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Ref: Lichtenburg 2 PV Facility Part 2
Amendment

Attention: Mr Reuben Maroga

Dear Sir,

ECOLOGICAL AND FRESHWATER RESOURCE COMMENTS: PROPOSED AMENDMENT TO THE AUTHORISED LICHTENBURG 2 PV FACILITY (DEA REF 14/12/16/3/3/2/1092) - CONSTRUCTION AND OPERATION OF A BATTERY ENERGY STORAGE SYSTEM (BESS).

The Lichtenburg 2 PV Facility is authorised for a contracted capacity of 100MW and includes the following infrastructure.

- » Photovoltaic modules with a net generation (contracted) capacity of 100MW;
- » On-site 88/132kV substation;
- » Mounting structures to support the PV panels (utilising either fixed-tilt / static, single-axis tracking, or double-axis tracking systems).
- » DC/AC Inverters, LV/MV power transformers and internal electrical reticulation (underground cabling);
- » Access and internal road network;
- » A new 132kV power line between the on-site substation to the Mmabatho/Watershed DS 1 88kV Powerline;
- » Temporary laydown area;
- » Auxiliary buildings (gate-house and security, control centre, office, two warehouses, canteen and visitors centre, rainwater tanks, etc); and
- » Perimeter fencing.

ABO Wind Lichtenburg 2 PV (Pty) Ltd is proposing the construction and operation of a Battery Energy Storage System (BESS) of up to 500MW/500MWh within the authorised footprint of the solar PV facility, on a site located 10km north of Lichtenburg and 7.5km south of Bakerville in the North West Province. The project is located on Portion 23 of the Farm Houthaalbomen No. 31 and Portion 2 of the Farm Zamenkomst No. 4, within the Ditsobotla Local Municipality in the Ngaka Modiri Molema District Municipality in the North West Province.

The general purpose and utilisation of a Battery Energy Storage System (BESS) is to save and store excess electrical output as it is generated, allowing for a timed release when the capacity is required.

BESS systems therefore provide flexibility in the efficient operation of the electricity grid through decoupling of the energy supply and demand.

The development area for the battery energy storage area is ~ 5ha and is proposed within the authorised laydown area assessed and approved for the solar PV facility. It is understood that the BESS may require the storage of dangerous goods for the operation and maintenance of the system, however these will be limited. The following infrastructure is associated with the BESS:

- » Electrochemical battery energy storage systems (including either Lead Acid and Advanced Lead Acid; Lithium ion; NiCd, NiMh-based batteries; Temperature (NaS, Na-NiCl₂, Mg/Pb-Sb) batteries or Flow batteries (VRFB, Zn-Fe, Zn-Br)) with a maximum height of 3.5m; and
- » Multi-core 33kV underground cables, to follow internal access roads of the PV facility, to connect the battery storage system to the on-site facility substation.

It is the Developer's intention to bid the solar PV facility and the battery energy storage into a bid program including, but not limited to, the Renewable Energy Independent Power Producer Procurement Programme of the Department of Mineral Resources and Energy (DMRE), the Risk Mitigation Independent Power Producer (IPP) Procurement Programme of the Department of Mineral Resources and Energy (DMRE), or any other power purchase program. Ultimately, the development of the solar PV facility as well as the battery energy storage is intended to be part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resources Plan (IRP).

The original Ecological and Surface Hydrological Impact Assessment/Report was conducted by Mr. Gerhard Botha (PrSciNat.) in November 2018. Ecological and surface hydrological inputs were requested from the Author of the Ecological and Surface Hydrological Impact Assessment, by Savannah Environmental regarding the proposed amendments to the authorised Lichtenburg 2 PV Facility.

Subsequently, the aim and terms of reference are to:

- » Determine whether the impacts assessed within the original Ecological and Surface Hydrological Impact Assessment (2018) still ring true with the addition of the BESS;
 - In the case where such impacts will change in any way due to the proposed amendments (in terms of duration, magnitude, significance etc.), a comparison should be provided of such impacts before the amendment and after the proposed amendment;
- » Whether there will be any additional impacts;
 - In the case where there will be additional impacts, such impacts should be assessed in-line with the methodology specified by Savannah Environmental.
- » Determine any potential advantages and/or disadvantages associated with the amendment;
- » Provide measures to ensure avoidance, management and mitigation of impacts associated with such proposed amendment, and any changes to the existing Environmental Management Programme (EMPr).

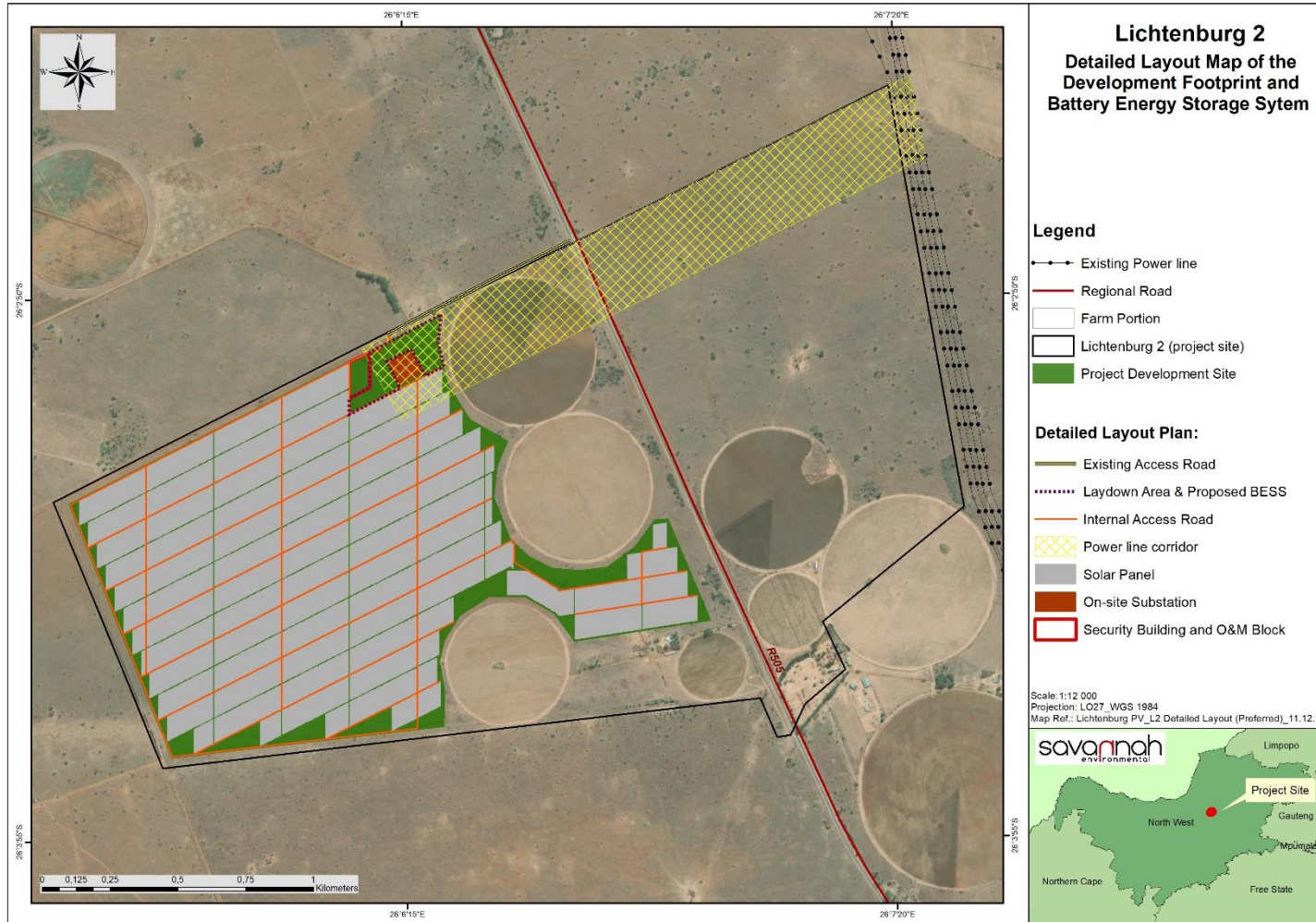


Figure 1: Authorised layout of the Lichtenburg 2 PV Facility (Savannah, 2018). Note that the proposed BESS will be located within the authorised laydown area.

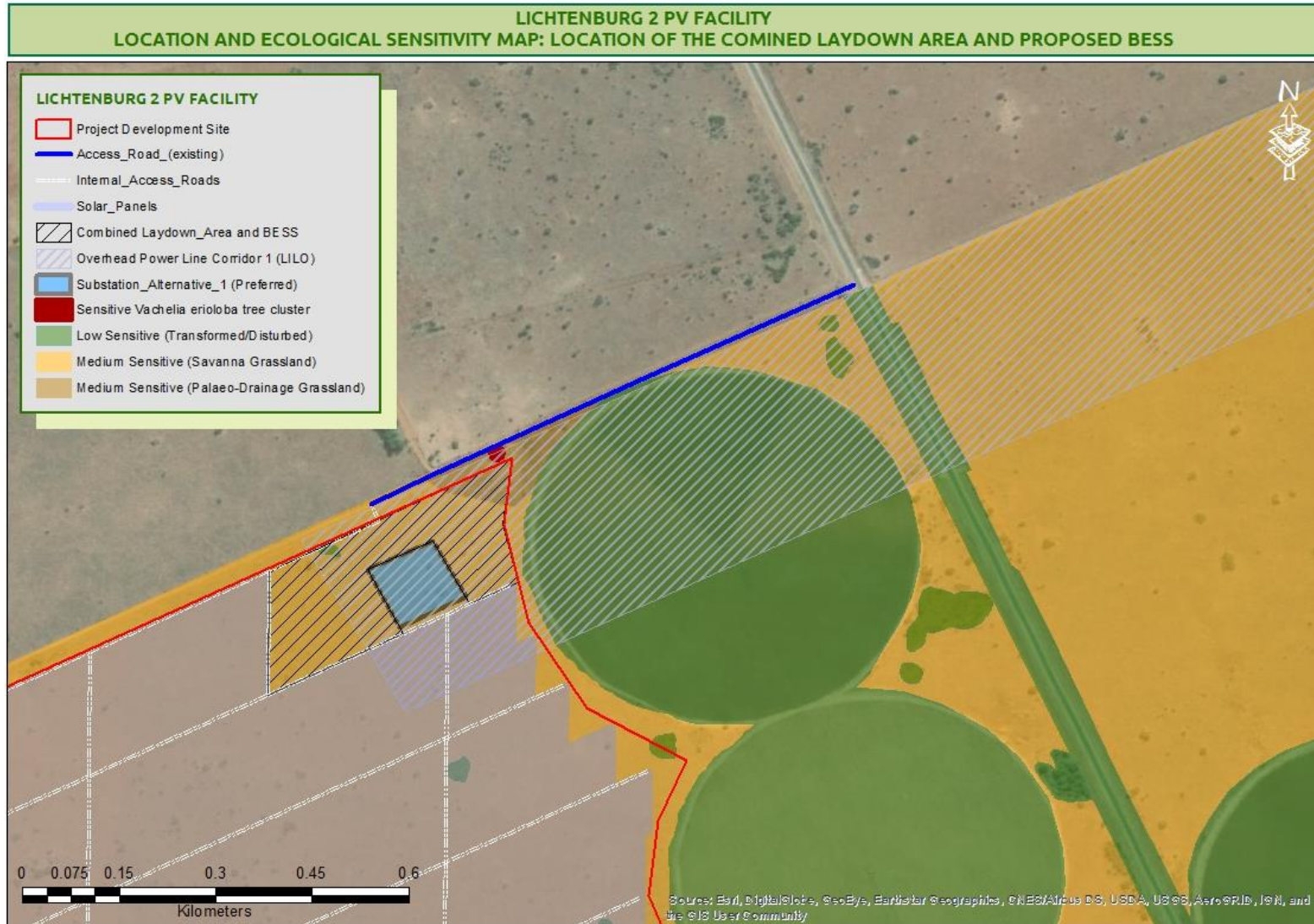


Figure 2: Map illustrating the location of the combined laydown area and BESS relative to the other components of the Lichtenburg 2 PV Facility as well as ecological sensitive features as identified within the original Ecological and Surface Hydrological Impact Assessment Report (2018).



1. GENERAL FINDINGS / NOTES ON THE AFFECTED ENVIRONMENT AND ASSESSED IMPACTS.

During the original ecological and surface hydrological impact assessment the following observations/findings were made:

- » Following fieldwork, no wetlands, watercourses nor any other surface water resource feature were identified within the proposed development footprint or within the proposed power line corridor.
- » The natural to near-natural areas within the project site was confirmed to be consistent with the description of Carletonville Dolomite Grassland with some variations occurring in terms of the herb (grass) tree / shrub layer relationship (different forms of savanna-grassland). The main ecological influences determining the vegetation patterns are edaphic and geological factors as well as grazing pressure.
- » Two habitat (vegetation) units were identified within the project site namely;
 - *Elionurus muticus* – *Helichrysum callicamum* Savannah Grassland; and
 - *Hyparrhenia hirta* – *Elionurus muticus* Palaeo-drainage Grassland
- » According to the sensitivity classification the entire development footprint is located within medium and low sensitive areas and NO highly sensitive habitats or features are present within the footprint of the solar PV facility as well as the BESS. Subsequently, this layout was regarded as acceptable.
 - The Medium Sensitive Areas within the development footprint area associated with the natural to near-natural portions of the Savanna- and Palaeo-drainage Grasslands, whilst the Low Sensitive areas are associated with disturbed and transformed areas.
 - Only one high sensitive feature was identified during the Ecological and Surface Hydrology Impact Assessment, namely a *Vachelia erioloba* tree cluster, however this sensitive tree patch was found to be located just outside of the PV's footprint (including the BESS) and it was furthermore found that impact on this tree cluster is unlikely with the implementation of mitigation measures as provided within the original report.
- » Regarding the conservation of important species, three floral species were identified within the project site, none of which are listed as Red Data species. These species are all listed as protected species within the relevant provincial conservation ordination (*Boophone disticha*, *Ammocharis coranica* and *Vachelia erioloba*). Furthermore, *V. erioloba* is also a protected tree under the National Forest Act, 1998 (Act No. 84 of 1998).
- » According to the Critical Biodiversity Area coverage for the North-West Province:
 - The majority of the project site (all natural to near-natural areas) is located within a Terrestrial ESA1 (corridor area) whilst the transformed areas are classified as Terrestrial ESA2 (corridor areas). During the ecological and surface hydrology impact assessment, it was found that with careful planning and the necessary mitigation measures in place, the proposed development will not result in a severe alteration of the functionality of the larger area as a corridor of movement (ESA), and is therefore considered acceptable within the identified areas.



- The project site falls within an Aquatic ESA2 due to its location within the North West Dolomite Karst Belt which is associated with extensive groundwater resources. It was however determined that it is unlikely that the development will have a significant impact on such resources.
 - » From the Ecological and Surface Hydrological Impact Assessment (impacts summarised in Table 1); the most notable impacts that are associated with the development are:
 - Clearing of natural, stable vegetation during construction may in turn expose the soils to erosion and the invasion of Alien Invasive Plants.
 - The interception of rainfall by the PV panel infrastructure and compacted areas will result in altered runoff patterns and may in turn result in excessive erosion.
- These impacts can however be successfully mitigated with the necessary monitoring and mitigation measures in place as specified within the original report.

As mentioned, the Battery Energy Storage System (BESS) will be located entirely within the authorised laydown area. This proposed footprint area is located outside of any high sensitive features and will furthermore be located within an area that would have been disturbed as a result of the construction of the PV facility, and the associated infrastructure. The proposed BESS footprint area is however located in relatively close proximity to the sensitive *Vachelia erioloba* tree patch, but it is unlikely that this sensitive tree patch will be impacted by the construction and operation of the BESS. The addition of the BESS will thus not result in an increase in the approved development footprint.

Subsequently, in terms of the comparative impact assessment of the approved development and the proposed amendment that includes a BESS, it was determined that all potential impacts, their status and significance (pre- and post-mitigation), as assessed within the original impact report, remain unchanged (refer to Table 1 below). As a result, no additional impacts are anticipated to occur within the footprint of the development as a result of the development of the BESS from an ecology and surface hydrology perspective.

The original impact assessment (2018) indicated that the transformation of the proposed authorised footprint for the PV facility and associated infrastructure will not have a significant impact on the conservation status of the identified protected and listed species and will not impact any red data species. As such the inclusion of the BESS within the approved footprint area will not result in additional pressure on protected and listed species as well as red data species or populations of red data species. Furthermore, a pre-construction ecological walk-through survey of the entire development footprint has been recommended within the original impact assessment report (2018) and this will include the combined laydown area and BESS footprint.

The BESS will, very slightly, contribute to the interception of rainfall and alteration in runoff patterns within the approved development footprint, however due to the small size of the BESS, the



significance of this impact will still remain unchanged due to the inclusion of the BESS within the authorised footprint of the solar PV facility.

In terms of impacts on CBAs and ESAs, as mentioned, with the necessary mitigation measures in place, it is unlikely that the development, with the inclusion of a BESS, will impact the larger area's capability as a functional corridor for the movement of fauna and flora (ESA1 and ESA2).

As the overall footprint of the entire development will remain unchanged, and the BESS will be located within the authorised laydown area, the cumulative impacts as assessed within the original assessment will remain unchanged.

Table 1: The summary of the Comparative Impact Assessment done for the Lichtenburg 2 PV facility (before and after mitigation). The comparison between the impacts for the original Lichtenburg 2 PV facility and the Lichtenburg 2 PV facility that includes the BESS.

Phase & Impact	Original Lichtenburg 2 PV Facility		Lichtenburg 2 PV Facility with the inclusion of the BESS	
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
Construction Phase				
Impact on vegetation and listed plant species	Medium (44)	Low (21)	Medium (44)	Low (24)
Potential impacts on fauna	Medium (36)	Low (15)	Medium (48)	Low (24)
Potential increased erosion risk	Medium (44)	Low (12)	Medium (44)	Low (24)
Operation Phase				
Potential increased alien plant invasion	Medium (55)	Low (18)	Medium (55)	Low (18)
Altered runoff patterns due to rainfall interception by PV panel infrastructure and compacted areas resulting in high levels of erosion	Medium (52)	Low (12)	Medium (52)	Low (12)
Cumulative Impacts	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects within the area	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects within the area
Reduced ability to meet conservation obligations and targets	Low (12)	Medium (33)	Low (12)	Medium (33)



Impacts on Ecological Support Areas and Broad-Scale Ecological Processes	Low (12)	Low (20)	Low (12)	Low (20)
Cumulative impacts due to nearby renewable energy developments – Large scale disturbance of indigenous vegetation	Low (7)	Medium (36)	Low (7)	Medium (36)

2. ADDITIONAL MITIGATION MEASURES AND CHANGES TO THE EMPR

No additional or amended mitigation measures, relating to fauna, flora and surface hydrology, in addition to those specified in the original Ecological and Surface Hydrological Assessment / Report (dated November 2018) are recommended.

3. CONCLUSION AND RECOMMENDATIONS

The following amendment to the project has been proposed ABO Wind by Lichtenburg 2 PV (Pty) Ltd:

- » the construction and operation of a Battery Energy Storage System (BESS) of up to 500MW/500MWh within the authorised footprint of the Lichtenburg 2 PV facility, approximately 10km north of Lichtenburg and 7.5km south-east of Bakerville in the North West Province.

The development area for the battery energy storage area is ~ 5ha and is proposed within the authorised laydown area assessed and approved for the solar PV facility. Subsequently, the proposed construction and operation of the BESS will not result in any additional impacts (impacts not mentioned or assessed within the "original" Ecological and Surface Hydrological Impact Assessment).

Furthermore, the addition of the BESS will not result in an increase in the significance of the assessed potential impacts associated with the development and operation of the PV facility.

Subsequently, the following conclusions can be drawn:

- » The assessment of the impacts within the original Ecological and Surface Hydrological Impact Assessment Report (November 2018) will remain unchanged and are still applicable.
- » These proposed amendments hold no additional advantage or disadvantage to ecological functioning and services provided by the affected habitats.
- » No additional recommendations or mitigations measures are relevant for the development of the BESS. The recommendations and mitigation measures included in the impact assessment are considered appropriate for the development of the BESS.



In conclusion, the addition of a BESS will not impact any additional areas of natural and/or sensitive vegetation, sensitive faunal species or sensitive freshwater resource features. The proposed amendments will result in similar impacts as was identified and assessed within the Ecological and Surface Hydrological Impact Assessment.

Subsequently, from an ecological (faunal, floral and surface hydrological) perspective, no objective or motives (identification of impacts of high ecological significance etc.) were identified which would hinder the proposed amendment. Therefore, it is the opinion of the specialist that the proposed amendment is acceptable and may be authorised, subject to the implementation of the recommended mitigation measures as listed within the original Ecological and Surface Hydrological Impact Assessment (Botha, GA. 2018).

Gerhard Botha (SACNASP Reg. No 400502/14)
05/10/2020