PROPOSED INSTALLATION OF THE BATTERY ENERGY STORAGE SYSTEM (BESS) AT THE PALEISHEUWEL SUBSTATION, PALEISHEUWEL, CEDERBERG LOCAL MUNICIPALITY, WESTERN CAPE PROVINCE.

Environmental Management Programme

November 2022

Prepared for:

Eskom Holdings SOC Ltd

Prepared by:

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DOCUMENT CONTROL

Phase	Author	Status	Revision	Distributed on	Signature
Author	Michelle Boshoff Enviroworks	Draft	02	21 September 2022 7 November 2022	
Review	Elana Mostert Enviroworks	Draft	02	21 September 2022 8 November 2022	
Distributed	Sibulele Mdingi Eskom	Final	02	22 September 2022 15 November 2022	

PROJECT LOCATION

Authorisation Reference No:	14/12/16/3/3/1/2066
Holder of Authorisation	Eskom Holdings SOC Limited
Location of the Activity	Erf 10/400, Piketberg, Cederberg Local Municipality, West Coast District Municipality, Western Cape

LIST OF ACRONYMS AND ABBREVIATIONS

BA	-	Basic Assessment
BBBEEE		Broad-Based Black Economic Empowerment
BAR	-	Basic Assessment Report
CBA	-	Critical Biodiversity Area
CR		Contractor's Environmental Representative
DEA		Department of Environmental Affairs
DEA&DP	-	Department of Environmental Affairs and Development Planning
DFFE	-	Department of Forestry, Fisheries and Environment
DoA	-	Department of Agriculture
DWS	-	Department of Water and Sanitation
DEO	-	Designated Environmental Officer
DWS	-	Department of Water and Sanitation
EA		Environmental Authorisation
ECO	-	Environmental Control Officer
EIA	-	Environmental Impact Assessment
EAP	-	Environmental Assessment Practitioner
EMF	-	Environmental Management Framework
EMPr	-	Environmental Management Program Report
ESA	-	Ecological Support Area
Eskom		Eskom Holdings SOC Limited
GN	-	Government Notice
HWC	-	Heritage Western Cape
IDP	-	Integrated Development Plan
I&APs	-	Interested and Affected Parties
MSDS		Material Safety Data Sheet
NCR		Non-conformance
NEMA	-	National Environmental Management Act
NFEPA	-	National Freshwater Ecosystem Protection Assessment
NNR	-	No Natural Area Remaining

NSBA	-	National Spatial Biodiversity Assessment
ONA	-	Other Natural Area
PM		Project Manager
PPP	-	Public Participation Process
PSDF	-	Provincial Spatial Development Framework
SAHRA	-	South African Heritage Resources Agency
SDF	-	Spatial Development Framework
SIP	-	Strategic Integrated Projects
SRK		SRK Consulting (South Africa) (Pty) Ltd
SWMP		Stormwater Management Plan
WCBSP	-	Western Cape Biodiversity Spatial Plan
WCG	-	Western Cape Government

GLOSSARY OF TERMS

Activity: An activity or operation carried out as part of the construction or operation of the power plant

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

Applicant: Any person who applies for an authorisation to undertake an activity or undertake an Environmental Process in terms of the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as contemplated in the scheduled activities listed in Government Notice (GN) No R. 327, 325 and 324.

Aspect: An action, event, product or service, occurring as a component or result of an activity, which interacts with the existing environment (or which results in impacts to it)

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

Broad-Based Black Economic Empowerment (BBBEE): BBBEE is a racially selective programme launched by the South African government to redress the inequalities of Apartheid by giving certain previously disadvantaged groups of South African citizens economic privileges.

Community: Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.

Contractor: Any company appointed by the Proponent to undertake construction or related activities on site, and will include the main Contractor, as well as any Sub- Contractors.

Construction Phase: The stage of project development comprising site preparation as well as all construction activities associated with the development.

Contaminated water: Water contaminated by activities on site, e.g., concrete water and run-off from plant / personnel wash areas.

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

Design Phase:

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

Environment: The external circumstances, conditions and influences that surround and affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.

Environmental Authorisation: The authorisation by a competent authority of a listed activity or specified activity in terms of NEMA.

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

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

Environmental Management Measures: Requirements or specifications for environmental management, as presented in the EMPr, some of which are based on the mitigation measures identified in the EIA Report (in this case the BA Report).

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

Hazardous substance: A substance (including materials and waste) that can have a deleterious (harmful) effect on the environment and those substances declared hazardous substances in terms of the Hazardous Substances Act 15 of 1973.

Heritage resources: This means any place or object of cultural and archaeological significance.

Impact: A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.

Method Statement: A mandatory written submission by the Contractor to the RE setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity.

Mitigation Measures: Actions identified in the BA Report to manage (avoid, minimise or optimise) potential environmental impacts which may result from the development.

Operational Phase: The stage of the works (including maintenance) following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.

Performance Indicators: A measurable indicator of the outcome of environmental management, used to assess the success with which mitigation measures have been implemented. Often captures the results of several different monitoring activities.

Phase: A defined period during the life of the project, e.g., the Construction and Operations Phases.

Proponent: The person or organisation taking ownership of the project.

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

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

Resources: The personnel, financial, equipment and technical requirements necessary for the successful completion of mitigation measures and for monitoring activities.

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

Schedule: The schedule or deadline for completion of each mitigation measure, which are recorded to ensure that mitigation measures are implemented in good time and in the correct sequence.

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

Solid waste: All solid waste including construction debris, chemical waste, broken / redundant equipment, oil filters, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g., plastic packets and wrappers).

Sub-Contractors: A Sub-Contractor is any individual or Contractor appointed by the main Contractor, to undertake a specific task on site.

A ENVIRONMENTAL ASSESSMENT PRACTITIONER

This Environmental Management Programme (EMPr) Report was prepared by Michelle Boshoff from Enviroworks, the Environmental Assessment Practitioner (EAP) who is undertaking this EMPr amendment process. The sections below provide the details of the EAP and explain the EAP's expertise to prepare this EMPr.

A.1 Details of the EAP

Business name of EAP:	Enviroworks
Physical address:	Michelle Boshoff
Postal address:	Unit 81, Millennium Business Park, 19 Edison Way, Century City, Cape Town
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A.2 Expertise of the EAP

Name of EAP	**Education qualifications**	**Professional affiliations**	**Experience at environmental assessments (yrs.)**
Michelle Boshoff	MSc. Entomology (NWU)	IAIAsa: 5602; EAPASA Reg. 2020/714; SACNASP Reg: 119286	18 years
Name of EAP (Reviewer)	**Education qualifications**	**Professional affiliations**	**Experience at environmental assessments (yrs.)**
Elana Mostert	MSc. Botany (SU)	IAIAsa: 5631; EAPASA: 2019/1311	5 years

A.3 Curriculum Vitae of the EAP

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Michelle Boshoff

RELEVANT QUALIFICATIONS

- Masters of Science in Entomology: University of North West (2005)

Other Courses

- Plant Protection Certificate in pesticide and herbicide applications (1997)
- Training in Aquabase data management (2000)
- Integrated Environmental Management Course through University of Natal (2003)
- Introduction to Waste Management Course through Icando Environmental Management and Training Solutions (2003)
- Coastcare Induction Programme through Department of Environmental Affairs & Tourism: Marine and Coastal Management (2004)
- Environmental Law through Aldo Leopold Institute (2004)
- Air Quality Management Course through University of Natal & CSIR (2006)
- Estuary Management through WRC & University of Natal (2006)
- Introduction to Arc GIS through ESRI (2007)
- Advanced Snake Handling Course through Hartebeespoort Dam & Animal Park (2007)
- Environmental Awareness in the Workplace through Green Gain Consulting (Pty) Ltd (2008)
- Legal Liability through Legislative Compliance Specialists (2008)
- Defensive Driving through Global Training (2008)
- Occupational Health, Safety and Environment Induction Course through Rio Tinto (2008)
- Effective Incident Investigations through Intersafe (2012)
- Stakeholder Engagement Academy – Residential Course through McDanough School of Business (2012)
- Water Management Awareness through Rio Tinto (2015)
- Decision Makers in Public Participation through iap2 (2018)
- Public Participation in Impact Assessment through iap2 (2018)
- Certificate of Training: EIA Law Event through Business Success Solutions (2020)

REGISTRATIONS & MEMBERSHIP:

EAPASA Registered EAP: 2020/714
IAIAsa: 5602
SACNASP: 119286

WORK EXPERIENCE

- **September 2000 – August 2001:** Scientific assistant for impact assessments at Jasper Muller & Associates
- **September 2001 – December 2002:** Research Assistant and Part Time Lecturer at the Hydrological Research Unit, University of Zululand
- **January 2003- February 2007:** Environmental Officer and Assistant Director for Impact Assessments at the Department of Agriculture and Environmental Affairs, KwaZulu-Natal
- **March 2007 – December 2017:** Ecologist and Environmental Manager for Richards Bay Minerals, Rio Tinto
- **January 2018 – August 2022:** Environmental Consultant at SM Services & Consulting Pty Ltd
- **September 2022 – current:** Environmental Consultant at Enviroworks

BASIC ASSESSMENT & EIA EXPERIENCE
Environmental Assessment Practitioner (EAP)

- The proposed upgrade of upper reaches of Manzanyama canal in the magisterial district of uMhlathuze, KwaZulu-Natal (2007).
- The proposed upgrade of the P700 road through Nkandla, KwaZulu-Natal (2003-2007).
- Various EIA's related road upgrades and culvert/causeway upgrades in KwaZulu-Natal (2003-2007).

- Proposed installation of an 83m3 aboveground storage tank at Elbee Conveying cc, Alton, Richards Bay, KwaZulu-Natal (2005).
- Proposed clearing of vegetation and the construction of a children home at QwaQwa, Free State (2020).
- Proposed expansion of the Zulti North Mining Right, Mbonambi Municipality, KwaZulu-Natal (2016-2018).

SPECIALIST EXPERIENCE

- Permitting and licencing compliance review for Base Toliara, Toliara, Madagascar (2019-2020).
- Wetland ecology of Sithebe Wetland for the management of acid mine water, Hlabane, Vryheid, KwaZulu-Natal (2003).
- Site sensitivity assessment for proposed new essential oils distillation plant in Tzaneen, Limpopo (jaar?).
- Alien weed assessment for Rainbow Chickens in Sasolburg, Free State (2020).
- Review and comment on Zulti South mining right and Environmental Authorisation Appeal. uMhlathuze Municipality, KwaZulu-Natal (2016-2017).
- Review and comment on proposed Musina-Makhado IDZ EIA and specialist studies in Makhado, Limpopo (2021).
- Review and advise on permitting requirements for mineral mine, Base Toliara in Madagscar (2018).

WATER USE LICENSES

- Proposed water abstraction from the Caledon River for Telle Bridge & Port of Entry, near Clocolan, Free State (2018).
- Proposed water use licence and IWWMP for Paula Poultry Abattoir, Brandfort, Free State (2019).
- Proposed water use licence and IWWMP for Amadeus Abattoir, Bethlehem, Free State (in progress).
- Compilation of IWWMP for Sasol Komatipoort Service Station, Komatipoort, Mpumalanga (2022).
- Compilation of IWWMP for Sasol Zebediela Service station, Polokwane, Limpopo (in progress).
- Compilation of IWWMP for Sasol Rose Haven Service Station, Pretoria, Gauteng (in progress).

MEMBERSHIP TO EXTERNAL COMMITTEES

- Chamber of Mines: Environmental Policy Committee Member (2007-2017).
- Zululand Chamber of Commerce Member (2015-2017).
- Richards Bay Clean Air Association Member (2007-2011) and Managing Director (2001-2017).
- Tugela Transfer Committee (2015-2017).
- Rio Tinto Energy & Minerals Environmental Network (2008-2017).
- Rio Tinto Legal & Closure Steercom (2009-2017).
- Ezemvelo KZN Wildlife Honorary Officer (2005-2017).

1 INTRODUCTION

King's Landing Trading 507 (Pty) Ltd trading as Enviroworks (Enviroworks) has been appointed by Eskom Holdings SOC Limited (Eskom) to update the existing Environmental Management Programme (EMPr) for the Eskom Battery Storage System (BESS) at Paleisheuwel Substation, Paleisheuwel, West Coast, Western Cape in terms of the National Environmental Management Act 107 of 1998 (NEMA).

The Department has requested in the environmental authorisation (EA) (Ref no: 14/12/16/3/3/1/2066) that the existing EMPr that was submitted along with the Basic Assessment Report (BAR) (dated October 2019_ be updated with the following information:

- Preferred technology and layout to be used at the BESS at Paleisheuwel (*Eskom has confirmed that self-contained (unhoused), solid state batteries will be used, please see photo illustration from BAR below as Figure 1-1: Integrated self-contained battery system)*;
- Final Site Layout (to adhere to the sensitivity map and no-go areas) (*please refer to Figure 1-6 & Figure 1-7); See Appendix C.*
- Incorporation of the specialist recommendations into the EMPr (*updated throughout the EMPr)*.

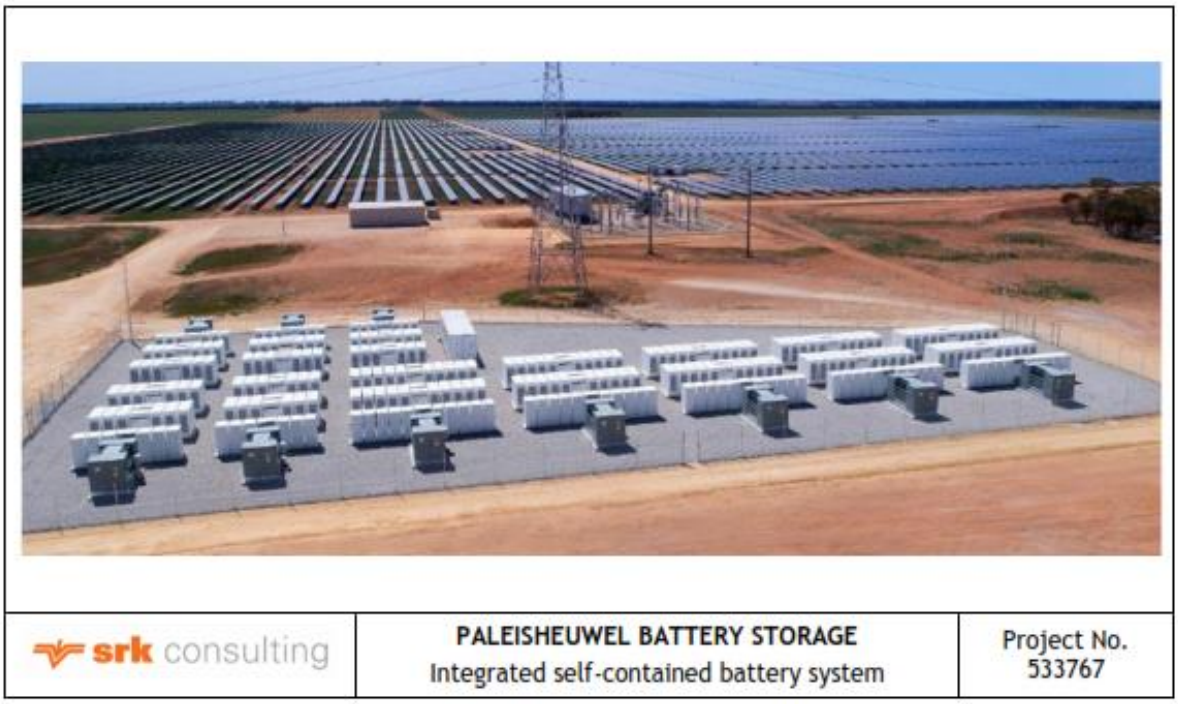

Figure 1-1: Illustration of self-contained solid state battery system.

(Photo taken from the BAR, SRK Consulting 533767/42B: Paleisheuwel Battery Storage BA, Source Insideevs.com)

Any amendments and/or updates within this EMPr has been underlined for ease of reference.

This Environmental Management Programme[1] (EMPr), amongst others, describes the mitigation measures and identifies the specific role players that will be responsible for implementation of the mitigation measures, in order to ensure that impacts on the environment are minimised during the construction, operational and decommissioning phases of the proposed development of a Battery Energy Storage System (BESS) at the Paleisheuwel Substation, Cederberg Local municipality, Western Cape Province.

The objectives of this EMP include[2]:

- Ensuring compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- Ensuring that are sufficient allocation of resources on the project budget so that the scale of EMP-related activities is consistent with the significance of the project impacts;
- Verifying environmental performance through information on impacts as they occur;
- Responding to changes in project implementation not consistent in the EIA;
- Responding to unforeseen events; and,
- Providing feedback for continual improvement in environmental performance.

This EMPr is largely based on the mitigation measures proposed in the EIA, as well as additional requirements from the conditions in the Environmental Authorisation (EA) (as it was issued prior to the EMPr) and more detailed project designs.

This EMPr must form part of the contractual agreement between the relevant Contractor(s) and the Developer/Applicant.

1.1 Background

Eskom Holdings SOC Limited (Eskom) proposes installing Battery Energy Storage Systems (BESSs) at various (existing) distribution substations throughout South Africa to:

- Strengthen the electricity distribution network and address current voltage and capacity constraints;
- Integrate a greater amount of renewable energy [in this case Paleisheuwel Solar Photovoltaic (PV) Plant] into the electricity grid; and
- Reduce the requirement for investment in new conventional generation capacity (i.e., gas, nuclear, coal) and new distribution substations and powerlines to strengthen networks.

The BESS will strengthen the electricity distribution network from the Paleisheuwel Solar PV Plant to the West Coast area, and make the electricity generated by renewable energy dispatchable.

SRK Consulting (South Africa) (Pty) Ltd (SRK) was appointed by Eskom to undertake the Basic Assessment (BA) processes for the proposed BESSs at the Paleisheuwel Substation and the Skaapvlei Substation along the West Coast in the Western Cape.

[1] Lochner, P. 2005. *Guideline for Environmental Management Plans.* CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs& Development Planning, Cape Town.
[2] Hill, R. C. 2000. Integrated Environmental Management Systems in the implementations of projects. South African Journal of Science 96:50-54

The National Environmental Management Act 107 of 1998 (NEMA) requires that an Environmental Management Programme (EMPr) be submitted along with the BA Report to demonstrate how environmental management and mitigation measures will be implemented. The BA Report contains a detailed description of the project and its impacts. The current layout will not require clearance of more than 1ha of indigenous vegetation.

Eskom can undertake this activity during maintenance without the need for Environmental Authorisation (EA) (Appendix E) if conducted in terms of an approved Maintenance and Management Programme (MMP). This document is intended to meet the requirements of an MMP and, through its approval, authorises Eskom to conduct ongoing maintenance in terms of the maintenance specifications in this document without the need for EA.

The mitigation measures apply to the following phases of the development process:

- **The Design Phase:** These measures relate to the detailed layout, planning and design of the BESS and associated infrastructure, and will largely be implemented by the planning and development team, prior to the commencement of any physical on-site activities. These mitigation measures are presented in Section 1.5.
- **The Construction Phase:** These mitigation measures are applicable during site preparation and construction on the site of the proposed project and must be implemented by the relevant contractors and sub-contractors. These mitigation measures are presented in Section 3.
- **The Operational Phase** (the MMP): These mitigation measures are applicable during the long- term operation and maintenance of the BESS and must be implemented by Eskom or approved service providers. These mitigation measures are presented in Section 4.

As it is expected that the BESS will be maintained in the long-term and not be decommissioned in the foreseeable future, measures related to decommissioning and post-closure rehabilitation are not included in the EMPr.

The management measures listed for the various phases are either:

- Essential: best practice measures which must be implemented and are non-negotiable; or
- Best Practice: recommended to comply with best practice, with adoption dependent on the proponent's risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented. These measures have been italicized for ease of reference.

Note: The EMPr will be submitted to DFFE for approval. This document may need to be updated to ensure that all relevant conditions of authorisation are adequately captured.

1.2 Content of the EMPr and MMP

The Environmental Impact Assessment (EIA) Regulations, 2014, promulgated in terms of NEMA (Government Notice (GN) R 982, as amended by GN R326 and GN R517) prescribe the required content in an EMPr. These requirements and the sections of this EMPr in which they are addressed, are summarised in Table 1-1.

Table 1-1: Environmental Management Programme requirements as per Appendix 4 of the NEMA EIA Regulations, 2014 (as amended).

Reg.	EMPr Content	Included (Yes, No or N/A)	Report Section Reference
(a)	A draft environmental management programme must comply with section 24N of the Act and include –		
	details of: (i) the person who prepared the environmental management programme; and	**Yes**	**Chapter A.1**
	(ii) the expertise of that person to prepare an environmental management programme;	**Yes**	**Chapter A.2**
(b)	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	**Yes**	**Chapter 4**
I	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;	**Yes**	**Chapter 1**
(d)	A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including planning and design; (ii) pre-construction activities construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and, (v) where relevant, operation activities;	**Yes**	**Chapter 2, 3 & 4**
(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 ti) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation. (ii) comply with any prescribed environmental management standards or practice) comply with any applicable provisions of the Act regarding closure, where applicable; and, (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	**Yes**	**Chapter 2, 3 &4**
(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**YES**	**Chapter 3 & 4**
(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**YES**	**Chapter 3 & 4**

Reg.	EMPr Content	Included (Yes, No or N/A)	Report Section Reference
(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	**YES**	**Chapter 3 & 4**
(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	YES-	**Chapter 3 & 4-**
(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	**YES**	**Chapter 3 & 4**
(l)	A program for reporting on compliance, taking into account the requirements as prescribed by Regulations;	**YES**	**Chapter 3**
(m)	An environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work; and, (ii) risk must be dealt with in order to avoid pollution or the degradation of the environment; and	**YES**	**Chapter 3**
(n)	Any specific information that may be required by the Competent Authority.	-	-

As well as the requirements of an EMPr specified in the EIA Regulations, 2014 (as amended), the local Department of Environmental Affairs and Development Planning (DEA&DP) has specified the required content of an MMP. These requirements and the sections of this EMPr in which they are addressed, are summarised in Table 1-2.

Table 1-2: Content of an MMP

Item	Section Ref.:
Personal details of the applicant	1.1
Project description/introduction	1.4
Relevant legislation	1.1
Description of the site	1.4
Description of maintenance activities	4
Roles and responsibilities during maintenance	4.1.1
Environmental monitoring or auditing during maintenance	Table 4-1

1.3 Project Description

Eskom proposes installing BESSs at existing distribution substations throughout South Africa to:

- Strengthen the electricity distribution network and address current voltage and capacity constraints;
- Integrate a greater amount of renewable energy into the electricity grid; and
- Reduce the requirement for investment in new conventional generation capacity (i.e., wind, solar, gas, nuclear, coal).

Eskom initially identified a total of 24 substation sites in the Western Cape where the BESS could be implemented with a total (proposed) BESS capacity of 148.5 Megawatts (MW). Eskom identified the Paleisheuwel Substation as an ideal site to implement the BESS primarily because of its location adjacent to the Paleisheuwel Solar PV Plant, operated by Enel Green Power.

The following will be implemented at the Paleisheuwel BESS:

Technology: Eskom will be installing self-contained (unhoused) solid state batteries. Solid state batteries solid electrodes and a solid electrolyte. Materials predominantly used as solid electrodes include ceramics (e.g., oxides, sulfides, phosphates) and solid polymers. They are potentially safer (as they are used in pacemakers), with higher energy densities, but at a much higher cost. (Refer to Appendix D Risk Assessment for solid state batteries and Appendic G for the battery storage technology). Solid state batteries are sensitive to temperatures and a common failure mechanism in solid state batteries are mechanical failure. Hence regular maintenance on the batteries will be required. The advantage of this choice of technology is that it may avoid the use of dangerous and toxic materials found in other types of batteries (such as organic electrolytes) and it is believed that they have a lower risk of catching fire. Another advantage of solid-state batteries is that the tend to charge faster[3] at higher voltage and has a longer life cycle[4].

Photo of the vegetation in the no-go area.

Updated Layout Plan: During the impacts assessment and consultation with stakeholders it was noted that some areas within the Eskom site were regarded as ecological sensitive and contained SCC and other vegetation that was noteworthy to conserve. Based on the vegetation sensitivity map the layout plan has been updated to relocate the BESS to the west of the Eskom site to an area that is already disturbed. The ecological sensitive area has been mapped as a no-go area to conserve and protect the identified SCC's. Refer to Figure 1-7 for the updated layout plan.

Incorporation of the specialist recommendations within the EMPr: This document has been updated to take into consideration the recommendations of the vegetation specialist and the stormwater management program. These recommendations informed the updated layout plan, the management measures on Chapters 2, 3 and 4.

The subject of this EMPr is the proposed installation of the BESS at the Paleisheuwel Substation ("the project"). Separate EMPrs have been compiled for the proposed BESSs at the other substations.

[3] Eisenstein, Paul A. (1 January 2018). "From cellphones to cars, these batteries could cut the cord forever". NBC News. Retrieved 7 January 2018.
Limer, Eric (25 July 2017). "Toyota Working on Electric Cars That Charge in Minutes for 2022". Popular Mechanics. Retrieved 7 January 2018.

[4] Bullis, Kevin (19 April 2011). "Solid-State Batteries - High-energy cells for cheaper electric cars". MIT Technology Review. Retrieved 7 January 2018.

1.4 Site Description

Photo of the entrance to Paleisheuwel Substation

The Paleisheuwel Substation is located adjacent to the Paleisheuwel Solar PV Plant, operated by Enel Green Power. Access to the Paleisheuwel Substation is via the R365, which continues north to Lamberts Bay and south to Portersville (refer to Figure 1-) on Erf 10/400, Piketberg, Cederberg Local Municipality, West Coast District Municipality, Western Cape

Besides the Paleisheuwel Solar PV Plant, which has a capacity of 75 MW, extensive agriculture is the primary land use in the study area, although tourism is of increasing significance in the region. The closest town to the Paleisheuwel Solar PV Plant is Redelinghuys (approximately 20 km southwest of the Substation). The Redelinghuys area is known for potato farming and rooibos harvesting.

The upper reaches of the Verlorenvlei (where it flows into the Atlantic Ocean at Elands Bay) are located approximately 30 km northeast of the Paleisheuwel Substation. The Verlorenvlei, a RAMSAR site, is famous for its prolific birdlife and unspoiled fynbos flora and fauna and is one of the largest natural wetlands along the West Coast. During the flower season (July to September) numerous wildflowers emerge in the area.

The study area falls within the Fynbos Biome and the Leipoldtville Sand Fynbos vegetation type (see Figure 1-2), listed as Endangered.

Photo of the northern area designated as no-go area.

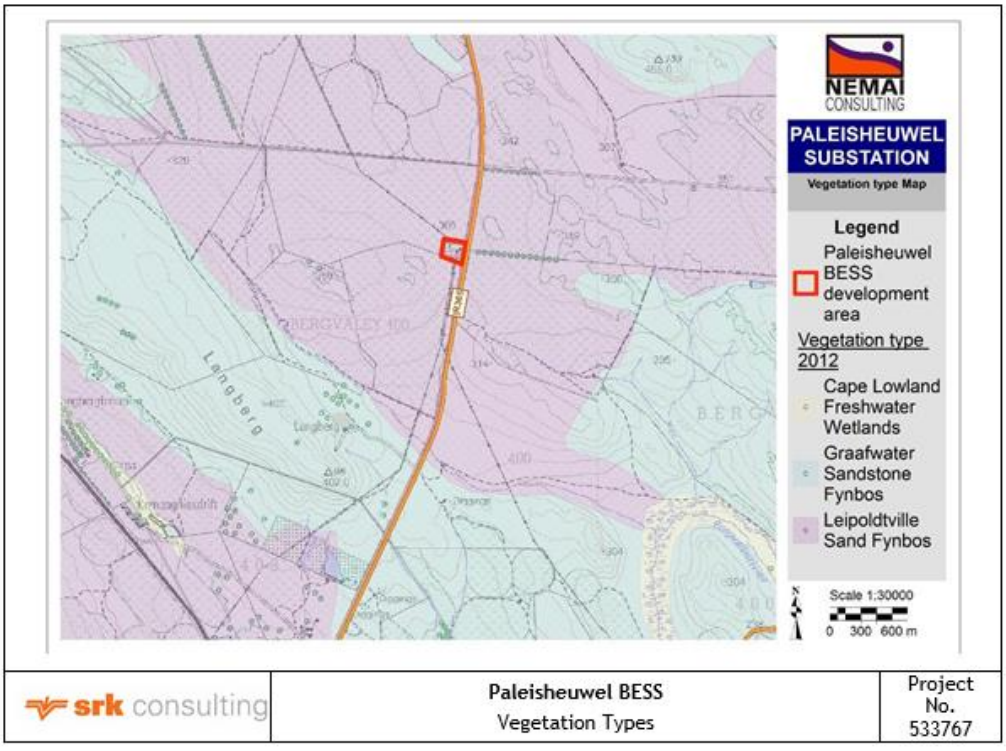

Figure 1-2: Vegetation Type.

According to the Western Cape Biodiversity Spatial Plan, the site intersects an Ecological Support Area (ESA) although much of the site is transformed and only pockets of natural vegetation remain (see Figure 1-3 and Figure 1-4).

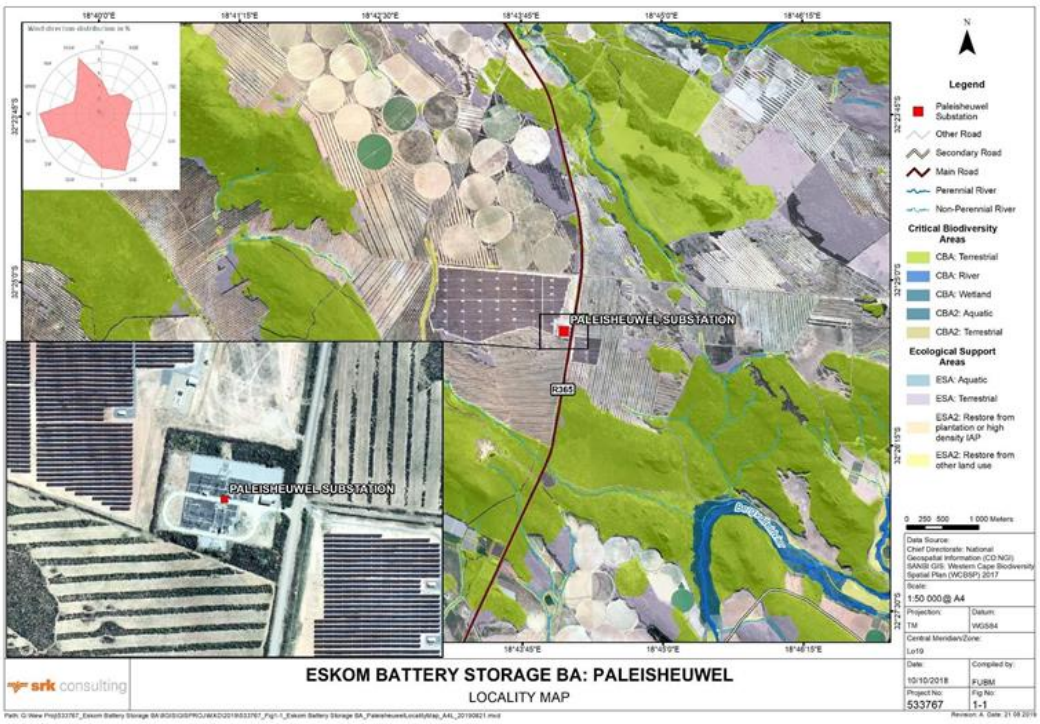

Figure 1-3: Locality Map.

View of the access road to the east of the Paleisheuwel Substation

The Paleisheuwel Substation as seen from the R365 (north-east) with the Paleisheuwel Solar Park to the right

View of the area to the west of the Paleisheuwel Substation looking south

View of the Paleisheuwel Substation looking south

srk consulting	**PALEISHEUWEL BATTERY STORAGE** Paleisheuwel Substation	Project No. 533767

Figure 1-4: The Paleisheuwel Substation as seen from various viewpoints

During the field survey, one plant Species of Conservation Concern (SCC) (*Leucospermum rodolentum*) and four provincially protected species protected were observed on site (*Amaryllidaceae spp.*, *Apocynaceae spp.*, *Mesembryanthemaceae spp*. and *Proteaceae spp*.). One species (*Brunsvigia orientalis)* of "Least Concern" in the "Red List" were also observed on the site.

Figure 1-5: Plant SCC and protected species distribution.

The vegetation assessment (Figure 1-5) undertaken by NEMAI as part of the BAR indicated that a "Search and Rescue" strategy must be implemented to save the abovementioned plants from where they can be impacted on from the BESS. A permit to remove these plant species will need to be obtained from CapeNature before careful removal occur. It was further recommended that these species should be relocated into areas with the same ecological habitats as its origin.

The vegetation specialist also indicated that the project area falls within the Fynbos biome and that part of the site is regarded as ESA1. It was further noted that although the ESA does not provide any ecological functionality and does not sustain and CBA's or terrestrial features, it is important to map the sensitive areas (Figure 1-6) and to exclude them from the development footprint (Figure 1-7).

It was recommended that all areas affected by the construction be rehabilitated upon completion of the construction phase of the development to the pre-construction state where possible. This has been noted in Table 3-2 Environmental management and mitigation measures that must be implemented during the Construction Phase.

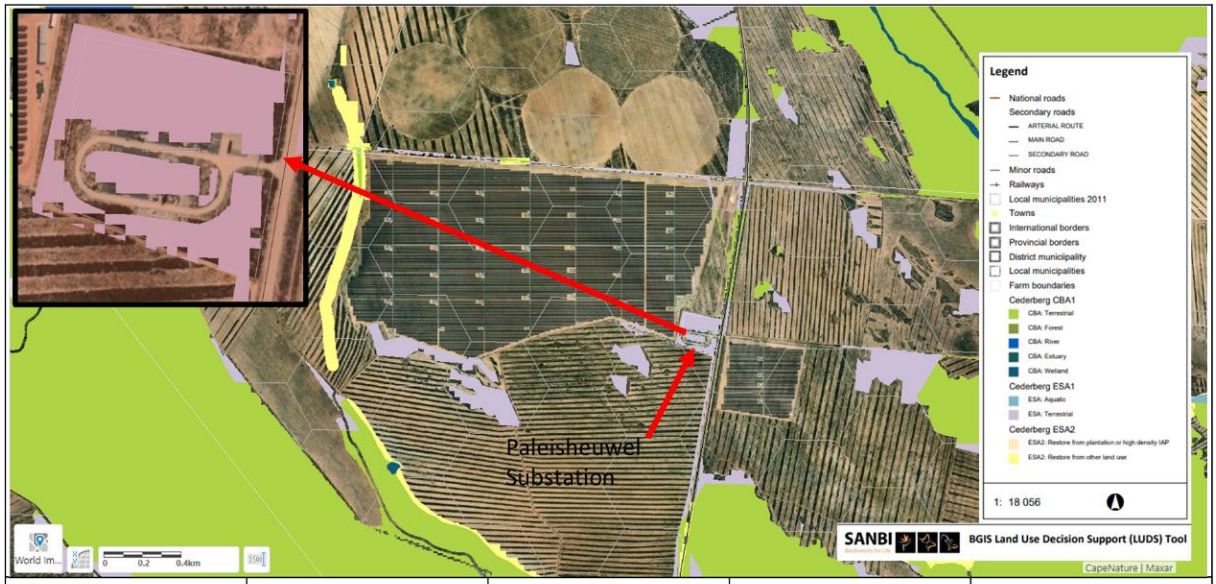

Figure 1-6: Paleisheuwel Sensitivity Map

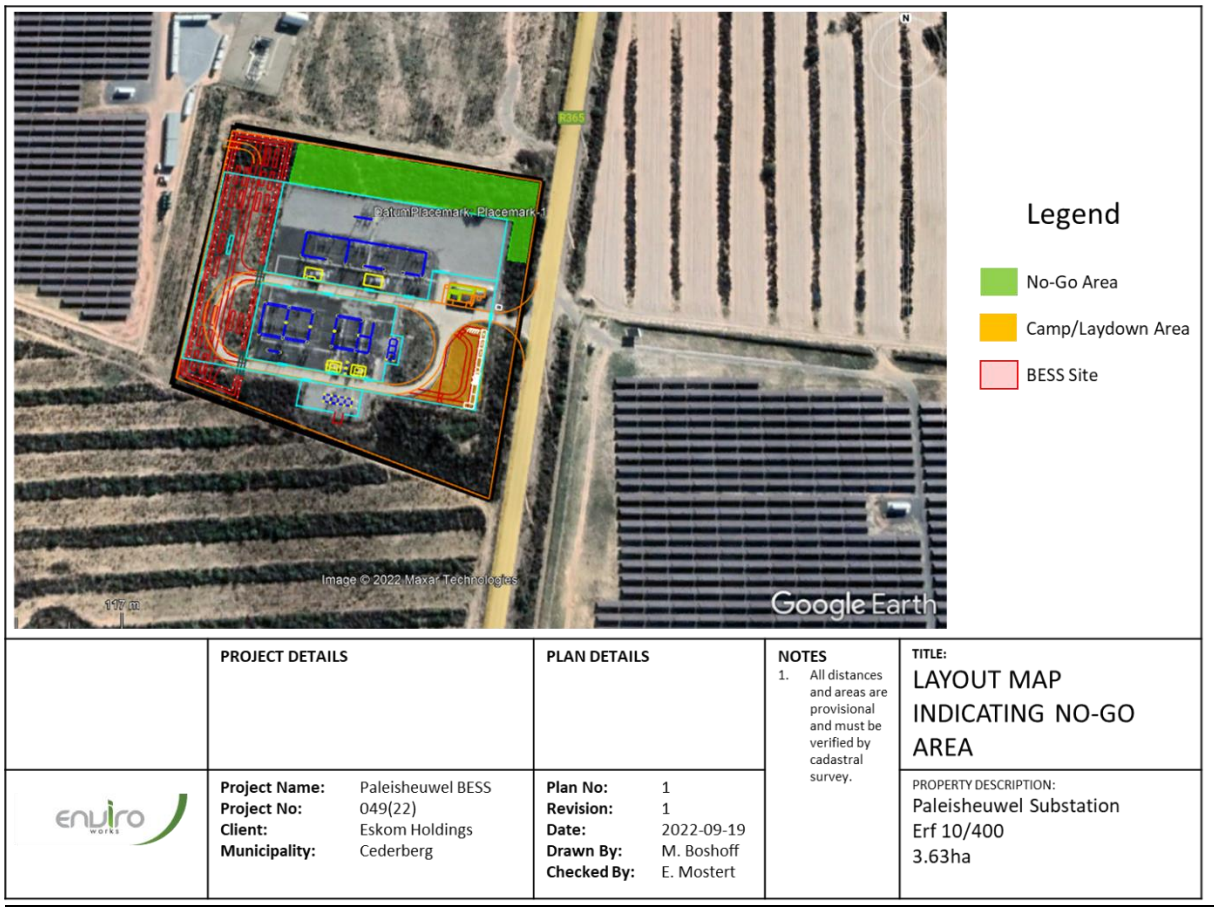

Figure 1-7: Final Layout Plan (with no-go area)

As per the recommendations of the vegetation specialist report and other key stakeholders, the BESS location was moved to the western side of the property to an area that has already been disturbed. The layout (Figure 1-7) enables the protection of sensitive ecological areas on the site and the conservation of SCC as identified by the specialist.

This area is already disturbed due to anthropogenic activities. An equipment laydown area and camp area has also been identified for use during the construction phase. This area is located in the south eastern corner of the Eskom property.

Photo of the area where the camp and laydown areas will be located.

1.5 Potential Impacts

A summary of the potential impacts of the proposed development identified and assessed in the BAR is presented in Table 1-4. Additional details on the nature of these impacts are provided in the BAR (SRK Consulting Report No: 533767/2, August 2019).

Table 1-4: Potential impacts of the proposed project.

Impact	Description	Impact Status
Construction Phase		
Groundwater	Deterioration of Groundwater Quality from Accidental Hydrocarbon Spills	Negative
	Deterioration of Groundwater Quality from Accidental (non-routine) Electrolyte Spills	Negative
Botanical	Loss of Vegetation and Plant SCC	Negative
	Loss of Ecological Connectivity	Negative
Socio- economic	Sustained Employment, Income and Skills Development	Positive
Human health	Impaired Human Health from Increased Ambient Pollutant Concentrations	Negative
Visual	Altered Sense of Place and Visual Intrusion	Negative
	Altered Sense of Place from Increased Traffic during Construction	Negative
Traffic	Increased Nuisance on Existing Road Users and Surrounding Residents	Negative
	Compromised Road Surface Integrity of the Regional Road Network	Negative
Operation Phase		
Groundwater	Deterioration of Groundwater Quality from Accidental (non-routine) Electrolyte Spills	Negative
Botanical	Loss of Vegetation and Plant SCC	Negative
Human health	Human fatalities / injuries caused by battery fires / explosions	Negative
Visual	Altered Sense of Place and Visual Intrusion	Negative

1.6 Public Participation

The PPP for the update of the EMPr for the Paleisheuwel BESS was undertaken in accordance with section 54 of the National Environmental Management Act (Act No. 107 of 1998) (NEMA), and the public and relevant authorities and stakeholders were notified on the proposed project.

Only registered Interested and Affected Parties (I&AP's) (i.e., who registered during the EA process) were invited to comment on the updated EMPr for Paleisheuwel BESS.

The Public Participation Report is included in Appendix H.

2 Measure Applicable to the Design Phase

2.1 Roles and Responsibilities

The key role players during the Design Phase of the project are:

- Eskom (the proponent); and
- Engineers responsible for the design of the BESS.

Their roles and responsibilities during the detailed Design Phase with respect to the implementation of the EMPr are outlined below.

Eskom:

- Ensure that the engineering/design team is aware of and takes into consideration all relevant measures in the EMPr; and
- Confirm that all relevant environmental management measures in the EMPr have been incorporated into the project design on completion of the Design Phase.

Engineers:

- Take cognisance of all relevant measures in the EMPr and ensure integration thereof in the detailed design; and
- Reference the environmental management measures applicable to the Construction (Section 3) and Operational (Section 4) Phases of the project in all documents that will be applicable to future phases of the project (e.g., tender documents).

2.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the Design Phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 2-1 below.

Table 2-1: Environmental management and mitigation measures that must be implemented during the Design and Pre-Construction Phase.

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[2]**	**Performance**
Authorisations	1.	Ensure that all required licences and permits have been obtained before the start of construction.	• Eskom	• Before construction commences	• Keep record of all permits, licences and authorisations	• Required licences/permits on file
	2.	Specific Risk Assessment Plan for Solid State Batteries has been compiled.		• Keep record of correspondence	• Required correspondence on file	•Updated Risk Assessment
Environmental Compliance	3.	Appoint a suitably qualified Environmental Control Officer (ECO) to oversee construction activities.	• Eskom	• Before construction commences	• Review appointment documentation	• ECO appointment documents
	4.	Include the EMPr in all tender documents to ensure that sufficient resources are allocated to environmental management by the Contractor.	• Eskom and Engineering consultants	• Prior to call for tenders	• Eskom to check tender documents and contract	• Incorporated in tender documents
	5.	Plan and make adequate financial provision for rehabilitation and restoration activities and clearly allocate timing and responsibility for environmental rehabilitation.				
	6.	Ensure compliance to the Method Statement: Vegetation Management (Specifically section 8 of the report.				
Water supply	7.	Obtain approval from local municipality / water user association for supply of water required during construction.	• Eskom	• Prior to construction	• Request for approval from local municipality / water use association	• Approval for water use
Employment	8.	Set targets for the use of local labour based on the needs of the proponent and the availability of existing skills and people that are willing to undergo training.	• Eskom	• Call for tenders	• Eskom to check tender documents and contract • Keep record of how targets were determined • Keep record of staff by origin • Keep record of training provided	• Incorporated in tender documents • Percentage of local staff • Percentage of Previously Disadvantaged Individual (PDI) staff • Number of incidents • Time activities stopped • Number of recurring incidents
	9.	Ensure that Contractors from outside the local area that tender for work meet the required targets for how many locals are given employment.				
	10.	Consider implementing labour-intensive rather than capital-intensive work methods wherever possible.				
	11.	Consider purchasing resources from local sources wherever possible.				

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[2]**	**Performance**
BESS design	12.	Design the batteries so that all electrolytes and active materials are encapsulated by protective covering where practical.	• Eskom and Engineering consultants	• During design phase	• Review design documentation	• BESS design
	13.	Design BESS to have monitoring systems to detect leaks or emissions.				
	14.	Consider an aqueous electrolyte which significantly reduces the hazards associated with organics and acids.				
	15.	**Specific to Solid State Battery Technology:** Add complexing agents to electrolyte to reduce potential for air borne release of toxic bromine.				
	16.	Paint the battery storage containers (and where possible, associated infrastructure such as fencing) grey or brown. Avoid the use of light colours (e.g., white).				
	17.	Do not increase the height of existing buildings, unless specifically required for operations.				
	18.	Be sensitive towards the use of glass or material with a high reflectivity which may cause glare and increase visual impacts.				
BESS safety	19.	Be mindful of supplier recommendations when deciding on placement (especially in relation to existing high voltage infrastructure at the substation) and stacking of battery storage containers.	• Eskom and Engineering consultants	• During design phase	• Review design documentation	• Placement of battery storage
Waste management	20.	Develop a waste management plan, laying out: • Expected type and amount of waste; • Measures to reduce waste; • Type and expected volume of recyclable waste; • Recycling facilities that will collect / receive waste; • Type of storage for different waste types; • Waste contractors that will collect waste.	• Eskom • Consultant team	• During design phase	• Review of design documents	• Adequate provision for waste disposal
Stormwater management	21.	Ensure designs comply with the recommendations of the Storm Water Management Plan (SWMP) (see Appendix B).	• Engineering consultants	• During design phase	• Review detailed layout plans	• Approval of final design • Recommendations of SWMP included in final design
	22.	Ensure that storm water originating from upgradient (stormwater that could flow across the site from external areas) is diverted around the site.				
	23.	Design stormwater infrastructure so that stormwater is kept separate from contaminated water and bunded areas.				
	24.	Design the drainage systems (of stormwater infrastructure, trenches, drains and outlets) to encourage dissipation of water, decreasing velocity of water and prevent erosion, ponding and flooding of the site and surrounding environment.				

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[2]**	**Performance**
	25.	Consider secondary and tertiary containment measures due to the hazardous nature of the battery electrolytes.				
	26.	Maintain and clean bunded areas on a regular basis.				
Floral management	27.	Appoint a suitably qualified specialist to oversee search and rescue of floral species*into a suitable receptor site*. Obtain necessary approval and permits from CapeNature.	• Eskom • Consultant team	• Prior to the start of vegetation clearance	• Appointment of vegetation specialist • Search and Rescue Report	• Permit on file • Floral species relocated
	28.	Rescue and relocate all identified Species of Conservation Concern, with the required permits, as per the Botanical Report to areas adjacent to construction footprint areas, preferably in Autumn, once the rains have fallen. (*Vegetation Specialist Report*).				
	29.	Appoint a botanist / rehabilitation specialist to help with the planning of relocation of species, should this be required. .				
	30.	Avoid placing infrastructure in areas containing sensitive vegetation.				
Dust management	31.	Ensure dust management is incorporated into the construction phase.	• Eskom • Consultant team	• Prior to the start of vegetation clearance	• Dust Management Plan	• Dust Management Plan available
Fire management	32.	Ensure that areas designed for the storage of fuel and other flammable materials comply with standard fire safety regulations.	• Engineering consultants	• During design phase	• Review detailed layout plans	• Compliance with measures
Visual impacts	33.	Paint the battery storage containers (and where possible, associated infrastructure such as fencing) grey or brown. Avoid the use of light colours (e.g., white).	• Engineering consultants	• During design phase	• Review detailed layout plans	• Compliance with measures
	34.	Do not increase the height of existing buildings, unless specifically required for operations.				
	35.	Be sensitive towards the use of glass or material with a high reflectivity which may cause glare and increase visual impacts.				
Traffic	36.	Engage the road authorities to determine the optimal route to the site for construction vehicles and battery delivery vehicles.	• Eskom	• Prior to construction	• Correspondence with road authorities	• Proof of correspondence with road authorities • Permission to transport battery storage containers
	37.	Obtain all required approvals for transporting battery storage containers to site (e.g., approval for abnormal load).				

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3 Measures Applicable to the Construction Phase

3.1 Roles and Responsibilities

The key role players during the Construction Phase of the project are anticipated as follows:

- Eskom (the proponent);
- Resident Engineer (RE), who will oversee the activities of the contractors on site;
- Contractor(s) responsible for the construction of the battery storage project;
- Any sub-contractors hired by Contractors; and
- ECO.

The anticipated Construction Phase organogram is presented in Figure 3-1 below and shows the proposed lines of communication during this phase. All instructions relating to the EMPr will be given to the Contractor via the ECO or RE. The Contractor will report issues of concern to the RE and ECO, who in turn will engage the proponent. The ECO will report to the RE and Eskom.

Eskom will retain responsibility for ensuring that the Contractor fully implements the provisions of the EMPr.

Figure 3-1: Construction Phase Reporting Structure

Key roles and responsibilities during the Construction Phase with respect to the implementation of the EMPr are outlined below.

Eskom as the Developer:

Eskom has overall responsibility for management of the project. In terms of environmental management, the proponent will:

- Appoint a suitably experienced Engineer/s and Environmental Practitioner/s who will be responsible for the overall management of activities on site during the Construction Phase;
- Appoint a suitably qualified ECO to monitor compliance with the EMPr and other environmental permits for the duration of the Construction Phase;
- Ensure that the engineers are aware of the requirements of the EMPr and relevant Method Statements (e.g. Vegetation Management, implement the EMPr and monitor the Contractor's activities on site;
- Ensure that Contractors are aware of and contractually bound to the provisions of this EMPr by including the relevant environmental management requirements in the tender and contract documents, as appropriate;
- Ensure that Contractors remedy non-compliance with the EMPr or unforeseen environmental damage timeously and to the satisfaction of the ECO and authorities (when necessary); and
- Notify the authorities should non-compliance with the EMPr or unforeseen environmental damage not be remedied timeously.
- Ensure that suitable mobile chemical toilets are placed on-site (via Eskom or appointed contractors)

Resident Engineer:

Eskom will appoint suitably qualified Engineers, who in turn will designate a suitable RE or technician/s who will be responsible for overseeing activities of the Contractor during the Construction Phase. The RE shall:

- Ensure that the Contractor is duly informed of the EMPr and associated responsibilities and implications of this EMPr prior to commencement of construction;
- Monitor the Contractor's activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Relay all instructions from the ECO to the Contractor and ensure that these are fully understood and implemented;
- Report any environmental emergencies/concerns to the ECO immediately;
- Act as a point of contact for local residents and community members; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the relevant authorities.

Contractors:

Contractors will each be required to appoint or designate a Contractor's Environmental Representative (CR) who will assume responsibility for the Contractor's environmental management requirements on site and be the point of contact between the Contractor and the ECO. Each CR shall:

- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Monitor the Contractor's activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Ensure that all employees and sub-contractors comply with the EMPr;
- Immediately notify the ECO of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the ECO.

Contractors have a duty to demonstrate respect and care for the environment. Contractors will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

Sub-contractors:

All Sub-contractors will be required to:

- Ensure that all employees are duly informed of the EMPr and associated responsibilities and implications of this EMPr prior to commencement of construction;
- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Monitor employees' activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Immediately notify the ECO of any non-compliance with the EMPr, or any other issues of environmental concern; and
- Ensure that non-compliance is remedied timeously and to the satisfaction of the
- ECO.

Each Sub-contractor has a duty to demonstrate respect and care for the environment. Sub-contractors will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation, resulting from their presence on site.

Environmental Control Officer:

The ECO shall be a suitably qualified/experienced environmental professional or professional firm, appointed by the proponent, for the duration of the Construction Phase of the project. The ECO shall:

- Request Method Statements from Contractors prior to the start of relevant construction activities, where required, and approve these (as appropriate) without causing undue delay;
- Monitor, review and verify compliance with the EMPr, Environmental Authorisation (EA) and any other environmental permit/ approval, by Contractors as well as any sub-contractors and specialist contractors;
- Undertake site inspections at least twice a month to determine compliance with the EMPr, EA, and any other environmental permit/ approval;
- Identify areas of non-compliance and recommend corrective actions (measures) to rectify them in consultation with Eskom, the RE and the applicable Contractor, as required;
- Compile a checklist highlighting areas of non-compliance following each ECO
- inspection;
- Ensure follow-up and resolution of all non-compliances;
- Provide feedback for continual improvement in environmental performance;
- Respond to changes in project implementation or unanticipated site activities which are not addressed in the EMPr, and which could potentially have environmental impacts, and advise Eskom, the RE and Contractor as required; and
- Undertake a site closure inspection, which may result in recommendations for additional clean-up and rehabilitation measures.

3.2 Compliance Monitoring

3.2.1 Method Statements

A Method Statement (Appendix 2) is a document setting out specific details regarding the plant, materials, labour and method the Contractor proposes using to carry out certain activities, usually activities that may have a detrimental effect on the environment. It is submitted by the Contractor to the RE and ECO for approval.

The purpose of a Method Statement is for the Contractor to provide additional details regarding the proposed methodology for certain activities, and for the RE and ECO to confirm that these meet the requirements of the EMPr and acceptable environmental practice. This allows the EMPr to be less prescriptive and affords the Contractor a certain amount of flexibility or to amend stipulations in the EMPr, if approved by the RE/ECO. It also provides a reference point to detect deviations from the agreed approach to an activity.

Each Method Statement will address environmental management aspects relevant to the activity and will typically provide detailed descriptions of items including, but not necessarily limited to:

- Nature, timing and location of activities;
- Procedural requirements and steps;
- Management responsibilities;

- Material and equipment requirements;
- Transportation of equipment to and from site;
- Method for moving equipment/material while on site;
- How and where material will be stored;
- Emergency response approaches, particularly related to spill containment and clean-up;
- Response to compliance/non-conformance with the requirements of the EMPr; and
- Any other information deemed necessary by the RE/ECO.

The following list provides examples of Method Statements that may be requested from the Contractor:

- Construction site establishment;
- Environmental awareness training including the date, time and location of the course/s, the course content and provision for refresher courses;
- Material and equipment (including battery) storage and delivery;
- Dust control;
- Fuel storage, dispensing and fuel spills;
- Waste management;
- Management of contaminated water;
- Stormwater management (Appendix 3);
- Operating heavy machinery;
- Cement batching;
- Transporting battery storage containers to site; and
- Any others requested by the RE/ECO.

The Method Statements will be submitted by the Contractor to the RE and ECO no less than 14 days prior to the intended date of commencement of an activity (or as otherwise agreed with the RE/ECO). The RE/ECO shall approve / reject the Method Statement within 2 days. An activity for which a Method Statement has been requested shall not commence until the RE/ECO has approved of such method and once approved, the Contractor shall abide by the relevant Method Statement. A pro forma Method Statement is attached in Appendix A, although a suitable Method Statement format can be agreed between the RE/ECO and Contractor.

3.2.2 Environmental Records and Report

Environmental records and reports required during the Construction Phase are listed in Table 3-1.

Table 3-1: Reports required during Construction.

Report	Frequency	From	To
Environmental Checklist	Weekly	CR	ECO and Eskom
Environmental Compliance Report	Twice a month / following each inspection	ECO	RE and Eskom

Report	Frequency	From	To
Environmental Incident Report	Within 24 hours of incident occurrence	CR	ECO and Eskom
Site Closure Report	End of Contract	ECO	RE and Eskom
Statutory Environmental Audit Report 1	Within six months of commencement of the Construction Phase or as specified in the EA	Independent environmental auditor	~~DEA~~ DFFE
Statutory Environmental Audit Report 2	Within one month after completion of the Construction Phase or as specified in the EA	Independent environmental auditor	~~DEA~~ DFFE
Other Statutory Environmental Audit Reports (S34 and Appendix 7 of EIA Regs)	As specified in the EA for the period during which the environmental authorisation and EMPr remain valid.	Independent environmental auditor	~~DEA~~ DFFE

3.2.2.1 Environmental Checklist

The CR will undertake weekly site inspections to check on the implementation of the EMPr, EA, and any other environmental permit/approval, by the Contractor and complete a brief report/checklist after the inspection. The completed checklists shall be submitted to Eskom and the ECO at the end of each inspection. This checklist should be discussed between the CR and the ECO during the initial site inspection, and agreement reached on the preferred format and content.

3.2.2.2 Environmental Compliance Report

The ECO will prepare an Environmental Compliance Report following each site inspection, detailing any environmental issues, compliances, non-compliance and corrective actions to be implemented. These reports will be based on the ECO's observations, and the weekly Environmental Checklists undertaken by the CR as per 3.2.2.1. Environmental Compliance Reports will be submitted to the RE and Eskom and a full record will be kept by the ECO, for submission to the Local Authority and/or ~~DEA~~ DFFE on request.

When more frequent site visits are undertaken by the ECO, the frequency of progress reports will increase accordingly to allow for timeous reporting of environmental issues and actions required.

3.2.2.3 Photographic Records

If the ECO identifies any areas of concern, the ECO will request photographic records, which must be submitted by the Contractor for evidential purposes. The ECO shall also keep photographic records of all construction activities and areas of concern during site inspections. Please see Appendix F.

3.2.2.4 Construction Site Closure Report

The ECO will undertake a final site closure inspection on completion of the Construction Phase. The purpose of this is to confirm compliance with all site closure requirements identified by the ECO, and that the site has been left in an environmentally suitable condition. If outstanding environmental requirements are observed during this inspection, a further inspection must be carried out to confirm compliance. The Site Closure Report will be submitted to the RE and Eskom for evidential purposes, and to ~~DEA~~ DFFE if requested.

3.2.2.5 Statutory Environmental Audit Reports

In terms of Regulation 34 of the NEMA EIA Regulations, 2014 (as amended), Eskom is required to appoint an independent person with environmental auditing expertise to undertake an environmental audit to determine compliance with the conditions of the EA and the EMPr and recommend improvements (if required). In terms of Regulation 34(2)(d) of the EIA Regulations, 2014 (as amended), the Environmental Audit Reports must be conducted and submitted at intervals confirmed by ~~DEA~~ DFFE in the EA.

SRK recommends that the first Environmental Audit Report be submitted to DEA within six months of the commencement of the Construction Phase and a second within one month of completion of the Construction Phase. A final Environmental Audit Report will be required during the Operational Phase (see Section 4).

The Environmental Audit Report must contain all the information required in Appendix 7 of the NEMA EIA Regulations, 2014 (as amended).

3.2.3 Corrective Action

Corrective action is a critical component of the implementation–review–corrective action– implementation cycle and it is through corrective action that continuous improvement can be achieved. Where repeated non-compliance is recorded, procedures may need to be altered accordingly to avoid the need for repeated corrective action.

If environmental compliance monitoring by the CR, Eskom or ECO indicates non-conformance with the EMPr or approved Method Statements, the RE or Eskom will formally notify the Contractor through the Eskom Non-conformance process (NCR) and/ or notification of Defect process detailed in the Contract. The Corrective Action Request documents:

- The nature of the non-conformance/environmental damage;
- The actions or outcomes required to correct the situation; and
- The date by which each corrective or preventive action must be completed.

Upon receipt of the NCR, the Contractor will be required to produce a Corrective Action Plan (or similar plan), which will detail how the required actions will be implemented. The Corrective Action Plan must be submitted to the NCR initiator and ECO for approval prior to implementation. Once it has been approved, the corrective action must be carried out within the time limits stipulated in the NCR. Additional monitoring by the CR and ECO will then be required to confirm the success or failure of the corrective action.

3.3 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the Construction Phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 3-2.

Table 3-2: Environmental management and mitigation measures that must be implemented during the Construction.

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
Site camp	1.	Submit a method statement for Site Camp establishment for acceptance by Eskom and the ECO at least two weeks prior to the start of construction activities.	• Contractor	• Start of construction	• Visual inspections • Method statement	• Accepted method statement • Site boundaries demarcated • Signage in place
	2.	Establish a suitably fenced Site Camp at the start of the contract, which will allow for site offices, vehicle, equipment, material and waste storage areas to be consolidated as much as possible. Locate the Site Camp at a position accepted by Eskom and the ECO. Provide water and / or washing facilities and ablution facilities (portable chemical toilets) at the Site Camp for personnel.				
	3.	Demarcate construction site boundaries upon establishment. Control security and access to the site. Fence off site boundaries to the satisfaction of the ECO and ensure that plant, labour and materials remain within site boundaries.				
	4.	Designate the area beyond the boundary of the site as "No go" areas for all personnel on site. No vehicles, machinery, materials or people shall be permitted in the "No go" area at any time without the express permission of the ECO.				
Safety and Security	5.	Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, battery handling, etc.) are established prior to commencing construction. Submit these emergency procedures to Eskom and the ECO for approval.	• All Contractors	• Throughout construction	• Visual inspection and approval by CR, RE and ECO	• Number of safety/emergency incidents
	6.	Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site.				
	7.	Provide suitable emergency and safety signage on site and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc.).				
	8.	Advise the ECO of any emergencies on site, together with a record of action taken.				

[3] Unless otherwise indicated, monitoring will be undertaken by the ECO, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
	9.	Secure the Site Camp, particularly to restrict unauthorised access to fuels and any other hazardous substances.				
	10.	Store all construction material and equipment in locked containers within the Site Camp. Employ 24-hour security for the Site Camp.				
	38.	Liaise with the local fire-firefighting department with regards to emergency procedures.				
Employment (<u>focussed on retaining exiting staff and upskilling inhouse</u>)	11.	Set targets for maintaining the use of local labour based on the availability of existing skills and people that are willing to undergo training.	• Eskom • Contractors	• Prior to construction	• Keep record of how targets were determined • Keep record of staff by origin • Keep record of training provided	• Percentage of local staff • Percentage of PDI staff
	12.	Maximise opportunities for the training of <u>staff.</u>				
	13.	Meet empowerment targets as per contractual requirements.				
	14.	Consider implementing labour-intensive rather than capital-intensive work methods wherever possible.				
	15.	Consider purchasing resources from local sources wherever possible.				
	16.	Develop and implement a fair and transparent labour and recruitment policy.				
	17.	Ensure gender equality in recruitment, as far as possible.				
Environmental Awareness Training	18.	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment. • Suitable disposal of construction waste and litter. Emphasis must be placed on the training of staff to distinguish what waste is classified as general and hazardous to prevent the mixing of these waste streams. • Key measures in the EMPr relevant to worker's activities. • How incidents and suggestions for improvement can be reported; and • Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that	• All Contractors	• Before workers start working on-site • Before additional activities are undertaken • When new staff start work on site	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMPr
	19.	Include environmental mitigation measures relevant to current activities in daily toolbox talks. Maintenance of batteries and chemical handling will be done by appropriately trained personnel only.		• Throughout construction	• Check toolbox talk attendance registers and content	• Content of toolbox talks includes environmental mitigation measures

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
Complaints Register / Grievance Mechanism	20.	Maintain and disclose a complaints register. The register must record: • Complainant name and contact details; • Date complaint was lodged; • Person who recorded the complaint; • Nature of the complaint; • Actions taken to investigate the complaint and outcome of the investigation; • Action taken to remedy the situation; and • Date on which feedback was provided to complainant.	• Eskom • Contractor	• Duration of construction activities	• Keep record of all complaints	• Register on site • Complaints followed up and closed out
	21.	Respond rapidly to complaints and take appropriate corrective action.				
Hazardous materials	22.	Design and construct hazardous material storage facilities, especially fuel storage, with suitable impermeable materials and a minimum bund containment capacity equal to 110% of the largest container. The storage volume of dangerous goods on site must not exceed 500m^3. (EA Condition 32)	• All contractors	• Throughout construction	• Visual inspection of hazardous materials handling and storage areas	• Number of incidents of non-compliance with safety procedures concerning hazardous materials, including waste materials . • Number of spills of hazardous materials, including waste materials • Cost of cleaning up spills • Evidence of contamination and leaks
	23.	Ensure that contaminants (including cement) are not placed directly on the ground (e.g., mix cement on plastic sheeting).				
	24.	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.				
	25.	Avoid unnecessary use and transport of hazardous substances. guidelines to limit spillage.				
	26.	Keep Material Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.				
	27.	Place appropriately sized drip trays under vehicles and equipment when not in use – ensure these are strategically placed to capture any spillage of fuel, oil, etc.				
	28.	Clean up any spills immediately, through containment and removal of free product and appropriate disposal of contaminated soils.				
	29.	Undertake regular maintenance of vehicles and machinery to identify and repair minor leaks and prevent equipment failures.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Vegetation clearing	30.	Limit the footprint area of the construction activity to what is absolutely essential. Only clear areas as per the approved Method Statement.	• All contractors	• Throughout construction	• Visual inspection • Appointment of vegetation specialist • Search and Rescue Report	• Size of area cleared relative to development footprint • Size of area disturbed outside of construction site boundary • Number of SCC relocated • Permit on file
	31.	Designate areas outside the development footprint as No-go areas.				
	32.	Remove cleared vegetation off site to eliminate the fire risk unless directed differently by the Botanist or ECO.				
	33.	Ensure that no vegetation is removed without the required permits or disturbed outside the delineated construction site boundary. (EA Condition 33)				
	34.	Immediately stabilize slopes that are disturbed / cleared for construction with geofabric or another appropriate erosion stabilisation technique to prevent erosion.				
	35.	Restrict the movement of construction vehicles to new and existing access roads only.				
	36.	Avoid removal and damage of SCC and provincially protected plants where possible. Plants that can be used during rehabilitation should be identified and stored appropriately off-site for use after construction. (Specialist Recommendation: Botanical Survey)				
Topsoil storage	37.	Limit construction and lay down areas to areas within the development footprint.	• All contractors	• Before construction commences	• Visual inspection	• Incidence of Erosion and • Incidence of incorrect storage and harvesting of topsoil
	38.	Designate areas outside the development footprint as “No go” areas.				
	39.	Designate and demarcate areas to be used for topsoil stockpiling.				
	40.	Remove topsoil (up to a maximum of 30 cm depth).		• During vegetation clearing		
	41.	Strip and store topsoil and subsoil separately & keep clear of alien weeds.				
	42.	Stockpile topsoil prior to the commencement of construction activities (stockpile no higher than 2m) and conserve topsoil for landscaping and rehabilitation.				
	43.	Locate topsoil stockpiles in an area protected from the wind and agreed to with the ECO.				
	44.	Locate all topsoil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation.				
	45.	Locate topsoil stockpiles away from aggregate, cement, concrete, fuels, litter, oils, domestic and wastes.				
	46.	Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on adjacent land and undeveloped portions of the site.		• During construction		

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
	47.	Replace harvested topsoil in areas that are to be rehabilitated as soon as sections of the works are completed (i.e., not only following the completion of all works).				
Concrete/Cement Work	48.	Use Ready-Mix concrete rather than batching where possible.	• All contractors	• Throughout construction	• Visual inspection and approval of Method Statement by Eskom and ECO.	• Number of incidents of batching outside works footprint • Contamination of water and soil • Visible litter / waste on site.
	49.	Ensure that cement truck delivery chutes are cleaned in a designated area where wastewater can be disposed of in the correct manner. A suitable washing facility is to be developed on site in consultation with the ECO.				
	50.	Batch cement in a bunded area within the boundaries of the development footprint only (where unavoidable).				
	51.	Ensure that cement is mixed on mortar boards and not directly on the ground (where unavoidable).				
	52.	Physically remove any remains of concrete, either solid, or liquid, immediately and dispose of as waste.				
	53.	Place empty cement bags in bins and dispose of bags as waste to a licensed hazardous waste disposal facility.				
	54.	Sweep / rake / stack excess aggregate / stone chip / gravel / pavers into piles and dispose at a licensed waste disposal facility.				
Waste management	55.	Submit a method statement for waste management.	• Eskom • All contractors	• Before start of activities on site • Throughout construction	• Availability and adherence to waste plan • Visual inspection of waste collection and disposal areas • Visual inspection of construction areas (litter) • Check waste disposal slips	• Monitor procedures to ensure the waste management plan is implemented • Presence of litter • Availability of rubbish bins and skips • Degree to which rubbish bins and skips are filled • Total volume of general and hazardous waste storage capacity • Total volume of general and hazardous waste stored on site
	56.	Train all staff in the effects of debris and litter in the environment and appropriate disposal procedures.				
	57.	Aim to minimise waste through reducing and re-using (packaging) material. (EA Condition 36)				
	58.	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.				
	59.	Collect all waste in labelled bins and/or skips at the construction site.				
	60.	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.				
	61.	Provide separate bins for hazardous / polluting materials and mark these clearly. Store hazardous / polluting materials on impermeable ground until it is disposed of / collected.				
	62.	Dispose of waste appropriately to prevent pollution of soil and groundwater. (EA Condition 37)				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
	63.	Do not allow any burning or burying of waste on site. Development of site-specific method statement according to project specifications in the Handling of hazardous materials. Ensure storage area is properly bunded. Ensure MSDS is readily available. Ensure storage area is locked and secure. Ensure handling by competent persons only.				• Degree to which different waste is separated • Frequency of waste collection
Stormwater management	64.	Submit a method statement for Stormwater Management. The stormwater management plan must implement water diversion options to minimise the potential for erosion.	• Contractors	• Throughout construction	• Visual inspection	• Incidence of stormwater contamination • Visible leaks/ water wastage • Visible surface erosion • Compliance with SWMP
	65.	Collect stormwater from bunded areas in a suitable container and remove from the site for appropriate disposal.				
	66.	Use berms and stormwater drainage systems to prevent surface run-off from entering site excavations.				
	67.	Implement measures to maximise the infiltration of stormwater on site.				
	68.	Implement measures stipulated in the SWMP (see Appendix A).				
	69.	Construct all drainage channels and stormwater drainage systems according to the engineer's design.				
	70.	Install temporary diversion systems / berms around the construction site or at certain problematic areas (including temporary access roads and parking bays) during construction to prevent ponding, flooding or contamination of stormwater with contaminants.				
	71.	Temporary roads should be kept to a minimum to avoid multiple access routes/roads and should only be constructed if absolutely necessary.				
	72.	Temporary parking bays/roads should consist of a compacted coarse gravel layer (if necessary).				
	73.	Any construction material stockpiles should be protected by berms (or another mechanism) to ensure that material cannot be mobilised by runoff and/or potentially block the stormwater system.				
	74.	Place oil traps under stationary machinery, only re-fuel machines at designated fuelling points, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.				
	75.	Ensure that spill kits appropriate to the hazardous substance/s are available at all times on the site.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
	76.	Draw up and strictly enforce a procedure for the storage, handling and transport of the battery containers, and other hazardous materials on site (including fuel storage areas). This procedure should be informed by hazardous material safety data sheets and discussions with the supplier.				
	77.	Ensure vehicles and equipment are in good working order.				
	78.	Ensure that good housekeeping and maintenance rules are applied.				
	79.	Inspect the site weekly for signs of spills.				
	80.	Ensure that onsite sanitation facilities are appropriately designed, are well maintained and serviced regularly.				
	81.	Excavations filled with rainwater may be pumped out and the water released into the environment.				
	82.	Handle and store waste in such a way as to prevent mixing with water.				
Erosion management	83.	Ensure that all roads and tracks used for construction have the appropriate water diversion / erosion control structures.	• Contractors	• Throughout construction	• Visual inspection	• Visible surface erosion
	84.	Stabilise slopes disturbed / cleared for construction with geofabric or another appropriate erosion stabilisation technique if erosion does occur.				
Dust management	85.	Submit and Implement a Dust Management Plan.	• Contractors	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Dust mitigation measures in place • Number of days that dust plumes are visible • Number of registered complaints • Size of disturbed areas
	86.	Avoid clearing of vegetation until absolutely necessary (i.e., just before excavations).				
	87.	Regularly evaluate the effectiveness of all dust management measures. Amend how or which measures are used if necessary.				
	88.	Stabilise exposed surfaces as soon as is practically possible.				
	89.	Avoid excavation, handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
	90.	Minimise dust generated off stockpiles: • Locate piles in sheltered areas where possible; • Place the stockpile lengthwise into the wind; • Minimise the slope of the stockpile (maximum slope of 2:1); • Limit stockpile sizes; • Install barriers on three sides of the stockpile (maximum 50% material porosity) if required; • Limit activity to the downwind side of the pile; • Use the last in – first out system of stockpile management; and • Cover stockpiles when not in active use for some time and / or use an environmentally friendly chemical spray to bind soil.				
	91.	Limit vehicle speeds to 20 km/h on unconsolidated and non-vegetated areas.				
	92.	Cover trucks transporting loose material to or from site with tarpaulins, plastic or canvas.				
	93.	Ensure that any material spilled from trucks during transport to or from the site is cleaned up immediately.				
	94.	Use bedliners to minimise seepage and spillage of material from bottom-dumping trucks.				
	95.	Check weather reports daily and closely observe weather patterns to enable action to be taken immediately if conditions change.				
	96.	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegetated areas once they are on site to reduce dust problems.				
	97.	Sweep roads leading from the site if wheel washing facilities do not effectively prevent mud being deposited on access roads.				
	98.	Reduce airborne dust at construction sites through: • Dampening dust-generating areas with non-potable water if available (and necessary); • Use of cloth or brush-barrier fences; and • Covering dumps or stockpiles of lose material with plastic sheeting or netting, especially during windy conditions.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
Noise management	99.	Limit construction activities to Mondays to Saturdays between the hours of 07h00 and 18h00, or in accordance with relevant municipal bylaws, if applicable.	• Contractors	• Throughout construction	• Times during which construction takes place	• Number of registered complaints
	100.	Limit particularly noisy operations to Mondays to Fridays between the hours of 08h00 and 17h00.				
	101.	Control the use of radios, television sets and other such equipment used by workers to a level that does not disturb neighbouring residents/tenants.				
	102.	Maintain all generators, vehicles, vessels and other equipment in good working order to minimise exhaust fumes and excess noise.				
	103.	Investigate and respond to complaints about excessive noise and take appropriate corrective action.				
	104.	Where practical enclose diesel generators used for power supply to reduce unnecessary noise.				
Fire Management	105.	Ensure that no fires are permitted on or adjacent to site.	• Contractors	• Throughout construction	• Inspect attendance register for training sessions; and • Inspect fire extinguishers and certificates.	• Number of fire incidents • Certified extinguishers in appropriate locations
	106.	Designated smoking areas with firefighting equipment must be provided.				
	107.	Ensure that sufficient fire-fighting equipment is available on site.				
	108.	Equip all hazardous substance stores and waste storage areas with fire extinguishers.				
	109.	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.				
	110.	Suitably maintain firefighting equipment.				
	111.	Liaise with the local fire-firefighting department with regards to emergency procedures.				
Transportation and refuelling	112.	Undertake regular maintenance of vehicles and machinery to identify and repair minor leaks and prevent equipment failures.	• All contractors	• Throughout construction	• Visual inspection of vehicles, barges, machinery and refuelling/maintenance areas	• Number of incidents of non-compliance • Number of leaks and spills • Cost of cleaning up spills
	113.	Undertake any on-site refuelling and maintenance of vehicles/machinery in designated areas. Line these areas with an impermeable surface, secondary containment measures and install oil traps.				
	114.	Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
	115.	Clean up any spills immediately, through containment and removal of free product and appropriate disposal of contaminated soils.				
	116.	Keep spill containment and clean-up equipment at all work sites and for all polluting materials used at the site.				
Fauna Management	117.	Flush out fauna before establishing site camp and site boundaries.	• Contractor	• Before construction commences	• Visual inspection	• Number of animals flushed out of area
	118.	Do not harm, catch or kill birds or animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor	• Duration of construction activities	• Visual Inspection	• Number of animals harmed/ incidents • Time period trenches are left open • Number of incidents of animals found in trenches.
	119.	Backfill trenches as soon as possible to ensure that the time the trench is exposed is kept to a minimum.				
	120.	Open trenches must be inspected on a daily basis for animals which may have fallen or become trapped.				
	121.	Safely remove and relocate any fauna that may be physically harmed by construction activities. Contact list needs to be kept on site of problem animals' catchers in the Piketberg area. Or the contractor needs to have trained snake catcher on site				
Protection of archaeological and paleontological resources	122.	Inform employees and contractors that archaeological or paleontological artefacts, including human skeletal remains, might be exposed during construction activities.	• Contractors	• Before construction commences	• Visual inspection	• Time to rehabilitation • Size of disturbed areas
	123.	Empower staff to stop works on (chance) discovery of artefacts at the site.		• During earthworks		
	124.	Report the presence of artefacts, paleontological fossils, graves or human remains, fragments of fossil bone, ostrich egg and stone fragments to SAHRA. Or Heritage Western Cape (EA Condition 35)				
	125.	Stop works and obtain a permit for the removal of artefacts from the site if any are discovered during construction.				
Traffic Management	126.	Manage construction sites and activities so as to minimise impacts on road traffic as far as possible, e.g.: • Attempt to arrange delivery of materials when it will least disrupt traffic; • Stagger deliveries if possible rather than concentrating them during "rush" hours; and • Keep construction materials and machinery at the construction site throughout the construction period, where possible.	• All contractors operating vehicles	• Throughout construction	• Keep record of vehicles entering the site and time they enter • Keep record of incidents and complaints; and • Visually inspect vehicles for any overloading	• Number of incidents and complaints • Number of vehicles travelling to site each day • Condition of vehicles
	127.	Notify local authorities, road authorities and affected stakeholders prior to construction activities and transport of battery storage containers.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
	128.	Use appropriate road signage, in accordance with the South African Traffic Safety Manual, providing flagmen, barriers etc. at the various access points when necessary.				
	129.	Ensure that large construction vehicles are suitably marked to be visible to other road users and pedestrians.				
	130.	Ensure that vehicles transporting battery storage containers are suitably marked noting the hazardous nature of their load.				
	131.	Ensure that relevant safety measures and signage are in place when containers are delivered to site.				
	132.	Ensure that all safety measures are observed and that drivers comply with the rules of the road.				
	133.	Ensure that vehicle axle loads do not exceed the technical design capacity of roads utilised by the project.				
	134.	Investigate and respond to complaints about traffic.				
	135.	Manage construction sites and activities to minimise impacts on road traffic as far as possible, e.g., minimise the unnecessary movement of construction vehicles.				
	136.	Maintain and repair roads damaged by construction vehicles, in consultation with relevant road authorities.				
	137.	Ensure that all safety measures are observed and that drivers of construction vehicles comply with the rules of the road.				
	138.	Maintain and repair damage caused by trucks on or vehicles.				
Visual aspects	139.	Paint the battery storage containers (and where possible, associated infrastructure such as fencing) grey or brown. Avoid the use of light colours (e.g., white).	• Contractors	• Throughout construction	• Visual inspection	• Colour of infrastructure • Number of complaints
	140.	Limit outdoor security lighting and ensure that it is as unobtrusive as possible.				
	141.	Attach signs to existing structures to avoid free standing signs in the landscape during the construction period as much as possible.				
	142.	Control litter and keep construction site as clean and neat as possible.				
Ablution facilities	143.	Provide ablution facilities (i.e., chemical toilets) for all site staff at a ratio of 1 toilet per 15 workers (absolute minimum 1:25).	• Contractors	• Throughout construction	• Visual inspections	• Number of incidents of staff not using facilities

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
	144.	Secure all temporary / portable toilets to the ground to the satisfaction of the ECO to prevent them toppling due to wind or any other cause.			• Records of waste disposal	• Number of pollution incidents
	145.	Maintain toilets in a hygienic state (i.e., toilet dispensers to be provided, toilets to be cleaned and serviced regularly (at least "twice- monthly" by an appropriate waste contractor), and toilets to be emptied before long weekends and builders' holidays.				
	146.	Remove / appoint an appropriate Sub-Contractor to remove, accumulations of chemicals and treated sewage from the site and dispose of at an approved waste disposal site or wastewater treatment works.				
	147.	Ensure that no spillages occur when the toilets are cleaned or emptied. Repeated incidents of spillage of chemicals and or waste (i.e., more than one incident), will require toilets to be placed on a solid base with a sump.				
Water conservation	148.	Use water sparingly and conserve water whenever possible.	• Contractors	• Throughout construction	• Monthly water consumption records	• No evidence of water wasted • Consistent water usage
	149.	Source and maintain records of water purchased.			• Water purchased or consumed from a licensed facility/supplier	• Records of water use or purchase available
Response to environmental pollution	150.	Develop a spill response procedure for approval by the ECO. In the event of environmental pollution, e.g., through spillages, immediately stop the activity causing the problem.	• Contractors	• Throughout	• Maintain register of pollution events and response • Following resumption of activities, frequently inspect repaired equipment to ensure proper functioning	• Number of incidents • Time activities stopped • Number of recurring incidents • Availability and completeness of register and records
	151.	Only resume activity once the problem has been stopped or (in the case of spillages) the pollutant can be captured without reaching the environment.				
	152.	Repair faulty equipment as soon as possible.				
	153.	Install additional bunding / containment structures around the equipment that was the source of the leak / spillage to prevent pollution from reaching the environment in future.				
	154.	Treat hydrocarbon spills, e.g., during refuelling, with adequate absorbent material, which then needs to be disposed of at a suitable hazardous waste landfill.				
Invasive species control	155.	Remove all alien and weed species encountered within areas disturbed by construction activities.	• Contractors			

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[3]**	**Performance Indicators**
	156.	Where possible, remove alien species by hand and not with chemicals.		• Throughout construction	• Check evidence of alien vegetation	• Construction footprint and road reserve clear of alien vegetation
	157.	Keep footprint areas as small as possible when removing alien plant species.				
	158.	Dispose of removed alien plant material at a licensed waste disposal site.				
Site rehabilitation and closure	159.	Plan and make adequate financial provision for rehabilitation and restoration activities and clearly allocate timing and responsibility for environmental rehabilitation.	• Contractor	• Prior to construction	• Record of financial provisioning for rehabilitation	• Financial provisioning for rehabilitation in place
	160.	Ensure that slopes are immediately stabilized to prevent erosion, using geofabric or other appropriate erosion stabilisation techniques.		• Once construction is complete; or • Throughout construction if it takes place in phases / different areas sequentially	• Visual inspection of site • Keep record of rehabilitation measures	• Rehabilitation forms an integral part of operations from start-up • Construction sites fully rehabilitated within five years
	161.	Remove all construction equipment, vehicles, equipment, waste and surplus materials, including site offices, temporary fencing and diesel, from the site.				
	162.	Clean up and remove any spills and contaminated soil in the appropriate manner.				
	163.	Ensure that no discarded materials are buried on site or on any other land not designated for this purpose.				
	164.	Ensure that affected areas are rehabilitated following construction.				
	165.	Use harvested topsoil for rehabilitation.				
	166.	Rehabilitate project areas with locally indigenous species, reseeding, using anti-erosion measures such as biobarrier or soil saver as soon as possible after activities have ceased at each area, or as directed by the Botanist.				
	167.	Replace harvested topsoil in areas that are to be rehabilitated as soon as sections of the works are completed (i.e., not only following the completion of all works).				
	168.	Rehabilitate all project areas as soon as possible after completion of activities in each area, including removing and/or remediating any contaminated soils.				
	169.	Source and maintain records of water purchased.				

4 Measures Applicable to the Operation / Maintenance Phase

4.1 Maintenance Management Plan

The objective of the MMP is to provide environmental management measures for the ongoing maintenance of the BESS and access roads, and emergency repairs.

Eskom can undertake this activity during maintenance without the need for EA in terms of this MMP (once approved).

4.1.1 Roles and Responsibilities

The key role players during Operational / Maintenance Phase are anticipated as follows:

- Eskom (the proponent);
- Engineer/s who will undertake operational activities and/ or oversee the activities of the contractors on site;
- Contractors / Service Providers responsible for maintenance of the BESS;
- Any sub-contractors hired by Contractors / Service Providers; and
- Eskom Environmental Practitioners who will implement the MMP and ensure compliance.

Key roles and responsibilities during Operational / Maintenance Phase with respect to the implementation of the MMP are outlined below.

Eskom:

- Ensure that all contractors / service providers / staff executing work for Eskom for the project are aware of the requirements of the MMP; and
- Appoint a suitably qualified and experienced staff member/s to review the environmental performance of contractors and staff.

Contractors:

- Comply with the applicable environmental commitments, procedures, restrictions and guidance specified in the MMP;
- Co-operate fully in implementing applicable environmental procedures;
- Ensure that copies of the MMP are available on site;
- Ensure that all personnel on site, (including any sub-contractors and their staff) are familiar with and understand the requirements of the MMP relevant to their activities; and
- Ensure that any problems and non-conformances are remedied in a timely manner, to the satisfaction of the relevant management personnel at Eskom

4.1.2 Compliance and Monitoring: Maintenance Activities

Any person appointed to undertake maintenance may be requested to submit a Method Statement for the works to be undertaken. The Method Statement will be submitted by the Contractor/ Appointed person to Eskom Environmental Management not less than 14 days prior to the intended date of commencement of maintenance. Eskom Environmental Management shall approve / reject the Method Statement within 2 days. An activity covered by a Method Statement shall not commence until the Operational Manager (project initiator) and Eskom Environmental Management has approved of such method and once approved, the Contractor/ Appointed person shall abide by the relevant Method Statement. A pro forma Method Statement is attached in Appendix A, although a suitable Method Statement format can be agreed between the Operational Manager (project initiator) / Eskom Environmental Management and Contractor/ Appointed person.

4.1.3 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the Operational / Maintenance Phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 4-1 below.

Table 4-1: Environmental management and mitigation measures that must be implemented during the Operational / Maintenance Phase.

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[4]**	**Performance Indicators**
Compliance Monitoring	1.	Audit compliance with the MMP.	• Eskom	• Once every two years	• Check record of audit	• Check frequency of compliance inspections
	2.	Record and retain the audit results.	• Eskom	• Once every two years		
	3.	Appoint a suitably qualified Eskom Environmental Management staff member to periodically inspect and report on compliance with the MMP during or following physical maintenance activities.	• Eskom Environmental Management	• Annually		
	4.	Increase the frequency of compliance inspections if significant non-conformances are reported.	• Eskom	• Following non-conformances		
	5.	Appoint competent person with environmental auditing expertise to undertake an environmental audit to determine compliance with the conditions of the EA and the EMPr and recommend improvements (if required) as per the specifications in S34 of the EIA Regulations,2014 (as amended).	• Eskom	• Every three years throughout the operational phase unless the frequency is changed based on an audit recommendation by the independent auditor.	• Check record of audit	• Check frequency of compliance inspections
Community	6.	Respond to complaints that are made.	• Eskom	• Throughout operations	• Check compliance reports	• Check record of correspondence
Maintenance of BESS	7.	Ensure that battery supplier user guides, safety specifications and MSDS are filed on site at all times.	• Eskom	• Throughout operations	• Check that documents filed on site	• Documents filed on site
	8.	Operate, maintain and monitor the BESS as per supplier specifications. Storage in secure containers to ensure/limit the potential for the occurrence of leakages. Storage area to be bunded with an appropriate volume capacity to protect from environmental contamination should accidental			• Keep supplier specifications on file	• Incidents of malfunctioning of battery system due to non-compliance with supplier specifications
	9.	Compile method statements for approval by the Eskom Environmental Practitioner for battery cell, electrolyte and battery cell/ container replacement. Maintain method statements on site.	• Contractors/ Maintenance staff		• Method statements submitted and approved by Eskom	• Method statements compiled and filed on site
	10.	Ensure that all maintenance contractors/ staff are familiar with the supplier's specifications. Maintenance activities undertaken during the Operational Phase must adhere to the applicable environmental management measures provided for the Construction Phase.	• Eskom		• Method statements comply with supplier specifications.	• Incidents of malfunctioning of battery system due to non-compliance with supplier specifications

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[4]**	**Performance Indicators**
	11.	Provide signage on site specifying the types of batteries in use and the risk of exposure to hazardous material and electric shock.			• Visual inspection	• Signage on site
	12.	Provide signage on site specifying how electrical and chemical fires should be dealt with by first responders, and the potential risks to first responders (e.g., toxic fumes). Provide suitable firefighting equipment on site.			• Visual inspection	• Signage on site
	13.	Maintain strict access control to the battery storage area.			• Monitor who enters and exits the substation	• Incidents of unauthorised entry
	14.	Undertake regular visual checks on BESS equipment to identify signs of damage or leaks.			• Regular checks taking place	• Incidents of damage to exterior of batteries
Waste management	15.	Develop a waste management plan, laying out: • Expected type and amount of waste; • Measures to reduce waste; • Type of storage for different waste types; • Waste contractors that will collect waste; and • Monitoring procedures to ensure the waste management plan is implemented.	• Eskom	• Throughout operations	• Regular audits against plan	• Availability of plan • Extent to which plan is complied with
	16.	Ensure that service providers dispose of used batteries properly by requesting and retaining receipts for disposal/refurbishment.	• Eskom	• Throughout operations	• Check that receipts are available for disposal/refurbishment	• Availability of disposal receipts
Stormwater management	17.	Ensure that stormwater is managed according to the recommendations of the approved SWMP.	• Eskom	• Throughout operations	• Visually inspect stormwater system	• Compliance with SWMP
	18.	Ensure that visible signage and emergency numbers are placed indicating who to call if any problem with stormwater or any other environmental issues is noticed.				
	19.	Clean up any spills immediately, through containment and removal of free product and appropriate disposal of contaminated soils.				
	20.	Bund all battery containers (hazardous chemicals) in accordance with legal requirements and supplier requirements.				
	21.	Ensure signage on all battery storage areas indicating as a minimum: • The battery type (and chemical name/s). • Who to contact (immediately) if a spill or leak is detected. • MSDS sheets (alternatively ensure that these are available on site).				
	22.	Remediate spills and repair battery leaks.				

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
	23.	Inspect the site for: • Spills and leaks in/from battery storage areas. • Blockages in stormwater systems. • Litter, particularly litter in any stormwater channels, culvert, drains etc. • New oil or fuel stains from vehicles. • Full or faulty bunds and oil/water separators.				
	24.	Run training courses annually for all employees that visit the site (or as needed) to inform them of the contents of this plan and how to inspect the site and who to inform if issues are noted;				
	25.	Maintain the following registers on site: • Register of spills. • Incident Management records with the corrective actions taken after spills. • Waste disposal records. • Attendance registers for training courses. • An inventory of battery types (and associated chemicals) on the site. • Record of all inspections.				
Hazardous materials	26.	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants. Inspection of packaging for damage. Adhere to OEM	• Eskom	• Throughout operations	• Visual inspection of hazardous materials handling and storage areas • Emergency procedures developed	• Number of incidents of non-compliance with safety procedures concerning hazardous materials, including waste materials • Number of spills of hazardous materials, including waste materials • Cost of cleaning up spills
	27.	Develop emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.).				
	28.	Avoid unnecessary use and transport of hazardous substances.				
	29.	Keep Material Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.				
	30.	Store battery waste in secured and labelled containers prior to disposal.				
	31.	Hazardous waste must be disposed of at a licensed hazardous waste disposal facility and waste disposal manifests must be made available to the competent authority upon request.			• Keep record of disposal manifests	• Review of disposal manifests
Employment (<u>focussing on retainment of current employees</u>)	32.	Consider maximising the <u>retainme</u>nt of employee's ~~employment of local workers~~ and formalising this policy in contracts.	• Eskom	• Throughout operations	• Keep record of staff by origin	• Percentage of local staff

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[4]**	**Performance Indicators**
	33.	Consider purchasing resources from local sources wherever possible.		• Before new workers start for the first time • Before new activities are undertaken	• Attendance registers of training sessions • Keep record that measure was considered and why it was (not) implemented	• Percentage of goods procured locally
Response to environmental pollution	34.	Ensure a quantity of appropriate remedial agent, capable of containing and/or remediating a hazardous spill is available on site at all times in case of an emergency spill. The material shall be capable of handling a spill of at least 200l.	• Eskom • Contractors	• Throughout operations	• Maintain register of pollution events and response • Following resumption of activities, frequently inspect repaired equipment to ensure proper functioning	• Number of incidents • Time activities stopped • Number of recurring incidents
	35.	Treat spills with adequate absorbent material, which then needs to be disposed of at a suitable landfill.				
	36.	Immediately remediate and rehabilitate areas in the event of a spill of an environmentally hazardous substance.				
	37.	Report all environmental incidents to the OU Eskom Environmental Management team and the Relevant Authority within 24 hours of an environmental incident (S30 of NEMA and S20 of NWA). T				
	38.	Submit the environmental incident feedback report to the Relevant Authority within fourteen days of an environmental incident (S30 of NEMA).				
	39.	Report all environmental emergencies to the DFFE and the DEA&DP Directorate: Pollution and Chemicals Management as soon as detected in accordance with S30A of NEMA and S20 of NWA.				
	40.	In the event of environmental pollution, e.g., through spillages, immediately stop the activity causing the problem.				
	41.	Only resume activity once the problem has been stopped or (in the case of spillages) the pollutant can be captured without reaching the environment.				
	42.	Repair faulty equipment as soon as possible.				
	43.	Determine if additional bunding / containment structures around the equipment is required.			• Visually inspect adequacy of bunding	
Fire Management	44.	Prepare and annually review a fire risk assessment.	• Contractors	• Throughout construction	• Inspect attendance register for training sessions • Inspect fire extinguishers and certificates	• Number of fire incidents • Certified extinguishers in appropriate locations.
	45.	Ensure that no fires are permitted on or adjacent to site.				
	46.	Ensure that no smoking is permitted on the site.				
	47.	Ensure that sufficient fire-fighting equipment is available on site.				

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[4]**	**Performance Indicators**
	48.	Equip all hazardous substance stores and waste storage areas with fire extinguishers.				
	49.	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.				
	50.	Suitably maintain firefighting equipment.				
	51.	Liaise with the local fire-firefighting department with regards to emergency procedures.				
	52.	Minimize the storage of flammable liquids on site (over and above the BESS or to fuel the BESS).				
	53.	Provide suitable emergency and safety signage on site and demarcate any areas which may pose a safety risk (including hazardous substances.). Emergency numbers for local police, fire department, Eskom and the Local Municipality must be placed in a prominent clearly visible area on site.				
	54.	Designate an emergency tipping area for waste loads identified to be on fire or otherwise deemed to be an immediate risk.				
	55.	Trim overgrown vegetation along access roads and maintain an appropriate firebreak.				
	56.	Respond to reports of the presence of alien plant species through eradication.				
	57.	Remove cuttings of alien vegetation from the site.				
Protection of Flora	58.	Limit vegetation clearance, pruning and the footprint of maintenance activities to what is absolutely essential.	• Contractor • Eskom	• Throughout operations	• Check for unnecessary disturbances	• Evidence of unnecessary disturbance
	59.	Favour vegetation pruning over clearing.				
	60.	Inspect access roads annually during routine maintenance and report on the presence or absence of invasive alien plant species.				
	61.	Respond to reports of the presence of alien plant species through eradication and the application of herbicides in the Eskom servitude, where appropriate.				
	62.	Remove cuttings of alien vegetation from the site.				
	63.	Restrict laydown areas for maintenance and repair work to areas disturbed during construction of the project.				
	64.	Designate areas outside the previous construction footprint as no-go areas.				
	65.	Restrict the movement of vehicles to access roads only.				

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[4]**	**Performance Indicators**
Protection of Fauna	66.	Do not harm, catch or kill birds or animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor	• Throughout operations	• Check for evidence of faunal mortalities	• Number of faunal mortalities
	67.	Avoid fauna when driving on site (especially tortoises).				
Dust management	68.	Submit and Implement a Dust Management Plan.	• Contractors	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Dust mitigation measures in place • Number of days that dust plumes are visible • Number of registered complaints • Size of disturbed areas
	69.	Avoid clearing of vegetation until absolutely necessary (i.e., just before excavations).				
	70.	Regularly evaluate the effectiveness of all dust management measures. Amend how or which measures are used if necessary.				
	71.	Stabilise exposed surfaces as soon as is practically possible.				
	72.	Avoid excavation, handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.				
	73.	Minimise dust generated off stockpiles: • Locate piles in sheltered areas where possible; • Place the stockpile lengthwise into the wind; • Minimise the slope of the stockpile (maximum slope of 2:1); • Limit stockpile sizes; • Install barriers on three sides of the stockpile (maximum 50% material porosity) if required; • Limit activity to the downwind side of the pile; • Use the last in – first out system of stockpile management; and • Cover stockpiles when not in active use for some time and / or use an environmentally friendly chemical spray to bind soil.				
	74.	Limit vehicle speeds to 20 km/h on unconsolidated and non-vegetated areas.				
	75.	Cover trucks transporting loose material to or from site with tarpaulins, plastic or canvas.				
	76.	Ensure that any material spilled from trucks during transport to or from the site is cleaned up immediately.				
	77.	Use bedliners to minimise seepage and spillage of material from bottom-dumping trucks.				

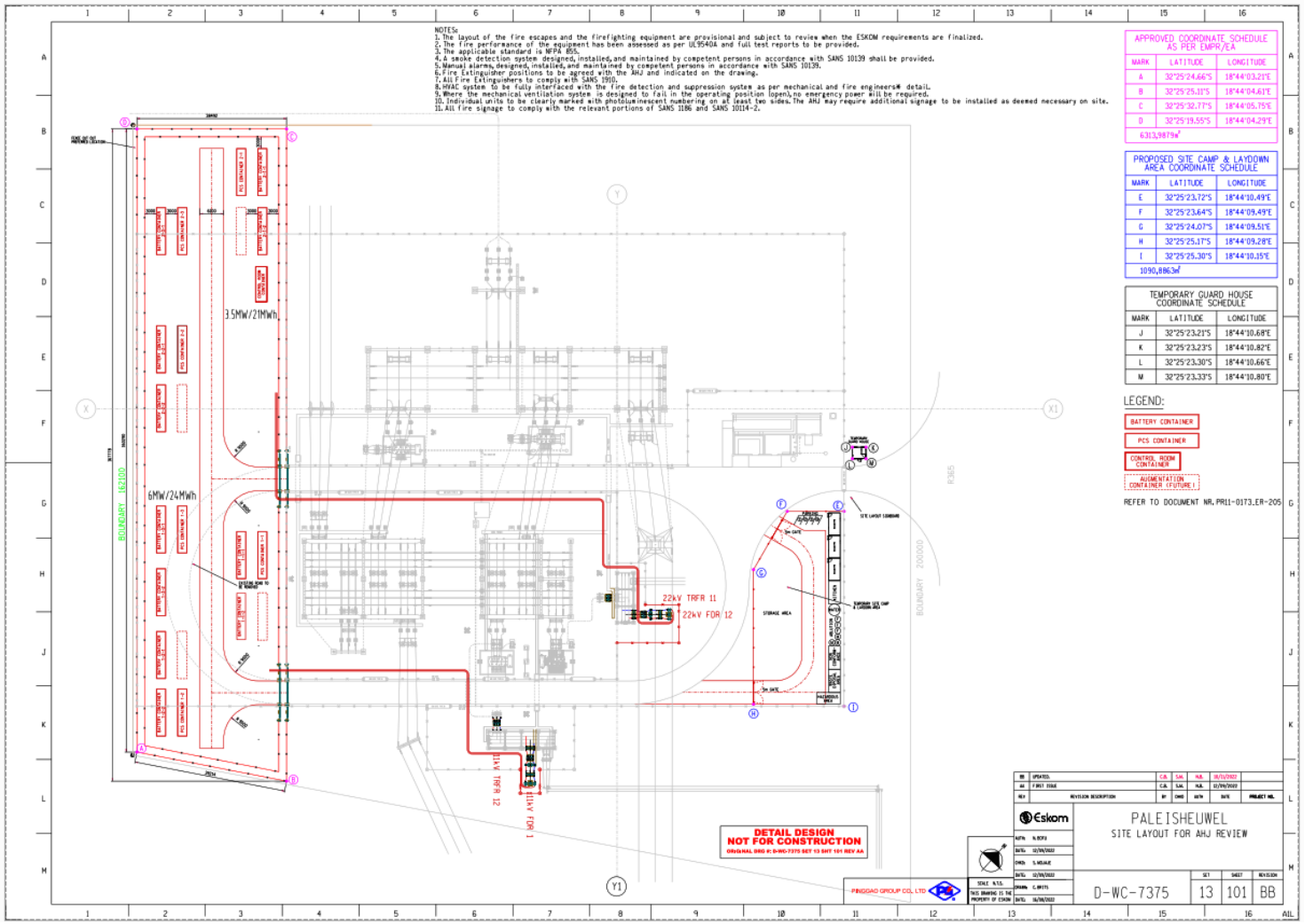
Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation**	**Monitoring Methods[4]**	**Performance Indicators**
	78.	Check weather reports daily and closely observe weather patterns to enable action to be taken immediately if conditions change.				
	79.	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegetated areas once they are on site to reduce dust problems.				
	80.	Sweep roads leading from the site if wheel washing facilities do not effectively prevent mud being deposited on access roads.				
	81.	Reduce airborne dust at construction sites through: • Dampening dust-generating areas with non-potable water if available (and necessary); • Use of cloth or brush-barrier fences; and • Covering dumps or stockpiles of lose material with plastic sheeting or netting, especially during windy conditions.				

Appendix A: Method Statements

- Site Establishment
- Waste Management
- Water & Stormwater Management
- Vegetation Clearance Plan
- Hazardous Wase
- Environmental Incident Management Procedure
- Industrial Relation & Stability Management
- Internal Audit Procedure
- Site Closure Procedure and Rehabilitation
- Training Procedure
- Monitoring & Review

Appendix B: Stormwater Management Plan

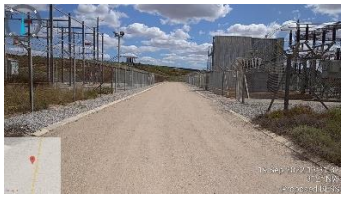
Appendix C: BESS Final Layout



Appendix D: Risk Assessment Plan for Solid State Batteries

Appendix E: Copy of the Environmental Authorisation

Appendix F: Photo Library of the Paleisheuwel Substation Site

Area of Interest	Photo's
Existing Infrastructure	 
No-go Area	   
BESS Site	   
Camp & Laydown	 

Appendix G: Battery Storage Technology

Appendix H: Public Participation Report