Sirius Solar PV Project Two, Northern Cape Province

Motivation for Amendment of the Environmental Authorisation

DEA Ref.: 14/12/16/3/3/2/481

September 2020

savannah environmental

t +27 (0)11 656 3237 f +27 (0)86 684 0547

e info@savannahsa.com w www.savannahsa.com

Prepared for:

Sirius Solar PV Project Two RF (Pty) Ltd
2D Nautica Building
The Water Club Complex
Granger Bay
Cape Town
8001

savannah environmental

t +27 (0)11 656 3237 f +27 (0)86 684 0547 e info@savannahsa.com w www.savannahsa.com
First Floor, Block 2, 5 Woodlands Drive Office Park, Cnr Woodlands Drive & Western Service Road, Woodmead, 2191

PROJECT DETAILS

Title	:	Sirius Solar PV Project Two, Northern Cape Province: Motivation for Amendment to the Environmental Authorisation
Authors	:	Savannah Environmental (Pty) Ltd Reuben Maroga Lisa Opperman Jo-Anne Thomas
Specialist Consultants	:	Gerhard Botha of Nkurenkuru Ecology and Biodiversity Brian Colloty of EnviroSci Mariné Pienaar of TerraAfrica Jaco van der Walt of HCAC Elize Butler of Banzai Environmental Jon Marshal of Environmental Planning and Design Lisa Opperman of Savannah Environmental Dr Neville Bews of Neville Bews and Associates
Client	:	Sirius Solar PV Project Two RF (Pty) Ltd
Report Status	:	Draft for 30-day review and comment period

When used as a reference this report should be cited as: Savannah Environmental (2020) Motivation Report for the Amendment to the Environmental Authorisation for Sirius Solar PV Project Two, Northern Cape Province.

TABLE OF CONTENTS

APPENDICES

Appendix A:	Ecological Specialist Letter
Appendix B:	Aquatic Specialist Letter
Appendix C:	Soils and Agricultural Potential Specialist Letter
Appendix D:	Heritage Specialist Letter
Appendix E:	Palaeontology Specialist Letter
Appendix F:	Visual Specialist Letter
Appendix G:	Social Specialist Letter
Appendix G(a):	*Social Specialist Letter Peer Review*
Appendix H:	Public Participation Documentation
Appendix H1:	*I&AP Database*
Appendix H2:	*Consultation with I&APs*
Appendix H3:	*Consultation with Organs of State*
Appendix H4:	*Advertisements and Site Notices*
Appendix H5:	*Comments and Responses Report*
Appendix H6:	*Comments Received*
Appendix H7:	*Public Participation Plan*
Appendix I:	A3 Maps
Appendix J:	Environmental Team CVs
Appendix K:	EAP Affirmation and Specialist Declarations

PURPOSE OF THE REPORT

Environmental Authorisation (EA) for the Sirius Solar PV Project Two in the Northern Cape Province (DEA Ref: 14/12/16/3/3/2/481) was obtained by Sirius Solar PV Project Two RF (Pty) Ltd on 9 July 2014 and amended on 23 May 2017 as well as on 11 July 2020. The project was authorised by the Department of Environment, Forestry and Fisheries (DEFF)[1] for the development of a solar PV facility with a contracted capacity of up to 75MW and associated infrastructure.

Due to technological advancements in the development of solar PV panels, as well as to ensure an adequate supply of electricity to the national grid, Sirius Solar PV Project Two RF (Pty) Ltd is proposing an increase in the contracted capacity by an additional 75MW as well as the construction and operation of a Battery Energy Storage System (BESS) with a capacity of up to 4.5GWh within the authorised development footprint of the solar PV facility.

The increase in contracted capacity and development of the BESS is based on the intention to bid the project as part of the Risk Mitigation Independent Power Producer (IPP) Programme (RMIPPPP) of the Department of Mineral Resources and Energy (DMRE), which provides for the generation of 2000MW of new dispatchable capacity, to be procured by IPPs. In order for solar energy to be dispatchable it will require the additional battery storage applied for in this amendment. The RMIPPPP further specifies the capacity cap to be between 50 and 450MW which allows for capacity beyond the initial REIPPPP cap of 75MW.

In terms of Condition 5 of the Environmental Authorisation and Chapter 5 of the EIA Regulations of December 2014 (as amended on 07 April 2017 and 13 July 2018), it is possible for an applicant to apply, in writing, to the competent authority for a change or deviation from the project description to be approved. The proposed amendments for the construction and operation of the BESS as well as an increase in the contracted capacity of the solar PV facility do not trigger any new listed activities. The BESS will be located within the originally authorised footprint of the Solar PV facility as assessed during the EIA process and the capacity increase will not change. The increase of the contracted capacity will not result in any change of the footprint or the height of the PV panels as authorised.

Savannah Environmental has prepared this Motivation Report in support of the application for the proposed amendments on behalf of Sirius Solar PV Project Two RF (Pty) Ltd. This report aims to provide detail pertaining to the environmental impacts as a result of the proposed amendments in order for interested and affected parties to be informed and submit comments for the competent authority to be able to reach a decision in this regard. This report is supported by specialist input letters to inform the conclusion and recommendations regarding the proposed amendments (refer to **Appendix A to G** of this report). This Motivation Report must be read together with these specialist input letters in order to obtain a complete understanding of the proposed amendments and the implications thereof from an environmental perspective.

This Motivation Report has been made available for a 30-day review and comment period in accordance with Regulation 32(1) (aa) of the EIA Regulations, 2014 (as amended) from **Friday, 11 September 2020** to **Monday, 12 October 2020**. The availability of the Motivation Report for the 30-day comment and review

[1] Then known as the Department of Environmental Affairs (DEA).

period was advertised in the Gemsbok Newspaper on **Wednesday, 9 September 2020** (refer to **Appendix H4** of the Motivation Report).

The Motivation Report is available for download from Savannah Environmental's website: https://www.savannahsa.com/public-documents/energy-generation/sirius-solar-pv-project-two/. To register on the project database as an interested and affected party, as well as obtain further information about the project, or submit written comments, please contact:

Nicolene Venter of Savannah Environmental
Post: PO Box 148, Sunninghill, 2157 Johannesburg
Tel: 011 656 3237
Mobile: 060 978 8396
Fax: 086 684 0547
Email: publicprocess@savannahsa.com
www.savannahsa.com

All comments received during the 30-day review and comment period will be included within a Comments and Responses Report (C&RR) to be submitted to the DEFF with the Final Motivation Report for consideration and decision-making.

1. OVERVIEW OF THE PROJECT

1.1. Location

The authorised Sirius Solar PV Project Two development footprint is located 21km south-west of Upington in the Northern Cape Province (refer to **Figure 1.1**). The project is located within the Upington Renewable Energy Development Zone (REDZ 7), within the Kai !Garib Local Municipality and the ZF Mgcawu District Municipality. The development footprint can be accessed from the N14 via an existing access road which has been developed for the operational Sirius Solar PV Project One, located adjacent to Sirius Solar PV Project Two and located to the east.

The development footprint of the solar PV facility is located on the Remaining Extent of the Farm Tungsten Lodge 638. It is within this property that Sirius Solar PV Project Two will be constructed and operated.

The following infrastructure components were authorised by the Department during the EIA process:

- Arrays of PV panels.
- Mounting structures to support the PV panels.
- Cabling between the project components, to be lain underground where practical.
- A new on-site facility substation and a power line to evacuate power from the PV facility to the Eskom grid.
- Internal access roads and fencing.
- Workshop area for maintenance, storage, and office.

1.2. Potential Environmental Impacts as determined through the EIA Process

From the specialist investigations undertaken within the Environmental Impact Assessment (EIA) process for the solar PV facility (Savannah Environmental, 2014), the following environmental impacts relevant to the amendment application were identified:

- Impacts on Ecology (including fauna and flora)
- Soil and Agricultural Potential Impacts
- Impacts on Water Resources
- Heritage Impacts (including palaeontology)
- Visual Impacts
- Impacts on the Social Environment

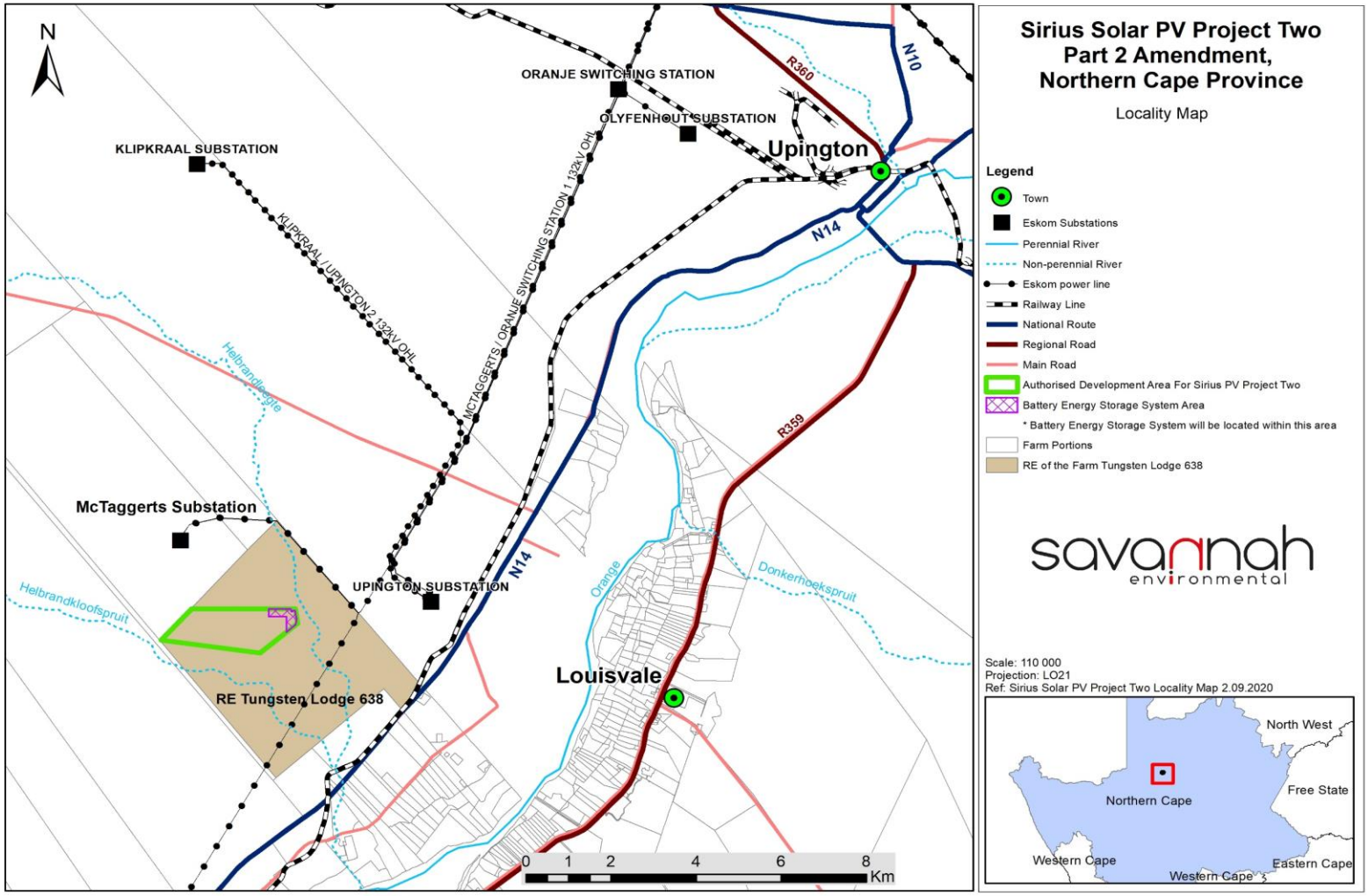

Figure 1.1: A map showing the location of the BESS development area within the authorised development footprint of the Sirius Solar PV Project Two. A3 maps have been included in **Appendix I** of the Motivation Report.

Key conclusions and recommendations of the original EIA pertinent to this application, as reported in the Final EIA Report (Savannah Environmental, 2014):

1.2.1. Summary of environmental findings

The EIA found that based on the nature and extent of the project, the level of disturbance predicted as a result of the construction and operation of the solar PV facility and the associated infrastructure was assessed as low and that the impacts associated with the proposed development could be managed and mitigated to an acceptable levels and that no fatal flaws were present.

1.2.2. Impacts on Ecology

The Kalahari Karroid Shrubland, with riverine vegetation on the banks of small ephemeral water washes that drains into the Orange River, is present about 7km south-east of the study area. Although these vegetation types are regarded as Least Threatened, the relatively high biodiversity of these undulating plains have medium to high conservation priority on a local scale, as described by the ZF Mgcawu Environmental Management Framework. Impacts on natural vegetation should therefore be minimised as far as possible.

Annual and geophytic species have highly variable emerging patterns, depending on the timing and amount of rainfall received during a season. It is therefore expected that the diversity of geophytic and annual species within the study area will be higher than could be determined during the survey for the Ecological Impact Assessment undertaken as part of the EIA.

All riparian vegetation around natural vleis and large intermittent rivers should be avoided by all development-related activities, except for the necessary crossing of access routes and power lines. The power line should cross where the lowest number of indigenous trees are present. Access roads to the development should follow existing tracks as far as possible. Where new access routes will be necessary, suitable erosion control measures must be taken.

Few alien invasive plants have been observed, but several grow in close proximity along major access routes. For all species, there is a very high risk of spread throughout the project area following disturbance. A detailed Invasive Plant Management Plan will have to be in place prior to commencement of the activity and be diligently followed and updated throughout the project cycle up to the decommissioning phase.

It is not expected that the development will compromise the survival of any specific flora or terrestrial vertebrate species if mitigation measures are fully implemented. The most significant impacts are expected to be on ecosystem health and functionality, which should remain relatively intact if all mitigation recommendations are implemented. Possible cumulative impacts are therefore expected to be fully avoidable. The project will have a medium to low impact on ecology.

1.2.3. Soil and Agricultural Potential Impacts

The development will have low to medium negative impact on soils, agricultural resources, and productivity, but it will also deliver low to medium positive impacts on agriculture. Grazing, the only current land use, will be able to continue unaffected on all other parts of the farm for the duration of the project. The significance of agricultural impacts is influenced by the fact that the solar PV panel development footprint has extremely limited agricultural potential. The farm has a land capability classification of class 7, non-arable and low

potential grazing land. Soils are predominantly shallow Mispah soils on underlying rock with only small, interspersed pockets of deeper Hutton soils between them. Four potential negative impacts of the development on agricultural resources and productivity were identified, including:

- Loss of agricultural land use caused by direct occupation of land by the energy facility footprint (medium significance with and without mitigation).
- Soil erosion caused by the alteration of the surface run-off characteristics (medium significance without, but low with mitigation).
- Loss of topsoil in disturbed areas, causing a decline in soil fertility (low significance with and without mitigation).
- Degradation of the veld due to vehicle trampling and dust deposition (low significance with and without mitigation).

1.2.4. Heritage Impacts

Based on the Phase 1 Archaeological Impact Assessment (AIA) study and survey it was found that no significant heritage resources occur on the site. Four areas of light concentration of stone tools were recorded. These four "heritage sites" are very common in the Northern Cape and are of low heritage significance. It was found that none of the tool concentrations warranted protection or mitigation action. The occurrence of these Stone Tools suggests that sub-surface heritage sites could occur. In addition, due to the area's close proximity to the Orange River, it is prone to alluvial deposits that could bury any Stone Age sites. Therefore, it is recommended that a suitably qualified heritage practitioner be appointed by the developer to perform periodic inspections of excavated materials during the construction phase to ensure than no sub-surface sites are damaged.

1.2.5. Palaeontology Impacts

The proposed project falls within the Kalahari sediments and calcretes have low fossil potential, but the possibility of fossils being encountered during excavations cannot be discounted. The area is characterised by deep sands and sandy soil covering calcretes and old non-fossiliferous igneous and metamorphic rocks. The findings of the scoping study showed that there is a very low likelihood that fossils will be found in the study. An exemption letter to undertake further studies during the EIA phase was issued by the specialist and SAHRA and was included in the EIA Report as **Appendix I**.

1.2.6. Visual Impacts

The findings of the Visual Impact Assessment indicated that the environment surrounding the site, especially within a 2.5km - 5km radius, will be visually impacted upon for the anticipated operational lifespan of the facility (i.e. 20 - 30 years). The proposed facility would be visible within an area that may incorporate certain sensitive visual receptors. These primarily include users of the N14 national road traversing near the proposed development. The solar energy facility could potentially have a moderate visual impact on road users travelling along the N14 national road traversing south-east of the facility. This impact may be mitigated to a low significance. The potential visual impact on residents of homesteads in close proximity to the solar PV facility is expected to be negligible due to the general absence of settlements and residences in close proximity (4km radius) of the development. The visual impact on the users of roads and the residents of towns, settlements and homesteads within the region (i.e. beyond a 5km radius) is expected to be low, before and after the implementation of mitigation measures. The potential visual impact of construction activities on sensitive visual receptors within close proximity to the project is likely to be of moderate

significance, before and after the implementation of mitigation measures. The potential visual impact associated with lighting at the facility at night (especially glare) is expected to be of moderate significance and may be mitigated to low. The anticipated visual impacts listed above (post mitigation measures) are on average expected to be of low to moderate significance. The area already has a Concentrated Solar Power (CSP) project under construction [2]and an Eskom CSP has been authorised which will have significant impact on the viewshed of the area. The most significant impact associated with these projects and associated infrastructure is the visual impact on the scenic resources and cultural landscape of this region. It should however be considered that the Sirius Solar PV Project Two structures are highly unlikely to be viewed in isolation, as the much taller structures of the Abengoa (!Khi) solar energy facility[3], is expected to generally dominate the observer's frame of view. The solar energy facility development is not considered to be fatally flawed from a visual perspective.

1.2.7. Impacts on the Social Environment

The findings of the Social Impact Assessment (SIA) indicate that the development of the proposed Sirius Solar PV Project Two will create employment and business opportunities for locals during both the construction and operation phase of the project. The enhancement measures listed in the SIA should be implemented in order to enhance these benefits. In addition, the proposed establishment of a number of other renewable energy facilities in the area will create significant socio-economic opportunities for the Kai !Garib Local Municipality, which, in turn, will result in a positive social benefit. The establishment of a Community Trust funded by revenue generated from the sale of energy from the proposed solar PV facility also creates an opportunity to support local economic development in the area. Given the size of the proposed facility (75MW) this will represent a significant social benefit for an area where there are limited opportunities. The proposed development also represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The establishment of the proposed Sirius Solar PV Project Two is therefore supported by the findings of the SIA. The potential positive and negative social impacts of the project will be of a medium to low significance.

[2] The Khi Solar CSP Facility began commercial operations in February 2016 and has a contracted capacity of up to 50MW: https://www.energy.org.za/news/khi-solar-one-near-upington-achieves-a-technological-milestone.
[3] The Abengoa (!Khi) solar energy facility is now referred to as the Khi CSP Solar Facility.

2. OVERVIEW OF THE PROPOSED AMENDMENTS

The amendments being applied for relate to various aspects of the project description as detailed in the EA dated 9 July 2014. The requested amendments will result in an increase in the contracted capacity of the solar PV facility by 75MW as well as the construction and operation of a BESS with a capacity of up to 4.5GWh.

This section of the Motivation Report details the amendments considered within this report and by the specialist investigations (refer to **Appendix A – G**). Each amendment request is detailed below.

2.1. An increase in the contracted capacity of Sirius Solar PV Project Two

The applicant is requesting an increase to the contracted capacity of the solar PV facility by an additional 75MW in the EA project description (including any references thereto) from: 'Export Capacity: 75MW' to 'Export Capacity: 150MW'. The development footprint and height of the panels of the solar PV facility will not change from those authorised for the project. The following changes in the EA project description are therefore requested:

EA Page Reference	Current wording	Proposed wording
Page 3, Listed Activities	*GNR. 545. Item 1.* *'The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.'* *'The proposed solar (PV) facility would have a generation capacity of 75MW.'*	**GNR. 545. Item 1.** **The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.** **The proposed solar (PV) facility would have a contracted capacity of 150MW.**
Page 5, Technical Details	*Export Capacity: 75MW*	**Export Capacity: 150MW**

2.2. An update to the project description of the EA to include the construction and operation of a Battery Energy Storage System (BESS)

The applicant is requesting an update to the project description of the EA to include the construction and operation of a Battery Energy Storage System (BESS) with a capacity of up to 4.5GWh within the authorised development footprint of the solar PV facility (refer to **Figure 3.1**). The development area[4] of the BESS will be up to 18ha and the development footprint[5] will be up to 6.5ha in extent. The BESS will connect to the authorised on-site facility substation via underground multi-core 33kV cables.

[4] the identified area (located within the authorised development footprint of Sirius Solar PV Project Two) where the BESS is planned to be located. The development area is ~18ha in extent.

[5] the defined area (located within the development area of the BESS) where the BESS and associated infrastructure is planned to be located. This is the actual footprint of the BESS and the area which would be disturbed. The development footprint of the BESS is ~6.5ha in extent.

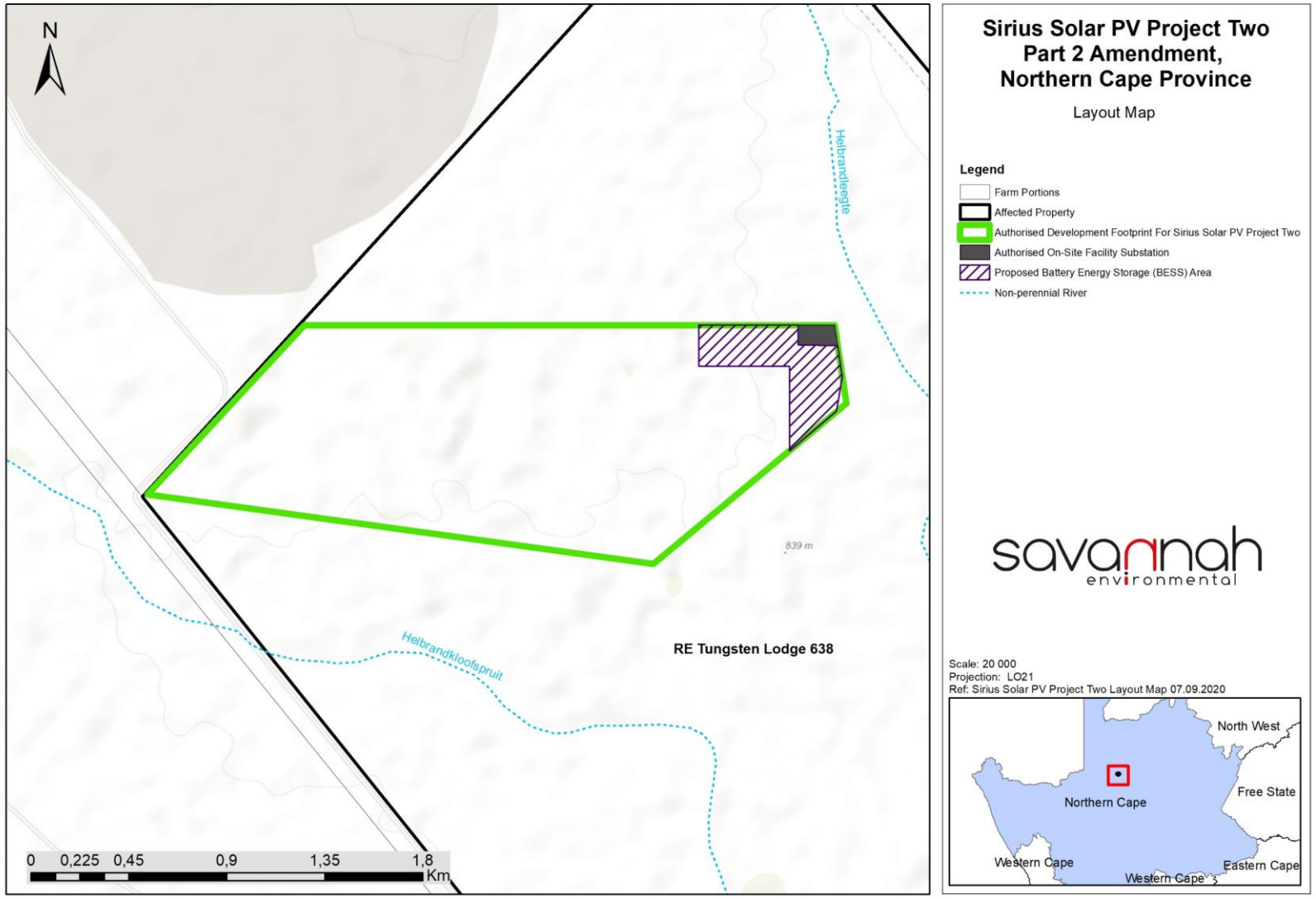

Figure 3.1: A map showing the layout of the BESS within the authorised development footprint of the solar PV facility. . A3 maps have been included in **Appendix I** of the Motivation Report.

The general purpose and utilisation of the BESS will be to save and store excess electrical output from the PV facility as it is generated, allowing for a timed release to the national grid when the capacity is required. The BESS will therefore provide flexibility in the efficient operation of the electric grid through decoupling of the energy supply and demand and will allow for longer generating periods of the solar PV facility. The following changes in the EA project description are therefore requested:

EA Page Reference	Proposed wording
Page 4, Infrastructure associated with this facility include	**Battery Energy Storage System**
Page 5, Technical Details Battery Energy Storage System (BESS)	» **Lithium-ion, Lithium Iron Phosphate, Sodium Sulphur, or Vanadium Redox batteries with a capacity of up to 4.5GWh in containers with a footprint of 6.5ha and a maximum height of up to 2.8m.** » **Multi-core, 33kV underground cables to connect the BESS to the authorised on-site facility substation of Sirius Solar PV Project Two.**

3. MOTIVATION FOR THE PROPOSED AMENDMENTS

The sections below describe the motivation for each of the requested amendments.

3.1. An increase to the contracted capacity of Sirius Solar PV Project Two

The applicant is requesting amendment of the EA to allow for the generation of 150MW of contracted capacity from Sirius Solar PV Project Two to be evacuated into the national grid in order to ensure an adequate supply of electricity. This is based on the intention to bid the project under the Risk Mitigation IPP Programme (RMIPPPP) of the DMRE, which provides for 2 000MW of new and dispatchable generation capacity to be procured from IPPs. In order for solar energy to be dispatchable it will require the additional battery storage applied for in this amendment. The RMIPPPP further specifies the capacity cap to be between 50 and 450MW which allows for capacity beyond the initial REIPPPP cap of 75MW. Furthermore, the requested amendment is a result of technological advancements in the development of solar PV panels, which means it has become possible to generate a higher capacity of electricity from a smaller footprint using solar PV technology with more efficient solar PV panels. The increase in the contracted capacity of the solar PV facility by 75MW will not change the size of the authorised development footprint of the solar PV facility or the height of the solar PV panels as authorised.

The increase in the contracted capacity of the solar PV facility allows for more generation capacity from the same development footprint as initially authorised for 75MW, therefore eliminating the need to construct additional solar PV facilities facility (which will lead to additional environmental impacts) for this additional capacity.

3.2. An update to the project description of the EA to include the construction and operation of Battery Energy Storage System (BESS)

The applicant is requesting an update to the project description of the EA to include the construction and operation of a BESS with a capacity of up to 4.5GWh within the authorised development footprint of the solar PV facility. The general purpose and utilisation of the BESS will be to save and store excess electrical output from the solar PV facility as it is generated, allowing for a timed release to the national grid when the capacity is required. The BESS will therefore provide flexibility in the efficient operation of the electric grid through decoupling of the energy supply and demand. Furthermore, the development of the BESS for the project is of importance as the system will ensure that electricity is fed into the national grid when required and excess amounts stored. This will allow for extended hours of generation from the 150MW solar PV facility, which will assist in meeting the objectives of the Risk Mitigation IPP Programme under the DMRE, which provides for the procurement of 2 000MW of new generation capacity from IPPs.

4. CONSIDERATIONS IN TERMS OF THE REQUIREMENTS OF THE EIA REGULATIONS

In terms of Regulation 31 of the EIA Regulations 2014, as amended, an environmental authorisation may be amended by following the process in this Part (i.e. a Part 2 amendment) if it is expected that the amendment may 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 authorisation.

The amendments to increase the contracted capacity of the solar PV facility to 150MW and to develop a BESS with a capacity of up to 4.5GWh were not specified or considered in the initial environmental authorisation. The requested amendments do not on their own, constitute a listed or specified activity. Therefore, the application is made in terms of Regulation 31(b).

5. POTENTIAL FOR CHANGE IN THE SIGNIFICANCE OF IMPACTS AS ASSESSED IN THE EIA AS A RESULT OF THE PROPOSED AMENDMENTS

In terms of Regulation 32(1)(a)(i), the following section provides an assessment of the impacts related to the proposed amendments. Understanding the nature of the proposed amendments and the impacts associated with the project (as assessed within the EIA), the following has been considered:

- Impacts on Ecology (including fauna & flora)
- Soil and Agricultural Potential Impacts
- Impacts on Water Resources
- Heritage Impacts
- Impacts on Palaeontology
- Visual Impacts
- Impacts on the Social Environment

The potential for change in the significance and/or nature of impacts based on the proposed amendments as described within this Motivation Report is discussed below and detailed in the specialists' assessment addendum letters included in **Appendix A - G**[6]. Additional mitigation measures recommended as a result of the proposed amendments have been underlined for ease of reference, where applicable. This section of the Motivation Report must be read together with the specialist addendum letters contained in **Appendix A - G** in order for the reader to obtain a complete understanding of the proposed amendments and the implications thereof.

5.1. Impacts on Ecology (including flora and fauna)

The Ecological Specialist Addendum Letter (**Appendix A**) included a review and assessment of the original Ecological Impact Assessment and data, as well as the update of any previously assessed impacts and additional mitigation measures, where required. The Ecological Impact Assessment (Strohbach, 2014) identified that the development footprint of the solar PV facility is located within the three (3) vegetation associations, *Ziziphus mucronata – Cenchrus ciliaris, Boscia foetida – Stipagrostis uniplumis* and *Kleinia longiflora – Enneapogon scaber.* Based on the distribution of the vegetation associations, the BESS development area will be located within the *Boscia foetida – Stipagrostis uniplumis* and the *Kleinia longiflora – Enneapogon scaber* vegetation associations. These vegetation associations and/or habitats are associated with a medium ecological and avifauna sensitivity (refer to **Figure 5.1**) and the development of the proposed solar PV facility within these vegetation associations was considered to be acceptable. Other environmental sensitivities present within the authorised development footprint of the solar PV facility include large *Vachellia erioloba* trees, large drainage lines as well as the riparian habitat. For the development of the BESS, none of these sensitive features (i.e. *Vachellia erioloba* trees and large drainage lines, etc) will be infringed on.

[6] It must be noted that the original specialists who undertook the EIA studies have been used for these assessments as far as possible. However, where the original specialists were not available for whatever reason, suitably qualified and experienced specialists have been used to provide an assessment of the proposed amendments.

During the Ecological Impact Assessment as well as the pre-construction walk-through (undertaken for the operational Sirius Solar PV Project One), eleven Listed and Protected plant species were recorded within the two vegetation associations. Both assessments indicated that the transformation of the authorised development footprint of the solar PV facility, as well as the BESS, would not have a significant impact on the conservation status of the identified Listed and Protected Plant species.

The increase in the contracted capacity of the solar PV facility to 150MW as well as the development of the BESS will not impact on any additional areas of ecological and avifauna sensitivity (refer to **Figure 5.1**). As such, the medium sensitivity rating of the Ecological Impact Assessment (Strohbach, 2014) following the implementation of the recommended mitigation measures would remain relevant for the proposed amendments. As a result, no additional impacts are identified or mitigation measures recommended as the impacts and mitigation measures included in the Ecological Impact Assessment (Strohbach, 2014) are deemed as relevant and adequate for the proposed amendments.

5.1.1. Cumulative Assessment

Cumulative impacts assessed as a result of the Sirius Solar PV Project Two as well as other renewable energy facilities within the region include, cumulative impacts on Listed and Protected Plant species such as *Vachellia erioloba* and *Boscia albitrunca*, excessive clearing of vegetation and change in run-off and stormwater flow patterns and dynamics as well as the potential of an uncontrolled invasion and spread of alien invasive plants within the region. Cumulative impacts have been sufficiently addressed within the Ecological Impact Assessment (Strohbach, 2014). The proposed amendments would not contribute to the significance of the cumulative impacts identified and assessed in the Ecological Impact Assessment (Strohbach, 2014).

The cumulative impact of the proposed development in isolation and with other renewable energy facilities in the region on Ecological Support Areas (ESAs) and Critical Biodiversity Areas (CBAs) was not assessed in the Ecological Impact Assessment. As a result, an assessment of the cumulative impact on the ESAs and CBAs within the vicinity of the development footprint of the solar PV facility and the BESS has been assessed below.

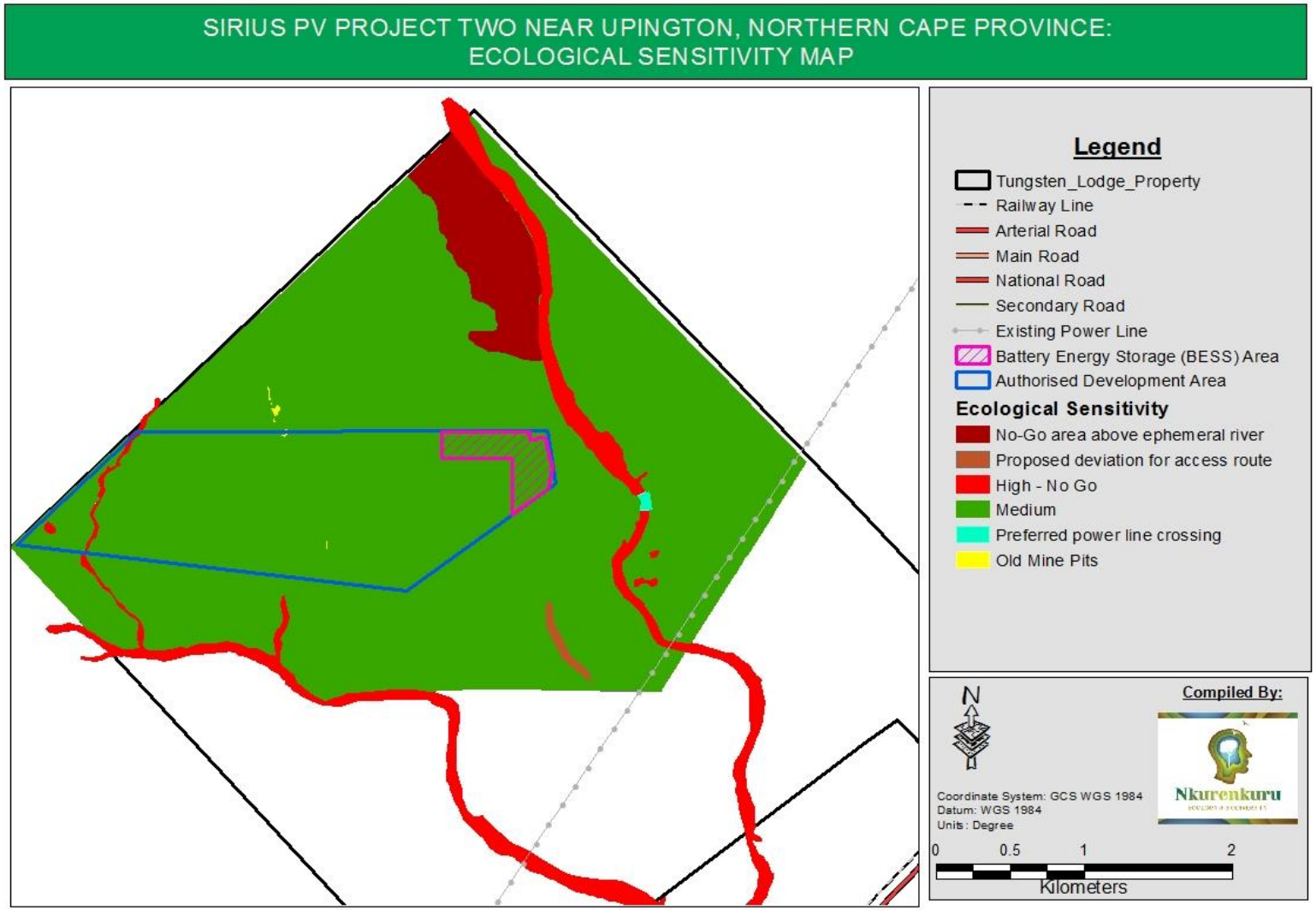

Figure 5.1: **T**he ecological sensitivities within the authorised development footprint of the solar PV facility as well as within the development area of the BESS.

Nature: *Cumulative impact on Ecological Support Areas and Critical Biodiversity Areas*

Transformation of intact habitat could potentially compromise ecological processes of CBAs and ESAs as well as ecological functioning of important habitats and would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Local (1)	Regional (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Small (1)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (12)**	**Low (20)**
Status	Neutral – Slightly Negative	Slightly Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	Likely
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

» The development footprints of the individual facilities should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
» Reduce the footprints of the facilities within sensitive habitat types as much as possible.
» Small to medium-sized mammals must be allowed to move between the different development footprints and surrounding areas by creating artificial passageways underneath boundary fences (this is optional and may be implemented by the developer if deemed necessary).

The entire extent of the authorised development footprint is located outside of any CBA (refer to **Figure 5.2**). However, small areas to the west and east fall within ESAs, with a portion of the proposed BESS development area falling within an ESA. These ESAs within the authorised development footprint of the solar PV facility are associated with the larger non-perennial drainage systems (i.e. Helbrandleegte and Helbrandkloofspruit rivers) which act as important faunal and floral corridors. However, the authorised development footprint of the solar PV facility, as well as the development area of the BESS fall outside these watercourses. With the implementation of recommended mitigation measures, the development of the solar PV facility as well as the BESS will not have a significant impact on the ecological functions and processes of the ESAs and the CBAs.

The functioning of the ESAs is of importance since they drain directly into the Orange River but have been fragmented from the Orange River through barriers and obstructions such as dams and weirs at the confluence. However, connectivity may be restored for a brief period of time following sufficient rainfall events and hence contamination or accelerated erosion of the authorised development footprint could potentially have a negative impact on the downstream CBA2 area during such periods. The proposed development must therefore proceed in such a manner that accelerated erosion is not initiated and mitigated if it occurs, and pollution is strictly controlled, with measures in place to contain any kind of pollution immediately on site, preventing it to reach even the smaller ephemeral washes.

In conclusion, no additional mitigation measures in addition to those included in the Ecological Impact Assessment (Strohbach, 2014) are recommended from a cumulative perspective. The mitigation measures for the cumulative impact on the ESAs as well as broad-scale ecological processes are not new or additional,

but have been recommended elsewhere in the Ecological Impact Assessment and have only been mentioned as these mitigation measures are applicable in mitigating cumulative impacts on ESAs and CBAs.

5.1.2. Conclusion

The specialist concluded that as the increase of the contracted capacity will not result in an increase in size of the authorised development footprint, the proposed amendment is considered to be acceptable from an ecological and avifauna perspective.

For the construction and operation of the BESS, the specialist concluded that the development would not result in any additional ecological and avifauna impacts, and that the infrastructure was acceptable.

The cumulative impacts associated with the development of the solar PV facility as well as other renewable energy facilities in the region on the ecological functions and processes of ESAs and CBAs was not assessed in the Ecological Impact Assessment (Strohbach, 2014). As a result, this Motivation Report includes an assessment of the cumulative impact on the ecological functions and processes of these features as a result of the proposed development as well as other developments in the region. The findings of the assessment indicate that the development of Sirius Solar PV Project Two (including the BESS and the increased contracted capacity) as well as of other renewable energy facilities in the region will have minimal impact on the ecological functions and processes of ESAs and CBAs in the area.

In general, the impacts identified and assessed within the Ecological Impact Assessment (Strohbach, 2014) remain unchanged and applicable. In addition, the proposed amendments within the authorised development footprint hold no advantage or disadvantage to ecological functioning and services provided by the affected habitats. Therefore, the implementation of the proposed amendments for Sirius Solar PV Project Two will result in similar ecological and avifauna impacts to those presented in the EIA, and no objectives have been identified that could hinder the authorisation of the proposed amendments. As a result, the specialist indicated that the proposed amendments are acceptable and may be authorised subject to the implementation of the recommended mitigation measures included in the Ecological Impact Assessment (Strohbach, 2014) and the Environmental Management Programme (EMPr).

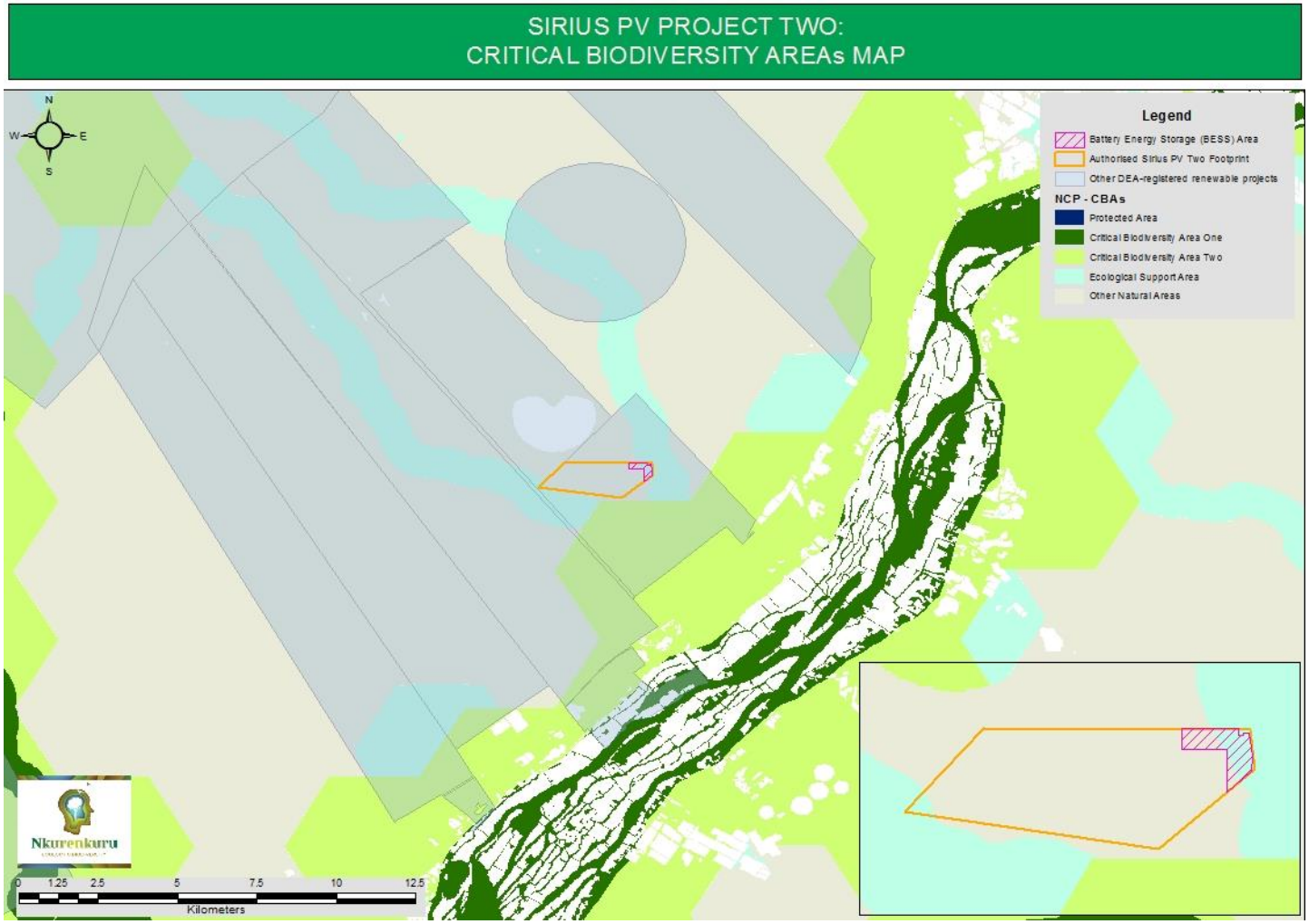

Figure 5.2: The location of the BESS development area within the authorised development footprint of Sirius Solar PV Project in relation to the ESAs and CBAs in the area, as well as other renewable energy facilities in the vicinity that are proposed and have been granted EAs.

5.2. Impacts of Aquatic Resources

The Aquatic Specialist Addendum Letter (**Appendix B**) included a review and assessment of the original Aquatic Impact Assessment (Colloty, 2014) and data, as well as the update of any previously assessed impacts and updated mitigation measures, where required.

The specialist indicated that based on the proposed amendments the overall impact would be low, following the implementation of the recommended mitigation measures. As a result, the significance of the proposed development of Sirius Solar PV Project Two, including amendments would be low. This finding is based on the premise that the aquatic features delineated within the authorised development footprint of the solar PV facility are ephemeral and only carry flows after heavy rainfall events for a limited period, while those that are associated with a high environmental sensitivity within the authorised development footprint are avoided by the development area of the solar PV facility and the BESS. Therefore, the impacts identified and assessed in the Aquatic Impact Assessment (Colloty, 2014) remain unchanged and would be applicable for the proposed amendments, and there is no potential for cumulative impacts from an aquatic perspective as a result of the proposed amendments. Therefore, no additional impacts or changes to the previously assessed impacts in the Aquatic Impact Assessment as part of the EIA would be required as a result of the proposed amendments. Furthermore, there are no specific disadvantages on the aquatic environment within the authorised footprint of Sirius Solar PV Project Two, and the surrounding environment as a result of the proposed amendments.

5.2.1. Cumulative Assessment

No additional aquatic cumulative impacts were identified by the specialist as a result of the proposed amendments. Therefore, the cumulative impacts identified by the Aquatic Impact Assessment (Colloty, 2014) remain unchanged and would be applicable to the proposed amendments.

5.2.2. Conclusion

The specialist concluded that the aquatic impacts as a result of the proposed amendments within the authorised development footprint of Sirius Solar PV Project Two would remain unchanged from the Aquatic Impact Assessment (Colloty, 2014). As a result, the specialist has indicated that there is no objection from an aquatic perspective to the authorisation of the proposed amendments on the basis that there are no additional impacts or changes as a result of the proposed amendments and that the recommended mitigation measures in the Aquatic Impact Assessment are sufficient for the proposed amendments.

5.3. Soil and Agricultural Potential Impacts

The Soil and Agricultural Potential Impact Assessment undertaken by Lanz (2013) described the soil and agricultural properties of the affected property and indicated that the area generally consists of shallow soils of Coega and Mispah forms, with small patches of deeper Hutton soil profiles. The authorised development footprint of the solar PV facility as well as the development area of the BESS is associated with a low agricultural potential and the soils are of a low sensitivity. Agricultural activities taking place within the area include low intensity grazing and there are no cultivated areas present within the affected property.

For the proposed amendments, the specialist in the Soils and Agricultural Potential Addendum Letter (**Appendix C**) has assessed an additional potential impact of soil pollution as a result of containment

breaches (i.e. leaks etc.) of the battery units during the construction and operation (including maintenance) phases of the BESS. The assessment of the impact is included below:

Nature: *Chemical pollution of the soil*

The following activities and risks associated with the construction and operation phase of the BESS can result in the chemical pollution of the soil. These activities include:

- Petroleum hydrocarbon (present in oil and diesel) spills by machinery and vehicles during earthworks and the removal of vegetation as part of site preparation.
- Spills from vehicles transporting workers, equipment, and construction material to and from the construction site.
- The accidental spills from temporary chemical toilets used by construction workers.
- The generation of domestic waste by construction workers.
- Spills from fuel storage tanks during the construction phase.
- Pollution from concrete mixing.
- Any construction material remaining within the construction area once construction is completed.
- Containment breaches related to the battery units and any inadvertent chemical exposure therefrom.

During the operation phase of the BESS, maintenance and repairs of the battery units can result in waste generation within the development footprint.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Low (4)	Improbable (2)
Significance	**Medium (36)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	N/A

Mitigation:

- Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills.
- Any waste generated during construction, must be stored into designated containers, and removed from the site by the construction teams.
- Any left-over construction materials must be removed from site.
- Ensure battery transport and installation by accredited staff / contractors.
- Compile (and adhere to) a procedure for the safe handling of battery cells during transport and installation.
- Adhere to a procedure for the safe handling of battery cells during transportation, installation as well as maintenance.

Residual Impacts:
The residual impact from the construction and operation of the proposed project will be low to negligible.

The additional mitigation measures outlined above must be included within the project EMPr during the update of the EMPr prior to construction.

5.3.1. Cumulative Assessment

No additional cumulative from a soils and agricultural potential were identified by the specialist as result of the proposed amendments.

5.3.2. Conclusion

The specialist concluded that apart from the assessment of the impact of chemical pollution on the soil during the project life cycle of the BESS, the impacts identified in the Soils and Agricultural Potential Impact Assessment (Lanz, 2013) remain unchanged and applicable for the proposed amendments. The mitigation measures recommended by the specialist in the Soils and Agricultural Potential Specialist Letter (**Appendix C**) must be implemented during the project lifecycle of the BESS. No impacts that cannot be mitigated to a low significance were identified by the specialist.

The specialist indicated that there were no impacts on soils and agricultural potential as a result of the increase in the capacity of the solar PV facility to 150MW as this amendment does not affect the development footprint of the facility.

5.4. Heritage Impacts

The findings of the Heritage Impact Assessment (HIA) (van der Walt, 2013) undertaken as part of the EIA process for Sirius Solar PV Project Two indicate that no significant heritage sites were present within the authorised development footprint of the solar PV facility. Three archaeological sites were recorded (refer to **Figure 5.2**), outside the authorised footprint of the solar PV facility and, as such, outside of the development area of the BESS.

The development area of the BESS with a capacity of up to 4.5GWh will be accommodated entirely within the authorised development footprint of Sirius Solar PV Project Two and is therefore unlikely to encroach on the identified archaeological sites (refer to **Appendix D**). As a result, the heritage impacts identified and assessed as part of the EIA process remain unchanged and are considered to be of a low significance.

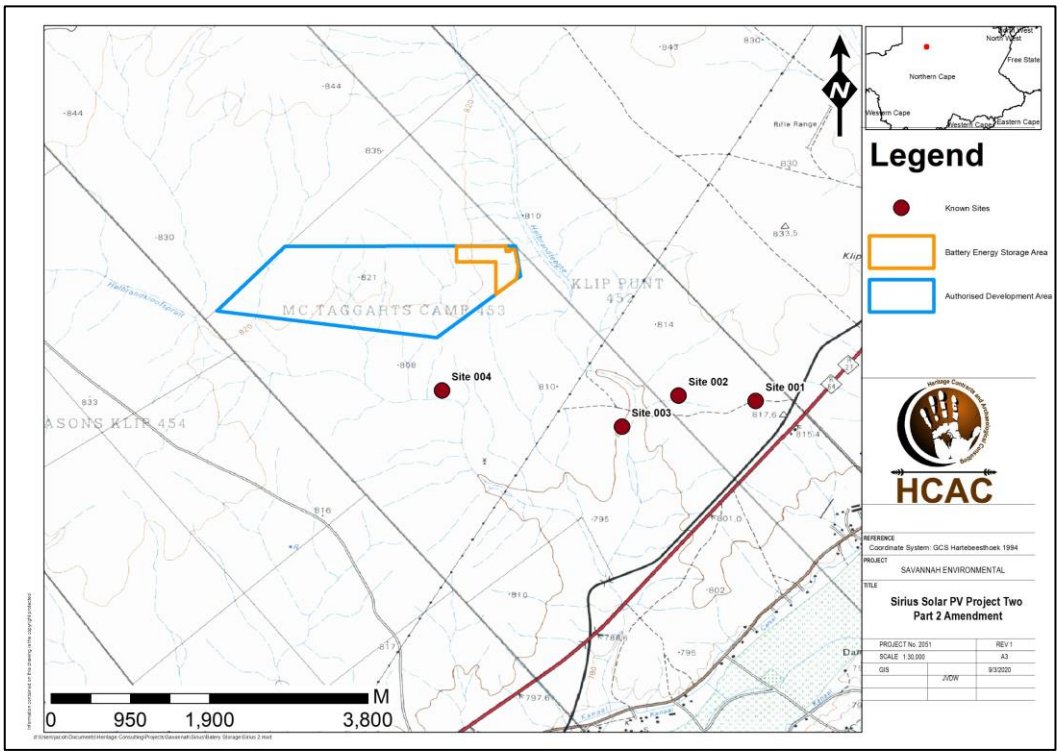

Figure 5.2: A map showing the location of the BESS development area within the authorised development footprint of Sirius Solar PV Project Two as well as the archaeological sites identified within the affected property, Remaining Extent of the Farm Tungsten Lodge 638.

5.4.1. Cumulative Assessment

No additional heritage cumulative impacts were identified by the specialist as a result of the proposed amendments. Therefore, the cumulative impacts identified by the HIA (van der Walt, 2013) remain unchanged and would be applicable for the proposed amendments.

5.4.2. Conclusion

The specialist concluded that based on the findings of the HIA (van der Walt, 2013), there is no objection to the authorisation of the proposed amendments for Sirius Solar PV Project Two based on the following:

- The construction and operation of the BESS within the authorised development footprint of the solar PV facility will not result in a change or significance of the impacts assessed in the Heritage Impact Assessment (van der Walt, 2013);
- The construction and operation of the BESS is unlikely to result in any additional impacts that were not previously assessed during the EIA process; and
- No additional management or mitigation measures over and above the recommendations made in 2014 within the HIA as well as by the South African Heritage Resources Agency (SAHRA) are appliable to the construction and operation of the BESS, however the proposed amendments are subject to approval from SAHRA.

5.5. Impacts on Palaeontology

The findings of the Palaeontology Exemption Letter (**Appendix E**) indicate that the authorised development footprint of the solar PV facility as well as the development area of the BESS is underlain by unfossilferous metamorphic basement rocks of the Namaqua-Natal Metamorphic Belt. These rocks are highly metamorphosed and are associated with a low palaeontological sensitivity. Rocks from the Bethesda Formation, Areachap Group, Dyasons Klip Gneiss (refer to **Figure 5.3**) are the main lithologies that characterise the authorised development footprint of the solar PV facility as well as the development area of the BESS.

5.5.1. Cumulative Assessment

No cumulative impacts were identified from a palaeontological perspective as a result of the proposed amendments.

5.5.2. Conclusion

The specialist concluded that the authorised development footprint of the solar PV facility as well as the development area of the BESS is underlain by unfossilferous metamorphic rocks, with a low palaeontological sensitivity. Furthermore, no additional impacts on palaeontology were identified as a result of the proposed amendments, therefore the impacts identified in the EIA as well as the recommended mitigation measures remain unchanged and applicable for the proposed amendments for Sirius Solar PV Project Two. As a result, the specialist has concluded that there are no objections from a palaeontological perspective for the authorisation of the proposed amendments.

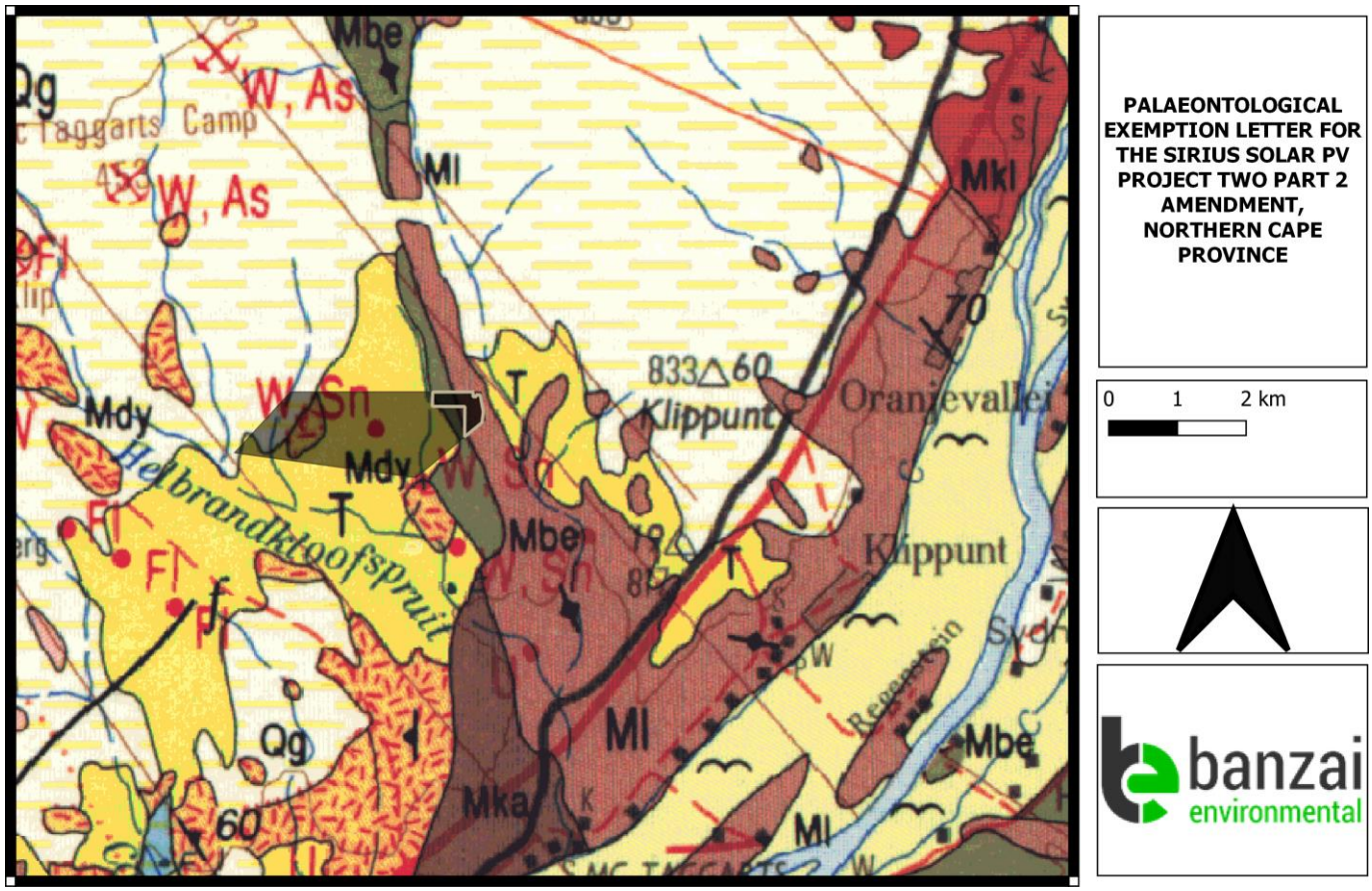

Figure 5.3: Map showing the geological formations present within the authorised footprint of the solar PV facility as well as the development area of the BESS.

5.6. Visual Impacts

The Visual Impact Assessment (Marshall, 2013) indicated that the development of the proposed Sirius Solar PV Project Two within the area would have a low to moderate significance, as the development would be viewed in the context of the Khi Solar One which at the time of the EIA process was under construction. The Visual Specialist Addendum Letter (**Appendix F**) addresses potential changes or impacts as a result of the proposed amendments by comparison with the original impact assessment undertaken in 2013 as part of the EIA process.

The Visual Specialist Addendum Letter (**Appendix F**) indicated that as the proposed increase of the contracted capacity will not result in an increase of the PV panel area or height of the PV panels, the amendment would not change the findings of the Visual Impact Assessment (Marshall, 2013).

For the BESS, the specialist indicated that since the infrastructure will be located within the authorised development footprint of the solar PV facility and the height of the infrastructure for the batteries will be lower than that of the authorised solar PV facility as well as the on-site facility substation, the proposed amendment will not change the findings and recommendations included in the Visual Impact Assessment (Marshall, 2013).

5.6.1. Cumulative Assessment

No additional cumulative visual impacts were identified by the specialist as a result of the proposed amendments. Therefore, the impacts identified by the Visual Impact Assessment (Marshall, 2013) remain unchanged and would be applicable to the proposed amendments.

5.6.2. Conclusion

Based on the nature of the proposed amendments for Sirius Solar PV Project Two, and the fact that the increased capacity will not result in a change in the panel area or height, and the height of the infrastructure components of the BESS will be lower (approximately 2.8m high) than those of the solar PV facility as well the on-site facility substation, and be located within the authorised footprint of the solar PV facility, it can be concluded that the proposed amendments will not result in any additional impacts other than those identified and assessed within the Visual Impact Assessment (Marshall, 2013). As a result, no change in the significance of the impacts is expected to occur and there is no need for any additional recommendations or mitigation measures other than those already specified in the Visual Impact Assessment (Marshall, 2013). Therefore, the proposed amendments are considered to be acceptable from a visual perspective and can be approved, subject to the implementation of the recommended mitigation measures as specified in the Visual Impact Assessment (Marshall, 2013).

5.7. Impacts on the Social Environment

The findings of the Social Impact Assessment (SIA) (Barbour, 2013) undertaken for Sirius Solar PV Project Two indicated that the development of the solar PV facility and the associated infrastructure would create employment and business opportunities for locals during both the construction and operational phases of the project. The establishment of a Community Trust would create an opportunity to support local economic development in the area. The development of renewable energy was identified as a key growth sector by the local and district municipalities and represents an investment in clean, renewable energy infrastructure, which given the challenges created by climate change represents a positive social benefit for society as a whole. The Social Specialist Addendum Letter (**Appendix G**) addresses potential changes or impacts as a result of the proposed amendments by comparison with the original social impact assessment undertaken in 2013 as part of the EIA process.

The Social Specialist Addendum Letter (**Appendix G**) indicated that the proposed amendments for Sirius Solar PV Project Two would not result in additional impacts from a social perspective and the impacts and mitigation measures included in the SIA would remain unchanged and applicable for the proposed amendments.

5.7.1. Cumulative Assessment

No additional cumulative social impacts were identified by the specialist as a result of the proposed amendments. Therefore, the impacts identified by the Social Impact Assessment (Barbour, 2013) remain unchanged and would be applicable for the proposed amendments.

5.7.2. Conclusion

Based on the nature of the proposed amendments for Sirius Solar PV Project Two, and the fact that the proposed BESS and increase in the contracted capacity of the solar PV facility to 150MW falls within the property and development footprint which was fully assessed as part of the SIA (Barbour, 2013), it can be concluded that the proposed amendments will not lead to any additional impacts other than those identified and assessed within the SIA. No change in the significance of the impacts is expected to occur and there is no need for any additional recommendations or mitigation measures other than those already specified in the SIA (Barbour, 2013). As a result, the proposed amendments are considered to be acceptable from a social perspective and can be approved, subject to the implementation of the recommended mitigation and enhancement measures as specified in the SIA.

6. ADVANTAGES AND DISADVANTAGES OF THE PROPOSED AMENDMENTS

In terms of Regulation 32(1)(a)(ii), this section provides details of the advantages and disadvantages of the proposed amendment.

Advantages of the amendment	Disadvantages of the amendment
General	
The increase of the contracted capacity of the solar PV facility by an additional 75MW within the authorised development footprint would allow for the contracting of up to 150MW. Therefore, this will negate the need to construct additional solar PV facilities for this additional 75MW, which would lead to additional environmental impacts (including cumulative), therefore reducing the environmental impact associated with the generation of 150MW.	None
The construction and operation of the BESS will allow for extended generation hours for the solar PV facility, as stored energy from the solar PV facility can be released into the grid during hours when the solar PV facility would not usually be operational. This will negate the need to construct additional power facilities to provide 150MW of electricity to the grid when the solar PV facility will be operating.	None.
Ecology (flora, fauna and avifauna), Aquatic, Soils, Heritage, Palaeontology and Visual	
The construction and operation of the BESS will allow for extended generation hours for the solar PV facility, as stored energy from the solar PV facility can be released into the grid during hours when the solar PV facility would not usually be operational. This will negate the need to construct additional power facilities to provide 150MW of electricity to the grid when the solar PV facility will be operating. The proposed increase of the contracted capacity of the solar PV facility by 75MW within the authorised development footprint of Sirius Solar PV Project Two would negate the need to develop additional solar PV facilities in order to generate the required capacity of 75MW, which would lead to cumulative environmental impacts in the region. Therefore, the increase of the contracted capacity of the solar PV facility within the authorised development footprint reduces environmental impacts from an ecological, aquatic, soils and agricultural potential, heritage, palaeontology, and visual perspective.	None.
Social	
The construction and operation of the BESS will allow for extended generation hours for the solar PV facility, as stored energy from the solar PV facility can be released into the grid during hours when the solar PV facility would not usually be operational. As a result, members of the community would	None

Advantages of the amendment	Disadvantages of the amendment
be guaranteed electricity supply in the area as a result of the operation of the BESS.	

Based on the above, it can be concluded that the advantages of the proposed amendments outweigh the disadvantages from an environmental and technical perspective. As a result, the implementation of the proposed amendments is considered acceptable from an environmental perspective and will not result in additional environmental impacts which were not considered in the EIA process of Sirius Solar PV Project Two.

7. REQUIREMENTS FOR ADDITIONAL MITIGATION AS A RESULT OF THE PROPOSED AMENDMENTS

As required in terms of Regulation 32(1)(a)(iii), consideration was given to the requirement for additional measures to ensure avoidance, management and mitigation of impacts associated with the proposed change. From the specialist inputs provided into this Motivation Report, it is concluded that the impacts identified as a result of the proposed amendments, particularly on the soil resources can be mitigated to a low significance following the implementation of the recommended mitigation measures. In general, the recommended mitigation measures included in the EIA Report as well as the EMPr would manage the anticipated impacts to acceptable levels.

It is however recommended that the project EMPr be updated once the final facility layout is available for approval to include management measures for the operation of the BESS from a technical perspective.

8. PUBLIC PARTICIPATION

A public participation process is being conducted in support of the Amendment Application to amend the Environmental Authorisation (DEA Ref: 14/12/16/3/3/2/481) issued for Sirius Solar PV Project Two. The Public Participation has been undertaken in accordance with the Public Participation Plan which has been submitted to the Department of Environment, Forestry and Fisheries (DEFF), which is in-line with Regulations 41- 44 of the EIA Regulations, 2014, and includes:

- Placement of site notices at the site on **08 September 2020** (refer to **Appendix H4**).
- The Motivation Report has been made available for the 30-day review and comment period from **11 September 2020** to **12 October 2020** on the Savannah Environmental website: https://www.savannahsa.com/public-documents/energy-generation/sirius-solar-pv-project-two/. CD copies are available on request from the project team.
- Written notifications to registered I&APs as well as Organs of State regarding the availability of the Motivation Report were distributed on **10 September 2020** (refer to **Appendix H2** and **Appendix H3**).
- Placement of an advertisement in the Gemsbok Newspaper on **09 September 2020** announcing the availability of the Motivation Report for a 30-day review and comment period. The tear sheet of the newspaper advert is included in **Appendix H4**.

No comments have been received to date. Comments received during the 30-day review and comment period will be included as **Appendix H5** in the final submission of the Motivation Report to the DEFF for consideration in the decision-making process. Comments will be included and responded to in the Comments and Responses Report (to be included as **Appendix H6**). Proof of attempts made to obtain comments from relevant Organs of State and key stakeholders will also be included in **Appendix H3**.

9. CONCLUSION

Based on the nature of the proposed amendments for Sirius Solar PV Project Two, the specialist findings, the fact that the proposed BESS development area avoids areas of high environmental sensitivity (refer to **Figure 9.1**), and that the proposed BESS and increased in the contracted capacity of the solar PV facility fall within the property and development footprint which was fully assessed and authorised for the development of the solar PV facility as part of the EIA in 2014, it can be concluded that the proposed amendments will not lead to any additional impacts other than those identified and assessed within the EIA.

In terms of the impacts identified in the EIA relating to ecology, aquatic resources, soil and agricultural potential, heritage (including palaeontology), visual and social aspects, it was concluded that the proposed amendments will not increase the significance of these impacts originally identified and assessed in the EIA or lead to any additional impacts that cannot be mitigated to a low significance following the implementation of the recommended mitigation measures. Furthermore, the proposed amendments do not constitute a listed activity and the mitigation measures recommended in the EIA and in this Motivation Report are adequate to manage the expected impacts as a result of the proposed amendments.

Therefore, taking into consideration the conclusions from the specialist addendum letters (**Appendix A – G**), and the findings of this report, it is concluded that the proposed amendments are acceptable from an environmental perspective, subject to the implementation of the recommended mitigation measures included in the EIA as well as the Environmental Management Programme (EMPr) for Sirius Solar PV Project Two.

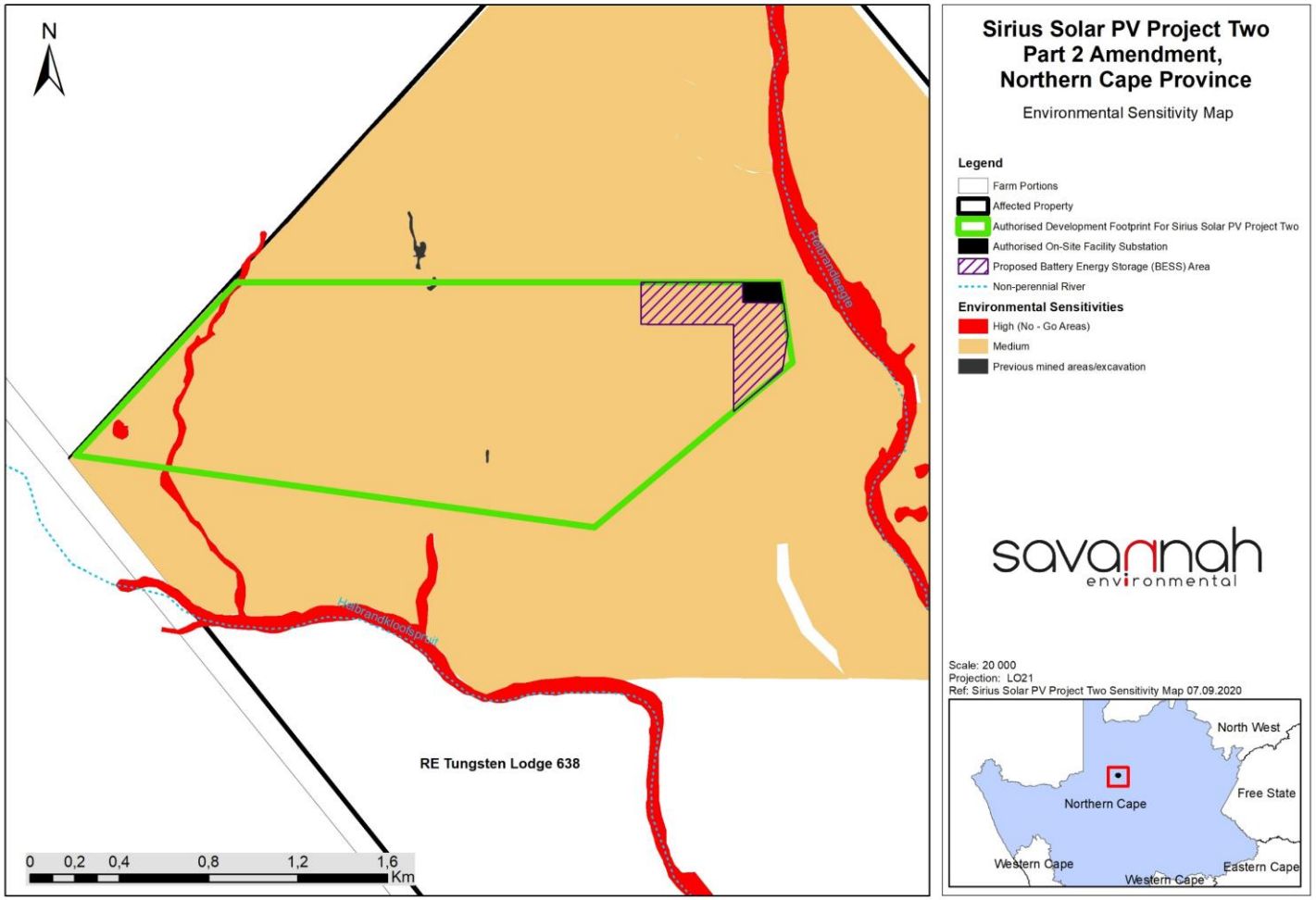

Figure 9.1 Environmental sensitivity map showing the location of the BESS development area located outside of areas of high environmental sensitivity. A3 Maps are included in **Appendix I** of the Motivation Report.