

Prepared for  
**75MW Humansrus PV 1 Solar Facility**  
Farm 469, RE  
Northern Cape  
EA:12/12/20/1903/1

## OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME (OEMP)

**DRAFT**



Rev	Description	Date
0	2011 EMP, compiled by ERM and approved by DEA.	December 2011
1.0	Final 2019 EMP, issued by Knight Piesolds Consulting and acknowledge by DFFE on 30 July 2019	4 April 2019
1.1	2021 OEMP, edited to address 2018 – 2020 ECO audit findings and include GA conditions.	28 October 2021
1.2	2022 OEMP, edited to address 2021 ECO audit findings and submitted to DFFE on 02 February 2022.	21 January 2022
2.0	2022 OEMP, reviewed by EAP and submitted to DFFE	22 June 2022
3.0	2023 OEMP, edited as part of the Part 2 EA Amendment Application. Released for PPP.	May 2023
<b>4.0</b>	<b>2023 OEMP, edited as part of the Part 2 EA Amendment Application. Released for a second round of PPP.</b>	<b>September 2023</b>

This OEMP is the result of the combined works of the following institutions, who are acknowledged for their contributions:



# TABLE OF CONTENTS

---

	<b>PAGE</b>
<b>1.0 INTRODUCTION.....</b>	<b>9</b>
1.1 BACKGROUND TO PROJECT.....	9
1.2 REQUIREMENTS FOR AN EMPr AND AN OEMP .....	9
1.3 OBJECTIVES OF THE OEMP .....	6
1.4 COMPONENTS OF THE OEMP.....	6
1.5 ENVIRONMENTAL ASSESSMENT PRACTITIONER.....	4
<b>2.0 PROJECT DESCRIPTION.....</b>	<b>6</b>
2.1 INTRODUCTION.....	6
2.2 SITE LOCATION.....	6
2.3 PROJECT COMPONENTS.....	6
2.3.1 PV ARRAYS .....	7
2.3.2 ELECTRICAL CONNECTIONS.....	7
2.3.3 CAPACITOR BANKS, SUBSTATION AND GRID CONNECTION .....	8
2.3.4 ACCESS ROADS AND SITE ACCESS.....	8
2.3.5 ADDITIONAL INFRASTRUCTURE .....	8
<b>3.0 IMPLEMENTATION OF THE OEMP .....</b>	<b>10</b>
3.1 INTRODUCTION.....	10
3.2 ROLES AND RESPONSIBILITIES .....	10
3.2.1 THE OWNER.....	11
3.2.2 THE OPERATOR .....	11
3.2.3 EXTERNAL ENVIRONMENTAL SERVICES .....	12
3.3.1 ENVIRONMENTAL AWARENESS.....	12
3.3.2 METHOD STATEMENTS.....	12
3.3.3 LEGISLATIVE FRAMEWORK.....	13
3.3.4 COMMUNITY RELATIONS .....	13
<b>4.0 OPERATIONAL ENVIRONMENTAL SPECIFICATION .....</b>	<b>15</b>
4.1 SCOPE.....	15
4.2 AIM AND PURPOSE .....	18
4.3 APPLICATION .....	18
4.4 FINANCING FOR ENVIRONMENTAL MANAGEMENT .....	18
4.5 ENVIRONMENTAL SPECIFICATIONS FOR OPERATIONAL ACTIVITIES .....	19
4.5.1 DANGEROUS GOODS HANDLING AND STORAGE .....	20
4.5.2 LITTER, WASTE & EFFLUENT MANAGEMENT .....	23
4.5.3 WATER RESOURCES.....	27
4.5.4 EROSION MANAGEMENT .....	36
4.5.5 VEGETATION MANAGEMENT .....	38
4.5.6 MAINTENANCE OF FACILITY .....	41
4.5.7 NOISE.....	44
4.5.8 DUST MINIMIZATION .....	45
4.5.9 "NO GO" AREAS .....	46
4.5.10 FIRE PREVENTION AND CONTROL.....	47
4.5.11 CONCRETE AND CEMENT WORK .....	49

OPERATIONAL ENVIRONMENTAL MANAGEMENT PROGRAMME (OEMP)

4.5.12	ARCHAEOLOGY AND PALAEOLOGY	51
4.5.13	EMERGENCY PROCEDURES	53
4.5.14	AUDITS AND EMPr REVIEWS	55
<b>5.0</b>	<b>CONSTRUCTION ENVIRONMENTAL SPECIFICATION</b>	<b>57</b>
5.1	SCOPE	57
5.2	APPLICATION	57
5.3	METHOD STATEMENTS	57
5.4	GENERAL REQUIREMENTS	58
5.4.1	MATERIALS HANDLING, USE AND STORAGE	58
5.4.2	FUEL (PETROL AND DIESEL) AND OIL	58
5.4.3	SOLID WASTE MANAGEMENT	59
5.4.4	ABLUTION FACILITIES	60
5.4.5	EATING AREAS	60
5.4.6	DRINKING WATER	60
5.4.7	CONTAMINATED WATER	60
5.4.8	DANGEROUS GOODS	60
5.4.9	SITE STRUCTURES	61
5.4.10	LIGHTS	61
5.4.11	EQUIPMENT MAINTENANCE AND STORAGE	61
5.4.12	SECURITY	61
5.4.13	PROTECTION OF FLORA AND FAUNA	61
5.4.14	DUST CONTROL	62
5.4.15	POLLUTION	62
5.4.16	EXCAVATION AND TRENCHING	62
5.4.17	TEMPORARY SITE CLOSURE	62
5.4.18	SITE CLEAN UP AND REHABILITATION	63
<b>6.0</b>	<b>CERTIFICATION</b>	<b>63</b>

## TABLES

Table 1	Components of the EMP	4
Table 2	Protected plants found at Lesedi Power Plant	28

## FIGURES

Figure 1	Layout Map of Lesedi Power Project showing drainage channels	2
Figure 2:	Layout Map of Lesedi Power Project showing farms	3
Figure 3	Typical communication and reporting structure	9
Figure 4	Demarcated No-Go Areas	30

## PLATES

Plate 1	PV Array	6
Plate 2	Substation (during construction)	7

## APPENDICES

Appendix A: EAP CVs

Appendix B: General Arrangement

Appendix C: Cultural Heritage Management Plan & Graves Register

## ACRONYMS AND DEFINITIONS

---

AC	alternating current
<b>CHMP</b>	<b>Cultural Heritage Management Plan (including Graves Register)</b>
DC	direct current
DEA	National Department of Environment Affairs
DFFE	National Department of Forestry, Fisheries and the Environment
DWS	National Department of Water and Sanitation
EA	environmental authorisation
EAP	environmental assessment practitioner
ECO	environmental control officer
EIA	environmental impact assessment
EMP	environmental management plan
EMPr	environmental management programme
GA	general authorization
GG	Government Gazette
HCS	hazardous chemical substance
MW	mega watt
NCNCA	Northern Cape Nature Conservation Act, 2009
NEMA	National Environmental Management Act, 1998
NEM:BA	National Environmental Management: Biodiversity Act, 2004
NEM:WA	National Environmental Management: Waste Act, 2008
NERSA	National Energy Regulator of South Africa
NFA	National Forest Act, 1998
NN&S	national norms and standards
NWA	National Water Act, 1998
OEM	original equipment manual
OEMP	operational environmental management programme
OHSA	Occupational Health and Safety Act, 1993
PPE	personal protective equipment
PV	photo voltaic
SABS	South African Bureau of Standards
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resource Agency
SANS	South African National Standards
SAWIS	South African Waste Information System
SDS	Safety Data Sheet
TOP(s)	Threatened or Protected Species
SHE	safety, health and environment
WTP	water treatment plant
WWTP	waste water treatment plant
WUL	water use license

**Bund:** Enclosure under / around a storage facility to contain any spillage that complies with the relevant OHS regulations, SANS and Norms and Standards

**Batch:** plant site for the large-scale mixing and production of concrete or plaster, and associated equipment and materials

**Contractor:** the principal persons/company undertaking the construction activities.

**Contaminated water:** Means water contaminated by the Contractor / Operator's activities, e.g. concrete water and runoff from plant/ personnel wash areas.

**Engineer:** A person representing the Owner on site and who is responsible for the technical and contractual implementation of the works to be undertaken. This is usually the engineer, but may be any other person, such as an architect or project manager, authorized by the Owner to fulfil this role.

**Environment:** Means the surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any part or combination of the above and the interrelationships among and between them; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

**Environmental Assessment Practitioner (EAP):** The independent individual appointed by the Owner to provide environmental services required under the EIA Regulations, and who is duly registered with a Registration Authority appointed by the Minister of Environmental Affairs, under section 24H of NEMA.

**Environmental Auditor:** The independent individual appointed by the Owner to conduct periodic compliance audits against the requirements of authorizations and licences in place.

**Environmental Control Officer (ECO):** The independent individual appointed by the Owner to verify compliance to the implementation of the EMP and suitable environmental management practices on site for the duration of the operational phase of the project.

**General waste:** waste which does not pose an immediate hazard or threat to health or to the environment, and includes domestic waste, building and demolition waste, business waste, inert waste; or any waste classified as non-hazardous waste in terms of the NEM:WA regulations (made under section 69), and includes non-hazardous substances, materials or objects within business, domestic, inert, building and demolition waste streams .

**Hazardous waste:** 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.

**Incident:** An unexpected, sudden and uncontrolled release of a dangerous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property. For example, a large oil spill into storm water systems.

**Method Statement:** A written submission by the Contractor / Operator to the Engineer and ECO in response to the Specifications or a request by the Engineer, setting out the plant, materials, labour and method the Contractor / Operator proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

**No Go Areas:** Areas identified as being environmentally sensitive in some manner and delineated on plan, and on the site with pegs or fencing and which are out of bounds to unauthorised persons. Authorisation must be obtained prior to entry.

**Operator:** the principal persons/company undertaking the operations and maintenance of the facility.

**Potentially hazardous substance:** Is a substance which, in the opinion of the Engineer, can have a deleterious effect on the environment.

**Reasonable:** means, unless the context indicates otherwise, reasonable in the opinion of the Engineer after s/he has consulted with suitably experienced person(s) in the matter at hand. The matter may also be discussed at management level, prior to a decision being taken.

**Responsible person** (in terms of an incident): includes any person who-

- (i) is responsible for the incident;
- (ii) owns any dangerous substance involved in the incident; or
- (iii) was in control of any dangerous substance involved in the incident at the time of the incident;

**Site:** The boundary and extent of facility works and infrastructure, including any areas off the main site on which works are to be carried out.

**Solid waste:** Means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

**Specification:** A technical description of the standards of materials and workmanship that the Operator is to use in the Works to be executed, the performance of the Works when completed and the manner in which payment is to be made.

**Works:** all related and incidental works, such as site works, earthworks, installation of services, rehabilitation etc., in connection with the operation and maintenance of the solar facility.

**Top material:** This refers to any surface material in the construction area, whether it be soil, fine material or stones including vegetation.

**Topsoil:** Means the top 300mm of soil and may include vegetation and rocks.



# 1.0 INTRODUCTION

---

## 1.1 BACKGROUND TO PROJECT

Oakleaf Investment Holdings 79 (RF) (Pty) Ltd ('Oakleaf'), hereafter referred to as "Lesedi" revised the 2019 Operational Environmental Management Programme (OEMP), internally with support from Unisam Environmental, and appointed MDT Environmental to conduct the external independent review of this document. The 2019 OEMP was compiled by Knight Piésold (Pty) Ltd, appointed as an independent environmental assessment practitioner (EAP) to update the 2011 Environmental Management Programme (EMPr) compiled by ERM, for the 75MW Humansrus PV1 Solar Power Facility (referred to as Lesedi Solar Farm), as authorised under EA Ref: 12/12/20/1903/1 on 23 February 2012. The 160MW Humansrus Solar Power Farm obtained Environmental Authorisation from the Department of Environmental Affairs (DEA) under EA:12/12/20/1903 in 2011, and this project was split in 2012 to for the Lesedi, Jasper and Red Stone solar facilities.

The Lesedi Power Project is located approximately 30 km east of Postmasburg, in the Northern Cape Province on the Remainder of Farm 469, Hay RD. Refer to Figure 1 and Figure 2 which show its locality in relation to drainage features and farm portions respectively. The facility achieved commercial operation on 21 May 2014 and comprises fixed solar panels (photovoltaic (PV) arrays) with an output of 64MW<sub>AC</sub> which feeds into South Africa's national electricity grid network.

## 1.2 REQUIREMENTS FOR AN EMPr AND AN OEMP

An Environmental Management Programme (EMPr) for the Lesedi Solar Facility is required in terms of the 2014 EIA Regulations (GN.R.982 to 985 of 2014, as amended by GN.R.324 to 327 of 2017, GN.R.706 of 2018, GN.R.599 of 2020 and GN.R.517 of 2021), as promulgated under section 24N of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). An EMPr encompasses the planning, construction, operational and decommissioning/closure phases of any development activity. EMPr is a specific requirement of Regulations 19 and 23 of the EIA Regulations.

In terms of condition 23 of EA:12/12/20/1903/1: *The applicant must compile an operational EMP for the operational phase of the activity or alternatively, if the applicant has an existing operational environmental management system, it must be amended to include the operation of the authorised activity.*

This OEMP therefore provide the management framework and focuses on operational activities of the facility, and mitigation measures proposed in the OEMP are integrated into the Owner's procedures and also into the Lesedi O&M's management system and operating procedures, which collectively make up the operational EMPr for Lesedi Solar Facility's operational phase. Lesedi O&M is the Operator, appointed by the Owner, and the contractual agreement between the parties requires the Operator to establish management plans for waste management, vegetation control, erosion and stormwater management and incident response. Therefore, Lesedi's OEMP is integrated into the Operator's management system (i.e. plans, standard operating procedures, method statements, and work instructions). The OEMP and its supporting subsidiary documents in the Operator's management system and the Owner's procedures are reviewed and updated annually, to address compliance audit findings.

The OEMP explicitly excludes a Closure Plan, as a closure EMP will be compiled towards the end-of-life to meet the EIA Regulations in place at that time.

## 1.3 OBJECTIVES OF THE OEMP

The aim of an OEMP is to facilitate and guide appropriate environmental consideration during operational phase of the project, and also governs any *ad hoc* construction activities which may be undertaken. To achieve this, the OEMP specifies environmental aspects, impact management outcomes, impacts management actions to avoid, modify, remedy, control or stop action, activity or process which causes (or may cause) pollution or environmental degradation. The OEMP thus provides the framework within which the Owner and Operator conduct their operations.

Instruction and guidance for the implementation of the OEMP is provided in section 4 and includes the monitoring and reporting requirements and the management of Method Statements to achieve compliance with the Environmental Specifications stated in section 4).

No closure or decommissioning EMP is in place at this stage because the act of decommissioning would likely trigger a requirement to undertake an Environmental Impact Assessment (EIA), as is presently the case in terms of activity 31 of Government Notice 983 of 2014. The EIA would assess the impacts and opportunities of decommissioning in far greater detail than is possible at this time and would likely include a specific decommissioning or closure EMP.

## 1.4 COMPONENTS OF THE OEMP

Table 1 provides details the components of this Operational EMP.

**Table 1:Components of the EMP**

Section		Description
<b>Section 1:</b>	Introduction	Gives background information regarding the solar facility and the OEMP.
<b>Section 2:</b>	Project Description	Provides a summary of the project description based on the EIA.
<b>Section 3:</b>	Implementation of the OEMP	Provides details of the communication and organizational structures within which the OEMP is implemented, and shows responsibilities of key role players during the operational phase.
<b>Section 4:</b>	Operational Environmental Specifications	Describes the impact management outcomes for each environmental aspect affected by the facility, and provides environmental management requirements to mitigated, manage, reduce or avoid impacts. These specifications are applicable to the Owner, Operator, and sub-contractors. The responsible party, timeframes and evidence of compliance for implementation and monitoring actions are specified for each mitigation measure/management action
<b>Section 5:</b>	Environmental Specifications for <i>ad.hoc.</i> construction works	Shows environmental management requirements for construction activities, which may occur during the operational phase, and is applicable to the Owner, Operator, and sub-contractors.

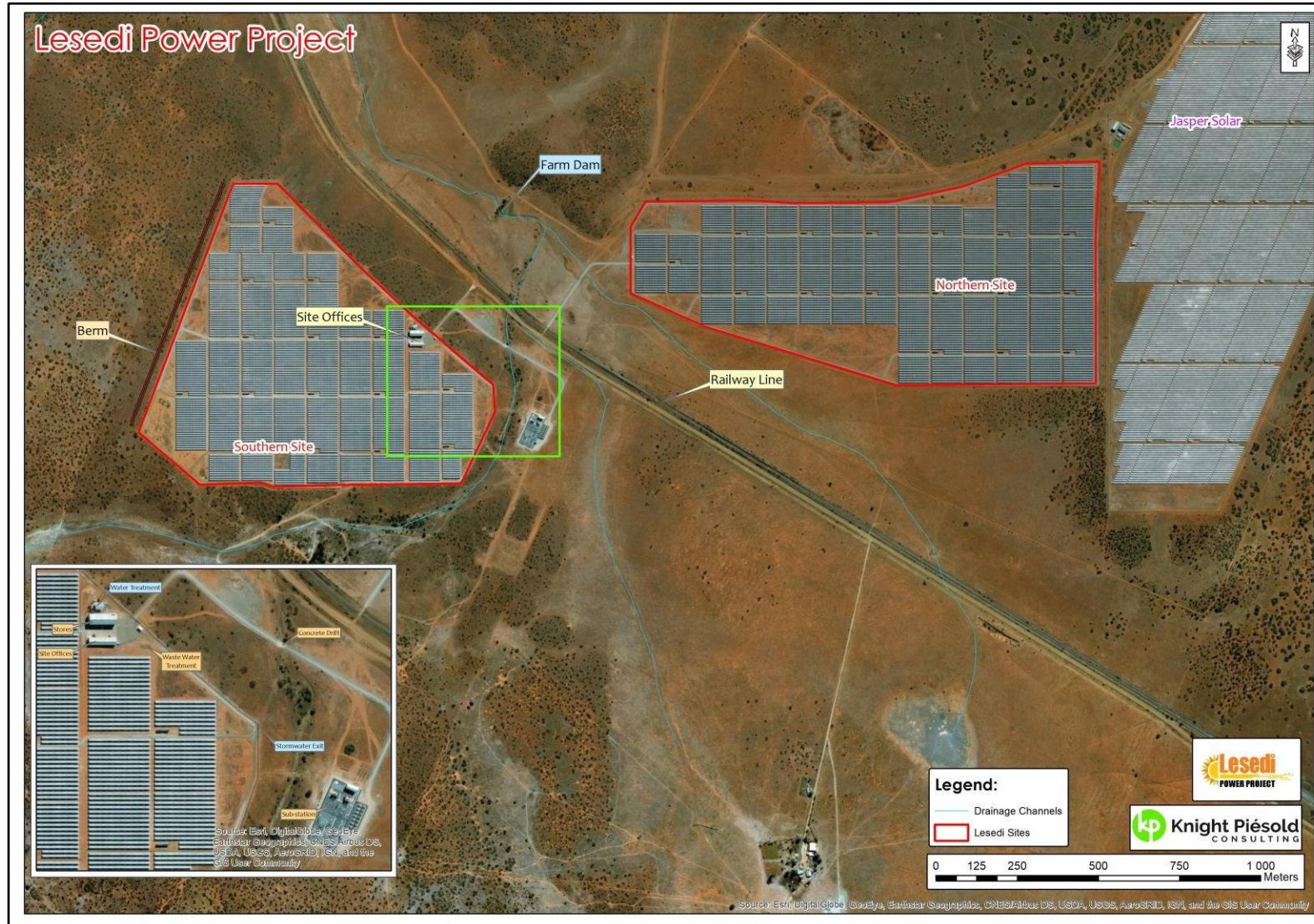


Figure 1 Layout Map of Lesedi Power Project showing drainage channels

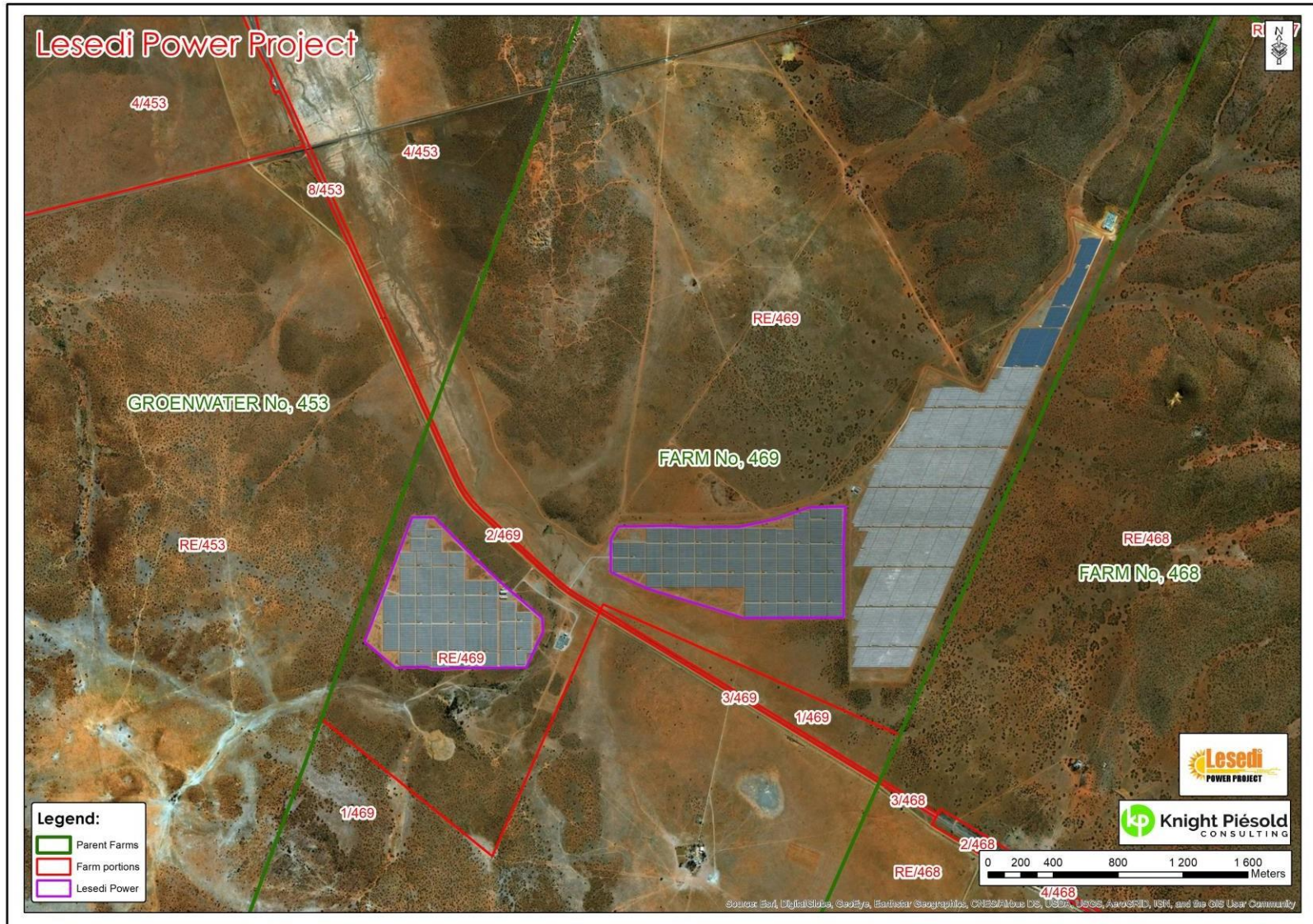


Figure 2: Layout Map of Lesedi Power Project showing farms

## 1.5 ENVIRONMENTAL ASSESSMENT PRACTITIONER

An EMPr is considered a 'live' document, which is amended from time to time to address current matters as they arise. The evolution of this OEMP has seen a number of iterations, with inputs from various stakeholders and environmental consultants. Appendix A holds the respective CVs for those who have contributed to this OEMP.

This 2023 OEMP was updated by EARTHnSKY Environmental (Pty) Ltd., the independent EAP appointed to facilitate the retrospective Part 2 Environmental Authorisation (EA) Amendment Application process, as required in terms of Section 32 of the National Environmental Management (NEMA) and the Environmental Impact Assessment Regulations (EIA), 2014 (as amended), for the EA: The OEMP was updated to incorporate the mitigation measures recommended by independent specialists as part of the Amendment Application as well as any additional compliance and management conditions of the amended EA.

The 2023 OEMP was updated by Lizette Kloppers and Rachele Botha. The external review was completed by Mandy Momberg of Unisam Environmental.

Mrs. Lizette Kloppers, the independent EAP, graduated from the University of London (External Programme) in 2014 with a M.Sc. degree in Environmental Management. Lizette has worked as an Environmental Consultant since 2011. She has successfully completed numerous Environmental Impact Assessment processes, Waste Management Licence applications and legal compliance audits in the mining, industrial and agricultural sectors. Lizette is registered as a competent Environmental Assessment Practitioner (EAP) with registration number 2019/767 and is also a registered SACNASP Professional Natural Scientist with registration number 115453.

Mrs. Rachele Botha graduated from the University of Stellenbosch in 2013 with a Master of Philosophy (MPhil) in Environmental Management. Rachele has worked as an Environmental Consultant since 2009. She has successfully completed numerous Environmental Impact Assessment process, Management Planning, waste, water, air management and licensing as well as in environmental control work and auditing for construction works. Projects completed in the public and private sectors with specific experience in mining, industrial, road, water, waste and power distribution infrastructure type developments.

The 2022 OEMP was updated internally by Lesedi Power Project, as advised by Mandy Momberg of Unisam Environmental, and is based on the 2019 OEMP, and updated to incorporate the mitigation measures proposed in the 2011 Environmental Impact Report (to address condition 13 of the EA). The external reviewed was conducted by Deon Esterhuizen, an independent EAP, appointed in accordance with Regulation 13(2) of the 2014 EIA Regulations (as amended).

Mr. Deon Esterhuizen, the independent EAP has a M.Sc. degree in Environmental Management with 28 years of experience in water related projects, which include water resource management, water quality management, water use registration and licencing of water users, including project management of multi-disciplinary studies. He also has extensive experience in a wide range of environmentally related projects, processes and applications for private, commercial and industrial clients, in addition to local, provincial and national government departments.

Water Resources: key experience gained through his involvement in a number of water resources related projects, including ensuring the protection, development, conservation, management, use and control of the water resources in the Gauteng Region; in a sustainable manner as well as co-ordinate the management of the quality of the water resources of a specific catchment on an ongoing basis to achieve water resource objectives during his employment at the Department of Water Affairs and Forestry.

Environmental: key experience gained through environmental related projects as a consultant at BKS (Pty) Ltd

and ILISO Consulting (Pty) Ltd in the fields listed below:

- Integrated Environmental Management (IEM) in general;
- Environmental Impact Assessments (EIAs);
- Environmental Management Plans (EMPs); and
- Environmental monitoring and auditing

Project Coordination & Management: key experienced gained as the project leader and coordinator on a number of large, strategically important and multi-disciplinary projects for various clients, including international (Africa) projects.

External Reviewer: key experienced gained as external reviewer for the Department of Water and Sanitation as well as other consulting firms

Ms. Mandy Momberg of Unisam Environmental, appointed to provide internal environmental support to Lesedi during the operational phase, is an environmental expert, with over 30-years' experience related to environmental sustainability, biodiversity and climate change matters. In addition to working for government for over 17 years (which included authorising EIAs in North West Province and as Park Ecologist for Pilanesberg National Park). Mandy has also worked in the mining industry and provides environmental consulting and advisory services to government and corporate clients for over 14 years. Mandy has a B.Tech Nature Conservation, and is a competent environmental auditor, with over 900 audit hours on-site (in South Africa and other African countries), assessing compliance with environmental authorization conditions, corporate sustainability standards, ISO14001 EMS, CDM carbon emission reductions projects, and carbon footprints (ISO14064-1). Mandy's biodiversity experience includes compiling and monitoring implementation of Natural Resource Management Plans and Biodiversity Action Plans; which include setting management objectives and interventions for ecosystem components (veld carrying capacity, game stocking rates, fire burning regimes, water distribution points, alien plant control and sustainable harvesting of natural resources like firewood) and species management plans (for lion, wilddog, rhino and elephant).

The 2019 OEMP was compiled by independent EAP Mrs. Tania Oosthuizen and reviewed by Mr. Neal Neervoort from Knight Piésold (Pty) Ltd. Refer to Appendix A for their CVs.

Mrs. Tania Oosthuizen is a Senior Environmental Scientist at Knight Piésold's Rivonia office. She is registered as a Professional Natural Scientist (*Pr. Sci. Nat.* 114500) with the South African Council for Natural Scientific Professionals (SACNASP). Tania holds a master's degree in Environmental Management from the North-West University. Her B.Sc. and B.Sc. Honours degrees were obtained from the Rand Afrikaans University. She has 14 years environmental consulting experience and has gained considerable experience over the years in managing complex environmental authorisation projects.

Mr. Neal Neervoort is an Aquatic /Senior Environmental Scientist at Knight Piésold's Rivonia office. He has seven years of working experience as a registered professional scientist in the Environmental Management and Aquatic Science fields. He has an aquatic ecology background as a Wetland Assessment Practitioner and DWS: SASS 5 Accredited Practitioner. He has been involved in various aquatic specialist studies as part of Environmental Processes and standalone projects. In the Environmental Management field, he has experience across Africa implementing Water Monitoring Programmes, Air Quality Monitoring Programmes, Environmental Compliance Audits, Water Use Licence Applications, Scoping Studies and Environmental Impact Assessments.

The 2011 EMPr was compiled by a team of environmental assessment practitioners from ERM, appointed to conduct the EIA and obtain environmental authorization for the solar facility, and was approved under condition 11 of EA:12/12/20/1903/1. The details of the EAP team, at the time of compiling the draft EMPr, include:

Mr. Stuart Heather-Clarke, the Partner-in-Charge, is a certified EAP, with an MPhil Environmental Science, B.Sc. Civil Engineering, and 15 years' experience conducting EIAs in South Africa and various African countries.

Clair Alborough had over 3 years' experience in EIA consulting in South Africa and other African countries, with an MPhil (Environmental Law) and B.Sc (Hons). Clair was a member of IAIAAsa.

Dean Alborough had over 3 years' experience in EIA consulting in South Africa and other African countries, with an M.Sc. (Environmental Science) and B.Sc. (Hons) Environmental Management.

Mr Barry Wiesner had over nine years' experience in environmental consulting, with an MPhil (Environmental Management), BTh. and BA HDE (Sec). Barry is a Green Star SA accredited professional and a member of IAIAAsa.

Mr Ross Holland had over eight years' experience in environmental consulting, an M.Sc. (Environmental Science) and B.Sc. (Hons). Ross was a Green Star SA accredited professional and a member of IAIAAsa.

## 2.0 PROJECT DESCRIPTION

---

### 2.1 INTRODUCTION

This Chapter provides a summary of the Lesedi Solar Power Project. The detailed project description and impacts of each component, as well as the need and desirability for the project was detailed in the 2011 EIR, which also describes the need and desirability for the project, as well as impacts associated with each environmental aspect and project component. Refer to Appendix B for a General Layout Plan for the facility.

The solar power facility is expected to have an operational lifespan of around 25 years. Regular maintenance is required to keep the PV cells in optimal working order. Operational activities include maintaining electrical components, cleaning of the solar panels, vegetation control and general repair activities. Minor construction activities, like refurbishment of Inverter Buildings, may be required during the operational phase.

The PV facility operates in conjunction with some farming activities; such as grazing of small livestock (e.g., sheep).

Once the facility has reached the end of its operational life, the solar panels could be refurbished or replaced, to continue operating as a power generating facility, or the facility could be closed and decommissioned. If decommissioned, all the components of the solar power farm would be removed, and the site would be rehabilitated. The concrete foundations of the PV array would be removed to below ground level and would be covered with topsoil and be replanted and allowed to return to agricultural land use (cultivation and grazing). Some access roads may also be removed and rehabilitated, should they not be required by the landowner.

### 2.2 SITE LOCATION

The Lesedi Solar Power Facility is located near the settlement of Groenwater in the Northern Cape Province. The site is located on of the Remainder of Farm (Farm 469), approximately 4 km southeast of Groenwater and 30 km east of Postmasburg. The location and site boundary are shown in Figure 2. The study area for the greater solar infrastructure complex was approximately 2233 ha, with the infrastructure taking up around 170 ha (approximately 20 percent of Farm 469).

### 2.3 PROJECT COMPONENTS

The facility generates up to 75 MW of electricity of which up to 64 MW<sub>AC</sub> is fed into the national power grid. The key components of the Lesedi solar power farm include the following, which are discussed in more detail below:

- PV arrays;

- Electrical connections;
- Substation, capacitor banks and grid connection;
- Access roads and site access; and
- Additional infrastructure.

### 2.3.1 PV ARRAYS

The PV solar panels occupy an area of around 150ha (1.5 km<sup>2</sup>) of the site in total. The solar field is divided in two, as the D3381 gravel road and a railway line bisect the facility. The panels are installed in rows (called PV arrays), extending across the site. Individual PV panels are 2m<sup>2</sup> in size, arranged in modules of up to 15m<sup>2</sup>, in PV arrays of up to 1.5km in length across the Lesedi North solar field and up to 1km in length across Lesedi South, made up of approximately 100m sections. The panels are mounted on metal frames with a maximum height of approximately 3m above the ground, supported by a combination of friction and end bearing pile foundations, and face north in order to capture the maximum sunlight. The facility is a fixed-tilt PV plant where the solar panels are stationary. Plate 1 shows a typical array of PV panels.



**Plate 1 Illustration of PV Arrays at Lesedi north solar field**

### 2.3.2 ELECTRICAL CONNECTIONS

Each row of PV panels is connected via an internal underground electrical collection system, to an Inverter Building, to convert the direct current (DC) output to alternating current (AC). The inverters are connected to a number of step-up transformers, which convert the low voltage AC to a medium voltage (22 kV) internal collection system. The medium voltage collection system is comprised primarily of underground cables, while the solar field to the north is connected to the substation via a 22kV overhead transmission line with a total length of 492.56 meters.



### 2.3.3 CAPACITOR BANKS, SUBSTATION AND GRID CONNECTION

A substation, transformer bays and associated switching facilities were built to facilitate connection of the solar facility to the national transmission and distribution grid network. The high voltage side of the substation is maintained and owned by Eskom. The substation is located close to Eskom's existing 132 kV overhead transmission line, situated to the south-west of the site. The substation and capacitor banks cover an area of up to **5 970m<sup>2</sup>** and includes external 132kV transformers, electrical switchgear and capacitor banks which are fenced for security and safety. The substation is shown in Plate 2 below. The capacitor banks, installed to satisfy the National Energy Regulator of South Africa (NERSA) regulations and the national Grid Code put in place in 2014, have a footprint of approximately **900m<sup>2</sup>**.



**Plate 2 Lesedi Substation and Capacitor banks (during construction)**

### 2.3.4 ACCESS ROADS AND SITE ACCESS

The site is accessed via the D3381 gravel road, from the R385 tarred road. Within the site area new gravel roads were developed to facilitate movement of construction and maintenance vehicles. Access tracks are adjacent to each PV array, and all components of the development are joined by gravel access roads up to 6 m wide with drainage trenches adjacent to the road. The Lesedi solar facility is bisected by an existing railway and the D3381 district road to Lime Acres. The access road to the northern solar field crosses the railway line.

### 2.3.5 ADDITIONAL INFRASTRUCTURE

Additional infrastructure that forms part of the facility includes:

- An office building with control room, the operations and maintenance warehouse building with security and ablution facilities;
- Water treatment plant, to demineralize water for washing solar panels;
- Wastewater treatment plant (sewage system);
- An outdoor store for spare parts and reclaimed metals;

- Three autonomous weather stations and five reduced weather stations, used to collect data on the solar resource at the site, as well as two soiling panels to facilitate research on the efficacy of panel cleaning regimes; and
- Site fencing with security checkpoint at the main gate.

Water sourced from Sedibeng is used for the ablution facilities and for periodic cleaning of the solar panels and filters during operations.

## 3.0 IMPLEMENTATION OF THE OEMP

### 3.1 INTRODUCTION

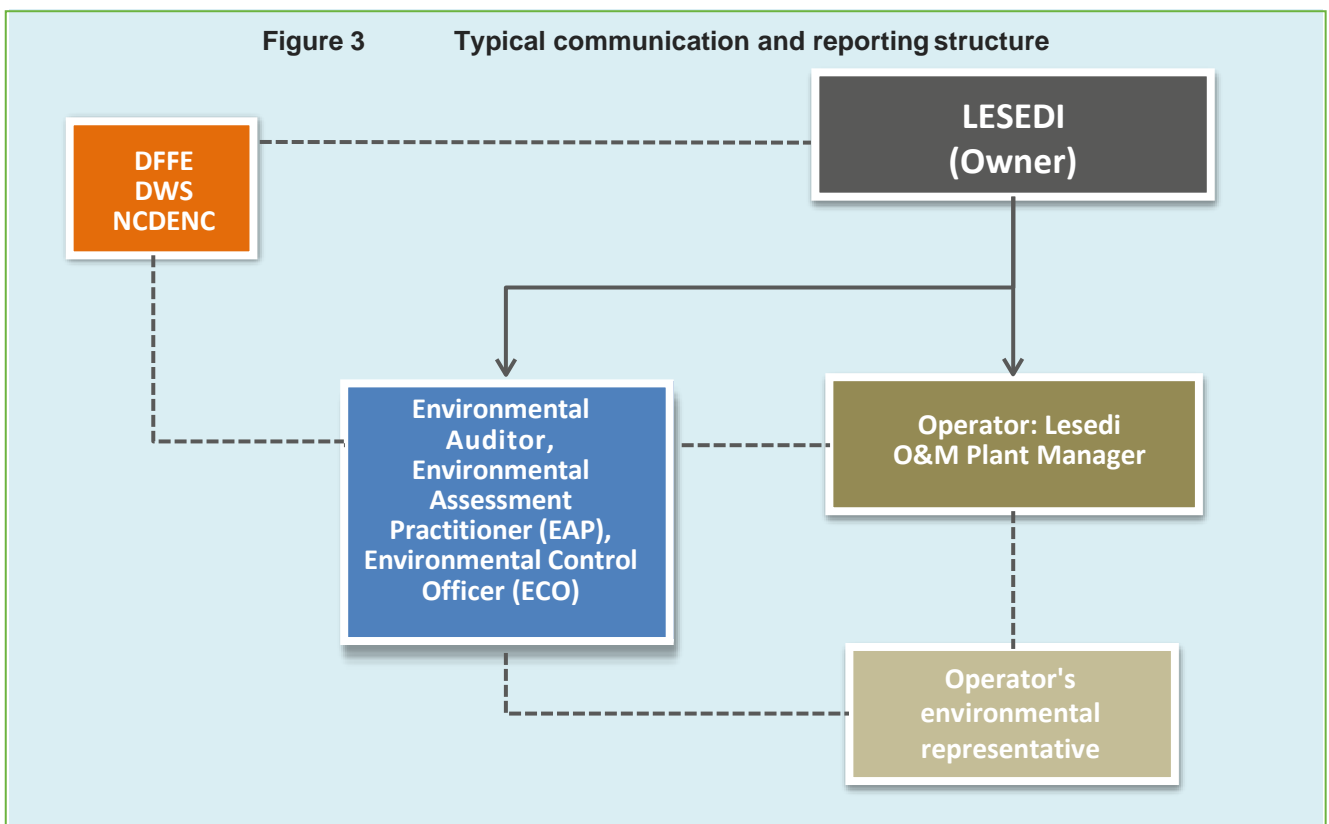
To ensure that impacts to the environment are minimised during the lifecycle of this project, the OEMP describes actions, mitigation measures, identifies specific people or organisations to undertake defined tasks, and is applicable to all works comprising the operation of the Lesedi Solar Farm Facility, and any future associated construction activities which may be needed. It is a dynamic document implying that operational changes could require revision of the OEMP.

This OEMP gives direction and guidance to all responsible parties. The responsible parties are expected to co-operate closely to minimise environmental impacts during the operational phase.

### 3.2 ROLES AND RESPONSIBILITIES

The key role-players during the operational phase of the facility, for the purposes of environmental management on site, include but are not limited to: The Owner (Lesedi Power Project), the Owner's Site Engineer, the Operator (direct appointments including specialist maintenance contractor, civil works contractor, building contractor, landscape contractor etc.) the independent Environmental Auditor, Environmental Assessment Practitioner (EAP), and/or Environmental Control Officer (ECO), and the competent authorities (DFFE, DWS Kimberly Regional Office, Northern Cape DENC). Lesedi O&M is the appointed Operator).

Details of the responsibilities of each of the key role-players have been provided in sections 3.2.1 to 3.2.3. Lines of communication and reporting between the various parties are illustrated in **Figure 3** below.



### 3.2.1 THE OWNER

For the purpose of this document “the Owner” refers to the holder of the environmental authorization, i.e. to whom permission has been granted to proceed with the Lesedi Solar Power Facility, and who is thus ultimately responsible for compliance with all conditions of approval of the facility or any aspect thereof, required by any authority. The owner of the facility is Oakleaf Investment Holdings 79 (Pty) Ltd (t/a the Lesedi Power Company (Pty) Ltd).

The Owner’s Community Liaison Officer (CLO) engages with stakeholders on an on-going basis, while the Owner’s Site Engineer refers to the appointed/delegated by the Owner, to be responsible for the technical and contractual implementation of the works to be undertaken, and for ensuring compliance with the EA, OEMP and Water Use GAs in place.

With respect to any future construction activities, the Owner is to:

- Ensure compliance with the EA conditions. This includes any person acting on the authorization holder’s behalf including but not limited to, an agent, servant, contractor, subcontractor, employee, consultants or person rendering a service to the holder of the EA see condition 3 of EA:12/12/20/1903/1;
- Ensure that the proposed activities do not trigger any listed activities in terms of the 2014 EIA Regulations (GN.N. 983 – 985), as amended; or water uses in terms of the National Water Act (Act No. 36 of 1998);
- Notify DFFE and obtain prior written approval for any changes to, or deviations from the project description, set out in the authorization (see condition 5 of EA:12/12/20/1903/1);
- Notify DFFE of any alienation, transfer and change of ownership rights in the property on which the activity takes place (see condition 8 of EA:12/12/20/1903/1);
- Ensure that all relevant approvals and permits have been obtained prior to the start of construction activities on site;
- Review and approve construction Method Statements from contractors;
- Order the removal of person(s) and/or equipment not complying with the specifications;
- Appoint (if required) a suitably qualified or experienced environmental control officer prior to the start of construction activities on site, and for the duration of the construction phase; and
- Budget for the implementation of the OEMP by allocating the requisite funds to facilitate compliance

With respect to the operational phase of the facility, the Owner is to:

- Ensure that the operation of Lesedi Solar Power Facility is undertaken in line with the requirements and conditions of the EA, WUL and OEMP and any other authorizations, licenses or permits in place;
- Oversee the Operator’s environmental monitoring and reporting obligations and review amendments to the environmental management system documentation;
- Ensure periodic environmental performance audits are undertaken; and
- Continuously seek to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation.

### 3.2.2 THE OPERATOR

For the purposes of this document “The Operator” refers to the party directly appointed (by the Owner) to oversee day-to-day operational activities at the solar facility.

The Operator is to:

- Ensure implementation of all applicable Environmental Specifications (see section 4), including all additional requirements related with approved Method Statements, failing which non-conformances may be raised by the Site Engineer;
- Ensure that all sub-contractors', employees, suppliers, agents etc. are fully aware of the environmental requirements detailed in the OEMP's Environmental Specifications;
- Liaise closely with the Site Engineer and ensure that the works on site are conducted in an environmentally sensitive manner;
- Inform the Site Engineer should environmental issues arise on site, e.g. dumping, spills, pollution, littering and damage to vegetation; and
- Carry out instructions issued by the Engineer, or on request of the ECO, EAP or Environmental Auditor, required to fulfil compliance obligations with the OEMP and authorizations in place.

The Operator's environmental representative must be appointed by the Operator to advise the Operator on environmental matters and is to ensure the requirements and obligations of the EMP, EAs and WULs are met.

### 3.2.3 EXTERNAL ENVIRONMENTAL SERVICES

During the construction phase of the project, the **Environmental Control Officer** played an active role, as was prescribed by the EA. Should any additional construction activities be undertaken, an independent construction ECO will be engaged to conduct monitoring and provide monitoring reports. Prior to undertaking any additional construction on site, it must first be determined whether the activity will trigger a listed activity, requiring further authorization.

During the operational phase, an independent **Environmental Auditor** is appointed to conduct the annual EA and WUL compliance audits. An independent **Environmental Assessment Practitioner** is appointed to periodically review the OEMP updates and to provide environmental services, as required under the 2014 EIA Regulations (as amended).

## 3.3 COMMUNICATION STRUCTURES ON SITE

The Owner receives a written Monthly Report from the Operator which is discussed during a joint monthly meeting between the operational teams on site and senior management for both parties. Quarterly reports are provided to Lesedi's Board of Directors, and ESG (environmental, safety and governance) progress is shared with the funders on a quarterly basis.

### 3.3.1 ENVIRONMENTAL AWARENESS

All staff entering the site must undergo induction training, be it visitors or workers induction. The induction will be required for first time visitors or employees and annually thereafter. This presentation will take cognizance of the level of education, designation and language preferences of the staff. The training will include general environmental "do's and don'ts" and how they relate to visitor/employee/contractor. The awareness training covers health, safety and environmental risks, and the avoidance of pollution and environmental degradation.

### 3.3.2 METHOD STATEMENTS

When called upon (required by the Site Engineer), the Operator and/or Contractor shall provide Method Statements (management plans, standard operating procedures or work instructions) for project components/activities deemed or identified to be of greater risk to the environment and/or which may not be covered in sufficient detail in the OEMP. The Method Statement must be submitted to and approved by the Engineer, prior to any work commencing on-site. The Lesedi O&M operational management plans include

Method Statements for activities like waste management, vegetation control, erosion and stormwater control and incident management. These are revised and updated during the annual review of the documents.

Note that a Method Statement is a 'starting point' for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment.

Changes to, and adaptations of Method Statements can be implemented with the prior consent of all parties.

A Method Statement describes the scope of the intended work in a step-by-step description in order for the Engineer to understand the intentions in order to assist in devising any mitigation measures, which would minimize the environmental impact during these tasks.

For each instance where it is requested that the Operator / Contractor submit a Method Statement to the satisfaction of the Engineer, the format should clearly indicate the following:

- What - a brief description of the work to be undertaken;
- How - a detailed description of the process of work, methods and materials;
- Where - a description/sketch map of the locality of work (if applicable); and
- When - the sequencing of actions with due commencement dates and completion date estimates.
- Who – The person responsible for undertaking the works described in the Method Statement;
- Why – a description of why the activity is required.

All Method Statements are to be to the satisfaction of the Site Engineer.

### 3.3.3 LEGISLATIVE FRAMEWORK

Obligations imposed by the OEMP are legally binding in terms of environmental statutory legislation (i.e. the Environmental Authorization, granted in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998); the Water Use General Authorization Registration Certificate granted under the National Water Act, 1998 (Act No. 36 of 1998); and any other permit or license awarded to Lesedi.

The requirements of this OEMP do not release the Owner from the requirements of any legislation that may be applicable to the project, such as:

- National Environmental Management Act, 1998 (Act No. 107 of 1998);
- National Environmental Waste Management Act, 2008 (Act No. 59 of 2008);
- National Environmental Biodiversity Act, 2004 (Act No. 10 of 2004);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Fertilizers, Farm Feeds, Agricultural Remedies and Stock Act, 1947 (Act No. 36 of 1947);
- **National Forest Act, 1998 (Act No. 84 of 1998);**
- National Heritage Resources Act, 1999 (Act No.25 of 1999);
- National Water Act, 1996 (Act No.36 of 1998);
- Occupational Health and Safety Act, 1993 (Act No.385 of 1993);
- Hazardous Substances Act, 1977 (Act No.63 of 1977);
- National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998); and
- Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009).

### 3.3.4 COMMUNITY RELATIONS

Lesedi's Community Liaison Officer (CLO) continues to engage with stakeholders throughout project operation. Communication with local communities and other local stakeholders are a key part of this engagement process and Lesedi and the Operator work closely together to achieve this.

The objectives of communication and liaison with local communities are the following.

- To consult with residents in the vicinity of the facility and other interested stakeholders, whenever new construction activities are being planned and any implications it may have on them.
- To manage any disputes between Lesedi, the Operators and local people.
- To support economic development of the surrounding area, through local enterprise development, and supporting social upliftment programmes and community projects.

### ***Grievance Procedure***

Lesedi and the Operator maintain a mechanism (documented in the Grievance Procedure and Stakeholder Engagement Plan) to ensure fair and prompt resolution of problems arising from the project. The grievance procedure is underpinned by the following principles and commitments:

- Implement a transparent grievance procedure and disseminate key information to directly impacted stakeholders;
- Seek to resolve all grievances timeously; and
- Maintain a complaints register and full written records of each grievance case and the associated process of resolution and outcome for transparent, external reporting.

The responsibility for resolution of grievances lie with Lesedi and its Operator, as documented in the Grievance Procedure and the Stakeholder Engagement Plan.

## 4.0 OPERATIONAL ENVIRONMENTAL SPECIFICATION

### 4.1 SCOPE

The OEMP required under condition 23 of EA:12/12/20/1903/1 and has been compiled to satisfy the requirements specified NEMA s.24N and in Appendix 4 of the 2014 EIA Regulations (as amended), as shown in the table below. The OEMP covers the operational phase of the solar facility and also provides environmental specifications for any *ad. hoc.* construction activities which may take place before closure and decommissioning of the facility.

Table 1 EMPr Content

NEMA 24N.	2014 EIA Regs Appendix 4	Location in this OEMP
(2)(b) details and expertise of the EAP who prepared the EMPr, including a curriculum vitae.	1(a) details and expertise of the EAP who prepared the EMPr, including a curriculum vitae	Section 1.5 and Appendix A.
2(c) a detailed description of the aspects of the activity that are covered by the environmental management programme;	1(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description	Section 4.5
	1(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;	Figure 1 in Section 1.3  Appendix B. General Layout
2(a) information on proposed management, mitigation, protection or remedial measures to address environmental impacts identified in the impact assessment report, including environmental impacts or objectives in respect of—  (i) planning and design;  (ii) pre-construction and construction activities;	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;	Impact management outcomes, and avoidance of impacts (for the operational phase) are stated for each environmental aspects (see Sections 4.5.1 to 4.5.14).  Section 5 for <i>ad.hoc</i> construction activities performed during the operational phase.



<p>(iii) the operation or undertaking of the activity in question;</p> <p>(iv) the rehabilitation of the environment; and</p> <p>(v) closure, if applicable;</p>	<p>(ii) pre-construction activities;</p> <p>(iii) construction activities;</p> <p>(iv) rehabilitation of the environment after construction and where applicable post closure; and</p> <p>(v) where relevant, operation activities;</p>	
<p>2(g) a description of the manner in which it intends to—</p> <p>(i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</p> <p>(ii) remedy the cause of pollution or degradation and migration of pollutants; and</p> <p>(iii) comply with any prescribed environmental management standards or practices.</p> <p>2(f) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and</p>	<p>1(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to —</p> <p>(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</p> <p>(ii) comply with any prescribed environmental management standards or practices;</p> <p>(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and</p> <p>(iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;</p>	<p>Impact management actions (mitigation measures) are proposed in column 1 in the tables for each environmental aspects (see Sections 4.5.1 to 4.5.14).</p>
<p>2(e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;</p>	<p>(1g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p>	<p>Monitoring methods and responsible person(s) shown in column 5 in the tables for each environmental aspects (see Sections 4.5.1 to 4.5.14).</p>

<p>2(e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;</p>	<p>1(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p>	<p>Monitoring frequencies shown in column 5 in the tables for each environmental aspects (see Sections 4.5.1 to 4.5.14).</p>
<p>2(d) information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);</p>	<p>1(i) an indication of the persons who will be responsible for the implementation of the impact management actions;</p>	<p>Person(s) responsible for implementation shown in column 2 in the tables for each environmental aspects (see Sections 4.5.1 to 4.5.14).</p>
<p>3(a) set out time periods within which the measures contemplated in the environmental management programme must be implemented;</p>	<p>1(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</p>	<p>Timeframes for implementation in column 3 in the tables for each environmental aspects (see Sections 4.5.1 to 4.5.14).</p>
<p>2(e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;</p>	<p>1(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</p>	<p>Internal and External compliance monitoring shown in column 5 in the tables for each environmental aspects (see Sections 4.5.1 to 4.5.14).  Section 4.5.14 - External audits and OEMP review.</p>
<p>2(e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;</p>	<p>1(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</p>	<p>Section 4.5.14 - External audits and OEMP review.</p>
<p>3(c) develop 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; and  (ii) risks must be dealt with in order to avoid pollution or the</p>	<p>1(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; and</p>	<p>Section 3.3.1</p>

degradation of the environment.	(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
	1(n) any specific information that may be required by the competent authority.	Specific requirement to include mitigation measures proposed in 2011 Environmental Impact Report integrated into EMP, integrated into Impact management actions (mitigation measures) for each environmental aspects (see Sections 4.5.1 to 4.5.14).

The Environmental Specification (in section 4.5) cover the requirements for avoiding, minimizing, controlling or remedying impacts to the environment caused by operational activities. The mitigation measures proposed also specify the party responsible for implementing the impact management actions, time periods for implementation, means of verification (evidence) and the monitoring (oversight) frequency. A description of the impact management outcomes and the impacts and risks to be avoided, managed and mitigated are presented for each environmental aspect, as identified through the environmental impact assessment process.

## 4.2 AIM AND PURPOSE

This OEMP aims to provide Lesedi with the necessary tools to prevent or minimize potential impacts on the environment during the operation of the facility. The OEMP aims to safeguard the environment and to ensure that the facility is maintained and operated in an environmentally sensitive and sustainable manner, and that the operation of the facility does not cause environmental impacts which could have been reasonably avoided. Moreover, it aims to ensure that the infrastructure is operated and maintained according to Best Practice Not Exceeding Excessive Cost.

The OEMP is a working document that may be amended to enhance its effectiveness for environmental control. Therefore, not all specifications and details are prescribed here but should be discussed and documented in specific method statements, and the best possible practicable application made by the responsible parties.

## 4.3 APPLICATION

This OEMP is applicable to all role players at Lesedi during the operational phase, as outlined in section 3.2.

## 4.4 FINANCING FOR ENVIRONMENTAL MANAGEMENT

The budget for the implementation of the OEMP is allocated from Lesedi’s operational budget. Lesedi must review the OEMP and allocate the requisite funds to facilitate compliance. Since many of the items addressed in the OEMP relate to required preventative maintenance, operator legal compliance, and responsible environmental

management, this cost should not represent significant additional expenditure.

## **4.5 ENVIRONMENTAL SPECIFICATIONS FOR OPERATIONAL ACTIVITIES**

This section specifies environmental management actions (mitigation measures) needed to mitigate, avoid or remedy impacts that have been, or may be, caused by activities associated with operating the solar facility. The impact management outcome and impacts to be avoided for each environmental aspect are also presented. These mitigation measures are integrated into the operational management system at Lesedi.

The management requirements, who is responsible for undertaking actions, time frames, evidence of compliance, as well as requirements for Owner's oversight (monitoring), are laid out below.

#### 4.5.1 DANGEROUS GOODS HANDLING AND STORAGE

**Impact Management Outcomes:** safe storage, handling, use and disposal of hazardous substances and dangerous goods, are done in accordance with the Hazardous Substance Act, 1973 (Act No. 15 of 1973), the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), and Safety Data Sheet specifications.

**Impact avoidance:** health impacts from using hazardous chemical agents, and contamination of soil, surface- and groundwater pollution and impacts to vegetation from fuel, oil or chemical spills are avoided.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Safe storage of hazardous substance</b></p> <p>(i) Store fuel, chemicals and other dangerous goods under lock, in labelled containers and only in designated and suitably constructed areas; with appropriate secondary containment (bunding to contain 110% of the total volume stored, and kept clean, free of debris, waste and equipment and with an overhead cover to prevent rain water from entering the banded areas);</p> <p>(ii) Equipment containing hazardous substances (e.g. petrol brush-cutters and dispensing equipment) to be kept over/within drip-trays. Proper dispensing equipment shall be used, and the dispensing mechanism of the fuel storage tank shall be stored in a waterproof container when not in use;</p> <p>(iii) Safety Data Sheets for each substance, to be clear, legible, and available at point of storage, point of use and on central filing system.</p>	Operator	<p>On-going: pre-task risk assessment</p> <p>Operator's weekly/monthly inspections.</p>	<p>Procedures, risk assessments, inspection sheets, photographs</p> <p>Safety Data Sheets, labelled containers, locked store, bunding</p> <p>Chemicals Register</p> <p>Training Records</p> <p>Audit Reports</p>	<p>Engineer's walkabout and quarterly audits</p> <p>ECO annual audits</p>
<p><b>B. Safe handling of hazardous substances</b></p> <p>(i) The use of hazardous substances to be minimized and non-hazardous and non-toxic alternatives substituted where possible;</p> <p>(ii) Vehicles and equipment are serviced regularly and provided with drip trays, if required;</p>	Operator	<p>On-going: pre-task risk assessment</p> <p>Operator's weekly/monthly inspections.</p>	<p>Procedures, risk assessments, inspection sheets, photographs</p> <p>Safety Data Sheets, drip trays</p> <p>Training Records</p>	<p>Engineer's walkabout and quarterly audits</p> <p>ECO annual audits</p>

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>(iii) No re-fuelling of vehicles or machinery is to take place outside of demarcated areas. Use proper dispensing equipment, with drip-tray in place, when re-fuelling vehicles or machinery. Place all hazardous substances and equipment containing hazardous substances (e.g. petrol brush-cutters) in drip trays;</p> <p>(iv) Paint products, chemical additives and cleaners such as thinners and turpentine, are classified as hazardous materials and may not be disposed of as general waste. Wash facilities for paint brushes, roller etc. shall be established to the satisfaction of the Engineer, and contaminated water disposed to licensed facilities and not discharged on-site;</p> <p>(v) Employees handling hazardous substances / materials must be trained and be aware of the potential impacts, follow appropriate safety measures, wear appropriate PPE, and use in accordance with instructions contained in material Safety Data Sheets.</p>			Audit Reports	
<p><b>C. Management of hazardous substance spills</b></p> <p>(i) All employees working with HCS must be trained in the safe use, storage and disposal of the substance, in according with safety data sheets. Training on the use of spill kits, fire-fighting equipment and emergency situations must be provided. Employees are to be aware of the procedure to be followed for reporting and dealing with spills and leaks, which shall include notifying the Engineer;</p> <p>(ii) In the event of a hydrocarbon or chemical spill, if safe to do so: isolate and contain the source of the spillage, prevent further spread of spill, demarcating the area as needed. Spill should be appropriately contained and disposed of as hazardous waste (see section 4.5.2);</p> <p>(iii) Inform the Plant Manager and Engineer immediately and notify the</p>	Operator Engineer	Immediately following spillage	Procedures, risk assessments, inspection sheets Photographs Records of notifying authorities (e.g. emails), Clean-up and safe disposal records, Incident report	Engineer's walkabout and quarterly audits ECO annual audits Authorities' Inspection Reports

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>relevant authorities, as required (i.e. DWS to be notified within 24 hours of an incident impacting a water resource and the Environmental Department (DFFE) within 48 hours);</p> <p>(iv) Have the necessary spill containment, clean up kits, materials and equipment for dealing with spills and leaks available at all times and wear the appropriate PPE for dealing with emergency situations;</p> <p>(v) Clean-up and remediation of the area, as directed by the authorities or the Site Engineer). Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the Site Engineer,</p> <p>(vi) Investigate and report the incident to the Site Engineer and all relevant authorities.</p>				
<p><b>D. Safe disposal of hazardous substances and contaminated waste</b></p> <p>(i) Expired or contaminated HCS and their packaging are classified as hazardous waste, and must be dealt with as described under section 4.5.2;</p> <p>(ii) Remove and place all contaminated material (soil, vegetation, PPE and rags, used spill-absorbent, etc.) in sealed, clearly marked containers, store in demarcated areas, and banded as required;</p> <p>(iii) Dispose hazardous waste to registered facilities (refer to 4.5.2. Waste Management).</p>	Operator	<p>On-going, as required</p> <p>Operator's weekly/monthly inspections</p>	<p>Procedures, inspection sheets, photographs</p> <p>Safe disposal records</p> <p>Monthly reporting</p>	<p>Engineer's walkabout and quarterly audits</p> <p>ECO annual audits</p>

## 4.5.2 LITTER, WASTE & EFFLUENT MANAGEMENT

**Impact Management Outcome:** the facility is kept clean, free of litter, and all waste is sorted at source, appropriately stored, handled and safely disposed at licensed reclamation/disposal facilities, in accordance with the National Environmental Management Waste Management Act, 2008 (Act No. 59 of 2008) and its supporting regulations. The waste management hierarchy is applied (i.e., reduce, reuse, recycle, recover and disposal as a final option), to ensure valuable resources are not discarded or wasted and recycling/recovery can also create employment opportunities.

**Impact avoidance:** health impacts from exposure to hazardous waste and other consequential effects (like vapours, odours, leachate, vermin or scavengers) are avoided and the contamination of soil, surface- and groundwater resources from litter and waste does not occur.

Note 1: The 2013 National Norms and Standards (NN&S) for Waste Storage are applicable to waste storage facilities with a capacity to store more than 80m<sup>3</sup> of hazardous waste or more than 100m<sup>3</sup> of general waste, without the need to apply for a Waste Management License. Therefore,

- The temporary storage of waste PV modules inside the warehouse must conform to the requirements of the 2013 NN&S; but
- The septic tank is a 5-chambered, prefabricated polyethylene cylindrical tank, with a throughput capacity of less than 34.2m<sup>3</sup> (i.e tank diameter of 2,270mm and length of 8,470mm – see Drawing No. SP1-CGC-AR-DRW-0013-03-D1), so does not fall under the ambit of the 2013 NN&SWS. The discharge capacity of the pumping chamber is less than 6.8m<sup>3</sup>; and
- General waste and recyclables are stored in wheelie bins with a capacity of 2.1m<sup>3</sup> each, so would only trigger the requirements of the 2013 NN&SWS if more than 47 wheelie bins of waste are stored at any given time.

Note 2: Generators of hazardous waste, who generate in excess of 20kg per day (calculated monthly as a daily average) must register with the South African Waste Information System (SAWIS) in terms of Regulation 5, and obtain a SAWIS Registration Certificate (see Annexure 1 of the 2012 National Waste Information Regulations).

Given that 1 PV modules weighs 28.5kg, it would mean that if more than 21 waste PV modules (i.e. more than 600kg) are generated in a month, Lesedi must register on SAWIS as a hazardous waste generator.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<b>A. Effective Waste Management</b> (i) Establish and maintain a waste management plan and procedures to address litter and waste management on-site; which includes waste reduction, recycling, and disposal of general- and hazardous waste (both liquid and solid forms). The waste management plan is to be updated annually to ensure appropriateness and effectiveness.	Operator	Annual review	Plans and procedures.	Engineer's annual review, and  Owner's acceptance



Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>B. Effective Sorting and Storage of Recyclable Materials</b></p> <p>(i) Separation of recyclable materials in separate containers for paper, glass, plastics, metals &amp; e-waste.</p> <p>(ii) Provide suitable, properly labelled and sufficient recycling storage containers, with weather-proof labelling; storage containers to be weather-proof to prevent dispersion through wind or rain.</p> <p>(iii) Recyclable metal is stored in the out-door storage area, which is fenced off to prevent further spread of parts and equipment.</p> <p>(iv) Keep recycling storage areas in a clean and hygienic condition to prevent odours, spreading of litter, vermin and scavengers.</p> <p>(v) Recycled waste is removed to registered facilities, before storage containers reach capacity (i.e., before they are full). Waste transporters contracted to remove recycling must be registered with the authorities, as required.</p> <p>(vi) Develop and maintain a site-specific waste manifest with records of disposed recyclables;</p> <p>(vii) Safe disposal records are stored, and monthly amalgamated record(s) maintained of all waste streams;</p> <p>(viii) Staff are trained on proper recycling.</p>	<p>Operator</p> <p>All staff</p> <p>Recycling companies / Waste Contractors</p>	<p>On-going</p> <p>Operator's weekly/monthly inspections</p> <p>Disposal before storage containers reach capacity</p>	<p>Property labelled, weather proof containers for separated recyclables</p> <p>inspection sheets, photographs,</p> <p>Waste Transporter Registration certificates,</p> <p>Disposal Facility's waste management license</p> <p>Safe disposal records,</p> <p>Training Records,</p> <p>Monthly Reports,</p> <p>Audit Reports</p>	<p>Engineer's walkabout and quarterly audits</p> <p>ECO annual audits</p>
<p><b>C. Effective handling and disposal of general waste</b></p> <p>(i) The site is to be kept clean and free of litter and waste.</p> <p>(ii) Collect and store general waste at a central depot (protected from wind and rain).</p> <p>(iii) Provide suitable and sufficient waste storage containers with weatherproof labelling. Waste storage containers must be weather proof. If there is a risk of soil or water contamination, waste storage</p>	<p>Operator</p> <p>All staff</p> <p>Recycling companies / Waste Contractors</p>	<p>On-going</p> <p>Operator's weekly/monthly inspections</p> <p>Weekly disposal (or as needed)</p> <p>Monthly</p>	<p>Labelled, weather proof containers</p> <p>Inspection sheets, photographs,</p> <p>Waste Transporter Registration certificates,</p> <p>Disposal Facility's waste management license</p>	<p>Engineer's walkabout and quarterly audits</p> <p>ECO annual audits</p>

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>area must be under roof and bunded, to prevent dispersal of waste and leachate through rain or wind.</p> <p>(iv) Vegetative (biodegradable) material to be kept separate from general waste stream and may be used on site as mulch, to enhance rehabilitation of disturbed areas, unless there is a risk of damage to solar infrastructure. Biodegradable waste to be diverted from landfill to an appropriate licensed/approved facility;</p> <p>(v) Remove general waste on a weekly basis to a licensed facility, ensuring no waste or litter spills or is blown from the vehicle. Waste transporters contracted to remove waste must be registered with the authorities, as required.</p> <p>(vi) Keep waste storage areas in a clean and hygienic condition to prevent odours, spreading of litter, vermin and scavengers.</p> <p>(vii) Develop and maintain a site-specific waste manifest with records of disposed waste.</p>		reporting	Safe disposal records, Monthly Reports; Training Records, Audit Reports	
<p><b>D. Effective handling and disposal of liquid waste (effluent and sludge)</b></p> <p>(i) All dirty water (from kitchen and ablution facilities and wash-water) is diverted to the on-site sewage system, where effluent is stored in underground tanks. No dirty water is allowed to be discarded to the environment.</p> <p>(ii) The disposal of sewage effluent and sludge shall be done as sanctioned by the authorities and Site Engineer. Effluent and sludge removed off-site must be done by a registered sanitary contractor (a licensed service provider), and disposed at a facility licensed to receive this waste stream, and</p> <p>(iii) Safe disposal records are to be maintained along with amalgamated records of disposed waste.</p>	Operator's representative Waste Contractor	On-going Operator's weekly/monthly inspections Disposal as required	Sufficient, property labelled facilities and safely fenced WWTP; inspection sheets, photographs, Waste Transporter Registration certificates, Disposal Facility's waste management license Safe disposal records, Training Records, Audit Reports	Engineer's walkabout and quarterly audits ECO annual audits

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>E. Effective handling and disposal of hazardous waste</b></p> <p>(i) Identify all hazardous waste streams (e.g. PV modules, Ci-Cd batteries, materials contaminated with hydrocarbons, herbicide packaging, used resin from WTP, etc.);</p> <p>(ii) All hazardous waste (including contaminated soils and PPE), to be stored separately, in appropriate clearly labelled containers, in a bunded area, to prevent pollution and contamination of soil and water resources. Any used oil or expired chemicals must be stored in impervious containers, within a bunded area.</p> <p>(iii) A maximum of 300 waste PV modules may be stored (in their original packaging) inside the warehouse, before disposal to a licensed facility. The 2013 National Norms and Standards for Waste Storage are applicable for the temporary storage of more than 80m<sup>3</sup> of hazardous waste;</p> <p>(iv) Spent (used) resin from the WTP, to be stored in original packaging (plastic buckets); and clearly marked 'hazardous waste – resin', indicating the volume of waste resin, the waste category/type, the date on which waste was first placed into the container and the date when the bucket was filled and sealed;</p> <p>(v) Adhere to any health and safety requirements for the storage, transport and disposal of hazardous waste. A registered contractor must be appointed to remove and dispose hazardous waste to a licensed hazardous waste facility.</p>	<p>Operator</p> <p>Waste Contractor</p>	<p>On-going</p> <p>Operator's weekly/monthly inspections</p> <p>Disposal as required</p>	<p>Sufficient, property labelled, weather proof containers</p> <p>Weekly inspection sheets of hazardous waste storage (PV modules and septic tank), photographs,</p> <p>Monthly report of the number of broken/low producing PV modules stored in the warehouse, and volumes of effluent discharged,</p> <p>Waste Transporter Registration certificate</p> <p>Disposal Facility's waste management license,</p> <p>Safe disposal records,</p> <p>Training Records,</p> <p>Audit Reports</p>	<p>Engineer's walkabout and quarterly audits</p> <p>ECO annual environmental audits, and biennial waste audit reports</p>

### 4.5.3 WATER RESOURCES

**Impact Management Outcome:** water resources are used conservatively and in compliance with the National Water Act, 1998 (Act No. 36 of 1998), Water Use Licenses (WUL) and/or General Authorizations (GA) in place.

**Impact avoidance:** the integrity of the nature, characteristics, and flow dynamics of natural watercourses are maintained. Impacts to ground and surface water avoided, by minimizing water consumption, preventing soil compaction, reducing sediment load in rain-water run-off, and by preventing leaks and spills from entering watercourses.

**Water-use – in-stream development:** the GA Notice 509 of 2016 replaces the need for a water use license for NWA S.21(c) and 21(i) in-stream development activities, if the water use is within the stipulated limits of the notice (i.e. where the risk class in the Risk Matrix is determined as Low Risk).

NWA S.21(c): for impeding/diverting the flow of a watercourse; and NWA S.21(i): for altering the bed, banks, course or changing the characteristics of a watercourse.

Lesedi was granted General Authorization (Registration Certificate No. 25065811, File No. 27/2/2/D173/18/1), by DWS on 25 February 2019, for a cement low water crossing over a watercourse, to access the substation. This was amended on 01 August 2021, to include the access road to Lesedi South, and the access road to- and overhead powerlines from Lesedi North, provided that the conditions of the GA Notice 509 of 2016 are complied with. Any additional structures across watercourses will require further GA/WUL authorization and a registration certificate. The GA for in-stream development is valid until 29 February 2036, and conditions of the GA (as presented after the table below) must be adhered to.

**Water-use – wastewater discharge:** The GA Notice 665 of 2013 replaces the need for a water use license to discharge effluent from the WWTW, under the NWA S.21(f). The GA was approved on 13 July 2021, and the Registration Certificate must still be received from DWS. Mitigation measures and management actions for wastewater discharge are included under section 4.5.6.C. Ablution facilities and sewage system.

**Control of alien invasive plant species:** List of Alien Invasive Species published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette (GG) No: 43726 of 2020) - No user shall allow Category 2 plants to occur within 30m of the 1:50 year floodline of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are prohibited from occurring within proximity to a watercourse.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<b>A. Effective management of water use resources</b> (a) No additional infrastructure is established within 100m of a watercourse, without prior authorization from the authorities;	Operator	Weekly / Monthly inspections	WUL/GA authorization(s), Plans and procedures, inspection sheets, photographs,	Engineer's walkabout, quarterly internal EA audits, annual WUL audit;

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>(b) Compliance with directives from competent authorities (DWS, DFFE) and additional monitoring programme(s) as directed by DWS in writing, are implemented.</p> <p>(c) Financial provision in place to maintain the water use, as set out in GA.N.509, and proof of budgetary provisions provide to DWS as required.</p> <p>(d) Copies of all designs, method statements, Risk Matrix or risk assessments, rehabilitation plans, and any other reports are retained and made available to the responsible authority when requested.</p> <p>(e) The monitoring programme addresses the monitoring and reporting requirement of GA Notice 665 of 2013 and GA.509 of 2016.</p> <p>(f) Quarterly internal audits assess whether rehabilitation is stable, assesses impacts on water resource quality, ensure water use remains within the GA parameters, and results are stored.</p> <p>(g) Annual independent Water Use Audits determine compliance with GA conditions and assess whether rehabilitation is stable; failing which, remedial action must be taken to rectify any impacts.</p>			<p>Audit Reports Budget allocation</p>	<p>Annual independent ECO and WUL audits External specialist</p>
<p><b>B. Awareness of instream development and impacts</b></p> <p>(a) Staff and contractors working at the authorized in-stream development sites (access roads and powerlines across watercourses) are made fully aware of the GA conditions and related management measures, prior to the carrying out of any works.</p>	Operator	On entry to site and annual refresher	Induction training and annual refresher training.	<p>Engineer's walkabout, quarterly internal EA audits, annual WUL audit; Annual independent ECO and WUL audits;</p>
<p><b>C. Construction and rehabilitation of instream development activities and watercourses (when applicable)</b></p> <p>(a) An independent SACNASP Professional is appointed to determine present day values for water resource quality before commencement</p>	Operator	<p>Weekly / Monthly inspections Ad hoc repair</p>	Plans and procedures, inspection sheets, photographs & video recordings	Engineer's walkabout, quarterly internal EA audits, annual WUL audit;

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>of water uses in terms of NWA section 21(c) or (i), and a GA/WUL authorization is in place for any additional structure(s) across watercourses, prior to construction activities taking place;</p> <p>(b) All GA requirements for construction activities within 100m of a watercourse, as listed under condition 9(3) of GA Noitce509 of 2016 (recorded below this table), are adhered to.</p>		work, as and when required	Risk Matrix Rehabilitation closure report Audit Reports	Annual independent ECO and WUL audits;  External specialist
<p><b>D. Operational control measures</b></p> <p>(a) No equipment, materials, chemicals or waste are stored within 100m of the edge of a water resource;</p> <p>(b) All works, including emergency alterations or the rectification of incidents, start upstream and proceed in a downstream direction, to ensure minimal impact on the water resource;</p> <p>(c) As the watercourses are generally dry in-stream water quality measurements are not feasible, however where aquatic life is present, measures must be implemented to –</p> <p>(i) prevent detrimental changes to breeding, nesting or feeding patterns, including for migratory species;</p> <p>(ii) allow for the free up and downstream movement of aquatic biota, including migratory species; and</p> <p>(iii) prevent a decline in the composition and diversity of the indigenous and endemic aquatic biota.</p> <p>(d) Substance or material used on-site, that can potentially cause pollution, are managed with strict controls to ensure no impacts are caused to water resources;</p> <p>(e) Maintenance inspections determine structural stability of infrastructure and hardened surfaces, and confirm areas are:</p> <p>(i) free of accumulated debris and other blockages;</p> <p>(ii) cleared of alien invasive vegetation;</p>	Operator	Weekly / Monthly inspections  Ad hoc repair work, as and when required	Plans and procedures, inspection sheets, photographs,  Audit Reports	Engineer's walkabout, quarterly internal EA audits, annual WUL audit;  Annual independent ECO and WUL audits;  External specialist

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>(iii) water courses are free-draining and stable (no signs of erosion, sedimentation or turbidity caused by site activities) and</p> <p>(iv) re-vegetated areas have indigenous vegetation, generic to the region.</p> <p>(f) Operational controls for wastewater discharge are included under section 4.5.6.C.</p> <p><b>(g) Control and management of alien invasive plant species (Category 2 and 3) along and in close proximity of watercourse.</b></p>				
<p><b>E. Water use and water conservation</b></p> <p>(i) No washing of vehicles on site, unless the designated wash area is approved by the Engineer and equipped with a suitable impermeable floor, an oil-water separator, and the residue managed appropriately.</p> <p>(ii) A Method Statement is required for all wash areas where hydrocarbon, hazardous materials, or pollutants are expected. This includes, but is not limited to cleaning of paint equipment, and cement batching areas. Wash areas must be located well away (50m) from any water course. No contaminated runoff shall enter any watercourse.</p> <p>(iii) Pollutants of any kind and in any form are kept, stored, and used in such a manner that any leaks or escape can be contained, and the water table not endangered. Water containing pollutants such as cements, concrete, lime, chemicals, paint, fuels and hydrocarbons shall be contained and stored in an impermeable container for removal from site (for proper disposal or recycling). This particularly applies to water emanating from concrete batching plants and concrete swills, and to runoff from re-fuelling and washing areas.</p> <p>(iv) Continually investigate new and emerging technologies and put into</p>	Operator	<p>Daily monitoring</p> <p>Weekly / Monthly inspections</p> <p>Monthly/ quarterly / biannual reporting</p> <p>Annual audit</p> <p>Two-yearly calibration of flow meter</p>	<p>Procedures, risk assessments, inspection sheets, photographs</p> <p>Training Records</p> <p>Inspection sheets, photographs,</p> <p>Monthly SHE Reports</p> <p>Biennial Reports to DWS (by 25 January and 27 July each year)</p> <p>Specialist reports (hydrology, wetland, etc.)</p> <p>Audit Reports</p> <p>Calibration certificates</p>	<p>Engineer's walkabout, quarterly EA audits, annual WUL audit</p> <p>Annual independent ECO and WUL audits</p> <p>External specialist</p>

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
practice water efficient devices, in an endeavour to conserve water at all times.				

### Instream development

Lesedi's General Authorization (Registration Certificate.No.25065811, dated 25 August 2021) states the conditions of the GA.N.509 of 2016, as published in *Government Gazette 40229* on 26 August 2016, for water use as defined in Section 21(c) and Section 21(i) of the National Water Act, 1998 (Act No 36 of 1998) must be adhered to.

For ease of reference, and for record purposes these conditions are presented below (but may be amended by DWS from time-to-time):

#### **GA Notice 509 of 2016: Conditions for impeding or diverting the flow of water or altering the bed, banks, course or characteristics of a watercourse**

9(1) The water user must ensure that -

- (a) impeding or diverting the flow or altering the bed, banks, course or characteristics of a watercourse do not detrimentally affect other water users, property, health and safety of the general public, or the resource quality;
- (b) the existing hydraulic, hydrologic, geomorphic and ecological functions of the watercourse in the vicinity of the structure is maintained or improved upon;
- (c) a full financial provision for the implementation of the management measures prescribed in this General Authorisation, including an annual financial provision for any future maintenance, monitoring, rehabilitation, or restoration works, as may be applicable; and;
- (d) upon written request of the responsible authority, they implement any additional management measures or monitoring programmes that may be reasonably necessary to determine potential impacts on the water resource or management measures to address such impacts.

9(2) Prior to the carrying out of any works, the water user must ensure that all persons entering on -site, including contractors and casual labourers, are made fully aware of the conditions and related management measures specified in this General Authorisation.

9(3) The water user must ensure that -

- (a) any construction camp, storage, washing and maintenance of equipment, storage of construction materials, or chemicals, as well as any sanitation and waste management facilities -
  - (i) is located outside the 1 in 100-year flood line or riparian habitat of a river, spring, lake, dam or outside any drainage feeding any wetland or pan, and
  - (ii) is removed within 30 days after the completion of any works.
- (b) the selection of a site for establishing any impeding or diverting the flow or altering the bed, banks, course or characteristics of a watercourse works:
  - (i) is not located on a bend in the watercourse;
  - (ii) avoid high gradient areas, unstable slopes, actively eroding banks, interflow zones, springs, and seeps;
  - (iii) avoid or minimise realignment of the course of the watercourse;
  - (iv) minimise the footprint of the alteration, as well as the construction footprint so as to minimise the effect on the watercourse.
- (c) a maximum impact footprint around the works is established, clearly demarcated, that no vegetation is cleared or damaged beyond this demarcation, and that equipment and machinery is only operated within the delineated impact footprint.
- (d) measures are implemented to minimise the duration of disturbance and the footprint of the disturbance of the beds and banks of the watercourse.
- (e) measures are implemented to prevent the transfer of biota to a site, which biota is not indigenous to the environment at that site.



- (f) all works, including emergency alterations or the rectification of incidents, start upstream and proceed in a downstream direction, to ensure minimal impact on the water resource.
- (g) all material excavated from the bed or banks of the watercourse are stored at a clearly demarcated location until the works have been completed, upon which the excavated material must be backfilled to the locations from where it was taken (i.e. material taken from the bed must be returned to the bed, and material taken from the banks must be returned to the banks).
- (h) adequate erosion control measures are implemented at and near all alterations, including at existing structures or activities with particular attention to erosion control at steep slopes and drainage lines.
- (i) alterations or hardened surfaces associated with such structures or works -
  - (i) are structurally stable;
  - (ii) do not induce sedimentation, erosion or flooding;
  - (iii) do not cause a detrimental change in the quantity, velocity, pattern, timing, water level and assurance of flow in a watercourse;
  - (iv) do not cause a detrimental change in the quality of water in the watercourse;
  - (v) do not cause a detrimental change in the stability or geomorphological structure of the watercourse; and
  - (vi) does not create nuisance condition, or health or safety hazards.
- (j) measures are implemented at alterations, including at existing structures or activities, to -
  - (i) prevent detrimental changes to the breeding, nesting or feeding patterns of aquatic biota, including migratory species;
  - (ii) allow for the free up and downstream movement of aquatic biota, including migratory species; and
  - (iii) prevent a decline in the composition and diversity of the indigenous and endemic aquatic biota.
- (k) no substance or material that can potentially cause pollution of the water resource is being used in works, including for emergency alterations or the rectification of reportable incidents.
- (l) measures are taken to prevent increased turbidity, sedimentation and detrimental chemical changes to the composition of the water resource as a result of carrying out the works, including for emergency alterations or the rectification of reportable incidents.
- (m) in-stream water quality is measured on a weekly basis during construction, including for emergency alterations or the rectification of reportable incidents, which measurement must be by taking samples, and by analysing the samples for pH, EC/TDS, TSS/Turbidity, and /or Dissolved Oxygen ("DO ") both upstream and downstream from the works.
- (n) in-stream flow, both upstream and downstream from the works, is measured on an ongoing basis by means of instruments and devices certified by the South African Bureau of Standards ("SABS "), and that such measurement commences at least one week prior to the initiation of the works, including for emergency alterations or the rectification of reportable incidents.
- (o) During the carrying out of any works, the water user must take the photographs and video- recordings referred to in paragraph (p) below, on a daily basis, starting one (1) week before the commencement of any works, including for emergency structures and the rectification of reportable incidents, and continuing for one (1) month after the completion of such works:
- (p) The following videos recordings and photographs must be taken as contemplated in paragraph (o) above:
  - (i) one or more photographs or video -recordings of the watercourse and its banks at least 20 meters upstream from the structure;
  - (ii) one or more photographs or video -recordings of the watercourse and its banks at least 20 meters downstream from the structure; and
  - (iii) two or more photographs or video -recordings of the bed and banks at the structure, one of each taken from each opposite bank.

### Rehabilitation

- 10(1) Rehabilitation as contemplated in paragraph 6(1)(v) above must be conducted in terms of a rehabilitation plan and the implementation of the plan must be overseen by a suitably qualified SACNASP professional member.
- 10(2) Upon completion of the construction activities related to the water use -
  - (a) a systematic rehabilitation programme must be undertaken to restore the watercourse to its condition prior to the commencement of the water use;

- (b) all disturbed areas must be re- vegetated with indigenous vegetation suitable to the area; and
  - (c) active alien invasive plant control measures must be implemented to prevent invasion by exotic and alien vegetation within the disturbed area.
- 10(3) Following the completion of any works, and during any annual inspection to determine the need for maintenance at any impeding or diverting structure, the water user must ensure that all disturbed areas are
- (i) cleared of construction debris and other blockages;
  - (ii) cleared of alien invasive vegetation;
  - (iii) reshaped to free -draining and non -erosive contours, and
  - (iv) re-vegetated with indigenous and endemic vegetation suitable to the area.
- 10(4) Upon completion of any works, the water user must ensure that the hydrological functionality and integrity of the watercourse, including its bed, banks, riparian habitat and aquatic biota is equivalent to or exceeds that what existed before commencing with the works.

### **Monitoring and reporting**

- 11(1) The water user must ensure the establishment and implementation of monitoring programmes to measure the impacts on the resource quality to ensure water use remains within the parameters of paragraph 8(3)(m) to (o) and results are stored;
- 11(2) Upon the written request of the responsible authority the water user must -
- (a) ensure the establishment of any additional monitoring programmes; and
  - (b) appoint a competent person to assess the water use measurements made in terms of this General Authorisation and submit the findings to the responsible authority for evaluation.
- 11(3) The water user shall monitor and determine present day values for water resource quality before commencement of water uses in terms of section 21(c) or (i) of the Act.
- 11(4) Upon completion of construction activities related to the water use, the water user must undertake an Environmental Audit annually for three years to ensure that the rehabilitation is stable, failing which, remedial action must be taken to rectify any impacts.
- 11(5) Rehabilitation structures must be inspected regularly for the accumulation of debris, blockages, instabilities and erosion with concomitant remedial and maintenance actions.
- 11(6) Copies of all designs, method statements, risk assessments as done according to the Risk Matrix, rehabilitation plans, and any other reports required must be made available to the responsible authority when requested to do so.

### **Wastewater discharge**

Lesedi received a copy of DWS's confirmation letter (dated 13 July 2021) on 28 January 2022; confirming the GA approval for discharging wastewater (NWA s.21(f)), along with the approval for the instream development activities (NWA s.21(c)&(i)). Due to administrative and IT matters DWS is yet to include the authorization for wastewater discharge on the GA Registration Certificate No.25065811, dated 25 August 2021. As such, Lesedi must be adhered to the conditions set out in GA Notice 665 of 2013, as published in *Government Gazette 36820* on 06 September 2013, for water use as defined in Section 21(f) of the National Water Act, 1998 (Act No 36 of 1998). For ease of reference, and for record purposes these conditions are presented below (but may be amended by DWS from time-to-time):

#### **GA Notice 665 of 2013: requirements for discharging waste or water containing waste into a water resource:**

##### **Precautionary practices**

- 2.8(1) The water user must follow acceptable design, construction, maintenance and operational practices to ensure the consistent, effective and safe performance of the wastewater discharge system, including the prevention of-

- (a) nuisance conditions such as flies or mosquitoes, odour or secondary pollution;
  - (b) the contamination of run-off water or stormwater;
  - (c) contaminated stormwater entering into a water resource; and
  - (d) the unauthorised use of the wastewater by members of the public.
- (2) Suspended solids must be removed from any wastewater, and the resulting sludge disposed of according to the requirements of any relevant law or regulation, including the document entitled "Guidelines for the Utilisation and Disposal of Wastewater Sludge, Volumes 1-5, Water Research Commission Reports No TT 261/06, 262/06, 349/09, 350/09, 351/09, as amended from time to time (obtainable from the Department upon written request).
- (3) All reasonable measures must be taken to provide for mechanical, electrical, operational, or process failures and malfunctions of the wastewater discharge system.
- (4) All reasonable measures must be taken for storage of the wastewater when discharge cannot be undertaken, which storage must be in accordance with general authorisation in section 3 of this Notice.
- (5) All reasonable measures must be taken to collect contaminated stormwater runoff and to retain it for disposal which disposal must be in accordance with general authorisation in section 3 of this Notice.
- (6) Upon the written request of the responsible authority the registered user must ensure the implementation of any additional construction, maintenance and operational practices that may be required in the opinion of the responsible authority to ensure the consistent, effective, safe and sustainable performance of the wastewater discharge system.

**Record-keeping and disclosure of information**

2.10(1) The water user must ensure the establishment of monitoring programmes to monitor the quantity and quality of the discharge prior to the commencement of the discharge, in the following manner:

- (a) The quantity of the discharge must be metered and the total recorded weekly;
- (b) the quality of domestic wastewater discharges must be monitored once every month by taking a grab sampling and analysed for specific substances and parameters as required by the responsible authority as set out in Table 2.2, which may be amended from time to time; and results submitted to the responsible authority

**TABLE 2.2: Monitoring requirements for domestic wastewater discharges**

DISCHARGE VOLUME ON ANY GIVEN DAY	MINIMUM MONITORING REQUIREMENTS
10 to 100 cubic metres	pH Electrical Conductivity (mS/m) Faecal Coliforms (per 100 ml)
100 to 1 000 cubic metres	pH Electrical Conductivity (mS/m) Faecal Coliforms (per 100 ml) Chemical Oxygen demand (mg/l) Ammonia as Nitrogen (mg/l) Suspended Solids (mg/l) Phosphate (mg/l)
1 000 to 2 000 cubic metres	pH Electrical Conductivity (mS/m) Faecal Coliforms (per 100 ml) Chemical Oxygen demand (mg/l) Ammonia as Nitrogen (mg/l) Nitrate/Nitrite as Nitrogen (mg/l)

	Free Chlorine (mg/l) Suspended Solids (mg/l) Orthophosphate as Phosphorous (mg/l)
--	---

- (c) The quality of industrial wastewater discharges must be monitored once every month by grab sampling-
  - (i) for all substances which have been added to the water through any industrial activity;
  - (ii) for all substances which have been concentrated in the water through any industrial activity;
  - (iii) for all substances which may be harmful or potentially harmful to human health or to the water resource quality; and
  - (iv) as set out in paragraph 2.10(1)(b), if the wastewater contains any domestic wastewater.
- (d) monitoring for the quantity and quality of the discharge shall be done at the point of discharge into a water resource and results submitted to the responsible authority
- (2) Upon the written request from the responsible authority the registered user must-
  - (a) ensure the establishment of any additional monitoring programmes; and
  - (b) appoint a competent person to assess the water use measurements made in terms of this authorisation and submit the findings to the responsible authority for evaluation.
- (3) Subject to paragraph 2.10(1), the water user must, on a monthly basis, submit the following information to the responsible authority-
  - (a) the quantity of wastewater discharged;
  - (b) the quality of wastewater discharged;
  - (c) details of the monitoring programmes;
  - (d) details of failures and malfunctions in the discharge system and details of measures taken. Such information must be made available upon written request to the responsible authority.

### Methods for sampling and analysis

2.11 The following methods for sampling and analysis must be adhered to:

- (a) Samples of the water containing waste must be taken as prescribed in the Notice, and in accordance with the applicable South African National Standard (SANS) for sampling.
- (b) The methods for the measurement of specific substances and parameters in any waste or wastewater must be carried out by a-
  - (i) laboratory that has been accredited in accordance with SANS 17025:2005 by the South African National Accreditation System (SANAS) to conduct the analysis in accordance with the prescribed SANS method for each applicable variables; or
  - (ii) laboratory that participates in a recognised Proficiency Testing Scheme (Z-scores results should be presented).
  - (iii) laboratory that has proof of intra- and inter-laboratory proficiency (quality assurance as prescribed in Standard Methods).
- (c) Water users who can be able to demonstrate to the responsible authority that there is no accredited laboratory within their vicinity may use methods 1.12(b)(ii) and (iii) above.

### Inspections

2.12 Any property or land in respect of which a water use has been authorised in terms of this general authorisation, such property or land must be made available for inspection by an authorised person in terms of section 125 of the Act.

### Incidence reporting

2.13 Any information on the occurrence of any incident that has or is likely to have a detrimental impact on the water resource quality must be reported to the responsible authority within 24 hours.

#### 4.5.4 EROSION MANAGEMENT

**Impact Management Outcome:** the integrity of site infrastructure is protected and erosion impacts to land and water resources addressed in accordance with the Conservation of Agricultural Resources Act, 2008 (Act No. 59 of 2008) and the National Water Act, 1998 (Act No. 36 of 1998).  
**Impact avoidance:** the loss of topsoil and changes in the soil profile due to compaction, lead to loss of vegetation, denuding of land, increased ambient dust levels, siltation of drainage lines, contamination of watercourses, and loss habitat impact for fauna and avifauna. Reduced soil stability also poses a risk to solar infrastructure, stormwater drainage system and the road network.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<b>A. Erosion Management</b> (i) Establish and implement an erosion and stormwater management plan, to manage and minimize the risk of wind and water erosion, and detailing monitoring and rectification measures (like brush-packing denuded areas, filling erosion rills and potholes with sedimentation removed from drains etc.).	Operator	Annual review	Plans and procedures	Engineer's annual review, and  Owner's acceptance
<b>B. Erosion avoidance</b> (i) Vegetation clearance in the operational phase is kept to an absolute minimum, to reduce the risk of wind and water erosion, which attenuates rainwater run-off, increasing infiltration, thus decreases sediment loads in surface run-off and in stormwater discharged from site. (ii) Drainage systems divert storm water away from solar infrastructure, impervious surfaces, roads and hard-standing areas. (iii) Drainage controls such as culverts, cut-off trenches, vegetated swales, and drains could be used to ensure effective management of rainwater and encourage the dispersion of surface water runoff, especially at stormwater discharge points.	Operator	On-going  Operator's weekly/monthly inspections  Ad hoc repair work, when required	Procedures, risk assessments, inspection sheets, photographs,  Audit Reports	Engineer's walkabout and quarterly audits  ECO annual audits

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
(iv) Work areas are restricted to hard compacted areas and are clearly demarcated, to avoid disturbance to natural vegetation. Vehicle traffic is limited to the internal road network, to prevent soil compaction and impacts to vegetation.				
<p><b>C. Erosion monitoring</b> and control</p> <p>(i) Monitor erosion in the vicinity of the roads, PV arrays, buildings and other hard-standing surfaces to ensure erosion sites are identified early and remedied.</p> <p>(ii) The cause of the erosion should be identified and addressed, to prevent silt entering watercourses;</p> <p>(iii) Implement suitable repair and mitigation actions, within a month of detecting erosion.</p> <p>(iv) Disturbed areas are rehabilitated with indigenous vegetation found in the region, as soon as possible to prevent erosion.</p> <p>(v) Soil conservation measures are implemented, such as stockpiling topsoil for remediation of disturbed areas. Soil erosion remediation efforts may include backfilling and compacting of erosion channels, providing cover (like brush-packs) to denuded areas, slowing the rate of surface water runoff and encouraging the dispersion of stormwater over greater surface area, so as to reduce the erosive power of the water, and increase greater infiltration into the soil.</p>	Operator	<p>Bi-annual monitoring (before and after the rainy season).</p> <p>Quarterly maintenance inspections</p> <p>Ad hoc repair work, when required</p>	<p>Maintenance Plan, Inspection sheets, photographs, Audit Reports</p>	<p>Engineer's walk-about and quarterly audits</p> <p>ECO annual audits</p>

#### 4.5.5 VEGETATION MANAGEMENT

**Impact Management Outcome:** Vegetation clearing is restricted to the authorised development footprint, so as to facilitate the ongoing operation of the solar facility. All landscaped and rehabilitated areas are maintained and kept clear of alien and invasive vegetation species, as listed under the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983), the National Environmental Management, Biodiversity Act, 2004 (Act 10 of 2004) and Schedule 6 of the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009). **List of Alien invasive Species (Government Gazette (GG) No: 43726 of 2020) of the National Environmental Management: Biodiversity Act (Act 10 of 2004).** Authorization obtained to clear/cut/trim species listed as threatened or in need of national protection under section 56(1)(d) of the National Environmental Management, Biodiversity Act, 2004 (Act 10 of 2004), the National Forest Act, 1998 (Act No. 84 of 1998) Notice 1935 of GG No 4690, 25 March 2022) or Schedule 2 of the Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009).

**Impact avoidance:** Limit disturbance to and impacts on natural vegetation and listed protected species; taking cognizance of significant ecological processes (like seed production during the growing seasons), and to support ecosystem function.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Effective Vegetation Management</b></p> <p>(i) Develop a vegetation management and alien plant control plan and have progress of its implementation assessed every two years by an external specialist.</p> <p>(ii) Review and update management plans biennially</p>	Operator External Botanist	Biennial update	Plans and procedures, Botanist reports;	External specialist Engineer's biennial review, and Owner's acceptance
<p><b>B. Effective Vegetation Control</b></p> <p>(i) Vegetation growth between the PV arrays is controlled to prevent shading of the panels and to limit the risk of fires. Limit the cutting and clearing of vegetation to a minimum to facilitate the ongoing operation of the solar farm.</p> <p>(ii) Minimize unnecessary damage to or loss of vegetation cover in all areas. Vegetation clearance is to be kept to a minimum, and if removed for fire risk safety, should take place after the growing season, once seeds have matured and a seedbank established for the following growing season.</p>	Operator	Ongoing maintenance: pre-task risk assessment  Operator's weekly/monthly inspections.  Induction training and annual refreshers	Procedures, risk assessments, Inspection sheets, photographs, Training Records; Botanist reports; Audit Reports; <b>Tree removal permit (as required)</b>	Engineer's walkabout and quarterly audits  ECO annual audits

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>(iii) Avoid disturbance or destruction of protected plant species found on site.</p> <p>(iv) Only indigenous species with natural distribution ranges in the region are used to rehabilitate disturbed areas and restore the natural ecology.</p> <p>(v) Vehicle traffic is limited to the internal road network, to prevent soil compaction and impacts to vegetation.</p> <p>(vi) Vehicle traffic and other activities must be restricted to the bare minimum along the overhead powerline routes;</p> <p>(vii) Activities must be limited along the non-perennial watercourse and riverine vegetation may not be impacted;</p> <p>(viii) Work areas are restricted to hard compacted areas and are clearly demarcated, to avoid unnecessary disturbance to natural vegetation.</p> <p>(ix) Natural vegetation surrounding the overburden stockpile must not be disturbed or impacted upon;</p> <p>(x) Collection of firewood, plants and lighting fires on the site is not allowed.</p> <p>(xi) Educate employees and visitors about the importance of threatened and protected species, and conservation of vegetation and vulnerable habitats.</p> <p>(xii) Listed threatened and protected species like the Shepherds tree (<i>Boscia albitrunca</i>), Camel Thorn tree (<i>Vacchillia erioloba</i>) and African Olive Tree (<i>Olea europaea africana</i>) must be protected and may not be removed without a permit.</p>				



Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>C. Effective Control and Monitoring of Alien Vegetation</b></p> <p>(i) An alien plant control and monitoring programme is maintained during the operational phase:</p> <ul style="list-style-type: none"> <li>• Category 1b and 3 alien plants must be removed;</li> <li>• Refer to Section 4.5.3 for management and control measures of alien plants in close proximity to watercourses;</li> <li>• Manual or mechanical removal is preferred to chemical control;</li> <li>• Seeds and propagative matter from alien vegetation must be destroyed;</li> </ul> <p>(ii) Undertake alien plant control and monitoring to ensure that the site is kept free of alien and invasive plants, and to prevent the spread onto neighbouring land.</p> <p>(iii) Limit pesticides and herbicides to a bare minimum; using properly calibrated equipment to apply the chemicals, strictly controlled by and under the supervision of a registered Pest Control Operator (PCO), limited to biodegradable and natural substances (where possible),</p> <p>(iv) Prior to appointment, the registered PCO must provide a notification of the herbicide(s) to be applied (registered name and number), the purpose of administration, precautions to be taken before, during and after such administrations, and the number of his/her valid registration certificate (along with a copy);</p> <p>(v) Do not apply herbicide prior to a rainfall event or within 5 days of a significant rain event.</p> <p>(vi) Provide appropriate training and PPE to employees applying herbicides and pesticides, under the strict supervision a registered PCO.</p>	<p>Operator Registered PCO</p>	<p>On-going maintenance: pre-task risk assessment</p> <p>Operator's weekly/monthly inspections.</p> <p>Induction training and annual refreshers</p>	<p>Plans and procedures, Inspection sheets, photographs, Chemicals Register and Safety Data Sheets PCO certificate of registration, and pre-administration notification Botanist report; Audit Reports</p>	<p>External Botanist Engineer's walkabout and quarterly audits ECO annual audits</p>

#### 4.5.6 MAINTENANCE OF FACILITY

**Impact Management Outcome:** The Facility is properly managed so that energy production is kept at an optimum without causing undue pressure to the environment.

**Impact avoidance:** Undue disturbance of natural areas and to wildlife is restricted and limited to the development footprint only. Impacts to ecological processes taking place on site (like seed production and population recruitment) are minimised, so that disruptions of natural cycles and biodiversity in the region are not adversely affected. Impacts to surface water, groundwater and soil from fuel, oils or cement spills to be avoided.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Maintenance of vehicles and equipment</b></p> <p>(i) All vehicles and machinery are checked for leaks and provided with drip trays if required. Hydrocarbon contaminants to be dealt with in accordance with the waste management procedures.</p>	Operator	Daily monitoring  Monthly/quarterly reporting  Annual audit	Maintenance Plan  Procedures, risk assessments, inspection sheets, photographs,  Monthly SHE Reports  Audit Reports	Engineer's walkabout and quarterly audits  ECO annual audits
<p><b>B. Minimise impacts associated with washing PV modules and filters</b></p> <p>(i) Washing of filters from the inverter buildings, is undertaken within a dedicated area, approved by the Site Engineer. The residue is managed, used as erosion fill material or disposed of in accordance with the waste management procedure;</p> <p>(ii) Best available practice methods are used to keep PV modules clean and to reduce volumes of water consumption;</p> <p>(iii) The unGer WTP to be maintained in line with OEM and sound health and safety precautions taken when handling resin bags. Should loose resin be used, take due care when refilling the unit, to prevent spills;</p>	Operator	<i>Ad hoc</i> (when required)	Maintenance Plan  Procedures, risk assessments, inspection sheets, photographs,  Monthly SHE Reports  Audit Reports	Engineer's walkabout and quarterly audits  ECO annual audits

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>C. Ablution facilities and sewage system</b></p> <p>(i) Washing, whether of the person or of personal effects, and acts of excretion and urination are strictly prohibited other than at the ablution facilities provided.</p> <p>(ii) Only approved ablution facilities may be used for any washing and sanitation. No dirty water may be discharged onto paved areas or into the environment.</p> <p>(iii) Regular maintenance and annual inspection of sewage wastewater treatment plant to ensure optimal performance and to prevent odours.</p> <p>(iv) Cleaning detergents and other chemicals discharged into the sewer system are limited to those which the system can accommodate; in accordance with the OEM.</p> <p>(v) The volume (quality) of wastewater discharge is metered, recorded weekly and reported monthly.</p> <p>(vi) Where more than 10m<sup>3</sup> is discharged on any given day, the water quality must be monitored once a month by taking a grab sample at the discharge point, and analysed for pH, Electrical Conductivity (mS/m), Faecal Coliforms (per 100 ml), and for any other substance which has been added to the water (e.g. chlorine, hydrocarbons, herbicide etc.). See requirements for water analysis by an accredited laboratory, under 'methods of sampling' (condition 2.11 of GA Notice 665 of 2013), as included under the table for 4.5.3 Water Resource.</p> <p>(vii) Submit monthly reports to DWS, showing the quantity of wastewater discharged, water quality results (where applicable), details of the monitoring programmes, details of failures and malfunctions in the discharge system and details of measures taken.</p>	Operator	Daily monitoring Weekly checks Monthly/quarterly reporting Annual audit	Maintenance Plan Procedures, risk assessments, inspection sheets, photographs, Monthly SHE Reports Audit Reports	Engineer's walkabout and quarterly audits ECO annual audits

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>D. Maintenance of infrastructure</b></p> <p>(i) The facility is maintained in a clean and hygienic manner so that rodents or vermin are not attracted into buildings. Small mammals and reptiles are removed from buildings as soon as possible, and those occurring on site are to be left undisturbed (unless the infrastructure or human well-being are impacted). No wildlife may be needlessly harmed or killed, without a permit from the provincial conservation authority.</p> <p>(ii) Birds are discouraged from building nests on solar infrastructure, early in the season, i.e. before nests are lined and eggs are laid; so that eggs and hatchlings need not be destroyed. Nesting material is removed daily, if needed, to encourage the birds to move back into the natural surroundings, so that that year's population recruitment can be raised successfully, and biodiversity impacts in the wider region are avoided.</p> <p>(iii) The overhead powerlines must be monitored for collision mortality of avi-fauna. Bird flapper infrastructure must be maintained at all times.</p> <p>(iv) Electric fences must be monitored for animal mortalities. Mortalities must be photographed and recorded accordingly.</p> <p>(v) Any mortalities of Threatened or Protected Species (TOPs) on site must be investigated and managed accordingly with new management measures such as additional barriers (as required).</p>	Operator	Daily monitoring Weekly checks Monthly/quarterly reporting Annual audit	Maintenance Plan Procedures, risk assessments, inspection sheets, photographs, Monthly SHE Reports Training Records, Audit Reports	Engineer's walkabout and quarterly audits ECO annual audits
<p><b>E. Management of outdoor storage area</b></p> <p>(i) Recyclable metal and spare parts are stored in the fenced off area, to prevent further spread of parts and equipment.</p> <p>(ii) The storage yard is kept neat and tidy.</p>	Operator	Weekly visual inspection and monthly checks	Fenced area with controlled access Inspection sheets, photographs, Training Records, Audit Reports	Engineer's walk about and quarterly audits ECO annual audits

#### 4.5.7 NOISE

**Impact Management Outcome:** Cognisance is given the Noise Control Regulations of 1998 as promulgated in terms of the Environment Conservation Act, 1989 (Act 73 of 1989); the Noise Induced Hearing Loss Regulations and the Environmental Regulations for Workplaces as promulgated under the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993); as well as relevant Local Authority bylaws.

**Impact avoidance:** Noise nuisance does not occur, to disturb or impair the convenience or peace of any person. Ambient sound level is not exceeded by 7dB(A) or more, and detrimental effects from exposure to noise, or permanent hearing damage is avoided.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Noise and hearing conservation</b></p> <p>(i) Limit noise levels of machinery with suitable silencing devices to avoid noise levels over 85db(A).</p> <p>(ii) Regular checks, maintenance and servicing of tools and equipment to keep them in proper working order.</p> <p>(iii) Noise surveys conducted to identify and demarcate noise zones, where mandatory wearing of hearing protection is required.</p> <p>(iv) Provide hearing protection to staff operating noisy equipment or in noisy workplaces.</p> <p>(v) Employees are educated about the potential risks to health and safety caused by exposure to noise.</p> <p>(vi) Employees exposed to noise at or above the noise-rating limit (85db(A) or higher) undergo medical surveillance within 30 days of commencement of employment, annually thereafter and upon exiting employment (resignation or dismissal).</p>	Operator Specialists	Ongoing: before use of noisy machinery or equipment t	Maintenance plan Procedures, risk assessments, inspection sheets, photographs Installation reports Biennial hygiene survey reports Medical surveillance records maintained for 40 years Training records Audit reports	Engineer walkabout and quarterly audit ECO annual audit
<p><b>B. Noise nuisance</b></p> <p>(i) Vehicles, machinery and equipment are operated so that ambient sound levels are not exceeded by more than 7 dBA, and the peace or convenience of any person is not disturbed or impaired.</p>	Operator	As per maintenance schedule	Maintenance plan Procedures, risk assessments, inspection sheets, photographs	Engineer's walkabouts and quarterly audit ECO annual audit

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
(ii) Maintain appropriate directional and intensity settings on all hooters and sirens. (iii) Amplified music is not allowed on site			Installation reports Complaints report (noise reports) Incident/Complaints Register	

#### 4.5.8 DUST MINIMIZATION

**Impact Management Outcome:** Cognisance is given the National Dust Control Regulations of 2013 as promulgated in terms of the National Environmental Air Quality Act, 2004 (Act 39 of 2004), and relevant Local Authority bylaws.

**Impact avoidance:** Prevent excessive dust generation, to limit impacts to electricity production potential of the PV panels. The dustfall rate for non-residential areas (i.e. 1,200mg/m<sup>2</sup>/day over a 30-day average) is not exceeded.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<b>A. Limit dust generation</b> (i) Ensure that vehicles related to the solar farm travelling on gravel roads do not exceed a speed of 20 km/h. Erect signage and undertake driver education in this regard. (ii) Vegetation clearance kept to a minimum, to minimize wind erosion and dust. Denuded areas to be covered with brush-packs and revegetated as soon as possible – see 4.5.4 Vegetation Management. (iii) Additional dust control measures may be implemented on advisement of the Engineer.	Operator	Ongoing: throughout operation.	Visual monitoring Signage Training records Audit reports	Engineer's walkabout and quarterly audits ECO annual audits

### 4.5.9 "NO GO" AREAS

**Impact Management Outcome:** Access to No-Go areas is prevented.

**Impact avoidance:** Prevent impacts to sensitive environments.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Respect No-Go areas</b></p> <p>(i) No development activities may take place within 100m of any watercourse, or within 500m of a pan or wetland without authorization from DWS.</p> <p>(ii) No employees are permitted to make use of any natural water sources (e.g. springs, streams, and open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.</p> <p>(iii) Prohibit the defacing, painting, damaging or marking of any natural features.</p> <p>(iv) No maintenance activities may take place within 20m of the derelict Humansrus homestead, family graveyard or graves site inside the South Site Solar PV Array area.</p>	Operator	Throughout operation.	Visual monitoring and inspections	<p>Engineer's walkabout and quarterly audits</p> <p>ECO annual audits</p>

#### 4.5.10 FIRE PREVENTION AND CONTROL

**Impact Management Outcome:** Uncontrollable fires are prevented; taking cognisance to the National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998).

It is an offence to light a fire, leave it unattended, or to throw or drop a burning match or other burning material, which initiates a fire that spreads and causes injury or damage to property or the environment.

**Impact avoidance:** Fire damage to equipment, infrastructure and property are prevented and injury to humans and loss of life are avoided.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Veldfire Prevention</b></p> <p>(i) The Facility's Maintenance Plan provides preventive maintenance measures, which reduce the risk of electrical shorts and fires.</p> <p>(ii) Prohibit fires on site and limit smoking to designated areas.</p> <p>(iii) Establish a fire break on the inside of the perimeter fence, which is reasonably free of flammable material, does not cause soil erosion, and provides a fair chance of preventing a veldfire from spreading to or from neighbouring land.</p> <p>(iv) A 1m wide strip of vegetation on the outside of the perimeter fence is also kept short to protect the electric fence.</p> <p>(v) Vegetation fuel load (moribund build-up) below PV arrays and around critical infrastructure is maintained by mowing/cutting vegetation after the growing season (once the grasses have seeded) – see 4.5.4 Vegetation Management.</p>	Operator	Ongoing: throughout operation.	Maintenance Plan  Procedures, risk assessment, inspection sheets, photographs  Monthly reporting  Audit Reports	Engineer's walkabout and quarterly audits  ECO annual audits
<p><b>B. Control of fires</b></p> <p>(i) The Emergency Plan deals with accidents, potential spillages and fires in line with relevant legislation.</p> <p>(ii) Appoint a Fire Officer who is responsible for ensuring immediate and appropriate actions in the event of a fire and ensure employees are</p>	Operator Fire Marshall	Ongoing: throughout operation	Emergency Plan  Procedures, risk assessment, inspection sheets, photographs  Fire Marshall appointment	Engineer's walkabout and quarterly audits  ECO annual audits



Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>aware of the procedure to be followed.</p> <p>(iii) Ensure adequate firefighting equipment and protective clothing are available on site at all times, and staff are trained to use the equipment and to combat the spread of fires.</p> <p>(iv) Take all reasonable steps to alert neighbours on adjoining land and the relevant fire protection association, if any.</p> <p>(v) Incident investigation, to identify root cause and define further preventive measures and controls.</p>			<p>Firefighting equipment, serviced annually</p> <p>Incident investigation and reporting</p> <p>Audit Reports</p>	

### 4.5.11 CONCRETE AND CEMENT WORK

**Impact Management Outcome:** Pollution and contamination of the environment are avoided, by minimizing spillages and contamination of soil, surface water and groundwater.

**Impact avoidance:** Cement powder has a high pH value. Careless handling and spillage of dry cement powder and concrete slurry affect the pH of both soil and water and impacts human health adversely. Cement spills are avoided; to ensure human health is not impaired, and soil, surface water and groundwater are not polluted.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Approval of cement batching areas</b></p> <p>(i) The Method Statement for additional works required, must indicate the layout of proposed cement batching plant (including the location of cement stores and sand and aggregate stockpiles) and must be approved by the Engineer, prior to stock arriving onsite.</p>	Operator Future contractor	<i>Ad hoc</i> as required during the operational phase.	Approved method statement and locality plan.	Engineer's walkabout and quarterly audits ECO annual audits
<p><b>B. Management on-site</b></p> <p>(i) Store cement in a secure weatherproof location to avoid contamination of the environment, and in line with the SDS.</p> <p>(ii) Control runoff from batching areas so that contaminated water does not enter stormwater or groundwater and does not pollute the environment.</p> <p>(iii) Ensure that suitable screening and containment is in place to prevent windblown cement dust contamination.</p> <p>(iv) Mixing trays should be used at all mixing and supply points. Cleaning of equipment and flushing of mixers must not pollute the surrounding environment.</p>	Operator Future contractor	<i>Ad hoc</i> as required during the operational phase.	Approved method statement and locality plan. Inspection sheets, photographs Monthly reporting	Engineer's walkabout and quarterly audits ECO annual audits

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>C. Rehabilitation and closure of laydown area</b></p> <p>(i) All visible remains of excess concrete must be physically removed to an approved Municipal waste site.</p> <p>(ii) Cement bags and packaging contaminated with cement dust must be disposed as directed in the SDS and to waste facility licensed to accept this waste stream – refer to 4.5.2. Waste Management.</p> <p>(iii) Compacted laydown areas to be rehabilitated as directed in 4.5.4 Vegetation Management.</p>	<p>Operator</p> <p>Future contractor</p>	<p><i>Ad hoc</i> as required during the operational phase.</p>	<p>Approved method statement</p> <p>Inspection sheets, photographs</p> <p>Safe disposal records</p> <p>Monthly reporting</p>	<p>Engineer's walkabout and quarterly audits</p> <p>ECO annual audits</p>

#### 4.5.12 ARCHAEOLOGY AND PALAEOLOGY

**Impact Management Outcome:** All fossils and archaeological, cultural heritage and paleontological resources over 60 years of age (such as stone hand tools, remnants of old structures, old ceramic shards, human remains, war memorabilia etc) are protected under the National Heritage Resources Act, 1999 (Act 25 of 1999).

##### **Protection of National Estate:**

- Humansrus homestead and family graveyard (sites outside of Lesedi's Lease Agreement): Graves and burial grounds on site as per SAHRA approval (9/2/074/0001 dated 24/03/11). The graveyard must be fenced off with a proper fence including entry gates to allow visits from relatives. The fence must be placed at least 5m away from the perimeter of the graves. No development is allowed within 15m of the fence line surrounding the graves. Also refer to EA condition 31: "The Humansrus homestead and family graveyard must be fenced off and a 20m buffer must be maintained."
- Grave site inside the South Site Solar PV Array area (sites within Lesedi's Lease Agreement): The graveyard must be fenced off with a proper fence including entry gates to allow visits from relatives.
- Implementation of the CHMP and Register as per Annexure C of this OEMP for the Grave site inside the South Site Solar PV Array area.

**Impact avoidance:** impact to archaeological, paleontological and heritage resources is minimized.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Discovery of artefacts or human remains</b></p> <p>(i) If anything of an archaeological nature is found on site, work is to be stopped and an Archaeologist notified. Once the specialist confirms a genuine artefact has been found, the South African Heritage Resources Agency (SAHRA) is to be informed.</p> <p>(ii) The area should be cordoned-off and access restricted, so that a systematic and professional investigation can be undertaken.</p> <p>(iii) Once the material is remove/collect by the specialist, work can recommence in that area.</p> <p>(iv) The derelict Humansrus homestead, family graveyard and grave sites</p>	Operator	Throughout operation.	<p>Approval from SAHRA if required.</p> <p>Approved method statement and locality plan.</p> <p>Inspection sheets, photographs.</p> <p>Monthly reporting.</p> <p>Grave register.</p>	<p>Engineer's walkabout and quarterly audits</p> <p>ECO annual audits</p>

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>within South Site Solar PV Array area: no maintenance activities may take place within 20m of these areas.</p> <p>(v) Implementation of the Cultural Heritage Management Plan (CHMP) (as attached in Annexure C) for the grave sites inside the South Site Solar PV Array area.</p>				
<p><b>B. Discovery of paleontological heritage resources (extinct animals and plants and their fossilised remains)</b></p> <p>(i) During any excavation activities required for maintenance, the Change Find Protocol for Paleontological Heritage must be implemented for any paleontological resource.</p> <p>(ii) Work is to be stopped and a Paleontologist notified and appointed for assessment and Change Find Protocol development and implementation.</p> <p>(iii) The area should be cordoned-off and access restricted, so that a systematic and professional investigation can be undertaken.</p> <p>(iv) Once the material is removed/collect by the specialist, work can recommence in that area.</p> <p>(v) Final Change Find Protocol must be uploaded onto SAHRIS Website.</p>	Operator	Throughout operation.	Approval from SAHRA if required Change Find Protocol.	Engineer's walkabout and quarterly audits ECO annual audits
<p><b>C. Sense of Place</b></p> <p>(i) Visual impacts (amongst others) are addressed during the operational phase to minimize impacts on 'sense of place' of the rural, agricultural setting.</p>	Operator	Throughout operation.	Screening (if required) No informal housing on site	Engineer's walkabout and quarterly audits ECO annual audits

### 4.5.13 EMERGENCY PROCEDURES

**Impact Management Outcome:** Emergency procedures are effective to enable a rapid and appropriate response to all types of environmental emergencies.

**Impact avoidance:** Injury and risk to human life avoided, and damage to property and the environment is limited.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Preventive Action</b></p> <p>(i) Documented procedures in place</p> <p>(ii) Ensure all key staff are adequately trained in emergency procedures, use of spill kits, firefighting and use of PPE;</p> <p>(iii) Emergency contact numbers always visible;</p> <p>(iv) Fire extinguishers are available on site and services annually.</p> <p>(v) First Aid boxes are available, and First Aiders trained.</p>	Operator	Bi-annual	Emergency Procedure Inspection sheets, photographs Records of training and emergency drills to be kept Visible contact numbers Maintenance records maintained and inspection dates displayed on fire extinguishers First Aid boxes are kept fully supplied	Engineer's walkabout and quarterly audit reports ECO annual audit reports
<p><b>B. Remediation Action</b></p> <p>(i) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons.</p> <p>(ii) undertake clean-up procedures and dispose waste into waste management procedure.</p> <p>(iii) remedy the effects of the incident as directed by the relevant authority or Site Engineer.</p>	Operator	As needed	Photographs Incident Registered Proof of notification (emails) Incident Reports Safe disposal records	Engineer's walkabout and quarterly audit reports ECO annual audit reports Authorities' Inspection Records

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
(iv) assess the immediate and long-term effects of the incident on the environment and public health.				
<p><b>C. Incident Reporting</b></p> <p>(i) The Operator must inform the Owner, immediately, and before the end of shift of any accident or incident.</p> <p>(ii) Environmental incident: notify (a) DFFE, (b) the South African Police Services and Local Fire Department (the relevant fire prevention service) of fires; (c) the relevant provincial head of department and/or municipality; and (d) all persons whose health may be affected by the incident, as soon as possible (Section 30 of NEMA);</p> <p>(iii) Fires: (i) notify Local Fire Department (the relevant fire prevention service) and (ii) the South African Police Services immediately;</p> <p>(iv) Incident impacting a water resource: notify DWS within 24 hours (Section 20 of NWA, and condition 2.13 of GA. Notice 665 of 2013);</p> <p>(v) Non-compliance reporting: notify DFFE within 48 hours if any condition of the authorization cannot be or is not adhered to, and give reasons for the non-compliance (EA:12/12/20/1972/2 condition 34);</p> <p>(vi) Investigate and submit Environmental Incident Report (DFFE template) to authorities (DFFE, DWS, SAPS, relevant provincial head of department and/or municipality), within 14 days, as required by Section 30 of NEMA). S20 of NWA and S24 of OHSA.</p>	Operator Owner	<p>Notify as soon as possible</p> <p>Investigate and Report within 14 days</p>	<p>Records of notification (Alarm Report)</p> <p>Investigation records, photographs</p> <p>Incident Reports and proof of submission to authorities</p> <p>EA non-conformance notifications to the authorities</p>	<p>Engineer's walkabout and quarterly audit reports</p> <p>ECO annual audit reports</p> <p>Authorities' Inspection Records</p>

#### 4.5.14 AUDITS AND EMPr REVIEWS

**Impact Management Outcome:** The OEMP and supporting standard operating procedures provides instruction and direction on the avoidance, management and remediation of environmental impact management, and remains current and relevant throughout the life of the solar facility.

**Impact avoidance:** impacts to the environment, caused by operational activities are avoided, managed and remedied appropriately.

Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p><b>A. Internal Audits</b></p> <p>(i) Internal audits to assess compliance with the conditions of the EA &amp; EMPr, the 2013 National Norms and Standards for Waste Storage and the Water Use License(s).</p>	<p>Owner</p> <p>Operator</p>	<p>Quarterly EA audits</p> <p>Biannual Waste Audits</p> <p>Annual WUL audits</p>	<p>Annual audit schedule</p> <p>Quarterly internal audit checklists,</p> <p>Bi-annual (twice a year) internal reports on storage of hazardous waste (PV modules)</p> <p>Action Plan tracker (register)</p> <p>Non-Compliance Notice and Corrective Action Reports</p>	<p>Engineer's quarterly EA audits, biannual (twice a year) waste audits, annual WUL audit.</p> <p>External audits</p>
<p><b>B. Independent external audits</b></p> <p>(i) Annual Environmental Audit to audit relevance of EA and EMPr and its implementation. Audit reports to be kept on record and submitted/made available to competent authorities as required (see 34(2)(d) and 54A of the 2014 EIA Regulations (as amended), condition 14.5 of the EA, and requirements of the WUL(s)).</p> <p>(ii) Biennial Waste Audit Report submitted to DFFE every two years, within 30 days of receiving the final audit report (see 18.4 of the 2013 NN&amp;S for Waste Storage).</p> <p>(iii) Annual WUL audit reports submitted to DWS within 30 days of</p>	<p>Independent ECO and WUL Auditors</p> <p>Owner</p> <p>Operator</p>	<p>Annual audit of EA and OEMP,</p> <p>Annual Audit of WUL;</p> <p>Biennial audit (every two years) of waste storage</p>	<p>Audit Report and proof of submission to the authorities</p> <p>Action Plan tracker (register)</p> <p>Non-Compliance Notice and Corrective Action Reports</p>	<p>Engineer to ensure Independent ECO, WUL and waste auditors are appointed.</p> <p>Annual external ECO and WUL audits;</p> <p>Biennial (2-yearly) independent waste audit</p>



Impact Management Actions / Mitigation Measures	Implementation:		Evidence of compliance	Monitoring: Owner's oversight)
	Responsible Party	Frequency/ Time frame		
<p>receiving final audit report.</p> <p>(iv) External Audit Reports must satisfy the requirements of Appendix 7 of the 2014 EIA Regulations (as amended).</p> <p>(v) Non-compliance reporting: notify DFFE within 48 hours if any condition of the authorization cannot be or is not adhered to, and reasons for the non-compliance must be provided (EA:12/12/20/1972/2 condition 34).</p>				
<p><b>C. Review of OEMP</b></p> <p>(i) Review recommendations made in External Audit Reports to amend the OEMP and operating procedures,</p> <p>(ii) Edit/update the OEMP and Operator's procedures and works instructions accordingly.</p> <p>(iii) Provide an action plan, showing schedule and resources to address shortcomings identified in the audits.</p> <p>(iv) Submit revised OEMP to DFFE and the Operator</p> <p>(v) Effect changes; include approved amendments as annexure to EMP where appropriate.</p>	<p>Owner</p> <p>Operator</p>	<p>Annually following each audit</p>	<p>Amended OEMP, SOPs, work instructions, checklists etc., updated as required</p> <p>Proof of submission to DFFE and acknowledgement of receipt</p> <p>Operator's confirmation of receipt of revised OEMP and confirmation of having read and understood it</p>	<p>Engineer and Management team annual review,</p> <p>DEA acceptance / approval</p>
<p><b>D. Authority's Inspections and Audits</b></p> <p>(i) Give access to the facility and provide all documents and records as required by any relevant authority.</p> <p>(ii) Respond to authorities' instructions or requests within the stipulated timeframes.</p>	<p>Owner</p> <p>Operator</p>	<p>As required</p>	<p>Correspondence from Authorities</p>	<p>Engineer quarterly audit</p> <p>ECO annual audit</p>

## 5.0 CONSTRUCTION ENVIRONMENTAL SPECIFICATION

---

### 5.1 SCOPE

Although the construction phase of Lesedi Solar Farm is complete, this section remains part of the OEMP so as to cover any future construction activities that may be needed, and are not governed by their own, separate EMP. This section of the EMPr should be included in the contractor's Scope of Work (at the bidding phase).

All construction activities shall observe the requirements of this specification as well as any relevant environmental legislation and in so doing shall be undertaken in such a manner as to minimize impacts on the natural and social environment.

### 5.2 APPLICATION

This Specification contains clauses that are generally applicable to the undertaking of civil engineering works in areas where it is necessary to impose pro-active controls on the extent to which the construction activities impact on the environment. The roles and responsibilities in terms of the application and implementation of this Specification have been outlined in Section 3.2 above.

### 5.3 METHOD STATEMENTS

The Engineer may request a method statement for any activity s/he believes may impact on the environment. The Engineer may also require changes to a Method Statement if the proposal does not comply with the Specification or, if in the reasonable opinion of the Engineer, the proposal may result in, or carry a greater than reasonable risk of damage to the environment in excess of that permitted by the Specifications.

Contractors shall carry out activities in accordance with the approved Method Statement(s). Approval of the Method Statement(s) shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract.

As a minimum the Method Statement must include details with regard to:

- Construction methods or development procedures;
- timing and location of activities;
- materials and equipment to be used (including fuels);
- moving equipment and materials to and from site;
- how equipment/material will be moved while on site;
- how and where material will be stored;
- the containment and/or remediation actions of leaks or spills, of any liquid or material, that may occur;
- waste streams to be generated and waste management and disposal;
- compliance/ non-compliance with the EMPr;
- incident reporting; and
- any other information deemed necessary by the Engineer (or construction ECO).

## 5.4 GENERAL REQUIREMENTS

### 5.4.1 MATERIALS HANDLING, USE AND STORAGE

Contractors shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Specifications. The Contractor shall ensure that these delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Specifications.

Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to, sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.

All laydown areas for manufactured and/ or imported material shall be subject to the Engineer's approval.

All building materials should be stored away (at least 50m) from aquatic ecosystems and the areas bunded appropriately such that there will be no runoff from these areas towards aquatic systems. All building materials should be removed after construction.

### 5.4.2 FUEL (PETROL AND DIESEL) AND OIL

All fuel is to be stored within a demarcated area. No refuelling of vehicles or machinery is to take place outside of this demarcated area unless authorised by the Engineer. The Engineer shall be advised of the area that the Contractor intends using for the storage of fuel.

Tanks containing fuels shall be situated on a smooth impermeable surface base with a bund to contain any possible spills and prevent infiltration of fuel into the ground. The impermeable lining shall extend to the crest of the bund and the volume inside the bund shall be 110% of the total capacity of all the storage tanks.

The floor of the bund shall be sloped towards an oil trap or sump to enable any spilled fuel to be removed. An Enretech or similar hydrocarbon absorption/remediation product approved by the Engineer shall be installed in the sump to reduce the risk of pollution. Bulk fuel storage and bunded areas shall have overhead cover to prevent rain from entering the bunded area.

The Contractor shall keep fuel under lock and key at all times. Safety Data Sheets must be available at storage areas and at points of use.

If fuel is dispensed from 200 litre drums, the drum(s) are to be kept within a bunded area, proper dispensing equipment shall be used, and the drum shall not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank shall be stored in a waterproof container when not in use.

During fuel tanker delivery, the tanker driver must be present at all times during offloading of the product. An emergency cut off switch must be installed to immediately stop fuel delivery should an accident occur. An anti-flash nozzle must be installed at the end of the vent pipe with a fuel dispenser equipped with an automatic cut off switch to prevent fuel tank overfills.

No vehicles are allowed to refuel on site, and this should be done offsite. If equipment requires refuelling, a drip tray must be used in the warehouse, which has a concrete floor.

No smoking shall be allowed in the vicinity of the stores. Symbolic safety signs depicting "No Smoking", "No Naked Lights" and "Danger" are to be provided. The volume capacity of the tank shall be displayed. The product contained within the tank shall be clearly identified; using the emergency information system. Any electrical or petrol-driven pump shall be equipped and positioned, so as not to cause any danger of ignition of the product.

Areas for storage of fuels and other flammable materials shall comply with standard fire safety regulations and may require the approval of the Municipal Fire Prevention Officer.

The Contractor shall ensure that there is adequate fire-fighting equipment at the fuel stores.

Where reasonably practical, plant shall be refuelled at a designated re-fuelling area or at the workshop as applicable. If it is not reasonably practical, then the surface under the temporary refuelling area shall be protected against pollution to the reasonable satisfaction of the Engineer prior to any refuelling activities. The Contractor shall ensure that there is always a supply of appropriate material readily available to absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200l of hydrocarbon liquid spill. This material must be approved by the Engineer prior to any refuelling or maintenance activities.

### **5.4.3 SOLID WASTE MANAGEMENT**

For the purposes of these Environmental Specifications, solid waste includes all debris and waste (e.g. litter, food waste, cable pieces, vegetation and tree stumps, building rubble, etc.), including hazardous waste (e.g. oils) resulting from any demolition and construction activities on site.

The contractor shall be responsible for the establishment of a waste control system that is acceptable to the Engineer. The contractor shall keep detailed records of all waste removed from site, together with proof of recycling or legal disposal at a registered landfill site (disposal certificates).

**NO REFUSE OR WASTE MATERIAL WILL BE DISPOSED OF BY BURYING OR BURNING.**

#### **5.4.3.1 REFUSE CONTROL**

The Contractor shall provide labourers to clean up the Contractor's camp and working areas on a daily basis.

Litter and waste materials (excluding rubble and hazardous waste materials) shall be kept in scavenger- and weather-proof bins. The Contractor shall provide sufficient bins with lids to store the waste and recyclable materials separately (e.g. separate bins for paper, metals, plastics, glass etc.). Bins shall not be allowed to become overfull and shall be emptied daily, as required. The Contractor shall ensure that waste and surplus food, food packaging and organic waste are not discarded or deposited by employees anywhere on the site except in refuse bins

The Contractor shall remove refuse and recyclable materials from working areas on daily basis, and store this at a central waste area that is weatherproof and scavenger-proof, as approved by the Engineer. All waste is to be removed from site at least once a week, to a licensed facility and safe disposal certificates provided to the Engineer.

#### **5.4.3.2 EMPTY CEMENT BAGS**

Empty cement bags must be collected from the construction area by the end of every day and before rain events and shall be stored in bins that are either placed under cover or have been fitted with lids. This prevents the bags getting wet and the cement powder leaching into the environment.

#### **5.4.3.3 HAZARDOUS WASTE**

Petroleum, chemical, harmful and hazardous waste is to be stored in an enclosed and bunded area. The location of these sites is to be approved by the Engineer. This waste shall be disposed of at a registered hazardous waste disposal site. The Contractor shall submit copies of safe disposal records to the Engineer as proof of proper disposal.

#### **5.4.3.4 BUILDERS RUBBLE**

The Contractor shall provide labourers to clean up the Contractor's camp and working areas of rubble generated in the course of construction work at least once a week.

Rubble shall be temporarily stockpiled in a waste skip or a central stockpile. Any rubble not being recycled (eg sent for crushing) or reused shall be removed from site to an approved landfill site as soon as it constitutes a

practical load for removal and before temporary closure of the site. No plastics, shrink wrap, paint buckets or any other debris that does not constitute clean building rubble, shall be stored at such stockpile sites.

#### **5.4.4 ABLUTION FACILITIES**

Only approved ablution facilities for any washing and sanitation use shall be used.

Latrine, ablution facilities and first-aid services shall be maintained in a clean and sanitary condition to the satisfaction of the Engineer.

The Contractor shall provide suitable sanitary arrangements at the Contractor's Camp and approved points around the designated work area to allow easy access to all employees on site. No staff are permitted to commence with work on a site without suitable toilet facilities available for them. Sanitary facilities shall be located within 100 m from any point of work, but not closer than 100 m to any water body. One chemical toilet is to be provided on site for every 15-contract personnel at each working area. These toilets must have doors and locks and shall be secured to prevent them blowing over. Toilet paper shall be provided.

The Contractor shall ensure that suitable sanitation facilities are provided for or by all his sub-contractors on site.

Toilets are to be emptied prior to builders' holidays. The contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from site. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited.

#### **5.4.5 EATING AREAS**

The Contractor shall designate eating areas to the approval of the Engineer which shall be clearly demarcated. Sufficient bins shall be present in this area. Any cooking on site shall be done on well-maintained gas cookers with fire extinguishers present.

#### **5.4.6 DRINKING WATER**

The Contractor shall ensure that drinking water is available for all staff on site. If no potable water source is available on site, then the Contractor shall import drinking water to the site.

#### **5.4.7 CONTAMINATED WATER**

Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any escape can be contained, and water resources, including the water table, shall not be endangered. Water containing pollutants such as cements, concrete, lime, chemicals, fuels and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling. This particularly applies to water emanating from concrete batching plants and concrete swills, and to runoff from fuel storage areas. No washing of vehicles is permitted on-site.

If construction areas are to be pumped of water (e.g. after rains), this water must first be pumped into a settlement area, and not directly into a natural ecosystem.

A Method Statement, approved by the Engineer, shall be required for all areas where hydrocarbon and hazardous materials, and pollutants are expected to be used. Contaminated wastewater shall be contained and removed from site to a licenced facility. This includes, but is not limited to, workshop wastewater and paint equipment cleaning. Wash areas for domestic use shall ensure that the disposal of contaminated "grey" water is sanctioned by the Engineer.

#### **5.4.8 DANGEROUS GOODS**

"Dangerous goods", means goods containing any of the substances as contemplated in SANS No. 10234,

supplement 2008 1.00. The relevant material Safety Data Sheets (SDS) shall be available on Site, at storage areas and at points of use. Procedures detailed in the SDS shall be followed.

#### **5.4.9 SITE STRUCTURES**

Contractors shall supply and maintain adequate and suitable sheds for the storage of materials. Sheds for the storage of materials that may deteriorate or corrode if exposed to the weather shall be weatherproof, adequately ventilated and provided with raised floors.

All site establishment components (as well as equipment) shall be positioned to limit visual intrusion on neighbours and the size of the area disturbed. The type and colour of roofing and cladding materials to the Contractor's temporary structures shall be selected to reduce reflection. The contractors' camp shall be fenced with a fence height of at least 1.8m, and the camp area shall be screened via the attachment of shade cloth to the fence surrounding the site camp.

#### **5.4.10 LIGHTS**

The Contractor shall ensure that any lighting installed on the site for his activities does not interfere with road traffic or cause a reasonably avoidable disturbance to the surrounding community or other users of the area.

#### **5.4.11 EQUIPMENT MAINTENANCE AND STORAGE**

When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants. Drip trays shall also be provided in construction areas for stationary plant (such as compressors and generators) and for "parked" plant (such as scrapers, loaders, vehicles).

All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from Site.

The use of detergents for washing shall be restricted to those specified in the OEM of the septic tank on-site.

#### **5.4.12 SECURITY**

With the possible exception of any security staff that may be required to stay overnight, no personnel will be permitted to live on site. Security staff must be provided with heating and cooking facilities (no fires are permitted on-site) access to toilet facilities and communication equipment.

Any security lighting at the Contractor's Camp is to be placed in such a way as to not cause a nuisance to residents of the area and traffic on adjacent roads.

#### **5.4.13 PROTECTION OF FLORA AND FAUNA**

Except to the extent necessary for the carrying out of the Works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted, unless required for rehabilitating the construction area.

Trapping, poisoning and/ or shooting of animals is strictly forbidden. No domestic pets are permitted on Site. Where the use of herbicides, pesticides and other poisonous substances has been specified, the Contractor shall submit a Method Statement, and application of the substance shall be undertaken under strict supervision of a registered Pest Control Officer (PCO). Proof of PCO registrations is to be submitted to the Engineer prior to any herbicides, pesticides and other poisons.

No protected tree species may be disturbed or removed without a license from the Department of Forestry, Fisheries and the Environment (DFFE).

#### 5.4.14 DUST CONTROL

Contractor shall take all reasonable measures to minimise the generation of dust as a result of their activities, and to the satisfaction of the Engineer. The speed limit of 20km/h shall be maintained on Site.

During high wind conditions, the Contractor shall comply with the Engineers instructions regarding dust-suppression measures. The Engineer may request the temporary cessation of all construction activities where wind speeds are unacceptably high, and until such time as wind speeds return to acceptable levels.

#### 5.4.15 POLLUTION

The Contractor shall take all reasonable measures to minimize any dust nuisance, pollution of streams and inconvenience to or interference with the public (or others) as a result of the execution of the Works. A method statement may be required in this regard as determined by the Engineer.

All machinery should be regularly checked for leaks. No runoff shall enter any watercourse.

Any pollution incident must be reported to the Engineer immediately, and before the end of shift.

#### 5.4.16 EXCAVATION AND TRENCHING

During excavation and trenching activities, care is to be taken to ensure that the stockpiling of top material is kept separate from sub-soils. Top material thus saved is to be replaced as top material and is to be the final layer when back-filling. The Contractor shall reinstate all working areas to the satisfaction of the Engineer.

Areas opened for trenching should be restricted to the minimum required to be worked in and closed up in a working day or as dictated by technical requirements such as length of pipe or cable, in order to prevent them from posing safety hazards to people, traffic and animals and to prevent rainwater erosion. Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion. Excess soil shall be stockpiled in an appropriate manner. No stockpiling must occur within 100 m of a water course.

#### 5.4.17 TEMPORARY SITE CLOSURE

If the site is closed for a period exceeding one week, a checklist procedure shall be carried out by the Contractor.

Contractor's Safety Officers (in terms of the Occupational Health and Safety Act) are to check, the site and report to the Engineer regarding the following:

##### **Fuels / flammables / hazardous materials stores:**

- Ensure fuel stores as low in volume as possible;
- No leaks;
- Outlet secure / locked;
- Bund empty;
- Fire extinguisher serviced and accessible;
- Secure area from accidental damage e.g. vehicle collision;
- Emergency and Management telephone numbers to be available and displayed;
- Adequate ventilation.

##### **Other:**

All trenches and manholes secured.

- Fencing and barriers in place per the Occupational Health and Safety Act (No. 85 of 1993).
- Notice boards applicable and secured.
- Security persons briefed and have facility for contact.

- Night hazards checked e.g. reflectors, lighting, traffic signage.
- Fire hazards identified – local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.
- Pipe stockpile wedged / secured.
- Scaffolds secure.
- Inspection schedule and log by security or contracts staff.

The OER is to check and report to the Engineer regarding the following issues:

- Wind and dust mitigation in place e.g. straw, brush packs, irrigation.
- Slopes and stockpiles at stable angle.
- Landscape areas watering schedules & supply secured.
- Fuels/hazardous substances stores secure.
- Cement and materials stores secured
- Toilets empty and secured
- Refuse bins empty and secured (lids)
- Bunding clean and treated
- Drip trays empty & secure (where possible)
- Structures vulnerable to high winds secure.

The Contractor is to ensure that all temporary closure requirements are met before leaving the Site.

## 5.4.18 SITE CLEAN UP AND REHABILITATION

### 5.4.18.1 SITE CLEAN UP

The Contractor shall ensure that all temporary structures, equipment, materials, waste and facilities used for construction activities are removed upon completion of the project. The site cleanup shall be to the satisfaction of the Engineer.

### 5.4.18.2 REHABILITATION

Where appropriate, the contractor shall rehabilitate areas damaged by construction activities during the course of the project to the satisfaction of the Engineer. The Contractor shall be responsible for rehabilitating areas identified by the ECO and the Engineer. The Contractor's procedure for rehabilitation shall be approved by the ECO and the Engineer.

## 6.0 CERTIFICATION

---

Final EMP to be signed once approved.

<b>Prepared</b>	Lizette Kloppers Rachelle Botha		EAPs
<b>Reviewed</b>	Many Momberg		Environmental Advisor
<b>Approved</b>	Kubendran Naicker Odwa Nkcitakalo		Operations Manager Site Engineer



# **APPENDIX A**

## **CVs**

# Curriculum Vitae Lizette Kloppers

## PERSONAL DETAILS

<b>Full Names</b>	Lizette Kloppers
<b>Date of Birth</b>	1 December 1987
<b>Marital Status</b>	Married
<b>Home language</b>	Afrikaans (Speak, read and write)
<b>Other languages</b>	English (Speak, read and write)
<b>Nationality</b>	South African
<b>Gender</b>	Female
<b>Contact Details</b>	E-MAIL: <a href="mailto:lizette@earthnsky.co.za">lizette@earthnsky.co.za</a> CELL: 061 524 2211
<b>Professional Registrations / Certifications</b>	EAPASA: 2019/767 SACNASP: 115453 IEMA Certified Carbon Footprint Analyst
<b>Professional experience</b>	Lizette has more than 12 year's experience in the field of Environmental Management, including various Environmental Authorisation applications (Basic Environmental Impact Assessments, full Scoping and Environmental Impact Assessments, Waste Management Licence applications and Section 24G Rectification applications) and Environmental Legal Compliance Audits. Clients include some of the leading agricultural and industrial companies in South Africa,

such as AFGRI Operations Limited, BiC, Mpack, the University of Pretoria and DMS Powders.

## QUALIFICATIONS AND TRAINING COURSES

Qualification	Institution	Year
BSc BIODIVERSITY AND ECOLOGY cum laude	UNIVERSITY OF STELLENBOSCH	2009
Postgraduate certificate in ENVIRONMENTAL MANAGEMENT (upgraded to MSc)	UNIVERSITY OF LONDON – EXTERNAL SYSTEM	2010
Certificate: Greening your Business (Nedbank and BusinessDay course)	NEDBANK	2011
Environmental Law for Environmental Managers	NORTH WEST UNIVERSITY - CENTRE FOR ENVIRONMENTAL MANAGEMENT	2013
MSc ENVIRONMENTAL MANAGEMENT with merit	UNIVERSITY OF LONDON – INTERNATIONAL PROGRAMMES	2014
An Introduction to Waste Classification in South Africa: Towards Implementation of the National Environmental Management Waste Act	NORTH WEST UNIVERSITY - CENTRE FOR ENVIRONMENTAL MANAGEMENT	2014
Resource Efficiency and Cleaner Production (RECP) Introductory Course	NATIONAL CLEANER PRODUCTION CENTRE (NCPC)	2015
ISO 14001:2015 Requirements	BSI SOUTH AFRICA	2016
Energy Management Systems (EnMS) End User Training	NATIONAL CLEANER PRODUCTION CENTRE (NCPC)	2016
GLOBALG.A.P. Public Farm Assurer Workshop – Crops (F&V)	GLOBALG.A.P. ACADEMY	2017
Energy Management 101	NATIONAL CLEANER PRODUCTION CENTRE (NCPC)	2017
Energy Performance Measurement Indicators (EnPI)	NATIONAL CLEANER PRODUCTION CENTRE (NCPC)	2020
Carbon Footprint Analyst	TERRA FIRMA ACADEMY	2020

## WORK EXPERIENCE

Current employment:

- EARTHnSKY Environmental – Director and Environmental Consultant – 8 April 2016 – present.

Previous employment:

- Research assistant – data collection for a PhD project – 14 October – 9 November 2010.
- African Bank – administrative assistant; full-time and temporary contract – 3 Jan 2010 – 29 April 2011.
- Shangani Management Services – Senior Environmental Consultant – 3 May 2011 – 7 April 2016.

<b>REFERENCES</b>	
<b>Name</b>	<b>Organisation/Institution</b>
1. Ruzelle Myburgh	DMS Powders
2. Ilze Euckermann	University of Pretoria
3. Cara Terblanche	SFP Townplanning
4. Tania van Staden	ARISCU
5. Patricia van der Walt	TiKOTECH
6. Charlotte Maphaha	Southern Proteins

Contact details will be provided upon request.

# Rachelle Botha

## Management Executive Portfolio:

Skilled in development of strategic business development plans, including budget and financial management, market trends analysis, employee performance management and creating and executing strategies to reach targets. Committed to leading and delivering positive multidisciplinary environmental, financial and social inputs to complex and large-scale capital and R&D projects to intercept to commercialization.

## Environmental Executive Portfolio:

A disciplined and dynamic environmental management professional offers a 10-year career track record of success in managing all environmental requirements across a portfolio of projects focussing on Environmental Impact Assessments, waste, water and air management and licensing, as well as in environmental control work and auditing for construction works across public and private sectors. Passionate about delivering valuable environmental inputs and positively influencing development project environmental performance. Reputed for effectively managing business unit operations by meeting objectives contributing to the company's overall success.



## WORK EXPERIENCE

**I-CAT International Consulting and Trading (Pty) Ltd, South Africa**  
<https://www.i-cat.co.za/>

**Special Capital Projects Manager** | March 2020 – Present

- Identify project's requirements.
- Define project objectives, timelines and budget requirements.
- Due diligence and viability assessments. Ensure projects meet all legislative and environmental requirements.
- Market analysis and route to market investigations.
- Develop strategies to optimize project execution.
- Manage project design, development, commercialization and implementation.
- Team management & co-ordination. Provide input and guidance on relevant external consultations and due diligence projects.
- Concept to commercialization.

**Business Unit Manager: Forestry and Agricultural Divisional Manager** | March 2018 to 2020

- Develop BU strategy, targets and objectives ensuring financial and strategic growth.
- Fostered a strong culture of continuous improvement and provided leadership in assigned teams to achieve the goals and strategies.
- Manufacturing and technical team management.
- Financial and manufacturing execution management.
- Client and supplier liaison and relationship management.
- Personnel mentorship and performance management.

**Business Unit Manager: Environmental Divisional Manager**  
April 2014 to 2018

- As above and including the following:
- Established divisional and project budgets for management approval.
- Full operational management of the environmental division.
- Managed environmental vendor contracts and budgets.
- Prepared proposals and cost estimates for future work.
- Review and approval of all environmental reports and projects.
- Key account management.

## PERSONAL DETAILS

**Address:** South Africa, Pretoria

**Phone:** +27 (0) 83 845 1540

**Email:** [rachstof@gmail.com](mailto:rachstof@gmail.com) /  
[rachellestofberg14@icloud.com](mailto:rachellestofberg14@icloud.com)

**LinkedIn:**  
<https://www.linkedin.com/in/rachelle-stofberg-90a39846/>

**Citizenship:** South Africa

**Nationality:** South African

**ID Number:** 8607140003082

**Languages:** English (Full Professional Proficiency)  
Afrikaans (Full Professional Proficiency/Native)

## KEY SKILLS

- Leadership and Direction
- Business Development
- Strategy Development and Implementation
- Client Liaison and Key Account Management
- Community Engagement and Partnership Building
- Critical Thinking and Decision-making
- Interpersonal Communication
- Analytical Problem-solving
- Dynamic, Disciplined and Confident

- Environmental Consulting
- Environmental Compliance Audits
- Environmental Research and Monitoring (Waste, Dust, Water and Noise)
- Environmental Impact Assessment (EIA)
- Management Plans (Waste, Water and Air)
- Environmental Control Works

**ENVASS Environmental, South Africa** | March 2013 to April 2015  
*Environmental Consultant and Senior Operations Manager*

<https://www.envass.co.za/>

- Oversaw all aspects of operations, including employee management, quality assurance, inventory accuracy and materials procurement.
- Ensured compliance with environmental regulations.
- Maintained the highest standards of Health and Safety.
- Ensured effective performance of operational activities.
- Reviewed operational procedures and risk assessments.
- Established and monitored key performance indicators (KPIs).
- Reviewed on-site incidents to establish and implement learning and best practices.
- Worked cross-functionally with business teams in developing short- and long-term growth strategies.
- Established team member responsibilities to meet the daily business demands and productivity targets.
- Supervised and trained operations teams to optimise quality and productivity for a high-growth environment.
- Proactively identify and lead process improvement initiatives.
- Developed, implemented and maintained standard operating procedures (SOPs).
- Reported on daily, weekly and monthly key performance metrics.
- Established and managed an operations budget.
- Advised on various environmental matters.
- Environmental impact assessments (EIAs) for proposed major new developments.
- Performed fieldwork, recorded information and analysed results using software modelling packages
- Drafted reports and action plans and made recommendations.

**SiVEST Environmental, South Africa** | Nov 2009 to March 2013  
*Environmental Consultant*

#### QUALIFICATIONS AND TRAINING

**Master of Philosophy (MPhil) in Environmental Management**  
 2013  
*University of Stellenbosch, South Africa*

**Bachelor of Science (BSc) in Conservation Ecology**  
 2009  
*University of Stellenbosch, South Africa*

#### PROFESSIONAL AFFILIATIONS

**International Association for Impact Assessment (IAIA)**  
*Member*

<https://www.iaia.org/>

**Employment Lawyers Association (ELA) South Africa**  
*Member*

<https://elasa.co.za/>

**Green Building Council of South Africa (GBCSA)**  
*Accredited Greenstar Professional*

<https://gbcsa.org.za/>

**Environmental Assessment Practitioners Association of South Africa (EAPSA)**  
*Application in process*

<https://eapasa.org/site/>

**South African Council for Natural Scientific Professions (SACNASP)**  
*Application in process*

<https://www.sacnasp.org.za/>

#### TECHNICAL KNOWLEDGE

- Microsoft Office: Word, Excel and PowerPoint, Projects

#### Clients:

- City of Cape Town
- Makoya Group
- Eskom
- Anglo
- Sedibeng
- Transnet
- ENRC Manganese

**CURRICULUM VITAE****Report**

---

<b>NAME</b>	:	Deon ESTERHUIZEN
<b>PROFESSION</b>	:	Environmental Consultant
<b>DATE OF BIRTH</b>	:	1968/06/06
<b>PARENT FIRM</b>	:	MDT Environmental (Pty) Ltd
<b>POSITION IN FIRM</b>	:	Director
<b>YEARS WITH FIRM</b>	:	6 years with the firm
<b>NATIONALITY</b>	:	South African
<b>BI &amp; MALE/FEMALE STATUS</b>	:	White Male

---

**TERTIARY EDUCATION (AND YEAR OBTAINED):**

<i>Institution:</i>	<i>Qualification:</i>	<i>Year Obtained:</i>
University of Pretoria	M.Sc (Environmental Ecology)	2003
University of Johannesburg	B.Sc. Honours (Botany)	1991
University of Johannesburg	B.Sc. (Botany and Zoology)	1990

---

**PROFESSIONAL QUALIFICATIONS (AND YEAR OBTAINED)**

- Professional Natural Scientist (RN: 400154/09)
- 

**LANGUAGES:**

	<b>Speaking:</b>	<b>Reading:</b>	<b>Writing:</b>
Afrikaans	Fluent	Fluent	Fluent
English	Fluent	Fluent	Fluent

---

**COUNTRIES OF WORK EXPERIENCE:**

South Africa	Libya	Zambia
Botswana	Lesotho	Namibia

---

**PROPOSED POSITION ON ENVIRONMENTAL LEAD TEAM:****KEY QUALIFICATIONS:**

Deon Esterhuizen has a MSc in Environmental Management with 28 years of experience in water related projects, which include water resource management, water quality management, water use registration and licencing of water users, including project management of multi-disciplinary studies. He also has extensive experience in a wide range of environmentally related projects, processes and applications for private, commercial and industrial clients, in addition to local, provincial and national government departments.

His key experience includes:

**Water Resources**

Key experience gained through his involvement in a number of water resources related projects, including ensuring the protection, development, conservation, management, use and control of the water resources in the Gauteng Region's area of responsibility in a sustainable manner as well as co-ordinate the management of the quality of the water resources of a specific catchment on an ongoing basis to achieve water resource objectives during his employment at the Department of Water Affairs and Forestry. Specific focus areas include:

- Catchment Management Strategies & Plans
- Water Quality Management Plans
- Registration and Licensing of water users
- Assessing water requirements for basic human needs and riverine ecology
- Determining stream-flow assimilative capacity for pollution loads
- Water quality guidelines
- Industrial wastewater treatment and disposal

**Environmental**

Key experience gained through environmental related projects as a consultant at BKS (Pty) Ltd and ILISO Consulting (Pty) Ltd in the fields listed below:

- Integrated Environmental Management (IEM) in general
  - Environmental Impact Assessments (EIAs)
  - Environmental Management Plans (EMPs)
-

- 
- Environmental monitoring and auditing

### **Project Coordination & Management**

Key experienced gained as the project leader and coordinator on a number of large, strategically important and multi-disciplinary projects for various clients, including international (Africa) projects.

### **External Reviewer & Auditor**

Key experienced gained as external reviewer for the Department of Water Affairs and Forestry as well as other consulting firms.

Acting as an independent external auditor in terms of National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), Environmental Impact Assessment Regulations, 2014, as amended for various companies.

---

### **RELEVANT EXPERIENCE**

NAME OF ASSIGNMENT: OLIFANTS RIVER CATCHMENT ENVIRONMENTAL FLOW REQUIREMENTS  
YEAR: From: 2002 To: 2003  
CLIENT & LOCATION: Olifants River catchment, South Africa  
POSITIONS HELD: **Water Specialist**  
ACTIVITIES PERFORMED: Part of the team to determine the environmental flow requirements for the Olifants River catchment. This involved the management of a number of river specialists over a three-year period to ensure that a scientifically defensible environmental flow was determined and recommended for implementation

---

NAME OF ASSIGNMENT: DRINKING WATER QUALITY MANAGEMENT GUIDE  
YEAR: From: 2002 To: 2003  
CLIENT & LOCATION: South Africa  
POSITIONS HELD: **Author**  
ACTIVITIES PERFORMED: Author of a management guide, which forms part of a series, which is intended to provide water supply agencies, water resource managers, workers in health-related fields, as well as communities throughout South Africa with guidance on domestic water quality with regard to planning a new domestic water supply scheme, implementation of a domestic supply scheme, and the management of an existing domestic supply scheme.

---

NAME OF ASSIGNMENT: TRAINING OF DWS EMI INSPECTORATE  
YEAR: From: 2018 To: 2020  
CLIENT & LOCATION: South Africa  
POSITIONS HELD: **Trainer**  
ACTIVITIES PERFORMED: Prepare training material and present courses.

---

NAME OF ASSIGNMENT: KITWE WATER AND SANITATION PROJECT PHASE II IN ZAMBIA  
YEAR: From: 2013 To: 2017  
CLIENT & LOCATION: Zambia  
POSITIONS HELD: **Environmental Expert**  
ACTIVITIES PERFORMED: External specialist review of Environmental Impact Assessment.

---

NAME OF ASSIGNMENT: WASTE MANAGEMENT LICENCE APPLICATION AND WATER USE LICENCE APPLICATION FOR BAVIAANSPOORT WASTE WATER TREATMENT WORKS  
YEAR: From: 2010 To: 2013  
CLIENT & LOCATION: South Africa



---

POSITIONS HELD: **Team Leader**  
ACTIVITIES PERFORMED: Project team management, report review, client liaison, process management.

---

NAME OF ASSIGNMENT: EIA AND WASTE MANAGEMENT LICENCE APPLICATION FOR THE DISPOSAL OF THE GYPSUM AND ASH ON THE KUSILE POWER STATION CO-DISPOSAL FACILITY  
YEAR: From: 2012 To: 2015  
CLIENT & LOCATION: South Africa  
POSITIONS HELD: **Project Leader**  
ACTIVITIES PERFORMED: Waste Management Licence Application.

---

NAME OF ASSIGNMENT: EIA AND WATER USE LICENCE APPLICATION FOR THE MZIMVUBU WATER PROJECT FOR THE CONSTRUCTION OF THE NTABELANGA AND LALINI DAM AND ASSOCIATED INFRASTRUCTURE.  
YEAR: From: 2014 To: 2015  
CLIENT & LOCATION: South Africa  
POSITIONS HELD: **Water Use Licence Task Leader**  
ACTIVITIES PERFORMED: Review of Reports and team and budget management.

---

NAME OF ASSIGNMENT: DESIGN AND CONSTRUCTION OF BOTSABELO COMPLEX - LESOTHO BLOOD TRANSFUSION SERVICES CENTRE, NATIONAL REFERENCE LABORATORY, STUDENT ACCOMMODATION AT THE NATIONAL HEALTH TRAINING COLLEGE  
YEAR: From: 2010 To: 2010  
CLIENT & LOCATION: Lesotho  
POSITIONS HELD: **Environmental Expert**  
ACTIVITIES PERFORMED: Development of an Environmental Protection Plan for implementation during construction. The development of method statements for key environmental construction activities.

---

NAME OF ASSIGNMENT: NELSPRUIT RING ROAD REPORT  
YEAR: From: 2005 To: 2005  
CLIENT & LOCATION: Nelspruit, South Africa  
POSITIONS HELD: **Environmental specialist**  
ACTIVITIES PERFORMED: Preparation of the surface water specialist report for the proposed Nelspruit Ring Road

---

NAME OF ASSIGNMENT: NATIONAL GROUNDWATER STRATEGY  
YEAR: From: 2007 To: 2010  
CLIENT & LOCATION: Department of Water Affairs - South Africa  
POSITIONS HELD: **Project Manager**  
ACTIVITIES PERFORMED: Project Manager of a multi-disciplinary team to develop a National Groundwater Strategy for the Department of Water Affairs

---

NAME OF ASSIGNMENT: WULA FOR TSHWANE METRO ZEEKOEKAT WWTW  
YEAR: From: 2007 To: 2010  
CLIENT & LOCATION: South African Government – Tshwane  
POSITIONS HELD: **Task Leader**  
ACTIVITIES PERFORMED: Task Leader for preparing the Water Use Licence application for the Tshwane Metro Zeekoegat Waste Water Treatment Works behalf of the South African Government.

---

---

NAME OF WATER QUALITY MANAGEMENT  
ASSIGNMENT:  
YEAR: From: 2006 To: 2007  
CLIENT & LOCATION: Department of Water Affairs: Mpumalanga Region – Mpumalanga, South Africa  
POSITIONS HELD: **Task Leader**  
ACTIVITIES PERFORMED: Task Leader of a multi-disciplinary team to assist the Mpumalanga Regional Office: Water Quality Management with line function work

---

NAME OF GAUTENG REGION OFFICE TECHNICAL AND ADMINISTRATIVE SUPPORT  
ASSIGNMENT: PROJECT  
YEAR: From: 2006 To: 2009  
CLIENT & LOCATION: DWAF – Gauteng, South Africa  
POSITIONS HELD: **Project Manager**  
ACTIVITIES PERFORMED: Project Manager of a multi-disciplinary team to assist the DWAF Gauteng Regional Office with specific technical tasks

---

NAME OF SURFACE WATER SPECIALIST REPORT  
ASSIGNMENT:  
YEAR: From: 2006 To: 2006  
CLIENT & LOCATION: Gautrain Rapid Rail Link  
POSITIONS HELD: **Environmental specialist**  
ACTIVITIES PERFORMED: Preparing the surface water specialist report in support of the variant alignment environmental impact assessment study

---

NAME OF ENVIRONMENTAL BASELINE SURVEY  
ASSIGNMENT:  
YEAR: From: 2004 To: 2006  
CLIENT & LOCATION: Libya  
POSITIONS HELD: **Environmental specialist**  
ACTIVITIES PERFORMED: Preparation of the Environmental Baseline Survey (EBS) for the Feasibility Study for the Coastal Road (Ras Ejder to Musaad) in Libya

---

NAME OF INITIAL WORKS EMP AND DRAFT FINAL EMP  
ASSIGNMENT:  
YEAR: From: 2005 To: 2006  
CLIENT & LOCATION: Gautrain Rapid Rail Link  
POSITIONS HELD: **Environmental specialist**  
ACTIVITIES PERFORMED: Part of the ISAA Joint Venture compiling the Initial Works EMP and Draft Final EMP as required by the Record of Decision issued by the Gauteng Department of Agriculture, Conservation and Environment

---

NAME OF THUNE DAM  
ASSIGNMENT:  
YEAR: From: 2007 To: 2012  
CLIENT & LOCATION: Botswana  
POSITIONS HELD: **Environmental specialist**  
ACTIVITIES PERFORMED: Environmental specialist for a 42-month construction period of the Thune Dam in Botswana

---

NAME OF GROOT LETABA STORAGE DAM  
ASSIGNMENT:  
YEAR: From: 2007 To: 2008  
CLIENT & LOCATION: Department of Water Affairs – South Africa  
POSITIONS HELD: **Environmental Specialist**  
ACTIVITIES PERFORMED: Preparation of an EMP for the Groot Letaba proposed storage dam

---

---

NAME OF MODDER AND RIET RIVERS CATCHMENT  
ASSIGNMENT:  
YEAR: From: 2002 To: 2006  
CLIENT & LOCATION: South Africa  
POSITIONS HELD: **Project coordinator**  
ACTIVITIES PERFORMED: Project coordinator for the development of a Catchment Management Strategy and determination of an intermediate Ecological Reserve for the Modder and Riet Rivers Catchment

---

NAME OF WATERVAL RIVER CATCHMENT  
ASSIGNMENT:  
YEAR: From: 2003 To: 2004  
CLIENT & LOCATION: South Africa  
POSITIONS HELD: **Project coordinator**  
ACTIVITIES PERFORMED: Project coordinator for the development of a Water Quality Management Plan for the Waterval River catchment

---

NAME OF OLIFANTS RIVER WATER RESOURCES DEVELOPMENT PROJECT PHASE 2  
ASSIGNMENT:  
YEAR: From: 2010 To: Current  
CLIENT & LOCATION: South Africa  
POSITIONS HELD: **Environmental & Social Team Leader**  
ACTIVITIES PERFORMED: Responsible and accountable for the management of all environmental and social related tasks performed by two Environmental Monitors, two Social Monitors, and a Land Acquisition Team. This team was responsible to ensure that the Contractor executes the project within the guidelines of legislation, the environmental authorisation, the environmental management plan, and project specifications.

---

NAME OF VARIOUS EXTERNAL AUDITS  
ASSIGNMENT:  
YEAR: From: 2016 To: Current  
CLIENT & LOCATION: Omnia Group (Pty) Ltd, Glencore, BME (Pty) Ltd & Sasol Mining (Pty) Ltd  
POSITIONS HELD: **External Auditor**  
ACTIVITIES PERFORMED: Various external audits for Omnia Group (Pty) Ltd, Glencore, BME (Pty) Ltd, Sasol (Pty) Ltd & Sasol Mining (Pty) Ltd. The critical review of the industry's operations versus its legislated compliance requirements.

---

NAME OF LOWER SHASHE DAM ENVIRONMENTAL IMPACT ASSESSMENT  
ASSIGNMENT:  
YEAR: From: 2005 To: 2005  
CLIENT & LOCATION: South African Government  
POSITIONS HELD: **Environmental Specialist**  
ACTIVITIES PERFORMED: Lower Shashe Dam Environmental Impact Assessment report and process review on behalf of the South African Government

---

NAME OF DEVELOPMENT OF A WATER CONSERVATION AND DEMAND MANAGEMENT STRATEGY  
ASSIGNMENT:  
YEAR: From: 2010 To: 2011  
CLIENT & LOCATION: City of Johannesburg  
POSITIONS HELD: **Team Leader**  
ACTIVITIES PERFORMED: Project team management, report review, client liaison, process management.

---

NAME OF BRAAMHOEK PUMP STORAGE SCHEME  
ASSIGNMENT:  
YEAR: From: 2007 To: 2007

---

CLIENT & LOCATION: **Knight Piesold**  
POSITIONS HELD: External reviewer  
ACTIVITIES Requested by Knight Piesold to act as an external reviewer of their  
PERFORMED: Environmental Impact Assessment and Water Use Licence Application for the  
Braamhoek Pump Storage Scheme

---

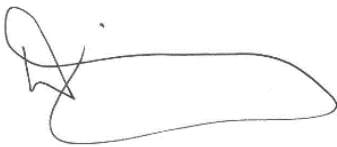
**SUMMARY OF OTHER EXPERIENCE:**

**From:** July 2017 **To:** Present  
**Employer:** MDT Environmental  
**Position held:** Director

**From:** August 2006 **To:** 2006  
**Employer:** ILISO Consulting  
**Position held:** Technical Director - Environmental Discipline Group

**Declaration:**

I confirm that the above information contained in the CV is an accurate description of my experience and qualifications and that, at the time of signature, I am available and willing to serve in the position indicated for me in the Proposal for Consulting Services for the Mokolo Crocodile Water Augmentation Project Phase 2, for the durations and at the locations indicated therein.



Signature

Date: 15 June 2022



## MANDY MOMBERG

### EDUCATION

- 2004 B.Tech Nature Conservation (Tshwane (University of Technology)
- 1993 Nat.Dip. Nature Conservation (Technikon RSA)
- 1994 Nat.Cert. Water Pollution Control (Technikon SA)
- 1994 Nat.Cert. Air Pollution Control (Technikon SA)

### SPECIALIZATION

- Auditing and Management Systems
- Environmental Management
- Sustainability Reporting
- Climate Change mitigation and adaptation responses
- Ecology, Biodiversity, Wildlife and Nature Conservation

### NATIONALITY

- South African

### LANGUAGES

- English
- Afrikaans

### COUNTRIES OF WORK EXPERIENCE

- South Africa      Tanzania
- Namibia            Sudan
- Uganda             Nigeria

### CONTACT DETAILS

Cell: 082 396 7636  
Email: mandy@carbenviro.co.za



## CONSULTANT'S PROFILE

### MANDY MOMBERG, ENVIRONMENTAL SPECIALIST

Mandy has over 30-years' experience in environmental sustainability, biodiversity and climate change matters; having worked for the government (authorizing EIAs in North West Province and as Park Ecologist in Pilanesberg National Park), and in the mining industry and consulting sector. Mandy is also experienced in water use and waste management license authorizations, and in establishing management systems to ensure compliance. Mandy has over 900 audit hours on-site, and is competent in auditing compliance with environmental authorization conditions, GRI and corporate sustainability standards, ISO14001 EMS standard, carbon emission reduction project (CDM and ISO14064-2) and carbon footprints (GHG Protocol and ISO14064-1). Mandy has a B.Tech: Nature Conservation with further training in various environmental matters.

### RELEVANT CONTINUOUS EDUCATION / TRAINING

- National Certificate Water Pollution Control, Technikon SA, 1994
- Systems and Greenhouse Gasses Technical Assessor (ISO14065 Standard), South African National Accreditation System (SANAS), Pretoria, 2012
- CDM Validation and Verification Training (UNFCCC requirements), ERM Verification and Certification Services, Frankfurt, Germany, 2010
- ISO 9001:2000 Internal & Supplier Auditor (SAATCA approved), Wynleigh International (Pty) Ltd, Johannesburg, 2007
- Implementing Environmental Management Systems – ISO 14001:2004 (SAATCA approved). Centre for Environmental Management NWU, 2006
- Environmental Management, University of Cape Town, Environmental Evaluation Unit, 2003
- Waste Management for Environmental Managers, Centre for Environmental Management, PUCHE, 1999
- Principles of Solid Waste Management, DEA & USE-EPA, 1997
- Environmental Law, Environmental Risk Assessment, and Environmental Auditing, Centre for Environmental Management, PUCHE, 1996

### OVERVIEW OF EMPLOYMENT HISTORY

ORGANIZATION	POSITION	PERIOD
CarbEnviro Services	MD, Principal Consultant	Dec2013-present
Shangoni Carbon	Managing Director, Lead Auditor	Jan2012-Sep2013
ERM	Lead CDM Validator/Verifier	Oct2010-Nov2011
PwC	DOE Manager, Senior Consultant	Mar2008-Sep2010
Palabora Mining	Environmental Specialist	Apr2006-Mar2008
NW Parks	Park Ecologist, Pilanesberg NP	Jun1998-Mar2006
NW DTEC	Chief Nature Conservator	Oct1993-May1998
TPA Nature Cons	Nature Conservator, Kgashwane	Apr1991-Sep1993
TPA Nature Cons	Admin Clerk, Law Enforcement	Feb1989-Mar1991

# TANIA OOSTHUIZEN, SENIOR ENVIRONMENTAL SCIENTIST

## SENIOR ENVIRONMENTAL SCIENTIST

Mrs. Tania Oosthuizen is a Senior Environmental Scientist at Knight Piesold's Rivonia office. She is registered as a Professional Natural Scientist (Pr. Sci. Nat. 114500) with the South African Council for Natural Scientific Professionals (SACNASP). Tania holds a master's degree in Environmental Management from the North-West University. Her B.Sc. and B.Sc. Honours degrees were obtained from the Rand Afrikaans University. She gained considerable experience over the years in managing complex environmental authorisation projects. In recent years, she has focused specifically on water use license applications and has presented a course on the topic in March 2018



**Knight Piésold (Pty) Ltd.**  
South Africa

### KEY SKILLS / QUALIFICATIONS

- Professional Natural Scientist (Pr.Sci.Nat.)
- Environmental Assessment Practitioner of South Africa (EAPSA)
- Languages: English (fluent), Afrikaans (fluent).
- Managing interdisciplinary teams of specialists

### SPECIFIC RELEVANT EXPERIENCE

- **Duvha Power Station (2016 – 2017)** - Duvha Water Use Licence. Project Manager for the gap analysis and amendment of the Integrated Water Use License Application (IWULA) and Integrated Water and Waste Management Plan (IWWMP) for the Duvha Power Station.
- **Kendal 30-year Ash Disposal Facility (2013 – 2017)** – Project Manager for the full suite of environmental authorisation processes (EIA, WMLA and IWULA) for the new 30-year Ash Disposal Facility (ADF) at Kendal Power Station near Ogies in Mpumalanga.
- **Camden New Ash Disposal Facility (2014 – 2016)** - Project Manager for the full suite of environmental authorisation processes (EIA, WMLA and IWULA) for the new ADF at Camden Power Station near Ermelo in Mpumalanga.
- **Wallmannsthal Fluorspar Mine, Gauteng, South Africa (2012 – 2013)** - Project Manager (during this period) on the environmental authorization processes (EIA, EMPR, IWULA, IWWMP and waste license) for a greenfields fluorspar mine in Gauteng. Also managed the public participation and GIS components of the study.
- **Burnstone Gold Mine, Mpumalanga (2009 – 2011)** - Project Manager for the compilation of a new EIA, EMPR update, and IWULA update for proposed expansions to the mine. The project included a full public participation programme. It further included a separate environmental authorisation process for a power line from Grootvlei Power Station.
- **Gauteng Freeway Improvement Project, Gauteng (2007 – 2011)** - SANRAL undertook to upgrade the national road network in Gauteng. Project Manager for the compilation of three Basic Assessment Reports and Environmental Management Plans. Tania project managed the Basic Assessment process for three work packages and was also appointed as the Environmental Control Officer (ECO) on six other work packages which comprised quarterly environmental site inspections and reports for three years.

### EDUCATION

- B.Sc. Natural and Environmental Science, RAU, 2003
- B.Sc. Honours Geography, RAU, 2004
- Masters Environmental Management, NWU (cum laude), 2010

### SPECIALIZATIONS

- Water Use Licencing
- EIA / EMPR
- Public Participation
- Environmental Training

### COUNTRIES OF WORK EXPERIENCE

- South Africa
- Swaziland
- Namibia
- Malawi
- Tanzania
- Zambia
- Ghana
- Zimbabwe

### WORK HISTORY

Company Name	Position	Dates
Knight Piésold (Pty) Ltd	Senior Environmental Scientist	2017-Date
Zitholele Consulting	Senior Environmental Consultant	2013-2017
AGES	Senior Environmental Consultant	2012-2013
Knight Piésold (Pty) Ltd	Senior Environmental Scientist	2005-2012
Information Decision Systems	GIS and Environmental Scientist	2004-2005

## NEAL NEERVOORT, SENIOR ENVIRONMENTAL SCIENTIST

### SENIOR ENVIRONMENTAL SCIENTIST

Neal Neervoort has ten years of working experience as a registered professional scientist in the Environmental Management and Aquatic Science fields. He has an aquatic ecology background as a Wetland Assessment Practitioner and DWS: SASS 5 Accredited Practitioner. Neal has been involved in various aquatic specialist studies as part of Environmental Processes and standalone projects. In the Environmental Management field he has experience across Africa implementing Water Monitoring Programmes, Air Quality Monitoring Programmes, Environmental Compliance Audits, Water Use Licence Applications, Scoping Studies and Environmental Impact Assessments.

#### KEY SKILLS / QUALIFICATIONS

- SACNASP, South African Council of Natural Scientific Professions, Pr.Sci. Nat No 115316
- Department of Water and Sanitation: SASS 5 Accredited Practitioner
- Certificate of Competence: Tools for Wetland Assessment Course
- IMRM, the NWA, Water Use Authorisation and Water Use Licence Application – Procedures, Guidelines, IWWMP's and Monitoring Course
- Basic French (basic verbal and communication skills)

#### SPECIFIC RELEVANT EXPERIENCE

- **Johannesburg Water Aquatic Monitoring of Waste Water Treatment Works:** Conduct bi-annual aquatic bio-monitoring, monthly water sampling, bi-monthly diatom sampling and bi-monthly toxicity testing at various WWTW.
- **Kinsevere Copper Mine, DRC:** Responsible for the design and implementation of an extensive groundwater and potable water monitoring programme, including analysis of laboratory results and reporting as well as conducting Bi-annual aquatic bio-monitoring.
- **Ethemba Dam Environmental and Social Impact Assessment, Swaziland:** Project manager and compilation of the ESIA associated with the Dam.
- **ERWAT Aquatic Monitoring:** Conduct quarterly aquatic monitoring including toxicity and diatom analysis at 19 water care works within the Ekurhuleni area.
- **Aquatic Assessment of Olushandja Dam:** Aquatic screening and bio-accumulation study for the Olushandja Bulk Water Supply project.
- **Nampower Water Quality Monitoring:** Develop water monitoring programme for three power stations in Namibia.
- **City of Johannesburg State of Rivers:** Manage and conduct the annual State of Rivers project for the City of Johannesburg.
- **Umshwathi Bulk Water Supply Aquatic Assessment:** Conduct aquatic assessment for the proposed bulk water supply in Umshwathi, KZN.
- **Initial Environmental Evaluation (IEE) for Ezulwini Sustainable Water Supply Project, Swaziland:** Compile and management the IEE for the Ezulwini Sustainable Water Supply Project.
- **Eldorado Park Wetland Assessment:** Conduct wetland delineation and flood line determination for proposed sub-station
- **Two Rivers Platinum Mine:** Conduct quarterly aquatic bio-monitoring for TRP in the Steelpoort area as part of their WUL conditions
- **Khorigas to Uis Environmental Scoping Report, Namibia:** Compile the Scoping Report and facilitate the public participation process for the proposed road upgrade in Namibia.

#### WORK HISTORY

Company Name	Position	Dates
Knight Piésold Consulting, South Africa	(Senior) Environmental Scientist	2009-Date



**Knight Piésold (Pty) Ltd.**  
South Africa

#### EDUCATION

- Current M.Env. Ecological Water Requirements
- 2007 B.Sc. Hons. Biodiversity and Conservation (University of Johannesburg)
- 2006 B.Sc. Zoology & Botany (University of Johannesburg)

#### SPECIALIZATIONS

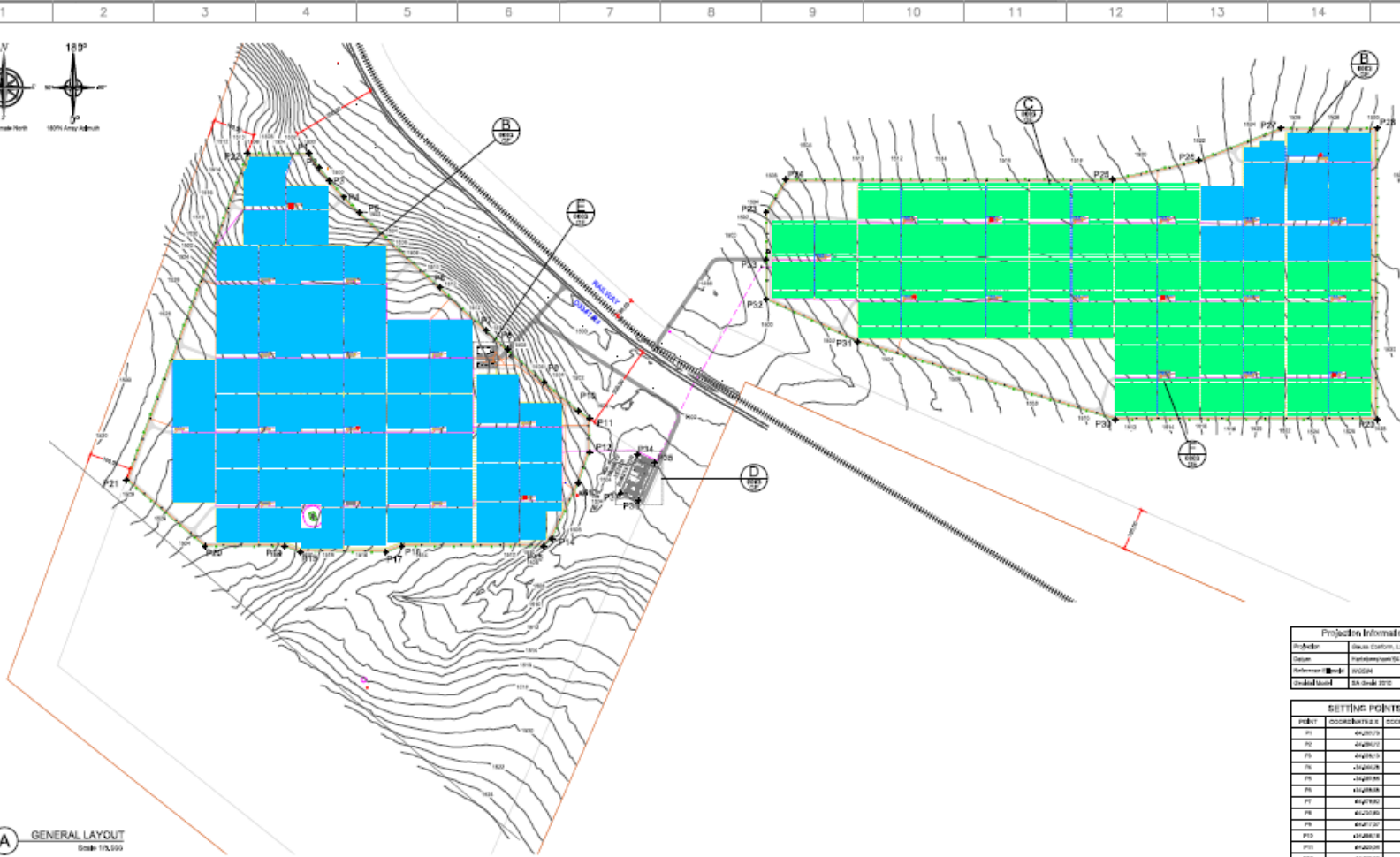
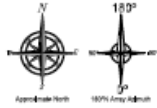
- Aquatic and Wetland Ecology
- Environmental Management
- Water Use Licence Applications

#### COUNTRIES OF WORK EXPERIENCE

- South Africa
- Democratic Republic of Congo
- Swaziland
- Namibia
- Ghana

# **APPENDIX B GENERAL ARRANGEMENT**





- 1. DIMENSIONS ON DETAILATION: DIMENSIONS BETWEEN POINTS OF F.I.C. =
- 2. REAL COLOR INSTALLATION: DIMENSIONS BETWEEN POINTS OF F.I.C. =

**GENERAL INFORMATION**

Project Name	64 MWac
Client	Lesedi Power Company
Location	South Africa
Scale	1:1500

**GENERAL LAYOUT LEGEND**

--- FENCE	--- AIR TRENCH
--- VERTICAL BACKSLOPE FENCE	--- AIR TRENCH
--- PROPERTY BOUNDARY	--- AIR TRENCH
--- ACCESS ROAD	--- AIR TRENCH
--- ROAD DRIVE IN	--- AIR TRENCH
--- ROAD DRIVE OUT	--- AIR TRENCH

**CONFIDENTIALITY STATEMENT:**

THIS DRAWING IS THE PROPERTY OF INGENIA SOLAR ENERGY. THIS INFORMATION IS CONFIDENTIAL AND IS TO BE USED ONLY IN CONNECTION WITH WORK DESCRIBED BY INGENIA SOLAR ENERGY. NO PART IS TO BE DISCLOSED TO OTHERS WITHOUT WRITTEN PERMISSION FROM INGENIA SOLAR ENERGY.

- REVISIONS**
- | NO. | DESCRIPTION        | DATE       | BY |
|-----|--------------------|------------|----|
| 01  | Issue for approval | 16/08/2014 | TR |

**REVISIONS**

INFORMATION ONLY	<input type="checkbox"/>
APPROVAL	<input type="checkbox"/>
QUOTATION PURCHASING	<input type="checkbox"/>
CONSTRUCTION	<input type="checkbox"/>
AS BUILT	<input checked="" type="checkbox"/>

**CONTRACTOR:**

**gransolar** **cobra** **KENSANI**

**DRAWING:**

**INGENIA SOLAR ENERGY**

**CLIENT:**

**Lesedi POWER COMPANY**

**PROJECT:**

**64 MWac Lesedi Solar Park South Africa**

**SHEET TITLE:**

**GENERAL LAYOUT**

<b>REFERENCE:</b>	<b>PAPER SIZE:</b>	
112-031-NG	A3 330 x 494 mm	
<b>DRAWING NO:</b>	HP12GRG46-LAY0000401	

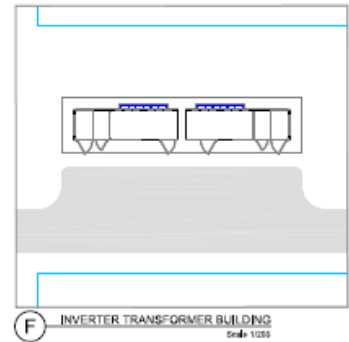
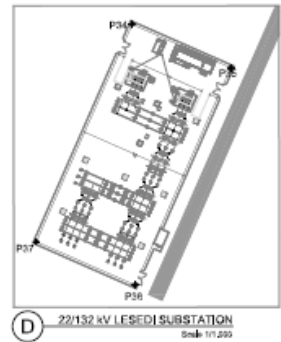
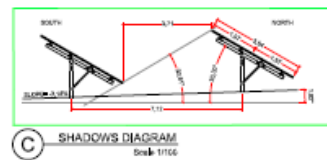
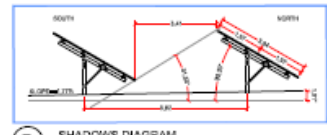
**Projection Information**

Project:	64 MWac LESEDI
Client:	Lesedi Power Company
Reference:	HP12GRG46
Scale:	1:1500

**SETTING POINTS**

POINT	COORDINATE X	COORDINATE Y
P1	48281.75	3215240.38
P2	48281.75	3215240.38
P3	48281.75	3215240.38
P4	48281.75	3215240.38
P5	48281.75	3215240.38
P6	48281.75	3215240.38
P7	48281.75	3215240.38
P8	48281.75	3215240.38
P9	48281.75	3215240.38
P10	48281.75	3215240.38
P11	48281.75	3215240.38
P12	48281.75	3215240.38
P13	48281.75	3215240.38
P14	48281.75	3215240.38
P15	48281.75	3215240.38
P16	48281.75	3215240.38
P17	48281.75	3215240.38
P18	48281.75	3215240.38
P19	48281.75	3215240.38
P20	48281.75	3215240.38
P21	48281.75	3215240.38
P22	48281.75	3215240.38
P23	48281.75	3215240.38
P24	48281.75	3215240.38
P25	48281.75	3215240.38
P26	48281.75	3215240.38
P27	48281.75	3215240.38
P28	48281.75	3215240.38
P29	48281.75	3215240.38
P30	48281.75	3215240.38
P31	48281.75	3215240.38
P32	48281.75	3215240.38
P33	48281.75	3215240.38
P34	48281.75	3215240.38
P35	48281.75	3215240.38
P36	48281.75	3215240.38
P37	48281.75	3215240.38
P38	48281.75	3215240.38
P39	48281.75	3215240.38
P40	48281.75	3215240.38
P41	48281.75	3215240.38
P42	48281.75	3215240.38
P43	48281.75	3215240.38
P44	48281.75	3215240.38
P45	48281.75	3215240.38
P46	48281.75	3215240.38
P47	48281.75	3215240.38
P48	48281.75	3215240.38
P49	48281.75	3215240.38
P50	48281.75	3215240.38
P51	48281.75	3215240.38
P52	48281.75	3215240.38
P53	48281.75	3215240.38
P54	48281.75	3215240.38
P55	48281.75	3215240.38
P56	48281.75	3215240.38
P57	48281.75	3215240.38
P58	48281.75	3215240.38
P59	48281.75	3215240.38
P60	48281.75	3215240.38
P61	48281.75	3215240.38
P62	48281.75	3215240.38
P63	48281.75	3215240.38
P64	48281.75	3215240.38
P65	48281.75	3215240.38
P66	48281.75	3215240.38
P67	48281.75	3215240.38
P68	48281.75	3215240.38
P69	48281.75	3215240.38
P70	48281.75	3215240.38
P71	48281.75	3215240.38
P72	48281.75	3215240.38
P73	48281.75	3215240.38
P74	48281.75	3215240.38
P75	48281.75	3215240.38
P76	48281.75	3215240.38
P77	48281.75	3215240.38
P78	48281.75	3215240.38
P79	48281.75	3215240.38
P80	48281.75	3215240.38
P81	48281.75	3215240.38
P82	48281.75	3215240.38
P83	48281.75	3215240.38
P84	48281.75	3215240.38
P85	48281.75	3215240.38
P86	48281.75	3215240.38
P87	48281.75	3215240.38
P88	48281.75	3215240.38
P89	48281.75	3215240.38
P90	48281.75	3215240.38
P91	48281.75	3215240.38
P92	48281.75	3215240.38
P93	48281.75	3215240.38
P94	48281.75	3215240.38
P95	48281.75	3215240.38
P96	48281.75	3215240.38
P97	48281.75	3215240.38
P98	48281.75	3215240.38
P99	48281.75	3215240.38
P100	48281.75	3215240.38

**(A) GENERAL LAYOUT**  
Scale: 1:1500



NOTES:  
 1. GREEN COLOR INSTALLATION: SEPARATION BETWEEN ROWS OF 7,12 m  
 2. BLUE COLOR INSTALLATION: SEPARATION BETWEEN ROWS OF 6,82 m

KEYED NOTES:  
 1 3 NONE

**MAIN FEATURES**  
 Nominal Power: 64 MWac  
 Peak Power: 80.51328 MWac  
 Installations: 32 of 2,00 MWac  
 Module technology: HANWHA SOLARONE (Polycrystalline)  
 Inverter: SIEMENS PVS 2000\_ZA

**ELECTRICAL CONFIGURATION:**  
 Modules per string: 18 modules  
 Peak Power Module: 290 W  
 Max. Voltage System: 1.000 V  
 Strings per Installation (2,00 MWac): 482 strings  
 Peak Power per Installation (2,00 MWac): 2.51604 MWdc  
 Total quantity of strings: 15.424 strings  
 Peak Power per 64MWac: 80.51328 MWdc

**PV MODULE**  
 Manufacturer: Hanwha Solarone  
 Model: SF260 Poly 1x4ra  
 Peak Power (Pmax): 290 Wp  
 Quantity: 277.632 modules

**PV INVERTER-TRANSFORMER**  
 Manufacturer: SIEMENS  
 Model: SINVERT SOLAR PVS 2000ZA  
 Nominal Power: 2 MWac  
 Quantity: 32

**GENERAL LAYOUT LEGEND**

FENCE	MV TRENCH
VISUAL SETBACK LINE	LV TRENCH
PROPERTY BOUNDARY	AS TRENCH
ROAD D3381 Rd	EAR TRENCH
ACCESS ROAD	SIEMENS WEATHER STATION
ROAD D3381 Rd	GEONICA WEATHER STATION
RAILWAY	AS MV/LV TRANSFORMER

**CONFIDENTIALITY STATEMENT:**  
 THIS DRAWING IS THE PROPERTY OF INGENIA SOLAR ENERGY  
 THIS INFORMATION IS CONFIDENTIAL AND IS TO BE USED ONLY  
 IN CONNECTION WITH WORK DESCRIBED BY INGENIA SOLAR  
 ENERGY. NO PART IS TO BE DISCLOSED TO OTHERS WITHOUT  
 WRITTEN PERMISSION FROM INGENIA SOLAR ENERGY

**EDITOR**

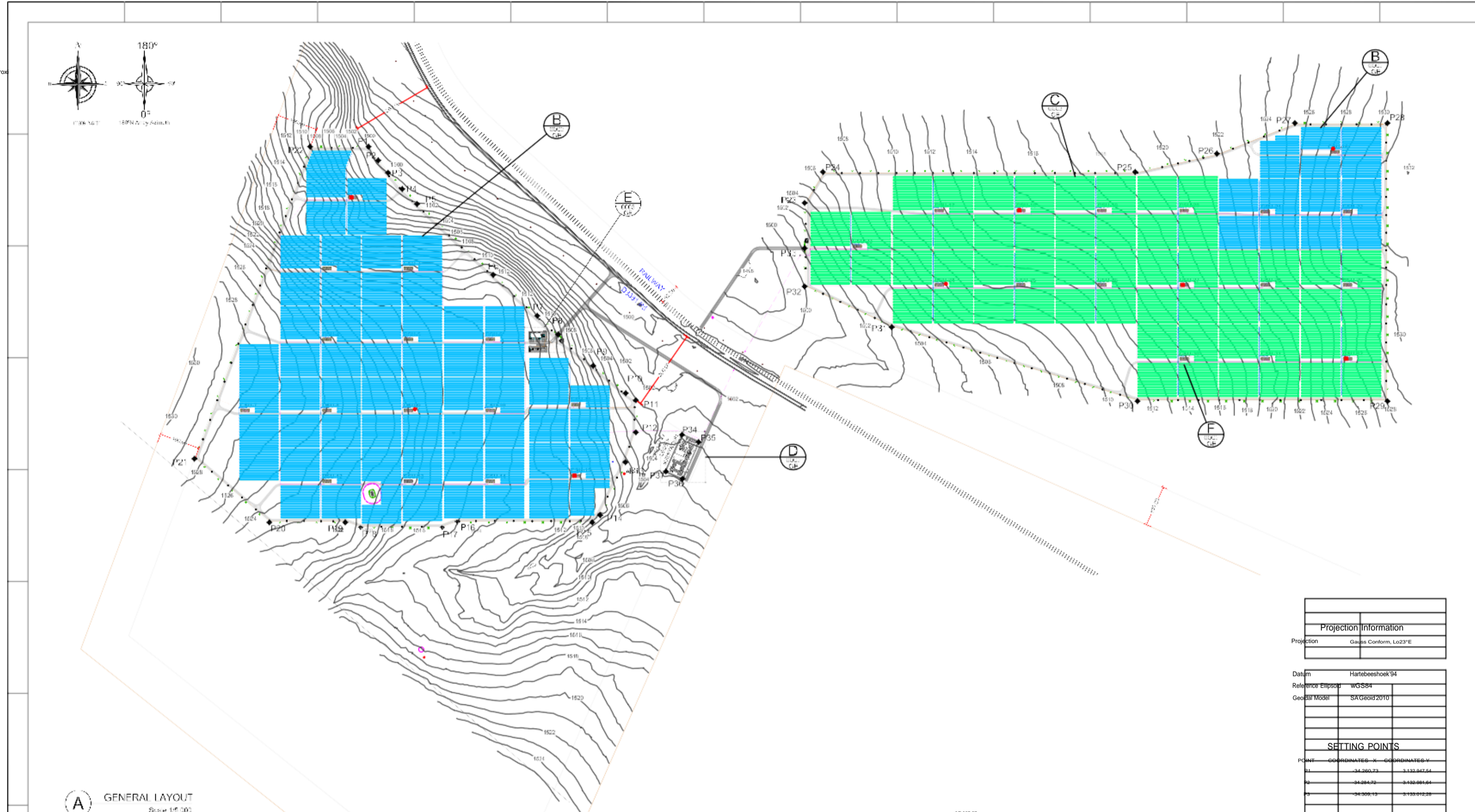
<input type="checkbox"/>	INFORMATION ONLY
<input type="checkbox"/>	APPROVAL
<input type="checkbox"/>	QUOTATION PURCHASING
<input type="checkbox"/>	CONSTRUCTION
<input type="checkbox"/>	AS BUILT



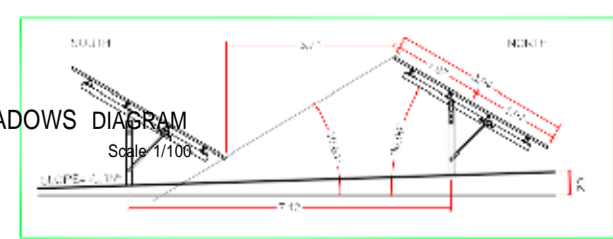
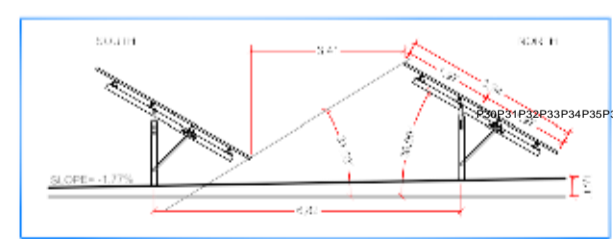
**INGENIA SOLAR ENERGY**  
 1189 Avenue  
 Rivonia Sandton  
 WILHELMS DRIF (SOUTH AFRICA)  
 Phone (+27) 11 251 8822  
 Fax (+27) 11 251 6678  
 www.ingenia-solar.com  
 www.ingenia-solar.com



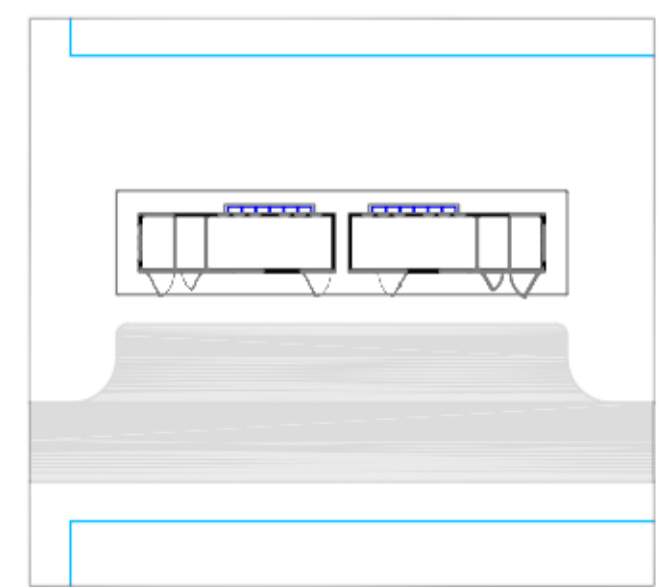
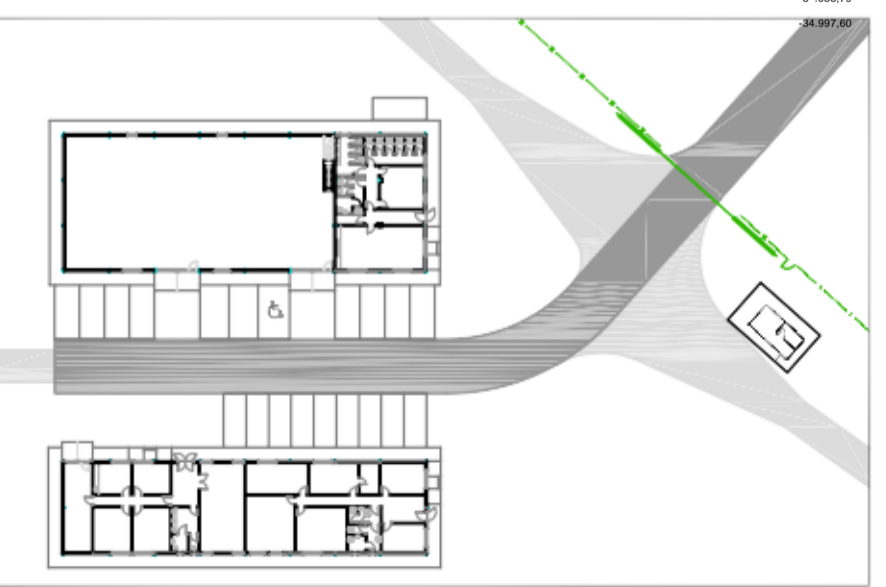
3.133.052.44	
3.133.089.51	
3.133.269.09	
3.133.366.34	
3.133.412.80	
3.133.496.11	
3.133.557.67	
3.133.75.78	
3.133.655.14	
3.133.723.09	
3.133.869.21	
3.133.876.16	
3.133.876.16	
3.133.89.80	
3.133.89.80	
3.133.876.16	
3.133.876.16	
3.133.726.46	
3.132.947.54	
3.133.096.99	
3.133.016.21	
3.133.016.21	
3.132.964.74	
3.132.889.14	
3.132.889.14	
3.133.576.01	
3.133.576.01	
3.133.394.68	
3.133.294.02	
3.133.198.25	



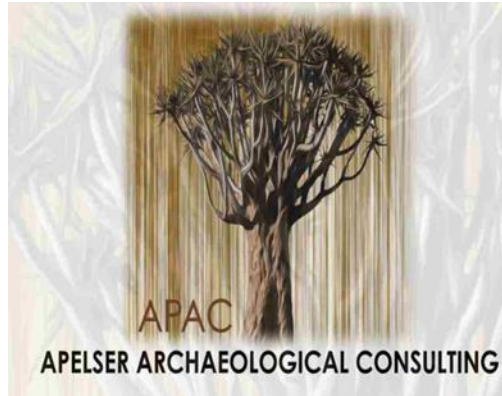
**A GENERAL LAYOUT**  
 Scale 1:5 000



Pd	-34.344.29	-36.037.57
	-34.380.95	-35.078.75
	-34.589.69	-3.038.79
	-34.678.82	
	-34.730.83	
	-34.817.37	
	-34.896.18	
	-34.923.36	
	-34.923.36	
	-34.897.50	
	-34.834.76	
	-34.815.14	
	-34.480.29	
	-34.442.82	
	-34.240.40	
	-34.202.92	
	-34.014.68	
	-33.828.01	
	-34.115.72	
	-35.341.33	
	-35.386.68	
	-36.160.61	
	-36.363.10	
	-36.556.49	
	-36.786.11	
	-36.786.11	
	-36.166.37	
	-35.557.36	
	-35.341.33	
	-35.341.33	



**APPENDIX C**  
**CULTURAL HERITAGE MANAGEMENT PLAN**



Comprehensive and Professional Solutions for all Heritage Related Matters  
CK 2006/014630/23 VAT NO.: 4360226270

**A GRAVE SITE CULTURAL HERITAGE MANAGEMENT PLAN  
FOR GRAVE SITES LOCATED AT THE 75 MW HUMANSRUS PV 1 SOLAR POWER FACILITY  
LOCATED ON THE REMAINDER OF FARM 469, HAY RD  
EAST OF POSTMASBURG IN THE NORTHERN CAPE PROVINCE**

For:

***EarthnSky Environmental  
P.O. Box 5419  
Rietvalleirand  
Pretoria  
0174***

REPORT: **APAC023/89**

by:

***A.J. Pelser  
Accredited member of ASAPA  
Member No:106***

***August 2023***

***P.O.BOX 73703  
LYNNWOOD RIDGE  
0040  
Tel: 083 459 3091***

***Email: [apac.heritage@gmail.com](mailto:apac.heritage@gmail.com)***

***Member: AJ Pelser BA (UNISA), BA (Hons) (Archaeology), MA (Archaeology) [WITS]***

**©Copyright**

**APELSER ARCHAEOLOGICAL CONSULTING**

**The information contained in this report is the sole intellectual property of APELSER Archaeological Consulting. It may only be used for the purposes it was commissioned for by the client.**

**DISCLAIMER:**

**Although all efforts are made to identify all sites of cultural heritage (archaeological and historical) significance during an assessment of study areas, the nature of archaeological and historical sites are as such that it is always possible that hidden or subterranean sites, features or objects could be overlooked during the study. APELSER Archaeological Consulting can't be held liable for such oversights or for costs incurred as a result thereof.**

**The South African Heritage Resources Agency (SAHRA) or one of its subsidiary bodies need to be provided a copy of this document for uploading into their National Database On Heritage Sites and Resources**

A handwritten signature in black ink, appearing to be 'A. Pelser', located at the bottom center of the page.

## SUMMARY

APelser Archaeological Consulting cc (APAC cc) was appointed by EarthnSky Environmental, on behalf of Lesedi Power Company, to draft and submit a Grave Site Cultural Heritage Management Plan for the 75 MW Humansrus (PV1) Solar Power Facility (Lesedi Power Company), located on the Remainder of Farm 469, Hay Rd, 30km east of Postmasburg in the Northern Cape Province.

The graves were identified during previous assessments for the PV Facility (then known as the Groenwater Solar Farm) in 2010 and graves inside the Lesedi Solar PV Facility area during the Construction Phase that commenced in 2012 (**See Webley 2010 & Lesedi Information Document**).

Graves always carry a High Cultural Significance rating and should not be impacted if possible and be left intact. Suitable measures to protect the Grave Sites within the Lesedi south solar PV field have been implemented as directed by the South African Heritage Resources Agency (SAHRA). This Grave Site Cultural Heritage Management Plan and Register is done to satisfy recommendations made by SAHRA in their Final Comments Letter on Case ID#21432, dated to the 23<sup>rd</sup> of June 2023.

## **CONTINUATION STRATEGY**

It is important to note that a Management Plan is an open document. Accordingly, it can be changed constantly within the parameters of Cultural Heritage Resources Management.

This particular Management Plan should be reviewed at least every Five Years and also whenever a specific development is planned (whichever comes first). In the latter case the impact of development on those Cultural Heritage Resources in the affected area should be reviewed. However, such a development may have a secondary impact on other Cultural Resources and this should also be assessed.

The Plan should then be adapted in accordance with those plans and any developments in the time that lapsed up to that particular point in time. Any additional information that was collected (for instance from research) should also be used to re-evaluate Cultural Heritage Resources.

This Management Plan should be re-evaluated in the year 2028.

## CONTENTS

1. INTRODUCTION .....	6
2. TERMS OF REFERENCE .....	6
3. CONDITIONS & ASSUMPTIONS .....	6
4. LEGAL REQUIREMENTS .....	8
5. THE PROPOSED NEW DEVELOPMENT & GRAVE SITE RECORDED .....	10
6. INTERNATIONAL CONVENTIONS FOR THE PROTECTION OF CULTURAL RESOURCES .....	19
7. STATING THE MANAGEMENT PLAN.....	22
8. MANAGEMENT & MAINTENANCE PRINCIPLES.....	22
9. MAINTENANCE OF THE SITE, ITS FEATURES AND INFRASTRUCTURE .....	23
10. VISITORS CONTROL .....	23
11. EDUCATIONAL ACTIVITIES.....	24
12. CONCLUSIONS AND RECOMMENDATIONS.....	25
13. REFERENCES .....	26
APPENDIX A.....	27



## 1. INTRODUCTION

APelser Archaeological Consulting cc (APAC cc) was appointed by EarthnSky Environmental, on behalf of Lesedi Power Company, to draft and submit a Grave Site Cultural Heritage Management Plan & Graves Register for the 75 MW Humansrus (PV1) Solar Power Facility (Lesedi Power Company), located on the Remainder of Farm 469, Hay Rd, 30km east of Postmasburg in the Northern Cape Province. The graves were identified during previous assessments for the PV Facility in 2010 and graves inside the Lesedi Solar PV Facility area during the Construction Phase that commenced in 2012.

Graves always carry a High Cultural Significance rating and should not be impacted if possible and be left intact. Suitable measures to protect the Grave Sites within the Lesedi south solar PV field have been implemented as directed by the South African Heritage Resources Agency (SAHRA). This Grave Site Cultural Heritage Management Plan and Register is done to satisfy recommendations made by SAHRA in their Final Comments Letter on Case ID#21432.

## 2. TERMS OF REFERENCE

The Terms of Reference for the Grave Site Cultural Heritage Management Plan for the 75 MW Humansrus (PV1) Solar Power Facility were the following:

1. To provide a sustainable Management Plan for the preservation and management of the Graves located in the Facility's footprint to ensure that the site and graves on it are not negatively impacted by any development actions & operational activities associated with it.
2. To include a register of the graves located here.

## 3. CONDITIONS & ASSUMPTIONS

The following conditions and assumptions have a direct bearing on this Management Plan:

1. Cultural Resources are all non-physical and physical man-made occurrences, as well as natural occurrences associated with human activity. These include all sites, structure and artifacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development. ***Graves and cemeteries are included in this.***
2. The significance of the sites, structures and artifacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects.

3. Cultural significance is site-specific and relates to the content and context of the site. Any future developments planned should be discussed with full cognizance of this management plan. Sites with a High Cultural Significance are more important than any foreseeable future development and should therefore be preserved at all cost.
4. All recommendations are made with full cognizance of the relevant legislation.
5. A Management Plan entails recommendations as to the preservation, conservation, interpretation and utilization of cultural resources.

Management can be done through five steps that are mutually inclusive and not necessarily chronological. These steps are in accordance with the Heritage Resources Paradigm (**See Van Vollenhoven 2000**). The steps are conservation/preservation, utilization, marketing, auditing and other action steps.

#### **(a) Conservation and preservation**

This refers to the criteria for keeping the historical character of a cultural resource intact. It entails the setting of criteria for the preservation of cultural resources. It also refers to the actions necessary for the preservation of the applicable resource. Security measures are also included. This refers to steps needed to prevent the looting of or damage done by humans to the cultural heritage resources. The last aspect here refers to the training of personnel in order for them to know how to deal with cultural heritage resources. The management guidelines and recommendations in this management plan will provide for this purpose.

#### **(b) Utilization**

This aspect refers to the sustainable utilization of cultural resources in order to also preserve it on the long term. The most important thing here which relates to the Grave Site located at the Solar PV Facility is the interpretation of the resource, which could be in the form of an Information Plaque erected on-site. Utilization may include an adapted (new), commercial or scientific use or a combination thereof. In this case no information plaque is intended.

#### **(c) Marketing**

This issue deals with the possibility to make cultural heritage resources accessible and useful for tourism purposes. It is important to realize that utilization will always be inferior to conservation and preservation principles.

#### **(d) Auditing**

Auditing refers to the peer review and evaluation of heritage reports and management plans. It also entails the frequent monitoring of management plans in order to determine whether the recommendations thereof are adhered to. For this purpose, a Continuation Strategy has been included on page 4 of this document.

#### (e) Other action steps

These are general steps that the managing authority should implement in order to preserve and conserve cultural heritage resources while also maximizing their potential. This should be done within the capacity and capabilities of the managing authority, but it is important that the managing authority should take the necessary steps to improve its capacity and capabilities.

It could include measures to sensitize visitors and staff members to the importance of cultural heritage resources, training of personnel at institutions involved in cultural resources, forming partnerships with other institutions involved in cultural resources and obtaining the necessary funds to implement the management guidelines and recommendation of the management documents (**in this case this Management Plan**).

### 4. LEGAL REQUIREMENTS

Aspects concerning the conservation of cultural resources are dealt with mainly in two Acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

#### 4.1. The National Heritage Resources Act (Act 25 of 1999)

According to the above-mentioned law the following is protected as cultural heritage resources:

- a. Archaeological artifacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g., prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years**
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

#### ***Archaeology, paleontology and meteorites***

Section 35(4) of the Act states that no person may, without a permit issued by the responsible heritage resources authority:

- a. destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;
- b. destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;

- c. trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or paleontological material or object, or any meteorite;
- d. bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and paleontological material or objects, or use such equipment for the recovery of meteorites;
- e. alter or demolish any structure or part of a structure which is older than 60 years as protected.

The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency.

**The National Estate includes the following:**

- a. Places, buildings, structures and equipment of cultural significance
- b. Places to which oral traditions are attached or which are associated with living heritage
- c. Historical settlements and townscapes
- d. Landscapes and features of cultural significance
- e. Geological sites of scientific or cultural importance
- f. Sites of Archaeological and paleontological importance
- g. *Graves and burial grounds***
- h. Sites of significance relating to the history of slavery
- i. Movable objects (e.g., archaeological, paleontological, meteorites, geological specimens, military, ethnographic, books etc.)

**Human remains**

Graves and burial grounds are divided into the following:

- a. ancestral graves
- b. royal graves and graves of traditional leaders
- c. graves of victims of conflict
- d. graves designated by the Minister
- e. historical graves and cemeteries
- f. human remains

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:

- a. destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

- b. destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- c. bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

#### **4.2. The National Environmental Management Act (Act 107 of 1998)**

This Act states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made.

Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

The specific requirements that specialist studies and reports must adhere to are contained in Appendix 6 of the EIA Regulations.

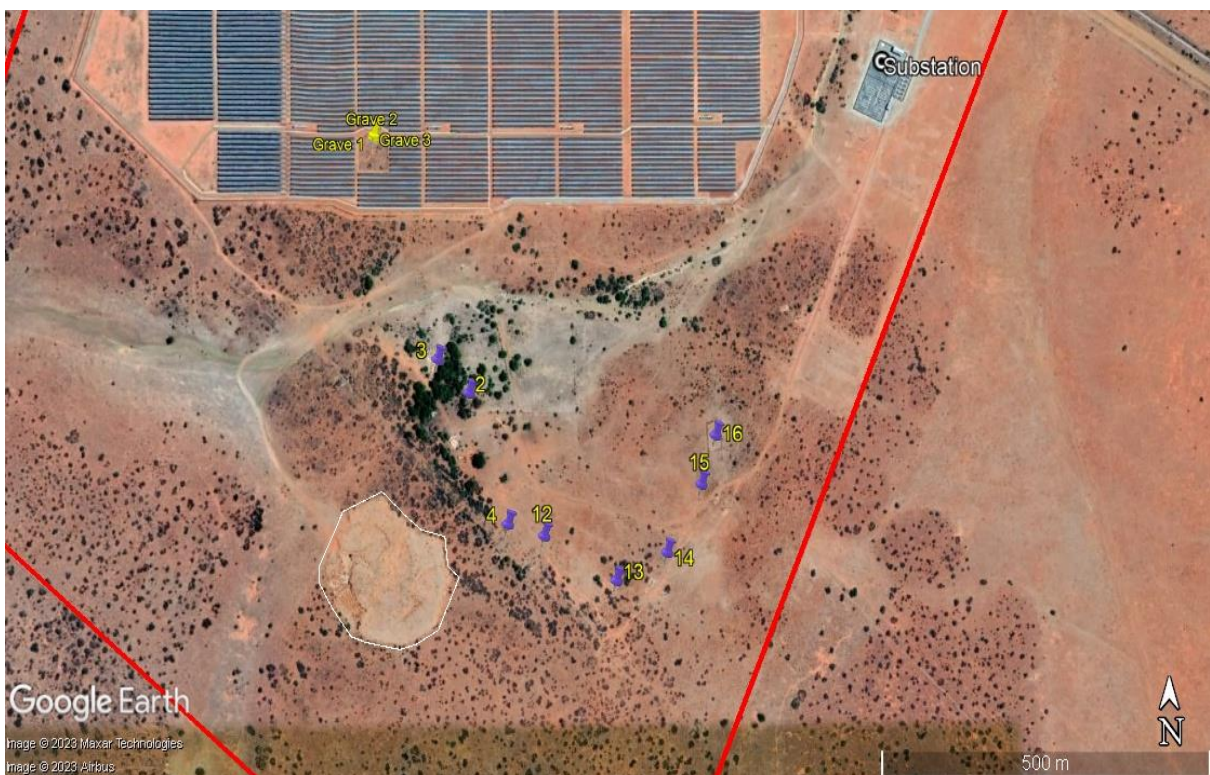
#### **5. THE SOLAR PV FACILITY & THE RELATED GRAVE SITES**

APelser Archaeological Consulting cc (APAC cc) was appointed by EarthnSky Environmental, on behalf of Lesedi Power Company, to draft and submit a Grave Site Cultural Heritage Management Plan & Graves Register for the 75 MW Humansrus (PV1) Solar Power Facility (Lesedi Power Company), located on the Remainder of Farm 469, Hay Rd, 30km east of Postmasburg in the Northern Cape Province.

The graves were identified during previous assessments for the PV Facility in 2010 and 2012, together with a number of other archaeological & historical sites and features. Two grave sites are located in the area, including a family graveyard close to the old Humansrus Homestead (numbered as Site 2), as well as a site containing 4 graves represented by 3 individual graves (Graves 1-3) . The Humansrus family graveyard is not directly impacted by the Solar PV Facility operations, while the Grave 1-3 Site is located within the Lesedi south solar PV field and is therefore directly impacted. This Management Plan focuses mainly on the last- mentioned site and graves.



**Figure 1: General Location of the PV Facility showing the sites recorded (Google Earth 2023).**



**Figure 2: Closer view of the PV Facility showing the sites (Google Earth 2023). Site 2 contains the Humansrus family graveyard, while Graves 1-3 is located at the South Solar Field PV Array area.**



**Figure 3: Closer view showing the location of the Graves 1-3 site inside the South Solar Field PV Array area (Google Earth 2023).**

### **The Grave Sites**

The family graveyard (part of Site 2) is located close to the house and near a stand of exotic cactus plants. It consists of four stone cairns, all covered with local stone termed “Ongeluk lava”. Only one grave contains a collapsed white marble headstone. The inscription indicates the deceased had the surname Human and died in 1913.

**Grave Site Approximate Location – S28 19 18.20 E23 21 03.20**



Figure 4: Graves at old homestead (from Webley 2010: 11).



Figure 5: Headstone on one of the graves (from Webley 2010: 11).



These graves are not impacted by the Solar PV Facility activities. SAHRA directed that to avoid any possible negative future impacts on the known and recorded sites, however, that the proposed mitigation measures related to the sites (more specifically the Humansrus Homestead, family graveyard and related sites) be strictly adhered to. No maintenance activities may take place within 20m of these areas. The drafting and implementation of a Cultural Heritage Management Plan (CHMP) for these sites should also be considered (as these sites are not within Lesedi's lease area, this would be the responsibility of the landowner). Lesedi confirmed that the solar fields and substation infrastructure are fenced to limit operational activities to the solar site, and to prevent further impacts on the homestead and surrounding farm area. Solar infrastructure is located outside of the 20m buffer zone, and the overburden storage area (behind the homestead) does not impact on the homestead or sensitive areas.

During the Construction Phase for the PV Facility that commenced in November 2012 a number of previously unknown graves (4 in total represented by 3 individual stone-packed features) were discovered by the contractor and reported to the Environmental Officer. Work in the area of the graves was immediately stopped, photographs taken and the heritage specialist contacted to investigate. SAHRA was also informed, and they recommended that the site be fenced off with a 5m buffer zone. A further 15m buffer had to be adhered to before any PV arrays were constructed. The area was demarcated and fenced in adherence to this directive of SAHRA. At the close of the construction phase these graves were still intact. It is believed that these graves belong to a one family, with two parents (in one grave) buried next to two small children. It is possible that these are the graves of farmworkers that worked and lived on the farm.

With the graves at the site containing no headstones with legible inscriptions, the identities of the deceased buried here, as well as the ages of the graves (dates of death) are not known. As they are unknown these graves are deemed as older than 60 years of age and therefore are protected by the National Heritage Resources Act.

**Graves GPS Coordinates:** S28 19 07.21 E23 20 57.92 (Grave 1); S28 19 07.16 E23 20 57.90 (Grave 2) & S28 19 07.02 E23 20 57.93 (Grave 3).



**Figure 6: View of the graves (courtesy Lesedi Power Company).**



**Figure 7: Grave 1 (possible adult grave with 2 individuals).**



**Figure 8: Grave 2 – child/infant.**



**Figure 9: Grave 3 – child/infant.**



**Figure 10: A view of the Grave Site with the site properly fenced-in and an access gate provided (photo courtesy Lesedi Power Company).**

### Individual Grave Register

Grave Number	Type	Headstone/Plaque	Name	Date of Birth & Death
1: Humansrus Homestead	Stone-packed	No	Unknown	Unknown
2: Humansrus Homestead	Stone-packed	No	Unknown	Unknown
3: Humansrus Homestead	Stone-packed	No	Unknown	Unknown
4: Humansrus Homestead	Stone-packed	Collapsed Marble Headstone	Hester C. Schoeman born Human	Born: 29 <sup>th</sup> September 1887 Died: 28 <sup>th</sup> May 1913
Grave 1: South Field Solar PV Array	Stone-packed	No	Unknown. Possibly contains burials of two adults	Unknown
Grave 2: South Field Solar PV Array	Stone-packed	No	Unknown. Infant/child?	Unknown

Grave Number	Type	Headstone/Plaque	Name	Date of Birth & Death
Grave 3: South Field Solar PV Array	Stone-packed	No	Unknown. Infant/child?	Unknown

## 6. INTERNATIONAL CONVENTIONS FOR THE PROTECTION OF CULTURAL RESOURCES

Three internationally accepted documents relating to the protection of cultural resources can be taken into consideration when writing management plans. These are:

1. The Australian ICOMOS charter for places of cultural significance, also called the Burra charter, of November 1999.
2. The Venice charter of January 1996.
3. The Conservation plan: a guide to the preparation of conservation plans for places of European cultural significance by James Semple Kerr of Augustus 1985.

Following the guidelines of these conventions will give the correct guidance in dealing with the protection of cultural resources. The principles of the documents correspond with the guidelines of the former National Monument Council (1983) for cultural sites.

### 6.1 The Burra Charter

The Burra Charter is concerned with the implementation of conservation to repair the cultural significance of a place. In article 2 of the document, it is stated clearly that the aim of conservation is to repair the cultural significance of a place. It includes the protection, maintenance and future of such a place (ICOMOS 1999: 1). This idea is in line with the principles of heritage management. Factors that are taken into account for this purpose are the context of the ethical, historical, scientific and social value of a place (ICOMOS 1999).

Article 3 of the Charter states that work on a heritage site should be done with caution in order to take into consideration the existing material, functions, associations and meaning of a site. It basically means that as much change as necessary, but as little as possible should be implemented (ICOMOS 1999: 1).

Article 4 of the Burra Charter indicates that all disciplines which can potentially play a role in studying a place should be used in the study thereof (ICOMOS 1999: 1). It means that anything that could give information should be used. In line with this, article 5 states that all aspects of the cultural significance of a place should be taken into consideration without emphasizing any one to the detriment of the others. It is this cultural significance which, according to article 6, is determining for the conservation policy of a place. The conservation policy is determining for the use, changes, protection and preservation of a historical site (ICOMOS 1999: 2).

The Charter emphasize that even the condition of a place gives ample reason for the preservation of it in terms of cultural significance. Preservation includes the protection, maintenance and stabilization of structures.

Only if not enough information is available on the previous state of the structure which may be used to recapture and emphasize its cultural significance, one may use the processes of restoration, reconstruction and adaptation of structures. However, the cultural significance of various periods should be taken into account (ICOMOS 1999: 2-3). Archaeological excavations is seen by the charter as an important method to collect information, either for restoration purposes or for the collection of scientific knowledge (ICOMOS 1999: 3-4).

In article 25 the Charter indicates that the cultural significance of a place should be strengthened by supporting information such as photographs, drawings and material samples (ICOMOS 1999: 4). This clause is very important as it influences the methodology with regards to the research on places of cultural importance. It includes the documentation of sites by all means available and as completely as possible. It also includes the safekeeping and making available of this documentation and material.

The Burra Charter also has an important influence on the way in which the cultural heritage is handled. Cultural significance is sometimes also referred to as heritage significance. The National Heritage Resources Act refers to this in article 3(3). According to this a place or object is regarded as part of the national estate when it has cultural significance for one of the following reasons:

- a. The importance for the community or in the history of South Africa;
- b. If it is an unusual, rare or endangered aspect of the natural or cultural heritage of South Africa;
- c. The potential to reveal information that will be a contribution to the understanding of South Africa's natural or cultural heritage;
- d. The importance to reveal the most important characteristics of certain classes of South Africa's natural or cultural places or objects;
- e. The importance in having specific aesthetical characteristics on which a community or cultural group place value;
- f. The importance to contain a high value of creative or technical achievements in a specific time period;
- g. The strong or special association of it with a specific community or cultural group for social, cultural or religious reasons;
- h. The strong or special association with the life and work of a person, a group or an organization of importance in the history of South Africa;

- i. Places of meaning with relation to the history of slavery in South Africa (Act 25 of 1999: 15).

## **6.2 The Venice Charter**

The Venice Charter sees historical sites as the most important living witness of the past. The heritage is accordingly seen as the responsibility of today's generation and that it should be conserved in an authentic state (ICOMOS 1996: 1).

The articles of the Venice Charter are more or less in agreement with those of the Burra Charter. It means that the application of last mentioned supports the first and will contribute to the upkeep of international standards in the conservation, preservation and the restoration of historical places.

## **6.3 The Conservation Plan of Kerr**

The Conservation Plan of Kerr is closely associated with the Burra Charter. Although it is stated that it is concerned with sites of European origin, it can also be applied to other historical and archaeological sites. It gives an explanation of the use of the Charter and the steps to be followed in the implementation of the conservation of a historical place. The process consists of two phases.

### **Phase 1**

The first phase deals with establishing cultural significance. It includes the collection of information (documents and physical), the analysis of the importance thereof, the assessment of this importance and the stating of the said importance (Kerr 1985: 2). Assessment consists of the establishing of criteria for the determination of cultural significance, whilst the stating of the cultural importance is only an explanation thereof (Kerr 1985: 8, 12).

### **Phase 2**

The second phase consists of the conservation plan. Firstly, information should be collected. This includes four sectors namely:

1. The needs of the client
2. External needs
3. Requirements for the maintenance of the cultural significance and
4. The physical condition of the place.

Hereafter a conservation plan is developed, a conservation policy is stated and a strategy for the implementation of the conservation plan is rolled out (Kerr 1985: 2).



***The needs of the client in this case are to maintain and protect the Graves and Grave Sites located at the Humansrus (Lesedi Power) Solar PV Facility South Field against any negative impacts related to the activities associated with the facility. External needs refer to things such as legislation specifically with regards to heritage, but also includes local ordinances and regulations with regards to for instance safety and security.***

The requirements for maintenance of the cultural significance refer to issues such as not to remove any cultural material and other objects from the site and the individual graves. This includes the headstones and metal name plaques from the graves. The physical condition refers to the current state of the individual graves and other site features.

Although a conservation plan is stated here, it may be adapted from time to time. This management document therefore gives basic principles for the conservation and management of the site.

## **7. STATING THE MANAGEMENT PLAN**

***The most important principle in the Management Plan for the Graves and Grave Sites in the Solar PV Facility South Field area is that the sites should be maintained in their current state. The facility and associated activities should in no way impact negatively on the sites and any of the individual graves on them, and should be done in complete sympathy with it. The required buffer zones (as directed by SAHRA) has been implemented, and the grave site in the South Field PV Array area has been properly fenced-in with an access gate provided.***

## **8. MANAGEMENT & MAINTENANCE PRINCIPLES**

The reasons for sites to be protected in accordance with the National Heritage Act can be summarized as follows:

1. The importance of the site for the community and in the history of South Africa
2. The importance in having specific aesthetical characteristics on which a community or cultural group place value
3. The strong or special association of it with a specific community or cultural group for social, cultural or religious reasons
4. The site and some of the graves on it could be older than 60 years of age
5. Cultural Heritage sites are unique, non-renewable, cultural resources, with both archaeological and historical significance, displaying both scientific and archaeological/historical research potential.

The following principles should be followed in the Management of the Grave Sites:

- I. The sites should under no circumstances be disturbed during the operational activities associated with the Humansrus (Lesedi) Solar PV Facility and any other activities associated with this.

Should the client at any stage decide to undertake the exhumation and relocation of the Grave Sites and graves on them, then that option would be possible.

The exhumation and relocation of the graves from the site entails the following:

- a. Detailed social consultation/public participation in the form of Newspaper Advertisements, the erection of site notices and possibly Radio Announcements. This is in order to try and trace any possible descendants of the deceased buried here and to obtain their consent for the exhumation and relocation work. These advertisements and notices need to be run for 60 days before permit applications to various government and local authorities can be undertaken. This includes SAHRA, Department of Health, the Municipality and the SAP.
- b. Only once the permits have been issued can the physical work be undertaken. A registered undertaker also needs to be contracted to be part of the process.

The above is, however, not currently foreseen.

## **9. MAINTENANCE OF THE SITE, ITS FEATURES AND INFRASTRUCTURE**

The above-mentioned principles should be used as starting point.

### **Action steps**

- (1) If any additional (previously unknown or invisible, low stone-packed) graves or grave sites are found during the operations and associated activities at the Humansrus (Lesedi) Solar PV Facility work should be stopped immediately so that detailed investigation of the finds are undertaken. Although the previous Heritage Impact Assessment aimed at finding all possible sites & features of cultural heritage origin and significance in the development area, there is always a possibility that some might have been overlooked. The subterranean nature of archaeological & historical remains and features should be taken into consideration here as well.
- (2) The Management Plan should be renewed periodically, at least every 5 years.

## **10. VISITORS CONTROL**

The area does not receive many visitors under normal circumstances. However, care should be taken to limit the possible damage to the identified Graves, by limiting the number of potential visitors.

No visitor should be allowed on the site without prior arrangement with a central office or without supervision of an appointed EO or Site Manager. This will include any possible family members or descendants of the deceased buried at the site.

## **11. EDUCATIONAL ACTIVITIES**

One of the many communicative functions of a museum or heritage site is that of education (Van Zyl et al 1989: 5). Education is also seen as one of the most important museum functions and is aimed at interpreting the information contained inside the museum for the education and entertainment of the public at large (Van Zyl 1989: 10).

**In this case it is not envisaged that the site will be visited by large groups of people (such as school groups) or smaller tour groups, but possibly individual visitors from time to time.**

Although the development and implementation of an Educational Program is therefore not envisaged, the following aspects are normally related to Educational Programs:

### **Aims of an education program**

1. Making the sites accessible to visitors
2. To interpret the sites to visitors
3. To stimulate interest in the sites, but also in heritage in general
4. To serve the visitors by providing an enjoyable educational experience, and
5. To foster appreciation of different cultures

### **Types of educational programs**

There are three types of educational programs, namely formal, non-formal and informal education programs. Formal programs include the following:

- a. Lectures
- b. Educational school programs
- c. Workshops and special courses
- d. In-service training
- e. Publications

**Non-formal programs include:**

- a. Guided tours
- b. Activities of the friends of the museum
- c. Holiday courses
- d. Volunteer training programs
- e. Museum related field trips
- f. Audio-visual programs
- g. Open day programs

**Informal programs include:**

- a. Displays and exhibitions
- b. Radio and television programs
- c. Public relations

**Site interpretation**

The interpretation of the sites also plays an important role in education. For these purposes on-site Information Plaques can play an important role.

**12. CONCLUSIONS AND RECOMMENDATIONS**

This Management Plan is an Open document, meaning that additions and changes can be made and incorporated at any time. It should be fully reviewed at least once every 5 years (therefore again in 2028). It is important to remember that although the recommendations put forward in this document is based on both applicable legislation and the knowledge and experience of the author and the sources utilized, the public at large can provide valuable insight into the management and preservation of any sites. They could therefore also be consulted when the plan is implemented and when it is reviewed as well in order to give recommendations of their own. This document should also be lodged with SAHRA (The South African Heritage Resources Agency) for their knowledge and comments.

To conclude, it is important to remember that there is always a possibility of the subterranean presence of archaeological or historical features or artifacts. Therefore, even though nothing might be visible on the surface of the already operational Solar PV Facility area, any continued & other related activities should proceed with the necessary care. If anything is discovered, the work should cease and a Heritage Specialist called in to investigate before work can continue.

### 13. REFERENCES

Location of Humansrus (Lesedi Power) Solar PV Facility & Known Grave Sites: Google Earth 2023.

Information on Grave Sites & Grave Photographs: Provided by Lesedi Power Company

ICOMOS, 1996. **International charter for the conservation and restoration of monuments and sites (the Venice Charter).**

ICOMOS, 1999. **The Australia ICOMOS charter for places of cultural significance (the Burra Charter).**

Kerr, J.S., 1985. **The Conservation Plan. A guide to the preparation of conservation plans for places of European cultural significance.** Sydney: The National trust of Australia (NSW).

Knudson, S.J. 1978. **Culture in Retrospect.** Chicago: Rand McNally College Publishing Company.

Republic of South Africa. 1998. **National Environmental Management Act** (Act no 107 of 1998). Pretoria: The Government Printer.

Republic of South Africa, 1999. **National Heritage Resources Act** (Act no 25 of 1999). Cape Town: The Government Printer.

Van Zyl, S (ed.). 1989. **Museum education and communication.** Grahamstown: The Albany Museum.

Webley, L. 2010. **Heritage Impact Assessment of Proposed Groenwater Solar Array, Northern Cape Province.** Unpublished Report ACO cc. For: Environmental Resources Management. December 2010.

## **APPENDIX A**

### **Definition of terms:**

#### **Artifact:**

Cultural object (made by humans).

#### **Buffer Zone:**

Means an area surrounding cultural heritage (see def. cultural heritage) which has restrictions placed on its use or where collaborative projects and programs are undertaken to afford additional protection to the site.

#### **Conservation:**

In relation to heritage resources, includes protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance as defined.

#### **Co-management:**

Managing in such a way as to take into account the needs and desires of stakeholders/ neighbors and partners, and incorporating these into decision making through, amongst others, the promulgation of a local board.

#### **Conservation:**

All the processes used to maintain a place or object in order to keep its cultural significance. The process includes preservation, restoration, reconstruction and adaptation.

#### **Contextual Paradigm:**

A scientific approach which places importance on the total context as catalyst for cultural change and which specifically studies the symbolic role of the individual and immediate historical context.

#### **Cultural Resource:**

Any place or object of cultural significance (see Heritage Resource).

#### **Cultural Resource Management:**

The utilization of management techniques to protect and develop cultural resources so that these become long term cultural heritage which is of value to the general public (see Heritage Management).

**Cultural Significance:**

Means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance of a place or object for past, present and future humans.

**Feature:**

A coincidental find of movable cultural objects (also see Knudson 1978: 20).

**Grade/Grading:**

The South African heritage resource management system is based on grading, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Grading is a step in the process towards a formal declaration, such as a declaration as a National Heritage Site, Provincial Heritage Site, or in the case of Grade 3 heritage resources the placing of a resource on the Register. It is not an end in itself, but a means of establishing an appropriate level of management in the process of formal protection. Grading may be carried out only by the responsible heritage resources authority or in the case of a Grade 3 heritage resource by the Local Authority. Any person may however make recommendations for grading. These are known as Field Ratings and usually accompany surveys and other reports.

**Heritage resource (Cultural):**

Any place or object of cultural significance (see Cultural Resource).

**Heritage Resources Management Paradigm:**

A scientific approach based on the Contextual paradigm, but placing the emphasis on the cultural importance of archaeological (and historical) sites for the community.

**Heritage management (Cultural):**

The utilization of management techniques to protect and develop cultural resources so that these become long term cultural heritage resources which are of value to the general public (see Cultural Resources Management).

**Historic:**

Means significant in history, belonging to the past; of what is important or famous in the past.

**Historical:**

Means belonging to the past, or relating to the study of history.

**Iron Age:**

In southern African archaeology, the Iron Age is the stage in the development of a specific groups or groups where the use of iron implements as tools and weapons is prominent. The adoption of this new material coincided with other changes in some past societies often including differing agricultural practices, religious beliefs and artistic styles, although this is not always the case.

**Maintenance:**

Means the continuous protective care of the fabric, contents and setting of a place. It does not involve physical alteration.

**Management:**

With reference to cultural heritage resources, it includes preservation/ conservation, presentation and improvement of a place or object.

In relation to a protected area, includes control, protection, conservation, maintenance and rehabilitation of the protected area with due regard to the use and extraction of biological resources, community-based practices and benefit sharing activities in the area in a manner consistent with the Biodiversity Act as defined and required as per the National Environmental Management: Protected Areas Act, No. 57 of 2003.

**Object:**

Artifact (cultural object) (also see Knudson 1978: 20).

**Partnership/s:**

Means a co-operative and/or collaborative arrangement/s between the various client/parties responsible for the implementation of the Management Plan and a third party that supports the achievement of the Project objectives.

**Preservation:**

Refers to protecting and maintaining the fabric of a place in its existing state and retarding deterioration or change, and may include stabilization where necessary. Preservation is appropriate where the existing state of the fabric itself constitutes evidence of specific cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out.

**Protection:**



With reference to cultural heritage resources this includes the protection, maintenance, preservation and sustainable utilization of places or objects in order to maintain the cultural significance thereof.

**Site:**

A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artifacts, found on a single location (also see Knudson 1978: 20). Also means any area of land, including land covered by water, and including any structures or objects on it.

**Stone Age:**

The period encompasses the first widespread use of stone for the manufacture of tools and weapons in human evolution and the spread of humanity from the savannas of East Africa to the rest of the world. It ends with the development of agriculture, the domestication of certain animals and the smelting of copper ore to produce metal.

**Structure:**

A permanent building found in isolation or which forms a site in conjunction with other structures (also see Knudson 1978: 20). Also means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

**Sustainable:**

In relation to the use of a biological resource, means the use of such resource in a way and at a rate that would not lead to its long-term decline; would not disrupt the ecological integrity of the ecosystem in which it occurs; and would ensure its continued use to meet the needs and aspirations of present and future generations of people (as per National Environmental Management: Biodiversity Act, No. 10 of 2004).