicing of equipment, reducing the likelihood of major equipment failures. • Ensure that the facility design promotes efficient water and energy use during operation, including minimising water requirements for panel cleaning where feasible	• Developer • Contractor	• Once-off

6. CONSTRUCTION PHASE

This section of the EMPr provides management principles and mitigation measures for the construction phase of the project. Environmental actions, procedures and responsibilities as required during the construction phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfactory of the Project Manager and Environmental Control Officer.

Table 5. Impact and Mitigation Measures in Construction Phase

Impacts	Mitigations	Responsible Party	Frequency of Action
Direct			
Legal and environmental non-compliance	• ECO to be appointed to audit environmental compliance with conditions in the EMPr and other permits and authorisations. • CLO and Social Facilitator to be retained throughout the construction tenure to represent the surrounding communities and local business, particularly SMMEs.	• Developer	• Ongoing
Site establishment and security	• Construction site to be selected by the contractor in conjunction with the consulting engineer and the ECO. • Fulltime security officers to be appointed to safeguard the site, its personnel, plant and equipment. • The site to be clearly and firmly demarcated using appropriate methods. • No-go areas to be clearly and firmly barricaded using appropriate techniques. • Necessary health and safety as well as road construction signage to be installed. • Screen the construction camp and laydown area yards by enclosing the entire area with a dark green or black cloth of no less than 2m height. • Where possible, utilize existing screening features such as dense vegetation and topographical features to place the construction camps and lay-down yards out of the view of sensitive visual receptors.	• Developer • Contractor • ECO	• Once-off • Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
Environmental awareness and training	• Undergo environmental induction for all staff and foremen prior to commencement of work on site to cover all identified project impacts and linked activities. • A training programme to be presented by ECO on possible environmental risks that may result from construction activities and how to deal with these (including a reporting structure) must be made available prior to construction commencing. • Undergo ongoing environmental training through toolbox talks.	• Contractor • ECO	• As required • Ongoing
Loss of productive agricultural land	• Minimise vegetation clearance and confine to the infrastructural footprint. • Implement systematic and incremental rehabilitation. • Regular monitoring of implementation of this plan for the rehabilitation of disturbed areas must be conducted throughout the duration of the construction/decommissioning phase. • Direct surface disturbance of the identified arable soils can be avoided where possible to minimise loss of arable soils. • Avoid construction on the active agricultural soils where feasible. • Direct surface disturbance of the identified arable soils can be avoided where possible to minimise loss of arable soils. • The footprint areas should be lightly ripped to alleviate compaction. • Limit removal of vegetation to demarcated areas only. • Limit earthworks and vehicle movement to demarcated paths and areas.	• Developer • Contractor	• Ongoing
Soil disturbance and compaction	• Restrict construction vehicles and machinery to designated access roads and approved working areas to minimise unnecessary disturbance of cultivated land. • Clearly demarcate the construction footprint, access routes and laydown areas before construction commences to prevent vehicle movement outside authorised areas. • Minimise the movement of heavy machinery over agricultural soils. • Use existing farm roads and tracks where feasible to reduce the need for new access routes.	• Developer • Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• Strip and stockpile topsoil separately before construction in areas requiring excavation and protect stockpiles from erosion and contamination for use during rehabilitation. • Soil compaction is usually greatest when soils are moist, so soils should be stripped when moisture content is as low as possible. • Heavy equipment movement over replaced soils should be minimised. • Minimise compaction during smoothing of replaced soils by dozers rather than graders. • Compacted soils should be ripped to full rooting depth (30cm as the bare minimum seedbed) to allow penetration of plant root.		
Soil erosion and sedimentation	• Appropriate erosion control and slope stabilisation measures should be implemented. • Stockpiles of excavated earth must not exceed 2 m height • Stockpile duration must be minimised to reduce their vulnerability to erosion. • Topsoil excavated from the site should be stockpiled and utilised for rehabilitation of the site after construction. • Movement of plant/ machinery/ vehicle must be avoided in order to prevent compaction. • Excavations must be limited to development footprint. • Disturbed areas must be rehabilitated immediately after construction has ceased. • Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces, must be re-vegetated or stabilised as soon as is practically possible. • All excavation/construction vehicles should be in good condition and inspected regularly to ensure there are no chemical spills (diesel/oil) which will negatively impact the receiving environment. • After the powerline installation, the ground should be seeded with an indigenous grass or other native cover.	• Developer • Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• Vegetation clearance and commencement of construction activities can be scheduled to coincide with low rainfall conditions when the erosive stormwater and wind are anticipated to be low whenever possible. • Avoid vegetation clearance prior to periods of prolonged inactivity. • All disturbed areas adjacent to the proposed development areas should be re-vegetated with an indigenous grass mix or vegetation mix, if necessary, to re-establish a protective cover, to minimise soil erosion. • Temporary erosion control measures should be used to protect the disturbed soils during the construction phase until adequate vegetation has established. • Erosion and sediment barriers must be installed immediately downstream of active work areas (including soil stockpiles) as necessary to trap any excessive sediments generated during construction. • All temporary erosion and sediment control measures must be monitored for the duration of the construction phase and repaired immediately when damaged. • Exposed soils must be stabilised and stockpiles must be located away from wetlands and drainage pathways.		
Soil contamination	• Designate specific areas for the storage of fuels, oils, chemicals and other hazardous substances, located away from drainage lines, wetlands and sensitive areas. • Store all hazardous substances in sealed, clearly labelled containers on impermeable surfaces. • Refuelling, servicing and maintenance of construction vehicles and machinery must only take place in designated areas equipped with appropriate spill containment measures. • Ensure that spill kits are readily available at all fuel storage, refuelling and maintenance areas, and that construction personnel are trained in spill response procedures. • Prohibit the discharge of cement wash water, concrete, chemicals, fuels, oils or wastewater onto the ground or into drainage features.	• Developer • Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• Inspect construction vehicles and equipment regularly for fuel, oil and hydraulic fluid leaks, and repair any leaks before equipment is used on site. • Collect and dispose of hazardous waste, including contaminated soil, used oils, oil filters and absorbent materials, in accordance with applicable waste management legislation. • Minimise the area of soil disturbance and strip, stockpile and protect topsoil separately to prevent contamination and facilitate rehabilitation. • Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces, must be re-vegetated or stabilised as soon as is practically possible. • All excavation/construction vehicles should be in good condition and inspected regularly to ensure there are no chemical spills (diesel/oil) which will negatively impact the receiving environment. • After the powerline installation, the ground should be seeded with an indigenous grass or other native cover. • Vegetation clearance and commencement of construction activities can be scheduled to coincide with low rainfall conditions when the erosive stormwater and wind are anticipated to be low whenever possibl. • Avoid vegetation clearance prior to periods of prolonged inactivity. • All disturbed areas adjacent to the proposed development areas should be re-vegetated with an indigenous grass mix or vegetation mix, if necessary, to re-establish a protective cover, to minimise soil erosion. • Temporary erosion control measures should be used to protect the disturbed soils during the construction phase until adequate vegetation has established.		
Proliferation of invasive alien vegetation	• Regular and ad-hoc alien vegetation removal • Construction site maintenance to include vegetation control and removal alien invasive vegetation from the land and other surrounding areas.	• Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• Revegetation of all disturbed and exposed surface with the same or similar indigenous vegetation. • Undertake visual inspections of the project footprint on a regular basis to identify the establishment of any AIPs. • Document and review the implementation of management actions to prevent additional establishment and spread of AIPs. • Monitor alien invasive species during construction and implement routine removal of the species. • Where required, rehabilitate and revegetate areas as soon as possible using indigenous plant species.		
Increased surface runoff	• Design and implement a stormwater management system before construction commences to maintain natural drainage patterns and minimise concentrated runoff. • Retain existing natural drainage channels and avoid unnecessary modification of drainage features. • Install temporary erosion and sediment control measures, such as silt fences, sediment traps, berms and diversion drains, to reduce runoff velocity and prevent sediment transport. • Stabilise exposed soils as soon as practicable using mulch, erosion control blankets or temporary vegetation cover. • Stockpile excavated material away from drainage lines and protect stockpiles from erosion using appropriate containment measures. • Rehabilitate disturbed areas progressively throughout construction rather than waiting until construction is complete. • Regularly inspect and maintain all stormwater control structures, particularly after rainfall events, to ensure they remain functional. • Ensure construction personnel receive environmental awareness training on stormwater management and erosion prevention requirements contained in the Environmental Management Programme (EMPr).	• Developer • Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
Direct loss of vegetation and habitat transformation	• Limit the footprint of disturbance by maximizing the use of existing tracks, roads, and infrastructure corridors wherever possible. • Appoint a competent Environmental Control Officer (ECO) for the construction phase to ensure all recommendations in this report (Terrestrial Biodiversity Impact Assessment) are implemented. • Limit all construction and maintenance access to demarcated areas to prevent disturbance to vegetation outside the development footprint. • Prohibit collection of plants, wood, or other natural resources outside the approved development footprint. • Restrict laydown, storage, and temporary work areas to sites of low ecological sensitivity to reduce unnecessary habitat loss. • Only clear vegetation that is essential for construction, such as for pipelines and avoid unnecessary widening of access routes, laydown areas, material storage areas and construction camps. • Remove and stockpile topsoil carefully during construction for use in the rehabilitation of disturbed areas. • Undertake rehabilitation immediately after construction activities cease in a given area to reduce erosion and promote ecosystem recovery. • Allow mostly passive regeneration of vegetation, supplemented initially with indigenous grass mixes to stabilize soils and accelerate recovery.	•	•
Direct loss of ESA	• Minimise natural vegetation clearance and the footprint for the disturbed area as far as possible by maximising the use of existing tracks and infrastructure • An Environmental Awareness Programme should be implemented to ensure basic environmental principles are adhered to; • All lay down areas should be limited to areas of Low sensitivity • Rehabilitation of sites should occur immediately after disturbance	• Developer • Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• Relevant permits must be applied to remove all protected species; and • Clear Alien Invasive Species from areas disturbed by construction on a regular basis, as per Alien Management Plan.		
Loss of Ecosystem function and connectivity	• Minimise natural vegetation clearance and the footprint for the disturbed area as far as possible by maximising the use of existing tracks and infrastructure; • An Erosion management plan must be implemented if construction occurs on the steeper slopes on site • Implement Alien Management Plan, including a maintenance plan post construction phase. • Vegetation clearance to only occur by hand in Very High and High Sensitivity areas, with no soil disturbance. • Where required, rehabilitate and revegetate areas as soon as possible using indigenous plant species. • Minimise natural vegetation clearance as far as possible by: o minimizing the development footprint; o avoiding unnecessary clearing or disturbance of surrounding grassland; o avoiding unnecessary widening of the road. • Secondary and Tertiary PAOI are no-go areas and no development activities are allowed.	• Developer • Contractor	• Ongoing
Changes to surface water quality characteristics	• All liquid chemicals including fuels and oil, must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refueled or serviced within 100m of a drainage line or wetland. • All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 100 m from any demarcated water courses.	• Developer • Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• Littering and contamination associated with construction activity must be avoided through effective construction camp management. • No stockpiling should take place within or near a water course. • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable. • ECO monitors the site on a daily basis to ensure plant is in working order (minimise leaks), spills are prevented and if they do occur, are quickly rectified.		
Contamination of surface and ground water from hazardous substances	• Construction plant should be well serviced and in good condition. • Drip trays should be provided for stationery and overnight parked plant. • Concrete batching should be done on impermeable surfaces not directly onto soil substrate. • Hazardous material spillages must be cleaned up immediately with the contaminated substrate and be disposed of to a registered landfill site.	• Developer • Contractor	• Ongoing
Loss and degradation of aquatic and wetland habitat	• Clearly demarcate all wetlands, drainage lines and no-go areas before construction commences, and ensure these areas are fenced or marked to prevent accidental encroachment. • Position the overhead powerline and associated infrastructure to avoid direct impacts on wetlands wherever technically feasible. • Restrict all construction activities, vehicles and machinery to designated access routes and working areas to minimise unnecessary disturbance. • Implement erosion and sediment control measures (e.g. silt fences, sediment traps and stormwater diversion structures) to prevent sediment entering wetlands. • Prohibit the disposal of spoil, construction waste, wastewater, fuels, oils and hazardous substances within or near wetlands. • Refuel and service construction vehicles and equipment in designated areas located outside wetlands and buffer zones, with appropriate spill containment measures in place.	• Developer • Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• Maintain natural drainage patterns and avoid impeding surface water flow into or out of wetlands during construction. • Limit vegetation clearance to the minimum area required for construction and • Implement an Alien Invasive Species Management Plan to prevent the establishment and spread of invasive plant species within disturbed wetland areas. • Temporarily disturbed areas must be rehabilitated and revegetated after construction.		
Disturbance of drainage lines and wetland system	• The layout should be amended so that the northern boundary of the development footprint is located outside the recommended 100 m buffer of the northern drainage line. • Delineated wetlands and drainage lines and associated buffers must be demarcated prior to construction and treated as no-go areas. • No construction activities may occur within delineated wetlands, drainage lines or their approved buffers. • Construction camps, laydown areas, stockpiles, refuelling areas and waste storage areas must be located outside wetlands and drainage lines. • Construction activities must be restricted to the development footprint. • Rehabilitated areas should be regularly monitored, and measures must be implemented to ensure that the reinstated topsoil does not wash away.	• Developer • Contractor	• Once-off • As required
Palaeontological and heritage resource disturbance	• If fossils are found by the Environmental officer, or other responsible person once excavations for foundations and infrastructure have commenced then they should be rescued and a Palaeontologist called to assess and collect a representative sample. • Contractor teams must be briefed on heritage sensitivities, chance find procedures, and reporting requirements. Heritage awareness should form past of environmental induction and ongoing site compliance monitoring. • A formal chance find procedure must be implemented for all contractors. If human remains, grave structures, artefacts, or	• Developer • Contractor • ECO	• As required.

Impacts	Mitigations	Responsible Party	Frequency of Action
	culturally significant features are uncovered, work must stop immediately and ECPHRA must be notified. The procedure must be included in contractor induction training. • All heritage related actions, including public participation, consultation, monitoring, chance find responses, and assessments must be documented and included in the final heritage compliance report submitted to ECPHRA. • If concentrations of pre-colonial archaeological heritage material including subsurface dense artefact accumulations, associated cultural deposits, or human remains such as graves or burials are uncovered during construction, all work must cease immediately and the discovery must be reported without delay to the Eastern Cape Provincial Heritage Resources Agency (ECPHRA) at 043 492 1370. No further disturbance may occur until the heritage authority has provided guidance.		
Changes to hydrological regime and increase in soil erosion	• No stormwater discharged may be directed to delineated aquatic zones or the associated buffers. • A stormwater management plan finalised post EA, detailing the structures and actions that must be installed to prevent the increase of surface water flows directly into any natural systems. • Effective stormwater management must include measures to slow, spread and deplete the energy of concentrated flows thorough effective stabilisation (gabions and Reno mattresses) and the re vegetation of any disturbed areas.	• Developer • Contractor	• Ongoing
Sanitation and hygiene	• Ensure availability of ablutions for males and females. One ablution facility for every 10 workers during construction phase. • Ensure regular servicing of the ablution toilets by a service provider.	• Contractor	• Ongoing
Hazardous material storage and handling	• A Hazardous Material Spill Response and Contingency Plan must be developed by the Contractor/s • Hazardous materials must be stored and handled in accordance with appropriate legislation and standards, including the Hazardous Substances Act (Act No. 15 of 1973) and Occupational Health and Safety Act (No. 85 of 1993). • Avoid hydrocarbon pollution to soil and watercourses.	• Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• During the construction phase all oils, fuel and other maintenance equipment and supplies must be stored in a secure area with an impermeable and bound area. • All stationary plant on site must have drip trays including tools such as generators and equivalent • All maintenance must take place off site. • Spill kits must be kept on-site and maintained. • Cement and concrete must only be mixed in designated areas and on an impermeable surface.		
Dust pollution	• Dust suppression through a water carting truck should be implemented. • Vehicle and plant speed should be kept minimal to reduce dust pollution. • Construction plant, equipment, machinery and vehicles should be well maintained and services regularly to minimise exhaust fumes and air pollution. • Daily plant checklist to be maintained on site throughout the construction period. • Reduce and control construction dust using approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent).	• Developer • Contractor	• Ongoing
Noise pollution	• Machinery should be serviced and good conditions to reduce their noise levels. • Construction activities should be maintained during the normal working hours (08h00-17h00) • Where works are to be carried out outside the normal working hours, the affected adjacent residents must be informed, and such be undertaken within the shortest time possible • Vehicles and plant to be inspected daily for defects which may cause elevated noise generation.	• Developer • Contractor	• Ongoing
Fauna disturbance	• Restrict construction activities to the approved development footprint and clearly demarcate all no-go areas before construction commences • Conduct a pre-construction walk-through by a suitably qualified ecologist to identify and relocate, where necessary and	• Developer • Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	permitted, any species of conservation concern that may be affected by construction • Ensure that excavations and trenches are covered or fitted with escape ramps where left open overnight to prevent animals from becoming trapped • Rehabilitate temporarily disturbed areas as soon as construction activities are completed to restore habitat and reduce long-term disturbance.		
Construction waste and litter	• Provision of waste bins for general and hazardous waste • Waste bins should be marked accordingly and have waterproof lids. • Sufficient waste bins must be provided throughout the construction site for collecting waste. • No waste must be buried or burned on site. • Any waste or building rubble generated during the construction phase should be recycled, where possible. • Rubble or vegetation debris should not be dumped onto adjacent natural vegetation. • Personnel should be instructed not to litter on site. • Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	• Developer • Contractor	• Ongoing
Health and safety	• The contractor must ensure that workers adhere to all safety regulations as per Occupational Health and Safety Act. • Appropriate PPE must be worn by workers at all times. • Regular training/talks must be given to all workers on site regarding safe working procedures. • Appropriate warning signs must be in place to notify the public regarding construction activities. • The construction site and camp must have access control and be demarcated, where possible.	• Contractor	• Ongoing
Short-term landscape change from the current rural agricultural sense of place to the	• Restrict the construction footprint to the minimum area required to reduce unnecessary disturbance of the surrounding rural landscape.	• Developer • Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
semi-industrial renewable energy landscape- PV Area	• Locate construction camps, laydown areas, material stockpiles and parking areas away from public roads, nearby residences and visually sensitive receptors where practicable. • Rehabilitate disturbed areas to restore the rural character of the site. • Retain and maintain natural vegetation (if present) immediately adjacent to the development footprint. • Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase, where possible.		
Employment opportunities	• It is recommended that, where possible, the labour force required during construction must be sourced from the local communities; and • Skills development in the form of training must be implemented where possible.	• Developer • Contractor	• Once-off • As required
Indirect			
Indirect impacts on animal species due to the disturbance and modification of existing habitat during the construction of project infrastructure	• Clearly demarcate all construction areas to avoid the unplanned loss, transformation of habitat • Locate construction camps and equipment stockpiles in transformed habitats and away from sensitive habitats. • Minimise vegetation clearance and confine to the infrastructural footprint. • Implement systematic and incremental rehabilitation. • Regular monitoring of implementation of this plan for the rehabilitation of disturbed areas must be conducted throughout the duration of the construction/decommissioning phase. • Minimise vegetation clearance and confine to the infrastructural footprint. • Implement systematic and incremental rehabilitation. • Regular monitoring of implementation of this plan for the rehabilitation of disturbed areas must be conducted throughout the duration of the construction/decommissioning phase.	• Developer • Contractor	• Ongoing
Skills development	• No mitigation measures.	• Contractor	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
Traffic congestion and visual disturbance	• Limit construction road access to an efficient minimum by coordinated planning between the project management and the environmental control officer. • Traffic signage for residents and oncoming traffic • Speed should be kept at a minimum next to the construction site. • Restrict traffic to clearly demarcated access routes and construction areas only.	• Contractor	• Ongoing
Cumulative			
Change in the sense of place	• Restrict the construction footprint to the minimum area required to reduce unnecessary disturbance of the surrounding rural landscape. • Locate construction camps, laydown areas, material stockpiles and parking areas away from public roads, nearby residences and visually sensitive receptors where practicable. • Rehabilitate disturbed areas to restore the rural character of the site.	• Developer • Contractor	• Ongoing

7. REHABILITATION PHASE

Post construction obligations, also application during works, of the project are outlined in the subsequent table to ensure that contractor leaves site in an acceptable condition with minimal environmental impacts.

Table 6. Impact and Mitigation Measures in Rehabilitation Phase

Impacts	Mitigations	Responsible Party	Frequency of Action
Direct			
Inadequate environmental compliance	• Rehabilitation should be implemented as per the EMPr • Quarterly rehabilitation audits for a 1-year period must be undertaken post construction to audit and monitor rehabilitation post completion of construction.	• Developer • Contractor	• Once-off • As required • Ongoing
Poor site de-establishment	• All structures should be removed, and the site should be clean with no waste, rubble or construction material.	• Developer • Contractor	• Once-off
Soil compaction	• Post construction, the laydown areas and other construction areas no longer needed for operational management, should be ripped (0.5m depth) to restore compacted topsoil, and then rehabilitated to natural vegetation under the supervision of the rehabilitation specialist.	• Developer • Contractor	• Once-off
Waste management	• Provision of waste bins for general and hazardous waste • Waste bins should be marked accordingly and have waterproof lids. • Sufficient waste bins must be provided throughout the construction site for collecting waste. • No waste must be buried or burned on site. • Any waste or building rubble generated during the construction phase should be recycled, where possible. • Rubble or vegetation debris should not be dumped onto adjacent natural vegetation. • Personnel should be instructed not to litter on site. • Maintain a neat decommissioning site by removing rubble and waste materials regularly.	• Developer • Contractor	• As required • Ongoing
Traffic impacts	• Restrict traffic rehabilitation to existing access roads and designated haul routes to minimise disturbance to surrounding land and agricultural activities • Ensure that all vehicles comply with applicable speed limits, particularly on gravel roads and near residences or farm entrances	• Developer • Contractor	• As required • Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• Implement appropriate dust suppression measures on unpaved roads where excessive dust generation occurs.		
Indirect			
Delayed rehabilitation	• Implement progressive rehabilitation by rehabilitating disturbed areas as soon as construction activities are completed, rather than delaying rehabilitation until the end of the construction period. • Develop and implement a Rehabilitation Plan prior to the commencement of construction, detailing rehabilitation objectives, methods, timelines and monitoring requirements. • Carefully plan to minimize the decommissioning period and avoid delays. • All cleared and disturbed areas should be rehabilitated as soon as possible.	• Developer • Contractor	• As required •
Increased maintenance burden	• Rehabilitation designs must prioritise low-maintenance, indigenous vegetation. • A post-construction maintenance plan must be developed and implemented. • Responsibilities for maintenance must be clearly assigned to the relevant authority or SEF management.	• Developer • Contractor	• Once-off • As required
Cumulative			
Long-term degradation of cultivation land	• Restrict the construction footprint to the minimum area required and avoid unnecessary disturbance of cultivated land. • Restrict vehicle and machinery movement to designated access routes to minimise soil compaction across cultivated areas. • Implement erosion and stormwater control measures to prevent the loss of fertile topsoil through runoff and sediment transport. • Rehabilitate all temporarily disturbed areas immediately following construction by ripping compacted soils where necessary, replacing topsoil and re-establishing cultivation or suitable vegetation.	• Developer • Contractor	• Once-off • As required

8. OPERATIONAL PHASE

This section of the EMPr provides management principles for the operational phase of the project. Environmental actions, procedures and responsibilities as required during the operational phase are specified.

Table 7. Impact and Mitigation Measures in Operational Phase

Impacts	Mitigations	Responsible Party	Frequency of Action
Direct			
Legal and environmental non-compliance	• All post construction requirements of the environmental permits should be fully adhered to.	• Developer • Contractor	• Ongoing
Alien and invasive vegetation management	• Regular and ad-hoc alien vegetation removal. • Construction site maintenance to include vegetation control and removal alien invasive vegetation from the land and other surrounding areas. • Revegetation of all disturbed and exposed surface with the same or similar indigenous vegetation. • Undertake visual inspections of the project footprint on a regular basis to identify the establishment of any AIPs. • Document and review the implementation of management actions to prevent additional establishment and spread of AIPs.	• Developer	• Ongoing
Increase in Anthropogenic Disturbance	• An Environmental Awareness Programme should be implemented to ensure basic environmental principles are adhered to; • Access should be limited to prevent further disturbance to the vegetation outside of the development footprint; • No fires should be allowed on site; • No plant or wood collection should be allowed outside of the proposed development footprint; • Prohibit littering and supply animal proof waste bins. • Implement the Open Space Management Plan. • Limit the use of pesticides and herbicides during the operation phase, particularly with the control of AIS. • Access should be limited to prevent further disturbance to the vegetation outside of the development footprint. • No fires should be allowed on site.	• Developer	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
	• No plant or wood collection should be allowed outside of the proposed development footprint.		
Alteration of surface runoff	• Runoff from panels, access roads and other compacted areas must not be concentrated directly on wetlands or drainage lines. • Vegetation cover beneath and between solar panels should be maintained as far as practicable to promote infiltration and reduce runoff velocity.	• Developer	• Ongoing
Ongoing disturbance associated with maintenance/agricultural activities.	• Maintenance vehicles and agricultural activities must remain within the development footprint. • Agricultural activities must be restricted to approved areas and must not encroach into aquatic areas.	• Developer	• Ongoing
Waste management	• Compilation of a waste management plan, amongst other things to consider: • Provision of waste bins for general and hazardous waste • Promote recycling activities through provision of waste bins for recyclables which may be dominant waste types such as metal, plastics etc.	• Developer	• Ongoing
Localised pollution from maintenance	• Designate specific areas for the storage of fuels, oils, chemicals and other hazardous substances, located away from drainage lines, wetlands and sensitive areas. • Store all hazardous substances in sealed, clearly labelled containers on impermeable surfaces. • Refuelling, servicing and maintenance of construction vehicles and machinery must only take place in designated areas equipped with appropriate spill containment measures. • Ensure that spill kits are readily available at all fuel storage, refuelling and maintenance areas, and that construction personnel are trained in spill response procedures. • Prohibit the discharge of cement wash water, concrete, chemicals, fuels, oils or wastewater onto the ground or into drainage features. • Inspect construction vehicles and equipment regularly for fuel, oil and hydraulic fluid leaks, and repair any leaks before equipment is used on site. • Collect and dispose of hazardous waste, including contaminated soil, used oils, oil filters and absorbent materials, in accordance with applicable waste management legislation. • Minimise the area of soil disturbance and strip, stockpile and protect topsoil separately to prevent contamination and facilitate rehabilitation.	• Developer	• Ongoing

Impacts	Mitigations	Responsible Party	Frequency of Action
Stormwater management	• Stormwater management infrastructure must be properly maintained and monitored.	• Developer	• Ongoing
Reduced scenic quality	• As far as possible, limit the amount of security and operational lighting present on site. • Lighting fixtures should make use of minimum lumen or wattage. • Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used.	• Developer	• Ongoing
Sanitation and hygiene	• Maintain sanitation facilities in good and hygienic condition. • Regular inspection faults, leaks and upgrades requirements. • Any leaks and failures of the sewer system must be fixed immediately.	• Developer	• Ongoing
Social and economic benefits	• Developer to prioritize local skilled and unskilled labour for the operation. • Local contractor should be prioritized for all procurement. • Prioritise local staff and service providers for day-to-day operations.	• Developer	• Ongoing
Spread of alien invasive vegetation	• Maintenance of the receiving areas should include alien vegetation control and eradication. • Prevent development from occurring within the identified No-Go areas (i.e. surrounding vegetation).	• Developer	• Ongoing
Changes to the microclimate	• Design the agrovoltaic system with appropriate panel height, spacing and orientation to allow adequate sunlight penetration, air circulation and continued agricultural production beneath and between the solar arrays. • Monitor soil moisture, vegetation condition and crop productivity periodically to identify any adverse microclimatic effects and implement corrective measures. • Ensure regular maintenance of the solar arrays to prevent unnecessary disturbance to soil and vegetation during operational activities.	• Developer •	• Once-off • As required • Ongoing
Indirect impacts on animal species due to disturbance and modification of existing habitat	• Restrict maintenance activities to where habitat disturbances have already occurred. • Use existing roads and access routes and only use designated roads and tracks for maintenance activities; avoid driving off road. • Develop and implement: i) Alien and invasive plant management plan to eradicate these species, and ii) Rehabilitation plan for the rehabilitation of cleared areas where appropriate.	• Developer • Contractor	• Ongoing

9. ROLES AND RESPONSIBILITIES

9.1 DEVELOPER

The Developer is responsible for overall management of the project and the implementation of the EMPr. The following tasks fall within his / her responsibilities:

- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures;
- Monitor site activities on a daily basis for compliance;
- Conduct internal audits of the construction site against the EMPr;
- Confine the construction site to the demarcated areas; and
- Rectify transgressions through the implementation of corrective action.

9.2 ENVIRONMENTAL CONTROL OFFICER

The Developer must appoint a suitable qualified Environmental Officer that will be responsible for ensuring compliance to the EMPr. The Environmental Control Officer on site will conduct regular site visits to ensure the success of the EMPr.

The Environmental Control Officer will:

- Do regular site visits to be able to compile site inspection reports for the inclusion in the EMPr as an addendum if necessary.
- Report compliance and non-compliance to the competent authority.
- Know the contents and implications of the environmental report and monitor the implementation of the findings using the EMPr.
- Act as a guide, advisor and consultant to the contractor and client on environment issues during construction. This will be achieved by continuous auditing of the project, identification of problem areas and provisioning of action plans to avoid costly stoppages and /or environmental damage.
- Ensure that people can report incidents and recommend corrective action when required for aspects of non-compliance within the EMPr
- Upgrade the EMPr as necessary and inform the relevant parties of the changes.

9.3 CONTRACTOR

The construction contractor is responsible for submitting reports on implementation of the environmental plan as described by the project proponent and authorities. The contractor must always ensure compliance with the EMPr during construction activities and maintain an environmental register which keeps a record of all environmental incidents that occur such as

- Public involvement / complaints;
- Health and safety incidents;
- Incidents involving Hazardous materials stored on site; and
- Non-compliance incidents.

10. IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PROGRAMME

A copy of the EMPr must be kept on site at all times during the construction period. The EMPr will be binding on all contractors operating on the site and must be included within the Contractual Clauses. The monitoring programme must be implemented for the duration of the construction and operation of the sport facility. This programme should include:

- Establishing a baseline of pre-construction site conditions validated with photographic evidence.
- Monthly audits will be conducted by an independent ECO for the construction phase to ensure compliance with the conditions stipulated in this EMPr and, where necessary, make recommendations for corrective action. These audits can be conducted randomly and do not require prior arrangement with the Project Coordinator.
- Compilation of an audit report with a rating of compliance with the EMPr. The ECO must keep a photographic record of the demarcated site and construction area. The Contractor must be held liable for all unnecessary damage to the environment. A register must be kept of all complaints from the community. All complaints must be handled immediately to ensure timeous rectification by the responsible party.

10.1 ENVIRONMENTAL AUDITS AND MONITORING

The construction contractor will submit reports on implementation of the environmental plan as described by the project proponent and authorities. An environmental audit will be conducted prior to the development and construction activities. This environmental audit will ensure that:

- Mitigation measures are implemented as prescribed in the Environmental Management Programme;
- The relevant authorities are kept informed about progress with the project and that they are given assurance that the project is implemented and managed as prescribed in the EMPr.
- Periodic inspections and/or audits are performed.
- Compliance to the conditions of the EMPr is adhered to and a report compiled.
- Reviews of conformance against policies and procedures stated in this document are performed.
- Supervisors in all work areas will conduct performance and compliance reviews, using the EMPr as guideline to ensure compliance.
- Inspections will occur monthly (or as required).

10.2 RECORD KEEPING

Documents to be maintained by the designated representative/ site agent are to include:

- Training records.
- Inspection records.
- Records of non-compliance and corrective action.
- Records of all complaints, concerns or issues and corrective action.
- Environmental Management Programme.
- All incidents reports.

All records will be kept for up to a year after the completion of the project or in accordance with other legal requirements as they apply.

10.3 EMPR UPDATES

The EMPr will be subject to on-going review throughout the course of the project to ensure its continued suitability, adequacy, and effectiveness. This review may include but will not be limited to monitoring and measuring information, performance data, assessment and audit results and other relevant information and data.

10.4 NON-COMPLIANCE

The contractors must act immediately when notice of non-compliance is received and take corrective action. Complaints received regarding activities on the construction site pertaining to the environment must be recorded in a dedicated register and the response(s) noted with the date and action taken. The ECO should be made aware of any complaints.

Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define how the environment is managed. Failure to redress the cause must be reported to the competent authority for them to deal with the transgression, as it deems fit. The Contractor is deemed not to have complied with the EMPr if, inter alia:

- There is evidence of contravention of the EMPr specifications within the boundaries of the construction site and site extensions;
- There is contravention of the EMPr specifications which relate to activities outside the boundaries of the construction site;
- Environmental damage ensues due to negligence;

- Construction activities take place outside the defined boundaries of the site; and/or
- The Contractor fails to comply with corrective or other instructions issued within a specific time.

It is recommended that the Contractors institute penalties for the following less serious violations and any others determined during work, as detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Persistent or unrepaired fuel and oil leaks.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven more than designated speed limits.
- Removal and/or damage to fauna, flora, cultural or heritage objects on site.
- Urination and defecation anywhere except at designated facilities.

10.5 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 to prevent similar future occurrences.

10.6 PENALTIES

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the EMPr, the Developer and/or the Contractor will be liable. The following violations, and any others determined during work, should be penalised:

- Hazardous chemical/oil spill and/or dumping in non-approved sites.
- Damage to sensitive environments.
- Damage to cultural and historical sites
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
- Uncontrolled/unmanaged erosion.
- Unauthorised blasting activities (if applicable).
- Pollution of water sources.
- Unnecessary removal or damage to trees.

11. SUMMARY OF RECOMMENDATIONS AND CONCLUSION

The proposed development will have minimal environmental impacts which are manageable through good engineering practices and following all environmental recommendations prescribed. Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr should be considered as a day-to-day management document. The EMPr thus sets out the environmental standards that are required to minimize the negative impacts and maximize the positive benefits of the local communities. An EMPr is a “live document” and its continuous review and correct management will definitely result to the successful construction of the proposed development.

The contractor is to be made aware of the potential cost and timing implications needed to fulfill the implementation of the EMPr, thus adequately costing for these.

Annexure 1: Rehabilitation Schedule and Guideline

Where applicable, the rehabilitation schedule and procedure to be adhered to is as follows (this methodology should be updated during the construction phase):

Table 8. Rehabilitation schedule and guideline

Step	Method	Equipment
1	Remove all construction material from the area where construction has been completed	To be undertaken by hand.
2	The ground should be sloped so as to attain a natural slope and to attain a natural water flow, if it has been altered during construction (the natural slope should be altered as little as possible during construction).	To be undertaken by hand.
3	Topsoil that has been stockpiled during construction must be applied to the area to undergo rehabilitation. The depth of the topsoil layer to be applied depends on the natural depth of topsoil in the area, and the amount of topsoil that may have been lost during construction.	Topsoil must be applied from the topsoil stockpiled during construction
4	The area should be mulched to improve water retention, and brushwood applied to act as a soil stabiliser. Mulch and brushwood must be applied more heavily in areas which are presently well-wooded (or as directed by the ECO).	The mulch used should be woodchip, obtained commercially or from trees removed during site clearance. The brushwood is obtained from the bushes and trees removed during site clearance.
5	The planting of locally indigenous species should be undertaken, with local species endemic to the area.	The plant species to be used during the rehabilitation process should be endemic to the area surrounding the substation installation.
6	The species which has been planted should be regularly watered after planting. Watering should ensure that no erosion of the topsoil takes place.	A hosepipe must be available on site.
7	Plant species which are not well established after a period of 2 months after planting should be re-planted. If necessary, another dressing of topsoil should be applied prior to planting.	As above
8	Slope stabilisation measures may be necessary in areas where vegetation has not been able to establish and there is an erosion risk. The measures implemented depend on the situation, and can be varied as necessary. The ECO will direct the Contractor as required.	Various slope stabilisation measures are available and vary in effectiveness according to the situation including • Onion bags • Soil saver (jute/hessian) blankets • Logs/bark held in place with pegs

Annexure 2: Proposed Fines and Penalty Structure

Table 9. Proposed fines and penalty structure

Typical incidents incurring penalties	Value
Failure to secure construction site from public access	R5,000
Failure to demarcate working areas and servitudes and/or maintain fences and/or demarcation tape.	R1,000
Failure to stockpile topsoil correctly (per incident)	R2,000
Failure to stockpile materials in designated areas (per incident)	R500
Discharging effluent and/or polluted storm water onto the ground or into surface water (per incident)	R2,000
Failure to provide adequate sanitation, waste disposal facilities or services (per incident)	R1,000
Failure to demarcate construction area boundaries before commencing construction clearance and other activities (per incident)	R5,000
Venturing into or undertaking construction related activities within no-go areas, without formal written approval from the ECO (per incident)	R5,000
No induction regarding environmental matters and site housekeeping practices (per employee)	R2,000
Stockpile of soils and materials outside demarcated areas (per incident)	R1,000
Inappropriate mixing of cement/concrete and poor management of concrete slurry (per incident)	R2,000
Burning of waste on site (including cement bags) (per incident)	R 2,000
Untidiness and litter at camp (per incident)	R200
Unauthorised removal of indigenous trees, medicinal or other plants (per incident)	R2,000
Damaging/killing animals/birds (per incident)	R 1,500
Failure to erect temporary fences as required (per incident)	R2,000
Failure to reinstate disturbed areas within the specified timeframe (per incident)	R2,000
Fire – costs of runaway fires will be borne by the Contractor, should he/she be proven responsible for such fires (per incident)	R25,000
Failure to provide adequate equipment for emergency situations (per incident)	R5,000
Defacing, painting or damaging natural or heritage features (per incident) – mandatory removal of employee from site	R5,000
Damaging cultural, historical and/or archaeological sites of importance (per incident) – mandatory removal of employee from site	R5,000
Failure to maintain basic safety measures on site	R1,000
Failure to carry out required community liaison, damage to property etc., without prior negotiation and/or compensation and other social infringements (per incident)	R1,000
Persistent and un-repaired oil leaks from machinery. The use of inappropriate methods of refuelling (per incident)	R2,000
Failure to provide drip trays and/or empty them frequently (per incident)	R500
Inappropriate use of bins and poor waste management on site (per incident)	R500
Inappropriate off-site disposal of waste from site (per incident)	R10,000
Deliberate lighting of illegal fires on site (per incident)	R1,000
The eating of meals on site outside the defined eating area. Individual not making use of the site ablution facilities (per incident)	R200
Inappropriate use of adjacent watercourses and water bodies – such as for unapproved water abstraction, washing of vehicles, wastewater disposal and use by employees for washing (per incident)	R1000
Any person, vehicle, item of plant, or anything related to the Contractor's operations causing a public nuisance (per incident)	R500
Construction vehicles not adhering to speed limits (per incident)	R200
Failure to maintain and register incidents in the incident register (per incident)	R1,000
Failure to remove all temporary features and leftovers from the construction site and works areas upon completion of the works (per incident)	R50,000
Any contravention with a Method Statement (per incident)	R5,000
Repeated contravention of the specifications or failure to comply with instructions (per incident)	R5,000

Annexure 3: Issues to be addressed by and where appropriate shown on the Environmental Management Site Plan

Table 10. Issues addressed on the EMP Site Plan

Issue	Nature / Description
Sequence of events	Description of the nature of the process required. Briefly describe the sequence of events that will take place from the time that the contractor moves onto site to the time when the site is handed over to the Project Proponent
Health and safety	Potential risks and hazards and precautions that will be taken Cooking area, hazardous materials site, first aid kit, fuel store, security issues, fire management, and public safety.
On site toilets	How many required for the particular development? Are there existing ablution facilities that can be used? If not, how many toilets need to be brought to site and how long are the toilets required on site? Location of toilets (Site Plan)
Workforce	Number of onsite workers Training of workforce in terms of environmental awareness Management of workforce, particularly sub-contractors
Transport and traffic	Transport required for site workers Routes to be used by construction vehicles Demarcate location of traffic turning circle and parking areas (Site Plan)
Infrastructure and associated equipment	Nature and extent of infrastructure needed for construction Indicate on site plan
Material storage (e.g. sand needed to build wall)	Approximation of quantity to be excavated Where to be stockpiled (Site Plan) How long to be stockpiled Area required for stockpile
Earthworks/cleaning	Volume of material to be excavated/cleaned Duration of operations Where stocks to be kept on site (Site Plan) How long to be kept on site Where, when and how to be disposed of Recycling and/or re-use of materials
Equipment needed for construction activities	Area required for material and equipment storage Duration of works Nature of equipment and necessary materials
Drinking water	Quantity required Duration of period in which required Source of water Location of potable water (Site Plan)
Cooking and rest areas	Area required Equipment required e.g. gas stoves, matches etc. Shelter Location – indicate on site plan
Existing structures	Indication of location of any structures that need to be removed and/or protected
Life of project	Working hours Time frame Phasing of work areas
Construction site	Work area required Location of construction site and work area (Site Plan) Demarcation of no-go areas
Environmentally sensitive areas and possible environmental risks associated with construction activities	A plan of environmentally sensitive areas must be drawn up and made available to contractors. This will include the riverine corridor and pan demarcated in the field survey. A training programme on possible environmental risks that may result from construction activities and how to deal with these (including a reporting structure) must be made available prior to construction commencing.
Waste management	Litter drums - number, type, size, location (Site Plan) Closest registered waste disposal site (Location map) Waste management plan Recycling / material re-use options

Annexure 4: General Code of Conduct for Contractors

Contractors shall ensure that all sub-contractors, employees, suppliers, agents, etc., are fully aware of the environmental issues detailed in the Construction Environmental Management Programme.

Contractors must Investigate and comply with all existing regulations and laws/ bylaws unless the Relevant Authority grants specific written authority waiving compliance with any legislation.

Contractor's, *inter alia*¸ commit to the following code of conduct:

- Implementing, documenting, reviewing and complying with environmental specifications, permits and management plans as well as relevant environmental legislation, regulations and standards.
- Ensuring the communication and training of all personnel through induction and appropriate environmental training.
- Reducing and, where possible, eliminating and preventing any harmful effects to the environment and societal milieu
- Liaising openly with, and reporting publicly to, all interested and affected parties on environmental matters.

Annexure 5: Environmental Incident Register

Table 11. Environmental incident register

ENVIRONMENTAL INCIDENT REGISTER				
Date	**Environmental incident**	**Comments** *(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)*	**Corrective Action Taken** (*Give details and attach documentation as far as possible)*	**Signature**

Annexure 6: Environmental Complaints Register

Table 12. Environmental complaints register

ENVIRONMENTAL COMPLAINTS REGISTER				
Date	**Environmental Complaint**	**Name of Complainee** (*Name of complained and method which complaint was received)*	**Corrective Action Taken** (*Give details and attach documentation as far as possible)*	**Signature**

12. REFERENCES

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