DRAFT MOTIVATIONAL REPORT

10 September 2020

PART 2 AMENDMENT: AS PART OF THE PROPOSED LUTZBURG SOLAR POWER PLANT NEAR OLIFANTSHOEK IN THE NORTHERN CAPE PROVINCE

ENVIRONAMICS

PROJECT DETAIL

DEA Reference No.	**:**	14/12/16/3/3/2/938
Project Title	:	The Lutzburg Photovoltaic (PV) Solar Power Project near Postmasburg in the Northern Cape Province
Authors	**:**	Mrs. Carli Otte
Client	**:**	Lutzburg Solar (RF) (Pty) Ltd.
Report Status	**:**	Draft Motivational Report
Submission date	**:**	10 September 2020

When used as a reference this report should be cited as: Environamics (2020) Draft Motivational Report: Part 2 Amendment as part of the Lutzburg Solar Power Plant near Olifantshoek, Northern Cape Province.

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GLOSSARY OF TERMS AND ACRONYMS

BESS	Battery Energy Storage Systems
BMS	Battery Management System
DEFF	Department of Environment, Forestry and Fisheries
DM	District Municipality
DoE	Department of Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
Environmental impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
ESS	Energy Storage System
GNR	Government Notice Regulation
I&AP	Interested and affected party
IPP	Independent Power Producer
kV	Kilo Volt
Mitigate	Activities designed to compensate for unavoidable environmental damage.
MW	Megawatt
NEMA	National Environmental Management Act No. 107 of 1998
PPP	Public Participation Process
PV	Photovoltaic
REIPPP	Renewable Energy IPP Procurement Process
RMIPPP	Risk Mitigation Independent Power Producers Procurement Programme

CONTEXT FOR THE DEVELOPMENT

As South Africa's population and economy continue to grow, so does the electricity demand and the strain it places on natural resources. Renewable energy is the fastest-growing electricity source, displacing fossil fuel-electricity which ensures the transition towards more sustainable electricity production. Though solar energy offers low-carbon electricity generation, its utilisation is characterised by two major constraints.

The first constraint is that solar PV is an intermittent electricity-generating resource. This means that solar electricity production is not continuous and is not always available for meeting electricity demand on the grid. Solar electricity generation varies geographically and temporally (by hour, day, and season) with changes in solar irradiance and cloud cover. Not only is solar generation variable, but it is also consistently unavailable in the early mornings and evenings before the sun has risen or after the sun has set. This daily decline in solar electricity production happens to coincide with the daily increase in electricity demand every morning and evening as thousands of electricity customers are home and use their electrical appliances (peak demand). To meet this daily peak demand, South Africa relies on coal-fired power plants, which can quickly dispatch electricity to the grid. The second constraint on solar electricity is the potential for solar power plants to produce more electricity during the day than is needed by customers, causing potential damage to the grid. Given the inflexibility of the grid, Grid operators must always maintain an exact balance between electricity generation and electricity demand on the grid. Thus, challenges with solar intermittency and over-generation may cause serious issues in maintaining the integrity and reliability of the grid.

In recent years, energy storage has taken on new relevance as it supports increasing energy demand, a higher penetration of renewables on the grid, requirements to reduce emissions, and efforts to improve resiliency. While there are many energy storage technologies, electrochemical (battery) energy storage is considered one of the most promising and well-suited options for dealing with intermittent renewables at the utility-scale level. This is due to its rapidly declining costs, high energy density, long lifetime, and high round-trip efficiency compared to other energy storage options. Lithium- ion (Li- ion) batteries have emerged as front runners in this new expansion of the industry, as their high energy density and rapidly decreasing capital costs support their use in applications ranging from portable personal electronics to transportation, grid-scale capacity support, and more.

As battery storage emerges as a potential solution for addressing the constraints caused by the high deployment of renewables, efforts are underway to identify key environmental impacts of large-scale battery energy storage systems (BESS). As with any technology, it is important to understand the technology's range of safety risks and potential mitigation measures. A comprehensive understanding of the environmental impacts of battery storage can help the energy storage industry to develop environmentally friendly energy storage solutions and help decision makers craft sustainable energy storage policies.

EXECUTIVE SUMMARY

Given the ongoing improvement in battery storage technology and the significant advantages of combining battery storage with renewable generation, it is proposed that battery energy storage systems (BESS) be included as part of the Lutzburg Solar Power Project (SPP). This report motivates the proposed amendment of the environmental authorisation (EA) as part of the Lutzburg SPP near Olifantshoek, Northern Cape Province (DEA Ref: 14/12/16/3/3/2/938). The Environmental Impact Assessment (EIA) process for the Lutzburg Photovoltaic SPP was lodged in 20 May 2016 and the Environmental Authorisation (EA) was granted on 10 February 2017.

Lutzburg Solar (RF) (Pty) Ltd. (hereafter referred to as Lutzburg SPP) was issued with an EA for the development of a 115MW photovoltaic solar facility and associated infrastructure on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266, Registration Division Gordonia, Northern Cape Province situated within the Tsantsabane Local Municipality area of jurisdiction. The town of Olifantshoek is located approximately 35km north-northeast of the proposed development. The total footprint of the project is approximately 300 hectares (including supporting infrastructure on site). The following activities were authorised with special reference to the proposed development and are listed in the EIA Regulations:

- Activity 11(i) (GN.R. 983): *"The development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."*
- Activity 28(ii) (GN.R. 983): *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."*
- Activity 1 (GN.R. 984): *"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more..."*
- Activity 15 (GN.R. 984): *"The clearance of an area of 20 hectare or more of indigenous vegetation..."*

Lutzburg SPP is said to be tendered to the Department of Mineral Resources and Energy (DMRE) in the latter half of 2020. The project will add new generation capacity under the Risk Mitigation Independent Power Producer Procurement Program (RMIPPPP). The IRP 2019 indicates that there is a short-term electricity supply gap of approximately 2 000 MW between 2019 and 2022. The objective of the RMIPPPP is to fill the current short-term supply gap, alleviate the current electricity supply constraints and reduce the extensive utilisation of diesel-based peaking electrical generators. One of the DMRE's conditions to tender the project under the RMIPPPP is that all projects must be able to operate between 5h00 and 21h30 in order to supply the grid during peak hours early in the morning and late afternoon when the sun has set, which can only

be done by using a battery storage system. As a result, Lutzburg SPP intends to make provision for the inclusion of a utility-scale battery storage at their PV power plant to increase utilization of solar electricity on the grid. Lutzburg SPP also intends increasing its capacity of 115MWdc to up to 150MWdc with the use of new and advanced technology of PV panels (470W and Bi-facial).

With the submission of the amendment application, the Department of Environment, Forestry and Fisheries (DEFF) advised that a part 2 amendment process should be followed in order to identify and assess any impacts or risks associated with the proposed amendments. The following amendments are applied for in terms of the EIA Regulations, 2014 (as amended in 2017): inclusion of a battery storage system, increasing capacity of 115MWdc to up to 150MWdc, increasing the height of the panels, increasing the number of inverters, general amendments to the layout plan (amending the location of inverters, buildings and internal roads within the development footprint (revised layout)), increasing the substation footprint and description to accommodate for IPP Step-up Substation and Switching Station, amending the location and coordinates of the access road and amending the location and coordinates of connection lines.

Environamics has been appointed as the independent consultant to undertake the Part 2 amendment process on Lutzburg SPP's behalf. This Motivational report is compiled in accordance with the provisions of Regulation 32 (1) of the EIA Regulations 2014, (as amended).

Battery storage facilities are a relatively new technology, particularly in South Africa. Batteries, as with most electrical equipment, can be dangerous and may catch fire, explode or leak dangerous pollutants if damaged, possibly injuring people working at the facility or polluting the environment. The risk level to the health and safety of on-site personnel as well as neighbouring landowners and community is seen to be of a low risk that is unlikely to occur with the proper safety measures taken as mitigation. Provided that the facility is designed and management properly, and the batteries are handled in the manner prescribed by the manufacturer, an incident is unlikely to happen. However, because of the risk we have recommended some special management actions to reduce the risk of an incident and manage an incident should one ever occur. The assessment determined that the potential negative impacts resulting from the proposed use of new and advanced technology (PV solar panels), new power line route and access road would remain unchanged. The proposed layout has been refined to incorporate the inclusion of the battery storage system as well as the advanced technology to be used for the panels.

The advantages and disadvantages of the proposed amendment were explored to provide an indication of the potential benefits and drawbacks. Battery storage offers a wide range of advantages to South Africa including renewable energy time shift, renewable capacity firming, electricity supply reliability and quality improvement, voltage regulation, electricity reserve capacity improvement, transmission congestion relief, load following and time of use energy cost management. In essence, this technology allows renewable energy to enter the base load

and peak power generation market and therefore can compete directly with fossil fuel sources of power generation and offer a truly sustainable electricity supply option.

A Public Participation Process (PPP) as required in terms of Chapter 6 of the EIA Regulations, 2014, (as amended) is being conducted in respect of the Part 2 Amendment application. All comments received throughout the amendment process will be included in the Comments and Response Report to be included as part of the Final Motivational Report.

In light of the above, it is concluded that the EA should be amended in line with the specifications as proposed and that potential risks identified can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

1 INTRODUCTION

Utility-scale energy storage (grid energy storage) is a collection of technologies used to store electrical energy on a large scale within an electrical power grid. The recent increase in solar and wind generating capacity has led to a strong push for the development of energy storage technologies. Energy storage involves storing excess electrical energy when electricity production exceeds demand and returning this electricity to the grid at a later time when demand is high. If implemented on a large scale, energy storage could help resolve the intermittency and over-generation issues of solar energy and allow greater penetration of solar energy on the grid. Energy storage systems cannot store electricity itself, but can convert electricity into other forms of energy, which can be stored for later use and then be converted back to electricity when demand is high.

While there are many energy storage technologies, electrochemical (battery) energy storage is considered one of the most promising and well-suited options for dealing with intermittent renewables at the utility-scale level. This is due to its rapidly declining costs, high energy density, long Lutzburgtime, and high round-trip efficiency compared to other energy storage options. Battery energy storage systems (BESS) can dispatch renewable energy in a responsive and reliable manner, which is important for grid operators to efficiently manage the power output to the grid. A BESS is comprised of three major components: the battery which is the energy container; the power conversion system (PCS) or inverter, which interfaces the DC battery system to the AC power system; and the power plant controller (PPC) which governs, monitors, and executes the intended functions of the energy storage application.

While there are various battery storage technologies available, this project focused entirely on utility-scale Lithium-ion (Li-ion) battery energy storage. Li-ion batteries have emerged as the leading technology in utility-scale energy storage applications because it offers the best mix of performance specifications, such as high charge and discharge efficiency, low self-discharge, high energy density, and long life cycle (Divya KC et al., 2009).

The following sections will explain the legal mandate and purpose of the report, details of the environmental assessment practitioner, the status of the amendment process and the structure of the report.

1.1 LEGAL MANDATE AND PURPOSE OF THE REPORT

Regulation 31 (GNR 326) determine that: "*An Environmental Authorisation (EA) may be amended by following the process prescribed in this Part if the amendment will result in a change to the scope of a valid EA where such change will result in an increased level or change in the nature of impact where such level or change in nature of impact was not—(a) assessed and included in the initial application for environmental authorisation; or (b) taken into consideration in the initial environmental authorisation; and the change does not, on its own, constitute a listed or specified activity*."

This report is the Draft Motivational Report to be submitted to the Department of Environment, Forestry and Fisheries (DEFF). According to Regulation 32 all identified and registered I&APs and relevant State Departments must be allowed the opportunity to review the motivational report. The report will be made available to all identified and registered I&APs and all relevant State Departments. They will be requested to provide written comments on the report within 30 days of receiving it. All issues identified during this review period will be documented and compiled into a Comments and Response Report as part of the Final Motivational Report. According to Regulation 32(1) of GNR 326 the objective of the report is to, through a consultative process:

- Assess all impacts related to the proposed change;
- Describe the advantages and disadvantages associated with the proposed change;
- Provide measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and
- Indicate any changes to the EMPr.

1.2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Environamics was appointed by the applicant as the independent EAP to conduct the Part 2 Amendment process and prepare all required reports. All correspondence to the EAP can be directed to:

Contact person: Carli Otte

Postal Address: PO Box 6484, Baillie Park, 2526

Telephone: 082 220 8651 (Cell) 086 762 8336 (f)

Electronic Mail: carli@environamics.co.za

Regulation 13(1)(a) and (b) determines that an independent and suitably qualified and experienced EAP should conduct the assessment process. In terms of the independent status of

the EAP a declaration is attached as part of the amendment application form. The expertise of the EAP responsible for conducting the EIA is also summarised in the curriculum vitae included as part of Appendix A.

1.3 STATUS OF THE AMENDMENT PROCESS

The EIA process is conducted strictly in accordance with the stipulations set out in Regulations 31-33 of Regulation No. 982 (as amended in 2017). Table 1.3 provides a summary of the amendment process and future steps to be taken. It can be confirmed that to date:

- On 11 August 2020 the pre-application meeting request together with the public participation plan was submitted to the DEFF.
- The DEFF approved the public participation plan on 4 September 2020 (no longer required as part of lockdown level 2).
- An application for amendment of the EA will be submitted with the Draft Motivational Report on 10 September 2020.
- The Draft Motivational Report was made available to all identified and registered I&APs and relevant State Departments on 10 September 2020 and they were requested to provide their comments on the report within 30 days of the notification (12 October 2020).

It is envisaged that the Part 2 Amendment process should be completed within approximately six months of submission of the Draft Motivational Report, i.e. by February 2021 – see Table 1.1.

Table 1.1: Project schedule

Activity	**Prescribed timeframe**	**Timeframe**
Submit public participation plan	-	26 August 2020
Submit Draft Motivational Report	-	10 September 2020
Public participation process	30 Days	10 Sep. 12 Oct. 2020
Submit Final Motivational Report	90 Days	13 October 2020
Decision	107 Days	January 2020
Public participation (decision) & submission of appeals	20 Days	February 2020

1.4 STRUCTURE OF THE REPORT

This report is structured in accordance with the prescribed contents stipulated in Regulation 32 of Regulation No.982. It consists of nine sections demonstrating compliance to the specifications of the regulations as illustrated in Table 1.2.

Table 1.2: Structure of the report

Requirements for the contents of a Motivational Report as specified in the Regulations		Section in report
Regulation 32 (1) – The applicant must… submit to the competent authority a report reflecting:		
(i)	an assessment of all impacts related to the proposed change	4
(ii)	advantages and disadvantages associated with the proposed change; and	6
(iii)	measures to ensure avoidance, management and mitigation of impacts associated with such proposed change; and	5
(iv)	any changes to the EMPr;	Appendix E
(iv)	Which report –	7
(aa)	had been subjected to a public participation process, which had been agreed to by the competent authority, and which was appropriate to bring the proposed change to the attention of potential and registered interested and affected parties, including organs of state, which have jurisdiction in respect of any aspect of the relevant activity, and the competent authority, and	
(bb)	reflects the incorporation of comments received, including any comments of the competent authority.	

2 PROJECT OVERVIEW

This section aims to provide background information of the location of the activity, property description, activities authorised, photovoltaic technology and approved layout.

2.1 THE LOCATION OF THE ACTIVITY AND PROPERTY DESCRIPTION

The activity entails the development of a photovoltaic solar facility and associated infrastructure on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266, Registration Division Gordonia, Northern Cape Province situated within the Tsantsabane Local Municipality area of jurisdiction. The town of Olifantshoek is located approximately 35km north-northeast of the proposed development (refer to figure 1.1 for the locality map).

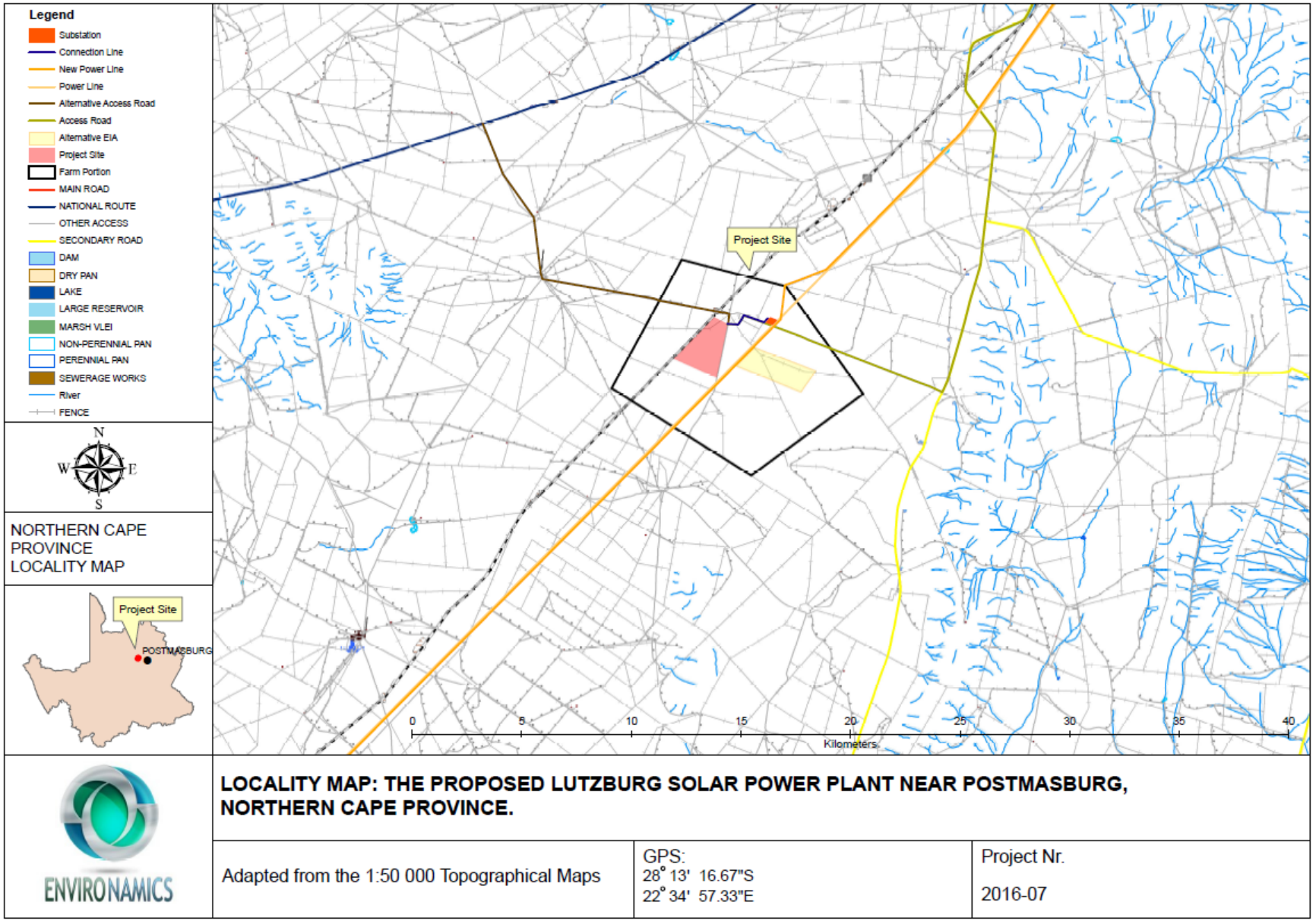


Figure 1.1: Locality Map

The project entails the generation of up to 115MW electrical power through photovoltaic (PV) panels. The total footprint of the project will approximately be 300 hectares (including supporting infrastructure on site) – refer to table 2.1 for general site information. The property on which the facility is to be constructed will be leased by Lutzburg Solar (RF) (Pty) Ltd. from the property owner, the Wilhelm Uys Trust, for the life span of the project (minimum of 20 years).

Table 2.1: General site information

Description of affected farm portion	The Remaining Extent of Portion 2 of the farm Ruby Vale No. 266, Registration Division Gordonia, Northern Cape
Description of affected farm portion (power line)	The Remaining Extent of Portion 2 of the farm Ruby Vale No. 266, Registration Division Gordonia, Northern Cape
21 Digit Surveyor General codes	C02800000000026600002
Title Deed(s)	T1919/1998
Type of technology	Photovoltaic solar facility
Structure Height	Panels ~3.5m, buildings ~ 4m and power lines ~32m
Surface area to be covered	Approximately 300 ha
Structure orientation	The panels will either be fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture the most sun.
Laydown area dimensions	300 ha
Generation capacity	Up to 115MW
Expected production	Up to 300 GWh per annum

2.2 ACTIVITY DESRIPTION

The development triggered a number of activities in terms of the EIA Regulations, 2014. The following activities were approved as per the EA dated 10 February 2017:

Table 2.2: Listed activities

Relevant notice:	**Activity No (s)**	**Description of each listed activity as per project description**:
GNR. 983, 4	Activity 11(i)	• *"The development of facilities or infrastructure for*

December 2014		*the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts."* • Activity 11(i) is triggered since the proposed photovoltaic solar facility will transmit and distribute electricity of 132 kilovolts outside an urban area.
GNR. 983, 4 December 2014	Activity 28(ii)	• *"Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare."* • Activity 28(ii) is triggered since the farm has been previously cultivated and the property will be rezoned to "special".
GNR. 984, 4 December 2014	Activity 1	• *"The development of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more."* • Activity 1 is triggered since the proposed photovoltaic solar facility will generate up to 115 megawatts electricity.
GNR. 984, 4 December 2014	Activity 15	• *"The clearance of an area of 20 hectares or more of indigenous vegetation."* • In terms of vegetation type the preferred site falls within the Gordonia Plains Shrubland (SVk16) and Olifantshoek Plains Thornveld (SVk13), both of which are described by Mucina and Rutherford (2006) as 'least threatened'. However, activity 15 is triggered since portions of the site has not been lawfully disturbed during the preceding ten years; therefore, more than 20 hectares of indigenous vegetation will be removed.

The proposed amendments will not result in any changes to the authorised activities and will not trigger any new listed activities.

2.3 PHOTOVOLTAIC TECHNOLOGY

The term photovoltaic describes a solid-state electronic cell that produces direct current electrical energy from the radiant energy of the sun through a process known as the Photovoltaic Effect. This refers to light energy placing electrons into a higher state of energy to create electricity. Each PV cell is made of silicon (i.e. semiconductors), which is positively and

negatively charged on either side, with electrical conductors attached to both sides to form a circuit. This circuit captures the released electrons in the form of an electric current (direct current). The key components of the proposed project are described below:

- PV Panel Array - To produce up to 115MW, the proposed facility will require numerous linked cells placed behind a protective glass sheet to form a panel. Multiple modules will be required to form the solar PV array which will comprise the PV facility. The PV modules will either be tilted at a fixed angle, or mounted on trackers tracking from east to west during the day in order to capture the most solar energy.

- Wiring to Central Inverters - Sections of the PV array will be wired to inverters. The inverter is a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency.

- Connection to the grid - Connecting the array to the electrical grid requires transformation of the voltage from 480V to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is 480V and this is fed into step up transformers to 132kV. An onsite substation will be required on the site to step the voltage up to 132kV, after which the power will be evacuated into the national grid. Whilst Lutzburg Solar (RF) (Pty) Ltd. has not yet received a cost estimate letter from Eskom, it is expected that generation from the facility will tie in with Lewensaar 275/50kV Substation. The Project will inject up to 100MW into the National Grid. The installed capacity will be up to approximately 115MW.

- Electrical reticulation network – An internal electrical reticulation network will be required and will be lain ~2-4m underground as far as practically possible.

- Supporting Infrastructure – The following auxiliary buildings with basic services including water and electricity will be required on site:

    - Office (~16m x 9.85m);
    - Switch gear and relay room (~25m x 14m);
    - Staff lockers and changing room (~21.7m x 9.85m); and
    - Security control (~11.8m x 5.56m)

- Roads – Access will be obtained via a gravel road off the R385 Provincial Road. An internal site road network will also be required to provide access to the solar field and associated infrastructure. The access road will have a width of ~6m and the internal road/track between 8m & 10m.

- Fencing - For health, safety and security reasons, the facility will be required to be fenced off from the surrounding farm. Fencing with a height of 2.5 meters will be used.

2.4 LAYOUT DESCRIPTION

The layout plan follows the limitations of the site and aspects such as environmentally sensitive areas, roads, fencing and servitudes on site were considered. The total surface area proposed for layout options include the PV panel arrays spaced to avoid shadowing, access and maintenance roads and associated infrastructure (buildings, power inverters, transmission lines and perimeter fences). Limited features of environmental significance exist on site. The layout assessed as part of the Final Environmental Impact Assessment Report (FEIAR) is indicated Figure 2.1 below.

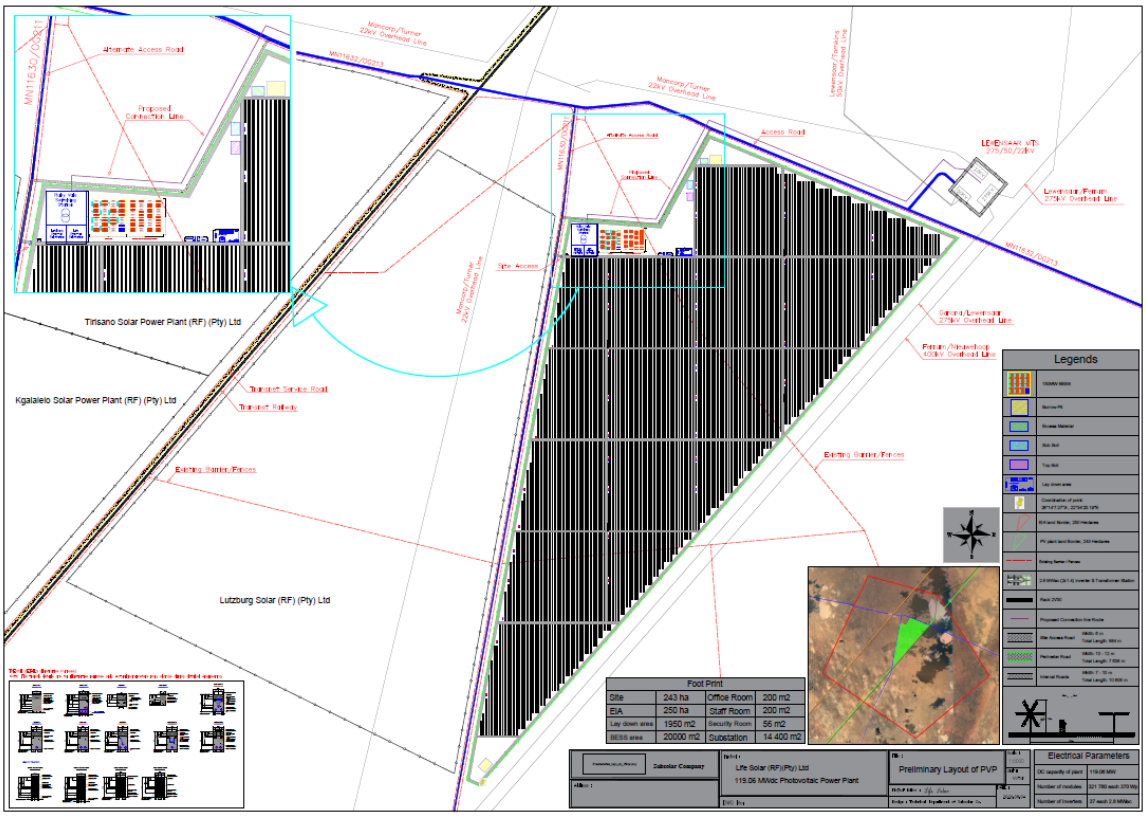


Figure 2.1: Layout plan

It should be noted that the layout had to be revised as a result of the proposed amendments (refer to Appendix C) but that the final development layout will be determined during the detailed design phase once the project has been awarded preferred bidder status. Table 2.3 below provides detailed information regarding the layout and the components that were authorised.

Table 2.3: Technical details for the proposed facility

Component	Description / dimensions
Height of PV panels	3.5 meters
Area of PV Array	300 Hectares

Number of inverters required	Minimum 34
Area occupied by inverter / transformer stations / substations	Inverter Transformer Station: 2.5 x 7.6 meters (19m^2) Substation: 3 000m^2
Capacity of on-site substation	132kV
Area occupied by both permanent and construction laydown areas	Permanent Laydown Area: 300 Hectares Construction Laydown Area: 713.11 m^2
Area occupied by buildings	Security Room: 66.74 m^2 Office: 157.6 m^2 Staff Locker and Changing Room: 213.745 m^2
Length of internal roads	Approximately 13 km
Width of internal roads	Between 8 & 10 meters
Proximity to grid connection	Approximately 780 meters
Height of fencing	Approximately 2.5 meters

2.5 ASSESSMENT OF ENVIRONMENTAL IMPACTS

As part of the original EIA process for the Lutzburg SPP undertaken in 2016, the following specialist studies were undertaken to investigate potential significant impacts:

- Brief Geotechnical Study;
- Ecological Fauna and Flora Habitat Survey;
- Avifaunal Study;
- Visual Impact Assessment;
- Agricultural and Soils Impact Assessment;
- Heritage Impact Assessment;
- Paleontological Impact Assessment; and
- Social Impact Assessment.

The findings of the specialist studies and impact assessment undertaken as part of the original environmental authorisation process are summarised in the table below:

Table 2.4: Original Rating of Impacts during construction of the proposed SPP and associated infrastructure

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING
Geotechnical	Impacts of the geology on the	Negative Low	Negative Low

Study	proposed development		
Ecological Fauna and Flora Habitat Survey	Loss of habitat for faunal and floral species	Negative Medium	Negative Low
	Destruction of Avifaunal Habitat	Negative Low	Negative Low
	Loss of indigenous faunal and floral species diversity	Negative Medium	Negative Low
	Loss of faunal and floral species of conservation significance	Negative High	Negative Low
Avifaunal Study	Collision with PV site itself	Negative Low	Negative Low
	Direct collision with the power line network.	Negative Low	Negative Low
Visual Impact Assessment	Visual intrusion	Negative Medium	Negative Low
Agricultural and Soils Impact Assessment	Loss of topsoil	Negative Low	Negative Low
	Soil erosion	Negative Low	Negative Low
Heritage Impact Assessment	Impacts on heritage objects	No impact	No impact
Paleontological Impact Assessment	Impact of construction of SPP and associated transmission line.	Negative Low	Negative Low
Social Impact Assessment	Temporary employment and other economic benefits (business opportunities and skills development)	Positive Medium	Positive Medium
	Technical advice for local farmers and municipalities	Positive Low	Positive Low
	Increase in construction vehicle traffic	Negative Low	Negative Low
	Impact of construction workers on local communities	Negative Low	Negative Low
	Influx of job seekers	Negative Low	Negative Low
	Risk to safety, livestock and farm infrastructure	Negative Low	Negative Low

	Increased risk of veld fires	Negative Medium	Negative Low
Other	Temporary noise disturbance	Negative Low	Negative Low
	Generation of waste - general waste, construction waste, sewage and grey water	Negative Medium	Negative Low

Table 2.5: Original Rating of Impacts during operation of the proposed SPP and associated infrastructure

SPECIALIST STUDY	IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING
Avifaunal Study	Impact mortality around the PV site for the Red-listed bird groups identified as at risk	Negative Low	Negative Low
	Impact mortality on transmission line for the Red-listed bird groups identified as at risk	Negative Low	Negative Low
	Nesting for birds	Negative Low	Negative Low
Visual Impact Assessment	Visual intrusion	Negative Medium	Negative Low
Agricultural and Soils Impact Assessment	Soil erosion	Negative Low	Negative Low
	Generation of alternative land use income	Positive Low	Positive Low
	Loss of agricultural land use	Negative Low	Negative Low
Paleontological Impact Assessment	Overall function of the SPP	Negative Low	Negative Low
Social Impact Assessment	Permanent employment	Positive Medium	Positive Medium
	Generation of additional electricity	Positive Medium	Positive Medium
	Establishment of a Community Trust	Positive Medium	Positive Medium
	Change in the sense of place	Negative Low	Negative Low
	Potential impact on tourism	Negative &	Negative &

		Positive Low	Positive Low
	Development of infrastructure for the generation of clean, renewable energy	Positive Low	Positive Low
Other	Increase in storm water runoff	Negative Medium	Negative Low
	Increased consumption of water	Negative Medium	Negative Medium
	Generation of waste	Negative Low	Negative Low
	Leakage of hazardous materials	Negative Medium	Negative Low

Table 2.6: Original Rating of Impacts during the decommissioning of the proposed SPP and associated infrastructure

IMPACT	PRE-MITIGATION RATING	POST MITIGATION RATING
Rehabilitation of the physical environment	Positive Low	Positive Low
Generation of waste	Negative Medium	Negative Low
Loss of employment	Negative Medium	Negative Low

3 PROPOSED AMENDMENTS

The Lutzburg SPP is said to be tendered to the Department of Mineral Resources and Energy (DMRE) in the latter half of 2020. However, one of the new conditions from the DMRE's Risk Mitigation Independent Power Producer Procurement Program (RMIPPPP) of adding 2000MW to the grid is that all tenders must include the storage of capacity. As a result, Lutzburg SPP is applying for the amendment of the EA (DEA Ref: 14/12/16/3/3/2/938) issued on 10 February 2017 to include (amongst other amendments) a battery storage system.

3.1 CHANGES TO AUTHORISED ELEMENTS OF THE PROJECTS

The following amendments are being applied for in terms of the EIA Regulations, 2014 (as amended in 2017)(refer to Figure 3.1):

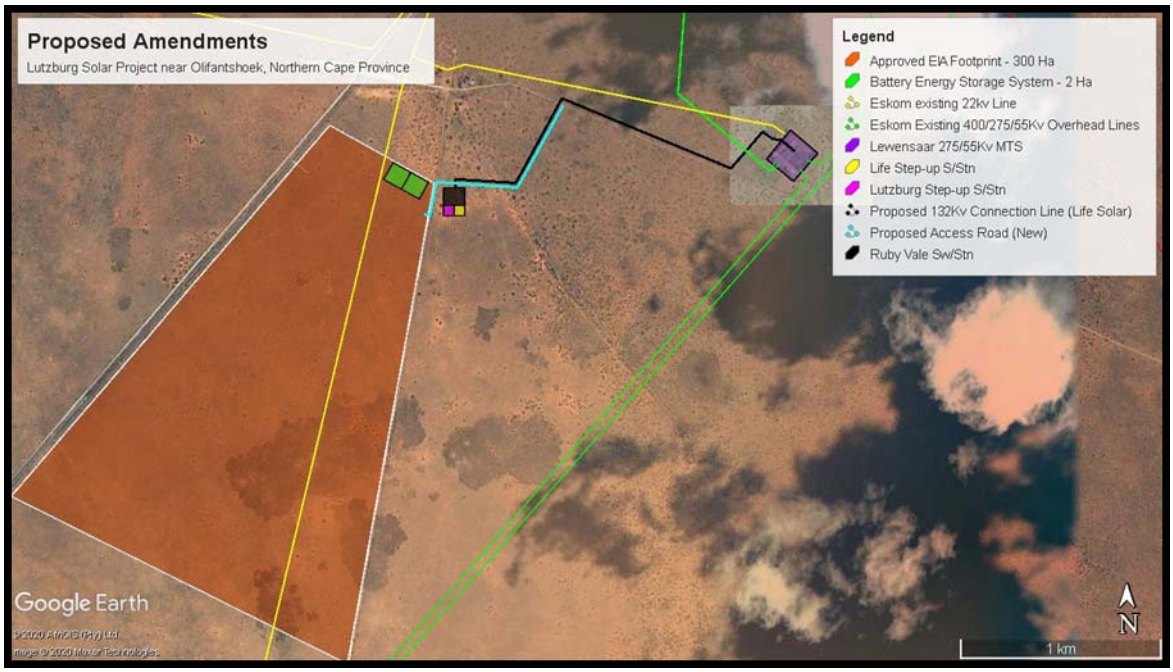


Figure 3.1: Proposed amendments

- <u>Inclusion of a battery storage system</u>

  Given the ongoing improvement in battery storage technology and the significant advantages of combining battery storage with renewable generation, it is proposed that battery energy storage systems "BESS" be included for this project in order to meet the requirements to tender the project for the new generation capacity under the Risk Mitigation Independent Power Producer Procurement Program (RMIPPPP) by the Department of Mineral Resources and Energy (DMRE). One of the DMRE's conditions to tender the project under the RMIPPPP is that all projects must be able to operate between 5h00 and 21h30 in order to supply the grid during peak hours early in the morning and late afternoon when the sun has set, which can only be done by using a battery storage system. The battery storage system will therefore improve the desirability of the proposed project as well as its efficiency.

  The capacity of the battery storage facility per project will be kept in standard shipment containers or smaller containers ("blocks") as might be proposed by selected supplier with an area of approximately 2ha. The battery to be installed will be lithium-ion and no electrolytes will be transported to and handled on site. Battery cells will be assembled at the supplier factory prior to delivery to the sites. The battery storage facility will be located within the already authorized PV plant footprint area. There will be no need for the additional clearance of more than 2 ha of vegetation for the development of a new area for the battery storage facility.

- Increasing capacity of 115MWdc to up to 150MWdc and the height of the panels

  Due to new and advanced technology of panels (470W and Bi-facial) the same amount of panels may be used as specified previously but will be able to generate more megawatts on the same area. The DMRE no longer caps projects at 75MW under the RMIPPPP, which means that developers may tender for larger capacity (if the grid can accommodate it). Using new advanced panel technology will result in the increase in the height of the panels, since the height of the panels will range between 3.5 to 4.5 m.

- Increasing the number of inverters

  Due to the increase in MWdc capacity, more inverters are needed to convert the increased DC capacity to AC. The minimum inverters should be amended from 34 to a minimum of 44. Reference should also be made to inverters and not central specifically.

- The location and coordinates of the connection line

  After receiving the Cost Estimate Letter for Grid connection and Supply from Eskom, the Proposed Lutzburg Solar Facility cannot connect straight into Lewensaar MTS, it was therefore proposed that the Lutzburg Solar Facility (including other facilities on the property) must first connect to the Ruby Vale Switching station with only one connection line to Lewensaar MTS., the Lutzburg Solar facility will make use of the same connection line as proposed in the Life Solar amendments as the proposed substation is situated on the Life Solar footprint. The proposed new route/corridor has been assessed as part of the Lutzburg, Tirisano and Kgalalelo SPPs.

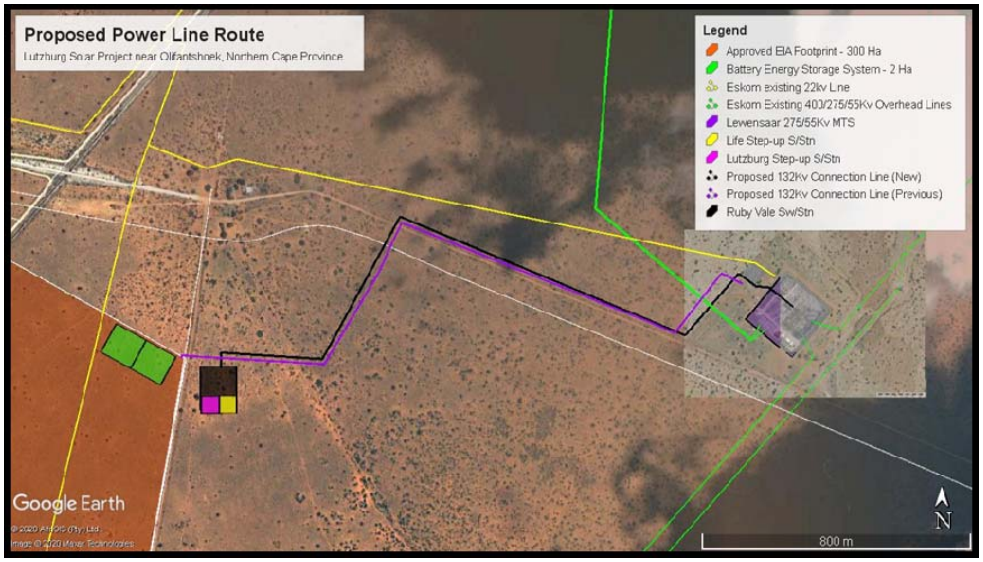


Figure 3.2: Proposed Power Line Route

- <u>Increase of Substation footprint and description to accommodate for IPP Step-up Substation and Switching Station</u>

  The proposed on site Substation will be situated on the Life Solar footprint and will have a combined footprint of approximately 1.54ha, the substation will consist of two IPP Step-up substations (Life and Lutzburg) and a Switching Station, the Lutzburg step-up substation will step-up the generated capacity to 132Kv in order to connect and supply at the same Voltage at the Lewensaar MTS (after constructing a 132Kv feeder bay), the Switching Station will be the connection between the Step-up Substation and the Lewensaar MTS. The proposed connection line will therefore be constructed using a single line between the Ruby Vale Switching Station and the Lewensaar MTS. The Proposed future Tirisano and Kgalalelo SPP's will also connect with a single line to the Ruby Vale Switching Station.

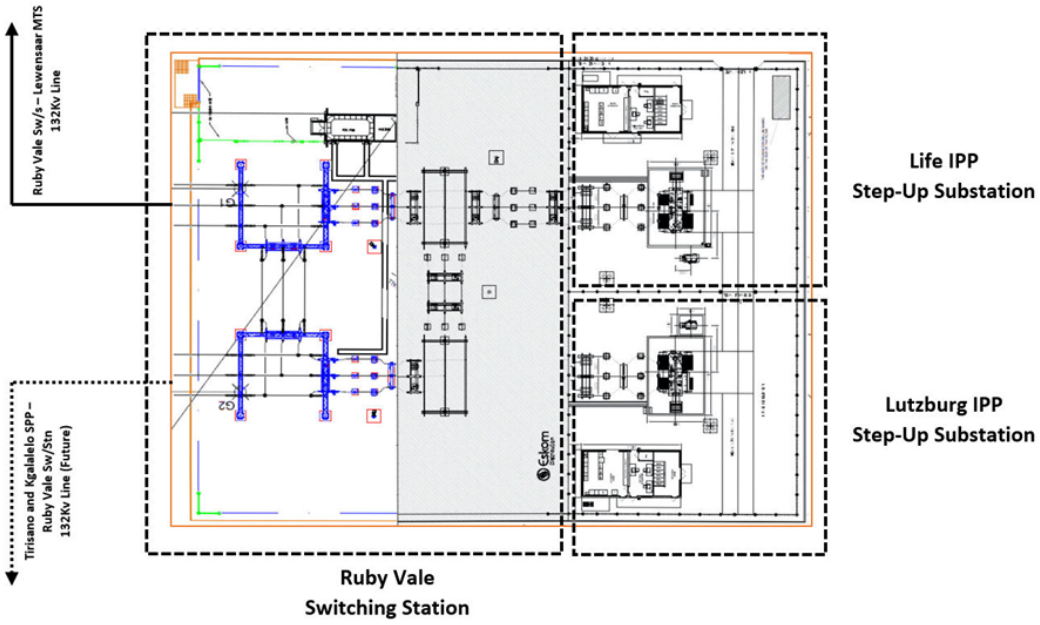
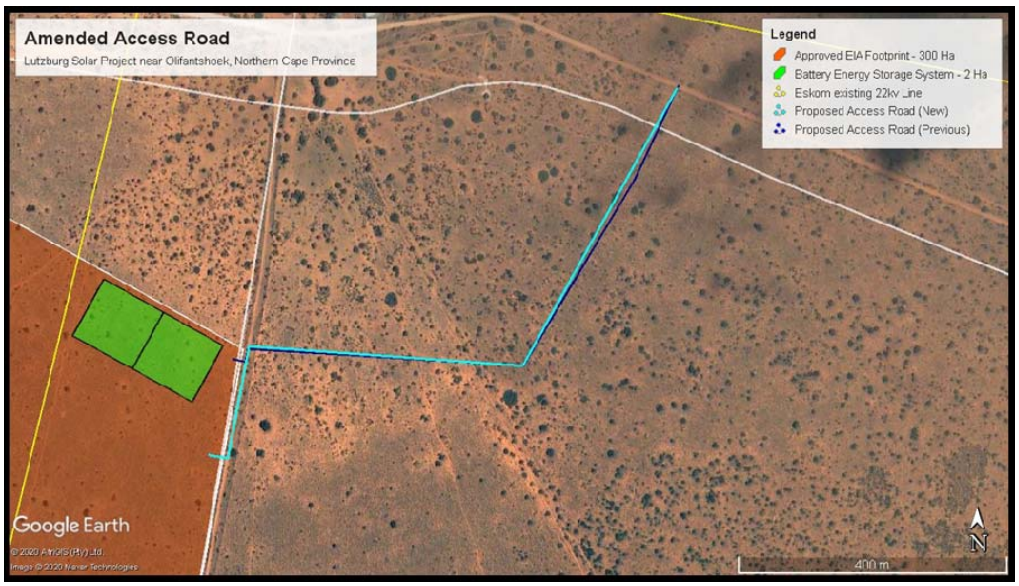


Figure 3.3: Substation and switching station (figure for illustration purposes only)

- <u>The location and coordinates of the access road</u>
  The proposed new route is a very slight amendment of the originally assessed access road. It may be assumed that the corridor has been assessed.



- <u>Amending the location of inverters, buildings and internal roads within the development footprint (revised layout)</u>

  Due to the increase of capacity (MW), inclusion of battery storage and the spacing between panels, a new layout had to be designed which changed the citing of the infrastructure as well as the sizes of the demarcated areas for the associated infrastructure (the substation, laydown area, office, staff room and security room).

Table 3.1: Technical details for the proposed facility

Associated Infrastructure	Description / dimensions
Inverter Transformer Station	~20m^2
Substation	-
Construction Laydown Area	~2 000m^2
Security Room	~60m^2
Office	~200m^2
Staff Locker and Changing Room	~200m^2
Length of internal roads	~20 km
Width of internal roads (includes perimeter road)	Between 7 & 12 meters

3.2 DETAILS OF AMENDMENTS BEING APPLIED FOR

In light of the above, it is recommended that the EA dated 10 February 2017 be amended as follow:

<u>Inclusion of a battery storage system within the development footprint</u>

It is proposed that reference should be made in the EA to the battery storage system at the following relevant pages:

- Page 4: The description of the associated infrastructure for the proposed PV facility should include reference to a battery storage of ~2ha in extent.

- Page 5: Reference should also be included in the table summarising the technical details of the proposed facility. It is proposed that the following be included: Battery storage – Of ~ 2ha in extent.

Increasing capacity of up to 115MWdc to up to 150MWdc

To increase the capacity of the facility from up to 115MW to up to 150MW, it is proposed that the EA (and its first amendment where applicable) be amended as follows:

- Page 1: The project description (title) should be amended from "*The 115 MW Lutzburg Photovoltaic Solar Energy Facility on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 south of the town of Olifantshoek situated within the Tsantsabane Local Municipality in the Northern Cape Province*" to "The up to 150 MW Life Photovoltaic Solar Energy Facility on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 south of the town of Olifantshoek situated within the Tsantsabane Local Municipality in the Northern Cape Province."

- Page 3: The activity description for activity 15 should amended from "*The proposed Lutzburg Solar Power Plant (RF)(Pty) photovoltaic solar facility will have an electricity output of up to 115 megawatts*" to "The proposed Lutzburg Solar (RF)(Pty) photovoltaic solar facility will have an electricity output of up to 150 megawatts."

- Page 4: The project description following the provision of the coordinates of the proposed development as follow: *"-for the 115 MW Lutzburg Photovoltaic Solar Energy Facility on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 south of the town of Olifantshoek situated within the Tsantsabane Local Municipality in the Northern Cape Province, hereafter referred to as "the project""* to "-for the up to 150 MW Lutzburg Photovoltaic Solar Energy Facility on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 south of the town of Olifantshoek situated within the Tsantsabane Local Municipality in the Northern Cape Province, hereafter referred to as "the project".

- Page 4: The first bullet describing the associated infrastructure for the proposed PV facility should be amended from: *"PV Panel Array – to produce a maximum capacity of 115 MW"* to "PV Panel Array – to produce a maximum capacity of 150 MW".

- Page 5: The table summarising the technical details of the proposed facility should be amended as follow: *"Generation capacity – 115 MW*" to "Generation capacity – up to 150 MW."

- Page 6: Under the condition of the authorisation section 1 as follow: "*The 115 MW Lutzburg Photovoltaic Solar Energy Facility on the Remaining Extent of Portion 2 of the*

farm Ruby Vale No. 266 south of the town of Olifantshoek situated within the Tsantsabane Local Municipality in the Northern Cape Province as described above is hereby approved" to "The up to 150 MW Life Photovoltaic Solar Energy Facility on the Remaining Extent of Portion 2 of the farm Ruby Vale No. 266 south of the town of Olifantshoek situated within the Tsantsabane Local Municipality in the Northern Cape Province as described above is hereby approved."

Increasing the height of the panels

To increase the height of the panels from 3.5 meters to 3.5 – 4.5 meters, it is proposed that the EA (and its first amendment where applicable) be amended as follows:

- Page 5: The table summarising the technical details of the proposed facility should be amended as follow: "Height of the PV panels – 3.5 meters" to "Height of the PV panels – 3.5 – 4.5 meters"

Increasing the number of inverters

The number of inverters should be increased from 34 as a minimum to a minimum of 44 in order to accommodate the increased capacity explained above. To amend the number of inverters, it is proposed that the EA be amended as follows:

- Page 5: The table summarising the technical details of the proposed facility should be amended as follow: "*Number of inverters required – 34 minimum*" to "Number of inverters required – 44 minimum."

Amending the location of inverters, buildings and internal roads within the development footprint (revised layout)

It is proposed that reference should be made in the EA to the following areas occupied by associated infrastructure:

- Page 5: The second bullet regarding the supporting infrastructure should be amended as follow: "*The following auxillary buildings with basic services including water and electricity will be required on site: Office (~16m x 9.85m); Switch gear and relay room (~25m x 14m); Staff lockers and changing room (~21.7m x 9.85m); and Security control (~11.8m x 5.56m)"* to "The following auxillary buildings with basic services including water and electricity will be required on site: Office (~200m²); Switch gear and relay room (~25m x 14m); Staff lockers and changing room (~200m²); and Security control (~56m²)".

- Page 5: The table summarising the technical details of the proposed facility should be amended as follow: "*Construction laydown area: 713.11m²";* "Construction laydown area: ~1950m²"; "Security Room: 66.74m²" to "Security Room: ~56m²"; "Office:

157.6m²" to "Construction laydown area: 2 000 m²"; "Office: ~200m²"; "Staff Locker and Changing Room: 213.745m²" to "Staff Locker and Changing Room: ~200m²";

Amending the location of internal roads within the development footprint

To amend the location of the internal roads, it is proposed that the EA be amended as follows:

- Page 5: The first bullet regarding the roads should be amended as follow: "The access road will have a width of ~6m and the internal road/track between 8m and 10m" to "The access road will have a width of ~6m and the internal road/track between 7m and 12m."

- Page 5: The table summarising the technical details of the proposed facility should be amended as follow: "*Width and length of internal roads – Main internal road – width between 8 and 10 meters, length: approximately 13 km*" to "Width and length of internal roads – Main internal road – width between 7 and 12 meters, length: approximately 20 km."

In this regard an amended layout plan is attached to this application – refer to Appendix 8. To amend the layout in general, it is proposed that the EA be amended as follow:

- Page 7: Section 14- "*The development layout plan titled "Lutzburg Solar Power Plant, dated 04 April 2016 is approved"* to "The development layout plan titled "Lutzburg Solar Power Plant, dated October 2020 is approved".

Increase of Substation footprint and description to accommodate for IPP Step-up Substation and Switching Station

- Page 5: In the table summarising the technical details of the proposed facility it is proposed that the following be amended: "*Area to be occupied by inverter / transformer stations / substations – Inverter Transformer Station: 2.5 x 7.6 meters (19m²) and Substation: "3000m²"* to "Area to be occupied by inverter / transformer stations / IPP Step-up substation and a Switching Station – Substation and switching station: 15 400m²".

Amending the location and coordinates of access road (opposite Lutzburg access), it is proposed that the EA be amended as follow:

- Page 4: The coordinated for the access road should be amended from

Access road	28°12'47.53"S	22°34'35.65"E
	28°12'47.71"S	22°34'36.47"E
	28°12'47.04"S	22°34'36.57"E

	28°12’47.89”S	22°34’51.78”E
	28°12’38.83”S	22°34’57.92”E
	28°12’34.21”S	22°35’00.29”E

To:

Access road		
1	28°12'34.51"S	22°35'0.16"E
2	28°12'47.84"S	22°34'51.73"E
3	28°12'46.96"S	22°34'36.63"E
4	28°12'52.36"S	22°34'35.44"E
5	28°12'52.53"S	22°34'36.55"E

Amending the location and coordinates of connection lines, it is proposed that the EA be amended as follow:

- Page 4: The coordinated for the Power line should be amended from

Power line		
	28°12’47.11”S	22°34’35.76”E
	28°12’46.72”S	22°34’35.92”E
	28°12’47.60”S	22°34’51.63”E
	28°12’38.74”S	22°34’57.62”E
	28°12’33.87”S	22°35’00.20”E
	28°12’44.64”S	22°35’30.19”E
	28°12’38.76”S	22°35’35.28”E
	28°12’39.88”S	22°35’37.64”E

To:

Power line		
1	28°12'47.93"S	22°34'40.18"E
2	28°12'46.43"S	22°34'40.26"E
3	28°12'47.09"S	22°34'51.37"E
4	28°12'33.27"S	22°34'59.96"E
5	28°12'44.71"S	22°35'31.31"E
6	28°12'38.82"S	22°35'37.17"E
7	28°12'42.04"S	22°35'42.97"E

3.3 SUMMARY OF PROPOSED AMENDMENTS

For ease of reference the proposed amendments are summarised in Table 2.4 below.

Table 3.2: Summary of proposed amendments

Component	**Description / dimensions**	
Battery storage system	-	Battery Storage System with a maximum height of ~8m and ~2 hectares in extent.
Capacity	Up to 115MWdc	Up to 150MWdc
Height of PV panels	3.5 meters	3.5 – 4.5 meters
Number of inverters	Minimum 34	Minimum 44
Location and demarcated areas for the associated infrastructure	Inverter Transformer Station: 2.5 x 7.6 meters (19m^2) Construction Laydown Area: 713.11 m^2	Inverter Transformer Station: ~20 m^2 Construction Laydown Area: 2 000 m^2
Area occupied by buildings	Security Room: 66.74 m^2 Office: 157.6 m^2 Staff Locker and Changing Room: 213.745 m^2	Security Room: ~60 m^2 Office: ~200 m^2 Staff Locker and Changing Room: ~200 m^2
Substation footprint	3 000m^2	15 400m² which includes a IPP Step-up substation and a Switching Station
Co-ordinates for access road	28°12’47.53”S; 22°34’35.65”E 28°12’47.71”S; 22°34’36.47”E 28°12’47.04”S; 22°34’36.57”E 28°12’47.89”S; 22°34’51.78”E 28°12’38.83”S; 22°34’57.92”E 28°12’34.21”S 22°35’00.29”E	28°12'34.51"S; 22°35'0.16"E 28°12'47.84"S; 22°34'51.73"E 28°12'46.96"S; 22°34'36.63"E 28°12'52.36"S; 22°34'35.44"E 28°12'52.53"S; 22°34'36.55"E

Length of internal roads	Approximately 13 km	Approximately 20 km
Width of internal roads	Between 8 & 10 meters	Between 7 & 12 meters
Grid connection	Lewensaar MTS	Ruby Vale Switching station
Proximity to grid connection	Approximately 780 meters	Approximately 2.5 km
Co-ordinates for grid connection	28°12’47.11”S; 22°34’35.76”E 28°12’46.72”S; 22°34’35.92”E 28°12’47.60”S; 22°34’51.63”E 28°12’38.74”S; 22°34’57.62”E 28°12’33.87”S; 22°35’00.20”E 28°12’44.64”S; 22°35’30.19”E 28°12’38.76”S; 22°35’35.28”E 28°12’39.88”S; 22°35’37.64”E	28°12'34.51"S; 22°35'00.16"E 28°12'47.84"S; 22°34'51.73"E 28°12'46.96"S; 22°34'36.63"E 28°12'52.36"S; 22°34'35.44"E 28°12'52.53"S; 22°34'36.55"E

4 IMPACTS/RISKS RELATED TO PROPOSED AMENDMENTS

This section aims to address the following requirements of the regulations:

Regulation 32(1) The applicant must within 90 days of receipt by the competent authority of the application made in terms of regulation 31, submit to the competent authority:

(a) a report, reflecting—

(i) an assessment of all impacts related to the proposed change;

4.1 THE CONCEPT OF “RISK”

Risk is a function of two components: severity (also referred to as consequence or impact) and likelihood (also referred to as probability or frequency) of the event occurring. As illustrated in the following equation: Risk = Severity x Likelihood. Each component is assessed independently and are combined to determine the risk of a situation or scenario. Risk can be defined on several levels, including health and safety (worker injuries or fatalities or impact to the surrounding community), environment, financial impact to an organization, or reputation. The matrix presented in Figure 4.1 is a generic example of a risk matrix. Severity level is shown on the top of the chart, with five categories:

- insignificant - no injury
- minimal - first -aid injury
- moderate - lost - time injury
- severe - one potential fatality onsite
- catastrophic - multiple potential fatalities onsite, potentially reaching offsite

The likelihood level is on the matrix's left -hand side, in six categories:

- nominal - less than once in 100,000 years
- rare - between once in 10,000 years to once in 100,000 years
- unlikely - between once in 1,000 years to once in 10,000 years
- probable - between once in 100 years to once in 1,000 years
- almost certain - between once in 10 years to once in 100 years
- frequent - more than once in 10 years

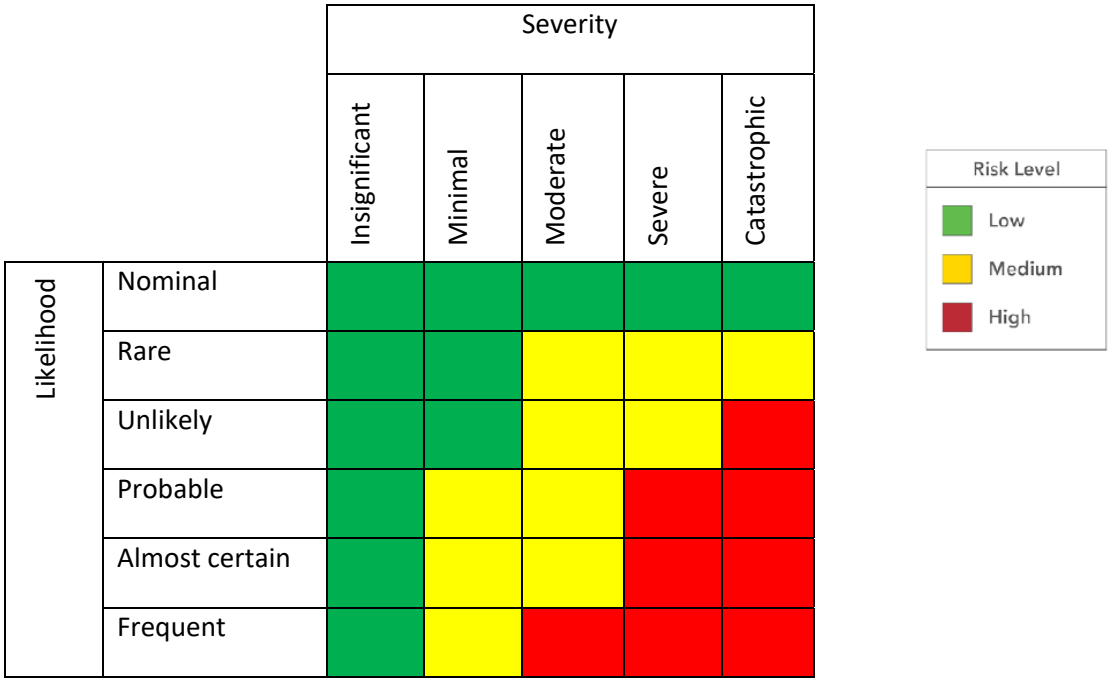


Figure 4.1: Generic risk matrix

Risk matrices illustrate the risk associated with various combinations of severity and likelihood levels. For example, if a scenario is assigned a severity of "severe" and a likelihood of "almost certain," the risk would be equivalent to "one potential fatality onsite between once in 10 years and once in 100 years.'

4.2 IDENTIFYING AND MANAGING RISKS

When assessing the risk of Li-ion batteries as it affects employees and people in the community, one can use the approach shown in Figure 4.2 below.

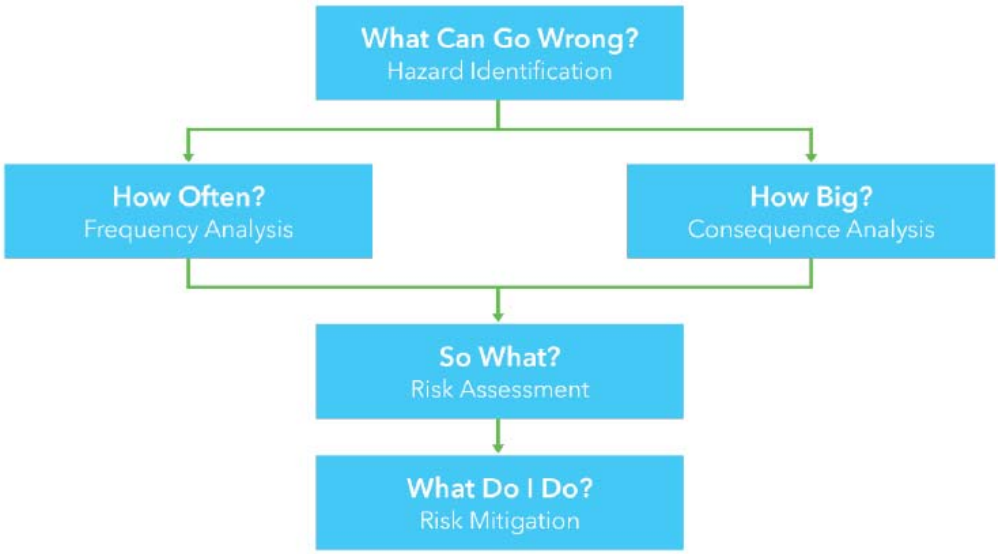


Figure 4.2: Risk Assessment Methodology

4.2.1 Hazard Identification

A process hazards analysis (PHA) is meant to identify hazardous scenarios and specific failure modes of the batteries and equipment. In the PHA process, the consequence (severity) and the frequency (likelihood) are qualitatively or quantitatively assessed to determine the risks of the scenarios. Safeguards or barriers are also identified.

4.2.2 Consequence Analysis

Consequence analysis determines the severity level of scenarios associated with battery failures. The analysis can be conducted qualitatively, with a group of subject matter experts and experienced operations and maintenance personnel, or quantitatively, using a consequence modeling tool.

4.2.3 Frequency analysis

Frequency analysis assesses the likelihood or frequency of an event. It can be conducted qualitatively, based on the experience of a group of subject matter experts in a workshop, or quantitatively, using historical reliability data or incident databases to provide more exact failure rates.

4.2.4 Risk Assessment and Mitigation

The risk is assessed for the scenario first without safeguards or barriers and then with them. This is to help the practitioner identify that an adequate number of safeguards or barriers have been implemented to reduce the risk to an acceptable level, or to develop an action plan if more

safeguards or barriers are needed. To reduce the overall risk, the severity and/or likelihood must be reduced by installing safeguards or barriers.

4.3 LI-ION BATTERY FAILURE RISK AND MITIGATION

While hydrogen generation is probably the highest risk associated with lead-acid-batteries, the most feared hazard of lithium-ion-batteries is thermal run-away. Thermal runaway is a situation where the current flowing through the cell or battery on charge or overcharge causes the cell temperature to rise, which increases the current with a further rise in temperature (Culpin, 2009). Li-ion battery fires can have very impactful consequences. However, a high-consequence level is often falsely interpreted to mean that the overall risk level is also high. To understand the full picture of risk, one must consider the likelihood or the frequency of the event occurring in addition to the associated consequences or severity. Standard safeguards and best practices used in Li-ion battery ESS should be included, helping to both reduce the likelihood and severity of failure events.

4.3.1 Common failure scenarios of Li-ion batteries

There are three categories of common Li-ion battery failures: electrical, mechanical, and thermal. The potential hazards associated with them are fire with consequent emission of gas and explosion. The major risks including thermal runaway, difficulty of fighting battery fires, failure of control systems and the sensitivity of Li-ion batteries to mechanical damage and electrical transients are discussed below.

- Thermal runaway

  'Thermal runaway' – a cycle in which excessive heat keeps creating more heat – is the major risk for Li-ion battery technology. It can be caused by a battery having internal cell defects, mechanical failures/damage or overvoltage. These lead to high temperatures, gas build-up and potential explosive rupture of the battery cell, resulting in fire and/or explosion. Without disconnection, thermal runaway can also spread from one cell to the next, causing further damage.

- Difficulty of fighting battery fires

  Battery fires are often very intense and difficult to control. They can take days or even weeks to extinguish properly, and may seem fully extinguished when they are not. They can also be very dangerous to fire fighters and other first responders because, in addition to the immediate fire and electricity risks, they may be dealing with toxic fumes, exposure to hazardous materials and building decontamination issues. Different types of batteries also react differently to fire, so firefighters must be knowledgeable about how they react and how to respond. Otherwise they may decide to contain the fire but leave it to burn itself out leading to great losses.

- Failure of control systems

  Another issue can be failure of protection and control systems. For example, a Battery Management System (BMS) failure can lead to overcharging and an inability to monitor the operating environment, such as temperature or cell voltage.

- Sensitivity of Li-ion batteries to mechanical damage and electrical transients

  Contrary to existing conventional battery technology, Li-ion batteries are very sensitive to mechanical damage and electrical surges. This type of damage can result in internal battery short circuits which lead to internal battery heating, battery explosions and fires. The loss of an individual battery can rapidly cascade to surrounding batteries, resulting in a larger scale fire.

4.3.2 Consequence Analysis

Existing battery test data provides a list of toxic and flammable chemicals released during battery fires in laboratory settings. Various types of chemicals (including carbon monoxide, hydrogen fluoride, hydrogen cyanide, benzene and others) may be released during battery fires.

4.3.3 Frequency Analysis

Table 4.1 summarises the most common Li-ion battery failures. Existing literature were used as references for assessing frequency of failures for various scenarios.

Failure Category	Failure	Probability of Failure (per year)
Electrical Failure	Overcharge or undercharge based on catastrophic inverter failure	0.01 Inverter vendor literature along with DNV GL Experience
Mechanical Failure	Physical damage onsite due to heavy impact during maintenance (internal short circuit)	0.01 (Human error initiating events, CCPS)
	Physical damage due to impact during transport (internal short circuit)	0.01 (Human error initiating events, CCPS)
	Manufacturing defect (internal short circuit) that affects multiple cells	0.01 (Six Sigma assumption and DNV GL experience with battery designs)
Thermal Failure	Overheating (due to HVAC failure)	0.1 (Process control failure, CCPS)
	Overheating from electrical or mechanical failures referenced in this table (Table 4-1)	
Human Error	Human error during commissioning, installation, repair, or operations activities	0.01 (Human error initiating events, CCPS)

Table 4.1: Common Failure Mechanisms and Frequency of Failure

As shown in Table 4.1, the orders of magnitude of these failures is once in 10 years to once in 100 years, depending on the number of batteries and the electrical equipment (inverters or transformers) that could have an impact on battery performance. It should be noted that these are failure rates of the equipment and not fatality rates associated with the failures.

4.3.4 Risk Assessment

As with any fire or explosion, a potential consequence of Li-ion battery fires is the endangerment of Lutzburg and property. In the risk analysis, these consequences are assessed based on their severity and likelihood. First, the severity of this consequence changes based on the quantity of cells in a system, as well as the system's proximity to people and property. Therefore, the size and location of the installation should be taken into consideration. For the Lutzburg SPP the location of the ESS and the fact that the area is sparsely populated will reduce the risk associated with toxic chemicals, flammability and overpressure from explosions.

4.3.5 Safeguards and Best Practices

Safeguards incorporated into ESSs (both portable and permanent) reduce the likelihood and severity of events before a battery fire escalates. Table 4.2 lists some of the most commonly used ESS safeguards.

Safeguard Type	Safeguards
Inherent design	UL 1973 Criteria Heating Ventilation and Air Conditioning (Redundant Units)
Basic Controls	Active Cooling/Thermal Management Controls HVAC with failure alarm
Safety Systems	Battery Management Systems which can isolate battery racks Master Controllers which can isolate battery systems and medium voltage equipment external to the ESS
Electrical protection	Fuses and Circuit Breakers
Fire Suppression	Active fire suppression Emergency HVAC
Procedures	Remote monitoring 24/7 and isolation

Table 4.2: Common Safeguards

For the Lutzburg ESS, the following safeguards should be implemented:

- Battery Management Systems;

- Safe distance between containers;
- Heating Ventilation and Air Conditioning;
- Failure alarm with procedure for control room personnel to address; and
- Active fire suppression that meets National requirements and is part of the maintenance and inspection program.

These safeguard will significantly reduce the likelihood of failure leading to health and safety impacts for on-site personnel as well as neighbouring landowners and the local community.

4.3.6 Layers of Protection

While Table 4.2 broadly covers the barriers that minimise potential risks before it escalates to a critical incident, barriers should also be in place to manage the consequences if the event has occurred. These barriers include thermal management of the systems, active monitoring of cell and ambient conditions by the battery management system (BMS), ability of the BMS, when failure is detected, to properly isolate the system, resilience of the cells to electrical and thermal abuse, design considerations within the system to limit or manage propagation among cells, modules, and racks, and fire protect ion schemes within the system or container.

Once a critical event is reached, such as full involvement of more than one battery rack, multiple barriers should exist to help control and mitigate the failure and potential consumption of the entire system. In many cases, these systems will no longer stop the fire that has occurred but will work to minimize its spread and prevent explosion, thus affecting the severity of the risk. These include the ability of the system to isolate the fire further, gas management (such as ventilation and exhaust), clean agents or initial fire suppression systems, water-based fire suppression systems, and response of the fire service or local first responders. Such barriers help prevent a single or even a multi-cell event from spreading to an unmanageable level.

It is understood that the BESS would be supplied by a vendor who has already mitigated to the maximum extent. The design of the BESS will comply with all the local and international standards to ensure that the risk of fire is minimal. Furthermore, each container has a built-in fire detection and suppression system. This system continually monitors the batteries and in an unlikely event of a fire it suppresses the fire using inert gas. Further mitigation would include building designs, operator training and organisational barriers.

4.3.6 Level of risk associated with the BESS

The findings of the high level risk assessment showed that the initial event frequencies (potentially leading to fires) could occur between once in 10 years and once in 100 years without safeguards in place and without considering the additional on-site mitigating factors. Assuming that the worst credible severity is a fatality from a fire, the level of severity and likelihood would place the scenarios in the “high risk” area of a risk matrix (illustrated as “1” in Figure 4.3). However, multiple safeguards will be put in place. When considering the effect of

mitigation measures in reducing the probability of failure to nominal, it would place the events in the low-risk zone of a risk matrix (illustrated as "2" in Figure 4.3).

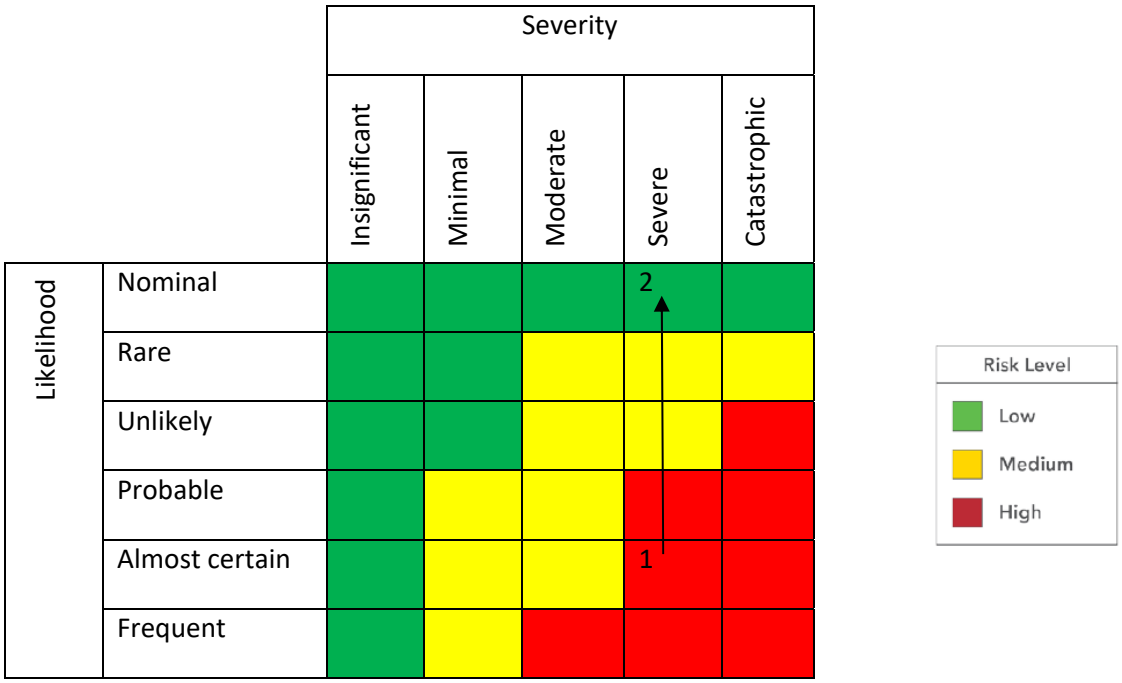


Figure 4.3: Comparison of Risk of ESS Without safeguards in Place (1) and with Safeguards in Place (2)

To ensure the accuracy of this assessment, ESS designers, manufacturers, and installers must move forward transparently to verify that they have developed safe systems with multiple barriers to failure, including quality assurance, testing, training, routine operations and maintenance, and sharing of lessons learned.

4.4 IMPACTS ASSOCIATED WITH RELATED AMENDMENTS

The majority of the proposed amendments discussed in section 3 of this report, apart from the proposed new power line route and access road, will only result in changes within the development footprint (layout) that was originally assessed. In light of the above it is argued that the proposed amendments would not require further assessment, since it would not result in an increase in the significance of the potential impacts or any new environmental impacts. The main concern was the increase in height of the proposed panels, the new advanced technology to be used, the new power line route and access road. It should be noted that the corridor proposed for the power line route and access road was assessed as part of the Lutzburg, Tirisano and Kgalalelo SPP projects and that the area has therefore been assessed. Specialists were consulted to obtain their input on the potential impact of the proposed amendments, whether the significance of potential impacts would remain unchanged and whether the mitigation and management measures contained in the environmental management programme (EMPR) will still suffice (refer to Appendix F).

4.4.1 Specialist input

In order to ascertain if further input would be required in relation to the above-mentioned proposed amendments, each of the specialist studies conducted during the EIA phase of the development was investigated in terms of its applicability. The following determinations were made:

Table 4.3: Investigation of EIA phase specialist studies

SPECIALIST STUDY	APPLICABILITY
Geotechnical Study	Not applicable - The proposed amendments are located within the assessed development footprint. The proposed new power line route and access road will not have an influence on the significance ratings and will not result in any additional impacts.
Ecological Fauna and Flora Habitat Survey	Not applicable - The proposed amendments are located within the assessed development footprint. The proposed new power line route and access road have already been assessed as part of the Lutzburg, Tirisano and Kgalalelo projects. The area has therefore been assessed and the changes will not have an influence on the significance ratings and will not result in any additional impacts. Specialist input will however be required.
Avifaunal Study	Potentially applicable - The proposed new technology and increased height of the panels, although very unlikely, may result in additional impacts. Specialist input will be required.
Visual Impact Assessment	Potentially applicable - The proposed new technology and increased height of the panels, although very unlikely, may result in additional impacts. Specialist input will be required.
Agricultural and Soils Impact Assessment	Not applicable - The proposed amendments are located within the wider area that has been assessed. The proposed new power line route and access road have already been assessed as part of the Lutzburg, Tirisano and Kgalalelo projects. The area has therefore been assessed and the changes will not have an influence on the significance ratings and will not result in any additional impacts.
Heritage Impact Assessment	Not applicable - The proposed amendments are located within the assessed development footprint. The proposed new power line route and access road have already been as part of the Lutzburg, Tirisano and Kgalalelo projects. The area has therefore been assessed and the changes will not have an influence on the significance ratings and will not result in

	any additional impacts. Specialist input will however be required.
Paleontological Impact Assessment	Not applicable - The proposed amendments are located within the wider area that has been assessed. The proposed new power line route and access road have already been assessed as part of the Lutzburg, Tirisano and Kgalalelo projects. The area has therefore been assessed and the changes will not have an influence on the significance ratings and will not result in any additional impacts.
Social Impact Assessment	Not applicable - The proposed amendments are located within the wider area that has been assessed. The proposed new power line route and access road have already been assessed as part of the Lutzburg, Tirisano and Kgalalelo projects. The area has therefore been assessed and the changes will not have an influence on the significance ratings and will not result in any additional impacts.

Despite numerous specialist studies not being affected, specialist statements were obtained from all specialists that confirmed that the proposed amendments will not result in any additional impacts and will not increase the level or nature of the impact, which was initially assessed and considered when application was made for an EA. The significance ratings will remain unchanged and the proposed mitigation and management measures proposed as part of the EIA process will still suffice (refer to Appendix F).

4.4.2 Summary of changes in Impact Ratings

As mentioned above, specialist inputs were obtained from all specialist to confirm whether the proposed amendments will result in any additional impact or an increase in the significance of any impacts that were previously assessed. Based on their findings Table 4.4 demonstrate that the proposed amendments will not result in any additional impacts and that the significance ratings of all potential impacts will remain the same.

Table 4.4: Original Rating of Impacts during construction of the proposed SPP and associated infrastructure

SPECIALIST STUDY	IMPACT	ORIGINAL SIGNIFICANCE	NEW SIGNIFICANCE
Geotechnical Study	Impacts of the geology on the proposed development	Negative Low	Negative Low
Ecological Fauna and Flora Habitat Survey	Loss of habitat for faunal and floral species	Negative Low	Negative Low
	Destruction of Avifaunal	Negative Low	Negative Low

	Habitat		
	Loss of indigenous faunal and floral species diversity	Negative Low	Negative Low
	Loss of faunal and floral species of conservation significance.	Negative Low	Negative Low
Avifaunal Study	Collision with PV site itself	Negative Low	Negative Low
	Direct collision with the power line network.	Negative Low	Negative Low
Visual Impact Assessment	Visual intrusion	Negative Low	Negative Low
Agricultural and Soils Impact Assessment	Loss of topsoil	Negative Low	Negative Low
	Soil erosion	Negative Low	Negative Low
Heritage Impact Assessment	Impacts on heritage objects	Negative Low	Negative Low
Paleontological Impact Assessment	Impact of construction of SPP and associated transmission line.	Negative Low	Negative Low
Social Impact Assessment	Temporary employment and other economic benefits (business opportunities and skills development)	Positive Medium	Positive Medium
	Technical advice for local farmers and municipalities	Positive Low	Positive Low
	Increase in construction vehicle traffic	Negative Low	Negative Low
	Impact of construction workers on local communities	Negative Low	Negative Low
	Influx of job seekers	Negative Low	Negative Low
	Risk to safety, livestock and farm infrastructure	Negative Low	Negative Low
	Increased risk of veld fires	Negative Low	Negative Low
Other	Temporary noise disturbance	Negative Low	Negative Low

	Generation of waste - general waste, construction waste, sewage and grey water	Negative Low	Negative Low

Table 4.5: Original Rating of Impacts during operation of the proposed SPP and associated infrastructure

SPECIALIST STUDY	IMPACT	ORIGINAL SIGNIFICANCE	NEW SIGNIFICANCE
Avifaunal Study	Impact mortality around the PV site for the Red-listed bird groups identified as at risk	Negative Low	Negative Low
	Impact mortality on transmission line for the Red-listed bird groups identified as at risk	Negative Low	Negative Low
	Nesting for birds	Negative Low	Negative Low
Visual Impact Assessment	Visual intrusion	Negative Low	Negative Low
Agricultural and Soils Impact Assessment	Soil erosion	Negative Low	Negative Low
	Generation of alternative land use income	Positive Low	Positive Low
	Loss of agricultural land use	Negative Low	Negative Low
Paleontological Impact Assessment	Overall function of the SPP	Negative Low	Negative Low
Social Impact Assessment	Permanent employment	Positive Medium	Positive Medium
	Generation of additional electricity	Positive Medium	Positive Medium
	Establishment of a Community Trust	Positive Medium	Positive Medium
	Change in the sense of place	Negative Low	Negative Low
	Potential impact on tourism	Negative & Positive Low	Negative & Positive Low
	Development of infrastructure for the generation of clean,	Positive Low	Positive Low

	renewable energy		
Other	Increase in storm water runoff	Negative Low	Negative Low
	Increased consumption of water	Negative Medium	Negative Medium
	Generation of waste	Negative Low	Negative Low
	Leakage of hazardous materials	Negative Low	Negative Low

Table 4.6: Original Rating of Impacts during the decommissioning of the proposed SPP and associated infrastructure

SPECIALIST STUDY	IMPACT	ORIGINAL SIGNIFICANCE	NEW SIGNIFICANCE
Other	Rehabilitation of the physical environment	Negative Low	Negative Low
	Generation of waste	Negative Low	Negative Low
	Loss of employment	Negative Low	Negative Low

5 NEW / REVISED MITIGATION MEASURES

This section aims to address the following requirements of the regulations:

Regulation 32(1) The applicant must within 90 days of receipt by the competent authority of the application made in terms of regulation 31, submit to the competent authority:

(a) a report, reflecting—

(iii) measures to ensure avoidance, management and mitigation of impacts associated with such proposed change;

In addition to assessing the risks and impact of the proposed amendments to the Lutzburg SPP, the EAP aimed to provide measures to ensure avoidance, management and mitigation of any impacts associated with the proposed amendments and identify any changes required to the EMPr. New and/or revised mitigation measures are outlined in Table 5.1 below and have also been included in the revised EMPR – refer to Appendix E, Table 2-5.

Table 5.1: New / Revised mitigation measures

POTENTIAL IMPACT/RISK	NEW MITIGATION MEASURES
Risks associated with the BESS (Gas release, fire, and explosion)	The battery management system (BMS) is essential to the safety and performance of the entire ESS system: it has a controlling and monitoring function, hence its specifications and functions need to be checked, tested and validated. Controlling and monitoring the state of charge (SoC) of the battery cell through its parameters (current, voltage, temperature) during charging and discharging is a critical function based on which functional safety for fault protection is designed.
	In order to ensure normal operation, optimum power output and service Lutzburg, the system will require cooling at high temperatures and heating in cold weather.
	The BESS should be located well away from critical buildings or equipment. Where spatial separation is not possible, provide exterior protection such as a passive thermal barrier, or active fire protection such as drenchers. An appropriate distance should be maintained between containers to safeguard against propagation.
	Install battery and battery management systems/electrical switch gear in separate rooms.
	Put battery and battery management systems/electrical switch gear in separate rooms, with fire resistive construction (two-hour fire rated) to adequately cut-off the room from surrounding exposures.
	Provide fire-rated compartmentation and adequate separation between battery units.
	Provide adequate fire doors that are maintained in the closed position and equipped with automatic closure mechanisms. Where insulated metal panels (IMPs) are used, these should contain a mineral wool core and be installed in accordance with the terms of their approval. Only non-combustible IMPs should be installed.
	Ensure proper management of cable/service penetrations. Cable penetrations should be adequately sealed to meet the fire resistance of the compartment (two-hour fire resistance rating). Heating, ventilation and air conditioning ducts should have fire dampers provided that automatically close on activation of the fire alarm.

	Establish a permit to access system to manage changes to service or cable penetrations under an audited system.
	Extensive monitoring of the battery states such as voltage, temperature, current etc. as well as redundant monitoring and control in terms of a fail-safe battery-management-system (BMS) is crucial for a safe operation of BESS. Maintenance and inspection schedules must be set up. The BMS, the inverter control unit and the BESS supervisory control and data acquisition (SCADA) system should closely monitor the BESS. If one of these fails, the BESS needs to be shut down.
	Automatic fire detection in should be in place, with early warning smoke detection or very early warning highly sensitive smoke detection. The system design should include continuous remote monitoring.
	Consider automatic fire sprinklers and water mist for active fire protection.
	To ensure that ESS remain at an acceptable risk level, owners and operators of both permanent or portable ESS must follow design standards and best practices, regularly maintain the system's equipment (as well as safety systems and related equipment), train personnel, and communicate with local emergency responders on the storage system's hazards.
Waste generation	Once the batteries become obsolescent, either due to the facility decommissioning or the batteries reaching their useful design Lutzburg and require replacement, the used batteries will be will be broken down and recycled as far as possible and unrecoverable wastes disposed of through appropriate channels.
Decommissioning of the ESS.	A method statement need to be developed to guide the safe decommissioning of Battery storage which will consider appointment of accredited battery recyclers.

6 ADVANTAGES AND DISADVANTAGES ASSOCIATED WITH THE PROPOSED AMENDMENT

This section aims to address the following requirements of the regulations:

Regulation 32(1) The applicant must within 90 days of receipt by the competent authority of the application made in terms of regulation 31, submit to the competent authority:

(a) a report, reflecting—

(ii) advantages and disadvantages associated with the proposed change;

6.1 ADVANTAGES OF THE PROPOSED CHANGE

The granting of the amendment will result in the following positive environmental impacts:

- Effective semi base load power

  Grid level battery storage systems can bridge the divide between supply and demand and allow renewable energy to provide the flexibility associated with most base load facilities, which are typically thermal plants combusting one or other form of fossil fuel.

- Defer the need for additional energy generation as well as transmission and distribution lines

  Energy storage can also displace or defer the need to build additional energy generation capacity and transmission and distribution lines, creating financial and environmental benefits (Arbabzadeh, Maryam et al., 2015).

- More reliable electricity grid

  Large scale or grid level battery storage systems are finding their way into major electricity grids across the world as they provide system buffers which allow for an easier management of load management (demand vs supply) on large grid systems, reduce power fluctuations and wastage, and make the electricity grid more reliable (Amrouche et al., 2016).

  The battery storage will store excess renewable electricity and will also dispatch it onto the grid when renewable energy is unavailable. During the day when power is not being fully utilised, excess power is diverted to the battery storage facility. This power can then be released into the grid on demand, such as during peak demand periods. This option makes renewable power projects effective semi base load power and can be used strategically to reduce the running time of non-renewable energy power plants if used strategically.

  The battery storage can also provide ancillary services to support the grid during normal operations and contingency events. This capability increases the benefit for the system.

- Combating climate change

  Whilst the battery storage facility under consideration is not likely to bring any significant benefit on its own, from a cumulative perspective this technology is highly significant and could play a significant role in the combating greenhouse gas emissions and climate change.

- Technical benefits

  The following technical benefits are associated with battery storage:

  - Reduce the variability in generation profile of the facility, resulting in a constant power output;
  - Provides the opportunity for energy shifting, to high demand periods;
  - Provide ancillary services to support the grid during normal operations and contingency events
  - Decongest transmission power lines; and
  - Avoid plant curtailment.

- Optimisation of layout

  The internal layout and positioning of the panels and associated infrastructure will also be optimised to accommodate the increase in capacity.

Overall, the granting of the amendment will result in the Lutzburg SPP being more desirable and efficient and therefore being more likely to be selected as preferred bidder by the Department of Mineral Resources and Energy.

6.2 DISADVANTAGES OF THE PROPOSED CHANGE

The proposed amendments may result in additional risks associated with the BESS. However, in light of the advantages of including this technology and the low level risk posed, it is argued that the proposed amendment will have an overall positive impact on the environment. Due consideration should be given to the broader cumulative ramifications of this technology and the important role it has to play in global energy market and combating global climate change and its many associated impacts on the environment and society.

7 PUBLIC PARTICIPATION

The following sections provide detailed information on the public participation process to be conducted as part of the amendment process and to address the following requirements of the regulations:

Regulation 32(1) The applicant must within 90 days of receipt by the competent authority of the application made in terms of regulation 31, submit to the competent authority:

(a) a report, reflecting…

(iv) Which report – (aaa) had been subjected to a public participation process, which had been agreed to by the competent authority, and which was appropriate to bring the proposed change to the attention of potential and registered interested and affected parties, including organs of state, which have jurisdiction in respect of any aspect of the relevant activity, and the competent authority, and (bbb) reflects the incorporation of comments received, including any comments of the competent authority.

7.1 INTRODUCTION

In terms of Chapter 6 of the EIA Regulations, 2014, (as amended), a Part 2 Amendment Application requires a 30- day Public Participation Process (PPP). Accordingly, the following PPP process has been undertaken The following three categories of variables were taken into account when deciding the required level of public participation:

- The scale of anticipated impacts
- The sensitivity of the affected environment and the degree of controversy of the project
- The characteristics of the potentially affected parties

The EIA process conducted in 2016 examined the sensitivity of the affected environment and assessed potential environmental impacts. It was concluded that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources. All negative environmental impacts can further be effectively mitigated through the proposed mitigation measures. The scale of the anticipated impacts associated with the proposed amendments is also not expected to be severe. The proposed project (and its subsequent amendment) is not controversial and the potentially affected parties generally seem to welcome the proposed development.

Since the scale of anticipated impacts is low, the low environmental sensitivity of the site and the fact that no conflict is foreseen between potentially affected parties, no additional public participation mechanisms were considered. The following steps will be taken as part of the public participation process for the amendment process:

- <u>Newspaper advertisement</u>

  Since the proposed development is unlikely to result in any impacts that extend beyond the municipal area where it is located, it was deemed sufficient to advertise in a local

newspaper. An advertisement will be placed in English in the local newspaper (Kalahari Bulletin) to notify the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Environamics Environmental Consultants. I&APs will be given the opportunity to raise comments within 30 days of the advertisement. The public will be informed that copies of the report will be made available upon request and that these will be sent via Dropbox, email, WhatsApp, registered post or courier services.

- Site notices

  Site notices will be placed on site (coordinates to be provided) in English to inform surrounding communities and immediately adjacent landowners of the proposed development. I&APs will be given the opportunity to raise comments within 30 days. The public will be informed that copies of the report will be made available upon request and that these will be sent via Dropbox, email, WhatsApp, registered post or courier services.

- Hard and/or soft copies of report

  Hard or soft copies of the report will be made available upon request. Hard copies will be made available for review to any interested and affected party who may not have access to the Internet or email communication. The availability of the report will be made known as part of the press advertisement and the site notices. All hard copies of the report will be sanitized prior to it being posted or couriered.

- Direct notification of potential and registered I&APs:

  Identified and registered I&APs, including key stakeholders representing various sectors, will be directly informed of the proposed amendment via registered post, telephone calls, WhatsApps and emails. A copy of the draft motivational report will be made available as part of the notification. I&APs will be requested to submit comments on the draft report within 30 days. For a complete list of I&APs with their contact details see Appendix A to this report. All letters will be sanitized prior to it being posted.

- Direct notification of surrounding land owners and occupiers:

  Written notices will also be provided via registered post, WhatsApp or email to all surrounding land owners and occupiers – refer to Figure 7.1. The surrounding land owners were given the opportunity to raise comments within 30 days. All letters will be sanitized prior to it being posted.

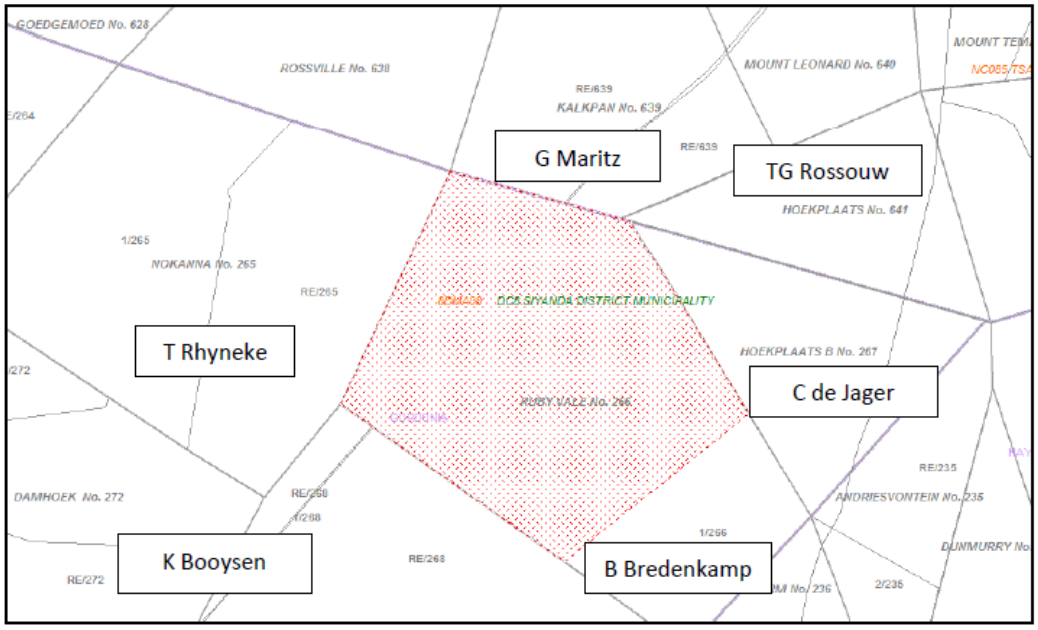


Figure 7.1: Surrounding land owners

- <u>Submission of Draft Motivational Report:</u>

  A Draft Motivational Report will be submitted electronically to the Department in September 2020 for comments. The EAP declaration has been included as part of the application for amendment.

- <u>Circulation of the Draft Motivational Report:</u>

  As mentioned above, copies of the draft motivational report will be provided to all I&APs via registered post, WhatsApp, couriers, Dropbox and/or email. They will be requested to provide their comments on the report within 30 days. All issues identified will be documented and compiled into a Comments and Response Report to be included as part of the Final Motivational Report. <u>Hard copies of the report will be sanitized prior to it being posted or couriered.</u>

- <u>Circulation of decision and submission of appeals:</u>

  Notice will be given to all identified and registered I&APs of the decision taken by the DEFF. The attention of all registered I&APs will also be drawn to the fact that an appeal may be lodged against the decision in terms of the National Appeals Regulations. In accordance with the provisions of Regulation 4(1) of Government Notice No. 993, an appellant must submit the appeal to the appeal administrator, and a copy of the appeal to the applicant, any registered I&APs and any organ of state with interest in the matter within 20 days from the date that the notification of the decision was sent to the applicant by the competent authority.

7.2 STAKEHOLDERS AND I&APS

I&APs, key stakeholder were identified using email, sms, fax and post notifications to all I&APs key stakeholders on the project database as well as referrals. A comprehensive list of registered I&Aps and key stakeholder was compiled and is included in Appendix B. The proofs of distribution (i.e. email notification) will be included in the Final Motivational Report.

It should be noted that all key stakeholders / organs of state / authorities will be contacted near the end of the 30-day comment and review period and will be reminded to submit comments before this period closes. Comments received from key stakeholders during the 30-day comment and review period will be incorporated into the Final Motivational Report, which will then be submitted to the competent authority (namely the DEFF) for decision-making.

8 REVISED LAYOUT

With regards to the battery storage system the attached document (see Appendix D) describes the battery type, preliminary physical design of the BESS, the size, preliminary layout and position of the BESS. The BESS will be located in close proximity to the solar farm substation and will be linked to the substation via 33kV (or less) cables. The system will not require additional office, operation or maintenance infrastructure, since infrastructure proposed as part of the substation and solar farm will be used. In effect, the battery storage system will be extensions of the substation infrastructure and, as per the substation, will be contained within a security fence (refer to the revised layout plan attached as Annexure C). The layout plan also reflects the location of the slightly amended power line route and access road.

9 CONCLUSION AND RECOMMENDATIONS

The Motivational Report provided an assessment of the potential risks and impacts, advantages and disadvantages associated with the proposed amendments, measures to ensure avoidance, management and mitigation of risks and impacts associated with such proposed change and an outline of the public consultation process to be undertaken. In light of the fact that the proposed amendments would still be within the development footprint already assessed for the SPP (apart from the new power line route and access road that has been assessed as part of three other projects), it was determined that the proposed amendments would not result in any additional environmental impacts or a change in the significance of the potential impacts, apart from the new risks associated with the BESS. These risks include fire with consequent emission of gas and explosion.

Mitigation and management measures haven been identified to reduce the level of risk associated with the BESS and the proposed layout has been revised to incorporate the proposed changes in technology to be used. The advantages and disadvantages were explored providing an indication of the potential benefits and drawbacks of the proposed amendments. From the assessment, the advantages outweigh the disadvantages mainly due to the potential broader

cumulative ramifications as a result of the use of the new technology and the important role it has to play in global energy market and combating global climate change.

A public participation process is being undertaken to obtain any comments received by I&APs on the proposed amendments. The public review and comment period will be undertaken from Thursday the 10th of September 2020 to Monday the 12th of October 2020, over a 30-day period (excluding public holidays). Any comments raised and responses to these comments and concerns will be integrated into the Final Motivational Report.

9.1 ENVIRONMENTAL IMPACT STATEMENT

The final recommendation by the EAP considered firstly if the legal requirements for the Amendment process had been met and secondly the validity and reliability of the substance of the information contained in the EIA report. In terms of the legal requirements it is concluded that:

- The Motivational Report complied with the requirements set out in Regulation 32.
- All key consultees will be consulted as required by the 2014 EIA Regulations - already approved by the environmental authority as part of the public participation plan.
- The proposed mitigation measures will be sufficient to mitigate the identified impacts and managed identified risks to an acceptable level.
- The EMPR have been revised to reflect the additional mitigation and management measures proposed.

In terms of the contents and substance of the EIA report the EAP is confident that:

- All key environmental issues were identified adequately assessed to provide the environmental authority with sufficient information to allow them to make an informed decision.

The final recommendation of the EAP is that:

The EAP is of the opinion that the significance of the environmental impacts of the proposed amendments are expected to remain the same as those already identified in the original EIA Report. Additional risks associated with the BESS have been identified and new mitigation and management measures have been provided to ensure that these risks are reduced to a low level. The potential risks can be mitigated to acceptable levels provided the additional mitigation measures recommended (see Table 5.1) are implemented.

It is the opinion of the independent EAP that the proposed development will have a net positive impact for the area and will subsequently ensure the optimal utilisation of resources. Based on the contents of the report it is proposed that an environmental authorisation be amended, subject to the implementation of the proposed mitigation measures.

We trust that the department find the report in order and eagerly await your final decision in this regard.

10 REFERENCES

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