BECRUX SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY

Mpumalanga Province

Basic Assessment Report

January 2022

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PROJECT DETAILS

Title	:	Basic Assessment Process Basic Assessment Report for the Becrux Solar Photovoltaic (PV) Energy Facility, Mpumalanga Province
Authors	:	Savannah Environmental (Pty) Ltd Mmakoena Mmola Tebogo Mapinga
Client	:	Becrux Solar PV Project One (Pty) Ltd
Report Revision	:	Revision 0 – Draft Report for Public Review
Date	:	January 2022

When used as a reference this report should be cited as: Savannah Environmental (2022) Basic Assessment Report for the Becrux Solar Photovoltaic (PV) Energy Facility, Mpumalanga Province.

PURPOSE OF THE BASIC ASSESSMENT REPORT AND INVITATION TO COMMENT

Becrux Solar PV Project One (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Basic Assessment (BA) process for the Becrux Solar Photovoltaic (PV) Energy Facility, Mpumalanga Province. The BA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This Basic Assessment (BA) report represents the findings of the BA process and contains the following chapters:

- **Chapter 1** provides background to the Becrux Solar PV Facility and the Basic Assessment process.
- **Chapter 2** provides a description of the Becrux Solar PV Facility and the infrastructure associated with the facility.
- **Chapter 3** provides the site selection information and identified project alternatives.
- **Chapter 4** describes solar energy as a power generation option and provides insight into technologies for solar energy.
- **Chapter 5** outlines the strategic regulatory and legal context for energy planning in South Africa and specifically for the proposed Becrux Solar PV Facility, as well as the need and desirability of the Facility within the project site.
- **Chapter 6** outlines the approach to undertaking the Basic Assessment process.
- **Chapter 7** describes the existing biophysical and socio-economic environment within and surrounding the project site.
- **Chapter 8** provides an assessment of the potential issues and impacts (direct, indirect, and cumulative impacts) associated with the Becrux Solar PV Facility and associated infrastructure and presents recommendations for the mitigation of significant impacts.
- **Chapter 9** presents the conclusions and recommendations based on the findings of the BA Report.
- **Chapter 10** provides references used in the compilation of the BA Report.

The BA report is available for review from Friday, **21 January 2022 – Monday, 21 February 2022** on the Savannah Environmental website (https://www.savannahsa.com/public-documents/energy-generation/)

Please submit your comments by **21 February 2022** to:
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PO Box 148, Sunninghill, 2157
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Comments can be made as written submission via fax, post, or email.

EXECUTIVE SUMMARY

Becrux Solar PV Project One (Pty) Ltd is proposing the development of a Solar PV Facility and associated infrastructure on Portion 6 of the Farm Goedehoop No. 290, located approximately 7km south-east of Secunda and 15km east of Embalenhle, within jurisdiction of the Govan Mbeki Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province (refer to **Figure 1).**

The Solar PV Facility will have a contracted capacity of up to 19.99MW_{ac}[1] and will use bi-facial panels with single axis tracking or fixed tilt systems to harness the solar resource on the project site. The purpose of the facility will be to generate electricity for exclusive use by Sasol Limited. Power generated at the facility will be delivered to Sasol Limited by feeding into the grid through a Wheeling Agreement signed with Eskom and/or direct embedded generation. The construction of the Solar PV Facility aims to reduce Sasol's dependence on direct supply from Eskom's national grid for operation purposes and demonstrate Sasol's move towards a greener future through procurement of renewable energy from Independent Power Producers (IPPs).

A development area[2] of up to ~26.64ha and a much smaller development footprint[3] of up to ~19.95ha have been identified within the project site[4] (~433ha) by Becrux Solar PV Project One (Pty) Ltd for the development of the Becrux Solar PV Facility. Infrastructure associated with the Solar PV Facility will include the following:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- E-house containerised or non-containerised substation.
- 11kV overhead power line for the distribution of the generated power, which will be connected to the existing Goedehoop Substation.
- Laydown area.
- Access gravel road (existing) and internal gravel roads (new).
- Security booth, Operations & Maintenance building, workshop, storage area and site office.

To evacuate the generated power to Sasol Limited, an 11kV overhead power line will be established to connect the 11kV E-house containerised or non-containerised substation, with a development footprint of up to 32m^2, to the existing Goedehoop Substation. A 170m wide and 400m long grid connection corridor has been identified for the assessment and placement of the overhead power line, which will provide for the avoidance of sensitive environment areas and features and allow for the micro-siting of the power line within the corridor.

[1] Alternating Current (AC) - alternating current is an electric current which periodically reverses direction and changes its magnitude continuously with time in contrast to direct current which flows only in one direction.

[2] The development area is that identified area (located within the project site) where the Becrux Solar PV Facility is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints, and has been assessed within this BA Report and by the respective specialists. The development area is up to ~26.64ha in extent.

[3] The development footprint of the Becrux Solar PV Facility will be located within the ~26.64ha development area and will be a much smaller area within which the PV panels and associated infrastructure will be constructed and operated. The development footprint has been subject to detailed design by the developer through the consideration of sensitive environmental features identified by independent specialists, which need to be avoided by the PV Facility.

[4] The project site is that identified area within which the development area and development footprint are located. It is the broader geographic area assessed as part of the BA process, within which direct effects of the proposed project may occur. The project site is ~433ha in extent.

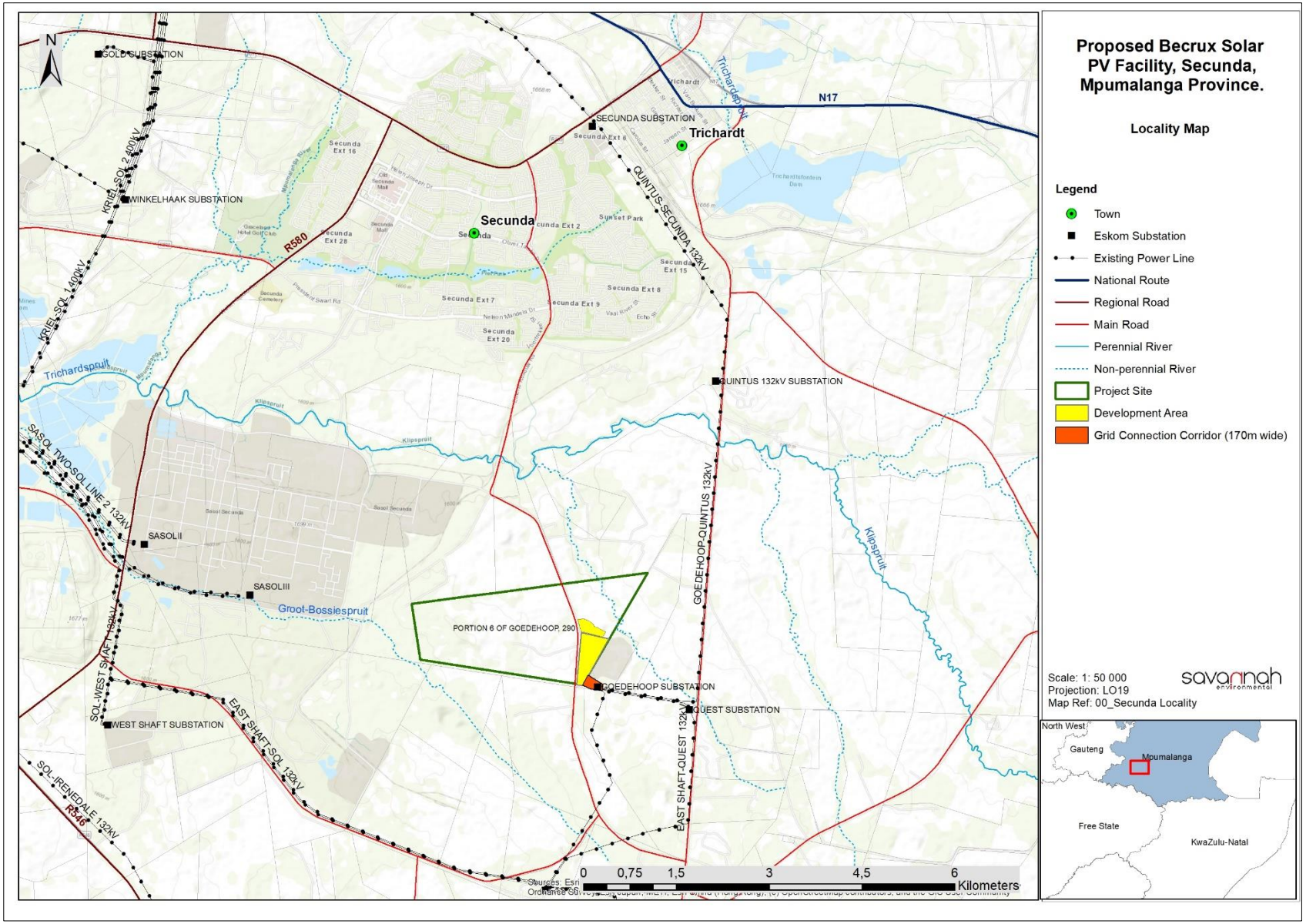

Figure 1: Locality map showing the location of the project site proposed for the development of the Becrux Solar PV Facility

The assessment of the development area within the project site was undertaken by independent specialists and their findings have informed the results of this BA report.

No environmental fatal flaws were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented.

As part of the specialist investigations undertaken within the project development area, specific environmental sensitivities were identified. The environmental sensitivities identified within and directly adjacent to the development area and development footprint are illustrated in **Figure 2**. A summary of the findings of the BA Report and a description of the environmental sensitivities identified within the development area is provided below:

Ecology

The Becrux Solar PV Facility falls within the Soweto Highveld Grassland vegetation type. No plant species protected in terms of the Mpumalanga Biodiversity Conservation Act (No.10 of 1998) and the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA) were recorded during the field survey of the development area. In addition, no tree species protected in terms of the National Forest Act (No. 84 of 1998) were identified on site.

The development area was superimposed on the Mpumalanga Biodiversity Sector Plan and was found to fall within a site classified as heavily modified. In terms of ecosystem threat status and protection level, the proposed project overlaps with a vulnerable ecosystem and falls within an area that is categorised as "Not Protected".

The development area partially overlaps with a National Protected Area Expansion Strategy (NPAES) focus area but does not overlap with any Mpumalanga Protected Areas Expansion Strategy (MPAES) areas. However, the development area is located in proximity to an MPAES area. No formally protected or conservation areas in terms of the National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEM:PAA) were identified within the development area.

Three main habitats were identified and delineated within the development area, namely drainage lines, wetlands and transformed grassland. All habitats within the development area were allocated a sensitivity category using the guidelines for interpreting site ecological importance in the context of the proposed development activities. According to these guidelines, the wetlands are regarded as being of high ecological sensitivity; the drainage lines have a low ecological sensitivity rating; and the modified grassland is considered to be of very low ecological sensitivity.

Areas rated as High sensitivity and their buffers in proximity to the development area should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to these areas.

No mammal, reptile, and amphibian species of conservation concern were recorded during the survey period for the development area. Twenty-one (21) avifauna species were recorded in the project area during the survey based on either direct observation, vocalisations, or the presence of visual tracks and signs. None of the species recorded in the project area are considered as species of conservation concern.

Based on the development footprint for the Becrux Solar PV Facility, no project infrastructure is expected to have a significant impact on the vulnerable ecosystem and Protected Areas Expansion Strategy focus area

as these have been found to be modified. No faunal species of significance were observed, which further reduced the impact significance of the development on terrestrial biodiversity. Historically, agriculture and the current land use (i.e., non-irrigated agriculture) has led to the deterioration of these habitats and as such, the classification of development area as heavily modified area is corroborated.

Considering that this area has been identified as being of low significance for biodiversity maintenance and ecological processes, impacts are expected to be of low significance and the specialist has recommended that development may proceed. All mitigations measures prescribed must be considered by the competent authority for authorisation and included in the project Environmental Management Programme (EMPr). No fatal flaws are evident for the proposed project and there are no terrestrial ecological considerations that should prevent it from proceeding.

Aquatic Ecology

A total of seven (7) wetland systems were identified and delineated within the 500m regulated area surrounding the development area, three (3) of which could potential be impacted upon (either directly or indirectly) by the proposed activities i.e., HGM 1, 2 and 3. The seven wetland systems comprised both natural and artificial systems. HGM 1, 2 and 3 are classified as a natural systems.

Overall, HGM 1, 2 and 3 scored Intermediate in terms of wetland ecosystem systems. It should however be noted that HGM 2 scored considerably higher indirect benefits than HGM 1 and 3. The overall Present Ecological State (PES) for HGM 1 and 3 has been calculated to be "Seriously Modified", with HGM 2 being scored "Largely Modified".

The Ecological Importance and Sensitivity (EIS) of the units was determined to be High for HGM 3 and Moderate for the HGM 1 and HGM 2. A 22m buffer has been recommended around the delineated wetland units.

A risk assessment was conducted, in accordance with the requirements of GN 509, published in the Government Gazette (no. 40229) under Section 39 of the NWA in August 2016. The GN 509 process provides an allowance to apply for a WUL for Section 21(c) & (i) under a GA, as opposed to a full WULA.

Two post-mitigation scenarios have been considered for this risk assessment, namely avoidance of the wetland buffers and impedance into the wetland buffers. The findings of the risk assessment indicate that various aspects scored "Moderate" pre-mitigation significance ratings. Considering the scenario where the applicant adheres to the buffer zones, all of the post-mitigation significance ratings are expected to be decreased to "Low". In the event that the buffers are impeded on, some of the aspects are expected to still be associated with "Moderate" post-mitigation significance ratings.

Should the 22m buffer zone be impeded on, the first and second steps in the mitigation hierarchy (avoidance and minimising impacts) cannot be met. Therefore, the third step in the mitigation hierarchy (rehabilitation) will need to be implemented. It should be noted that the 22m buffer can only be impeded on up to the 10m mark (therefore 12m from the edge of the buffer) to avoid direct impacts to the wetland.

As part of the impact assessment results, it has been determined that all risks posed by the proposed activities are characterised by "Low" post-mitigation significance ratings. Considering these findings, it is the specialist's opinion that the proposed activities can be favourably considered on condition that all mitigations measures be implemented, including the adherence to the 22m buffer zone.

In terms of water use authorisation, proceeding with the proposed activities and avoiding the wetland buffer zone will constitute "Low" post-mitigation significance ratings, ultimately only requiring general authorisation. By impeding into the buffer zones, a water use license will be required with the condition of rehabilitation (i.e., rehabilitating HGM1 and 2 to "Largely Modified" after construction).

Land Use, Soil and Agricultural Potential

Various soil forms were identified within the Becrux Solar PV Facility development area, namely, Glenrosa, Deep Arcadia, Shallow Arcadia, Darnall and Rensburg. There soils forms have been divided into six main land capability classes according to depth, texture, hydromorphic properties etc. (namely land capability class I, II, III, IV, V and VI). These land capability classes range from a "Low" to a "High" sensitivity, which concurs with the findings from the DFFE Screening Tool. From these six classes as well as the poor climatic capability of "C7"[5], four land potential levels were calculated, namely land potential 3, 5, 6 and "vlei". Therefore, the overall land potential is considered to be"Moderate" to "Low".

Two classes of land capability sensitivity are located within the development area, namely "Moderate" and "High", which concurs with the findings from the Department of Forestry, Fisheries and the Environment (DFFE) screening tool report. No no-go areas have been identified and no buffers have been recommended.

Considering the low post-mitigation significance ratings for all the aspects and phases, it is the specialist's opinion that no significant impacts towards the land capability resources are foreseen. Thus, the proposed development should be considered favourably by the relevant Competent Authority provided the recommended mitigation measures are implemented.

Heritage Resources (archaeology and palaeontology)

During the survey of the Becrux Solar PV Facility, no significant archaeological resources were identified. According to the SAHRIS Palaeosensitivity Map, the PV Facility is underlain by sediments of zero and very high palaeontological sensitivity. The palaeontologically sensitive geology of the area is ascribed to the Vryheid Formation of the Ecca Group of sediments. While the sediments underlying the development area have high levels of palaeontological sensitivity, the nature of the excavations associated with PV facilities tends to be shallow (<3m) and as such, the likelihood of impacting intact Vryheid Formation sediments is low. From a heritage perspective, no no-go areas have been identified and no buffers have been recommended for the PV facility. In addition, the footprint is currently being utilised for non-irrigated agricultural activities and as such, it is unlikely that any palaeontological resources will be encountered during excavations. However, given the very high palaeontological sensitivity of the development area, the specialists recommended that a Chance Fossil Finds Procedure be implemented during the course of construction activities.

The overall impact of the Becrux Solar PV Facility on the identified heritage resources is considered as acceptable after the recommendations below have been implemented:

- The mitigation measures articulated in the VIA (2021) completed for this project are implemented.
- The Chance Fossil Finds Procedure is implemented during the course of construction activities.
- Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African

[5] Severe to Very Severe - Severely restricted choice of crops due to heat and moisture stress.

Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

Impacts on heritage resources can be mitigated to acceptable levels allowing for the development to be authorised.

Visual

Potentially sensitive visual receptors were identified within 1km, 1-3km, 3-6km and beyond 6km of the proposed development area. Impacts on receptors within a 1km radius of the PV facility are likely to be of very high magnitude. Visual receptors within a 1km radius of the PV facility include observers travelling along Secunda secondary road. Impacts on receptors within a 1-3km radius from the PV facility are expected to be of high magnitude. Visual receptors within a 1-3km radius of the PV facility include residents of/visitors to Goedehoop (north), Vlakspruit (north-east), and Vlakspruit (east). The PV facility may have a moderate visual impact on receptors within a 3-6km radius of the facility. Visual receptors within a 3-6km radius include residents of/or visitors to Secunda (outlying), Goedehoop (far north), Vlakspruit (south-east), and Bossiespruit. Receptors beyond 6km are expected to have a low potential visual impact. No no-go areas have been identified and no buffers have been recommended from a visual perspective.

The anticipated visual impacts identified and assessed in the Visual Impact Assessment range from **moderate** to **low** significance. Anticipated visual impacts on sensitive visual receptors (if and where present) in close proximity to the proposed facility are not considered to be fatal flaws for the proposed PV facility. This impact is primarily applicable to the individual Becrux PV facility, and no cumulative visual impacts are expected.

Considering all factors, it is recommended by the specialist that the development of the facility as proposed be supported; subject to the implementation of the recommended mitigation measures and management programme included in the VIA.

Social

Impacts are expected to occur with the development of the Becrux Solar PV Facility during the construction, operation and decommissioning phases. Both positive and negative impacts are identified and assessed.

Positive and negative impacts during construction include:
» Direct employment opportunities
» Economic multiplier effects
» Influx of jobseekers and change in population
» Safety and security impacts
» Impacts on daily living and movement patterns
» Nuisance impacts, including noise and dust
» Visual impacts and impacts on the sense of place

Positive and negative impacts during operation include:
» Direct employment opportunities
» Development of clean, renewable energy infrastructure
» Visual impact and impact on sense of place
» Impacts associated with the loss of agricultural land

Sensitive receptors from a social perspective are similar to those identified from a visual perspective, as detailed above. No no-go areas have been identified and no buffers have been recommended from a social perspective.

From a social perspective, it is concluded by the specialist that the project is supported, but that mitigation measures should be implemented and adhered to. The assessment of the key issues indicated that there are no negative impacts that can be classified as fatal flaws, and which are of such significance that they cannot be successfully mitigated. Positive impacts could be enhanced by implementing appropriate enhancement measures and through careful planning. Based on the social assessment, the following general conclusions and findings can be made:

- The potential negative social impacts associated with the construction phase are typical of construction related projects and not just focussed on the construction of PV facilities (these relate to influx of non-local workforce and jobseekers, intrusion and disturbance impacts, safety and security) and could be reduced with the implementation of the mitigation measures proposed.
- Employment opportunities will be created in the construction and operation phase and the impact is rated as positive even if only a small number of individuals benefit in this regard.
- The proposed project could assist the local economy in creating entrepreneurial development, especially if local business could be involved in the provision of general material and services during the construction and operational phases.
- Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other sectors.
- The proposed development also represents an investment in infrastructure for the generation of clean, renewable energy, which, given the challenges created by climate change, represents a positive social benefit for society as a whole.

The proposed Becrux Solar PV Facility and associated infrastructure is unlikely to result in permanent damaging social impacts. From a social perspective, it is concluded that the project should be developed subject to the implementation of the recommended mitigation measures and management actions contained in the Social Impact Assessment.

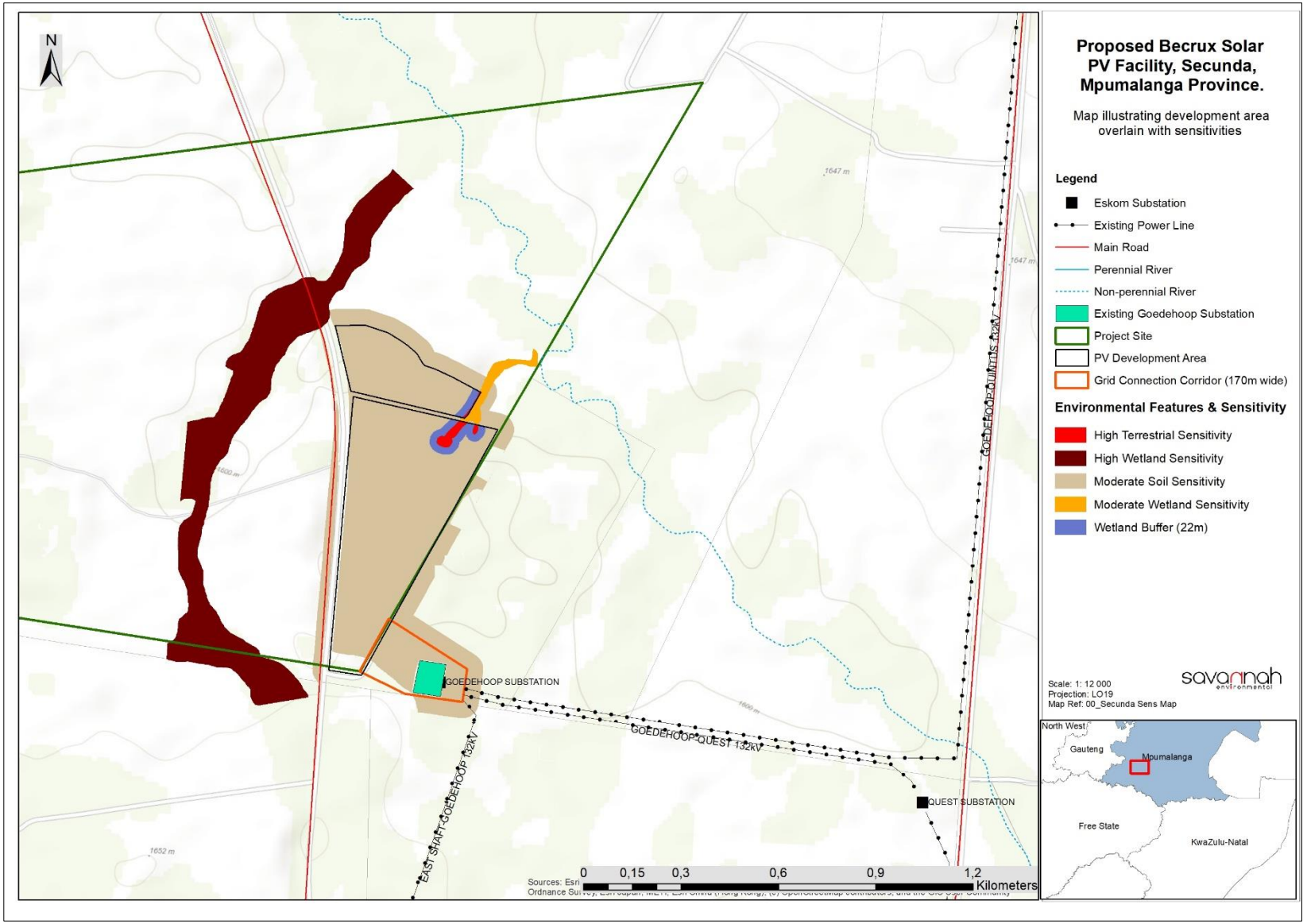

Figure 2: The development area (up to ~26.64ha) of the Becrux Solar PV Facility, as assessed within this BA Report, overlain on the identified environmental sensitive features (refer to **Appendix K for** A3 map)

DEFINITIONS AND TERMINOLOGY

The following definitions and terminology may be applicable to this project and may occur in the report below:

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biodiversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Commissioning: Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the wind turbine are installed.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per the EIA Regulations. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: The impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Development area: The development area is that identified area (located within the project site) where the Becrux Solar PV Facility is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints, and has been assessed within this BA Report and by the respective specialists. The development area is up to ~26.64ha in extent.

Development footprint: The development footprint is the defined area where the PV panel array and other associated infrastructure for the Becrux Solar PV Facility is planned to be constructed. This is the anticipated actual footprint of the facility, and the area which would be disturbed. The exact size of this area is subject to finalisation of the layout. However following initial layout optimisation is up to ~19.95ha.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that is made up of:

i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Authorisation (EA): means the authorisation issued by a competent authority (Limpopo Department of Economic Development, Environment and Tourism) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) and the EIA Regulations promulgated under the Act.

Environmental Assessment Practitioner (EAP): An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Environmental Control Officer (ECO): An individual appointed by the Owner prior to the commencement of any authorised activities, responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation

Environmental Impact: An action or series of actions that have an effect on the environment.

Environmental Impact Assessment (EIA): Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

Environmental Management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental Management Programme (EMPr): A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a project or facility and its ongoing maintenance after implementation.

Environmental Officer (EO): The Environmental Officer (EO), employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. The EO must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Incident: An unplanned occurrence that has caused, or has the potential to cause, environmental damage.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party (I&AP): Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Method Statement: a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

Photovoltaic effect: Electricity can be generated using photovoltaic panels (semiconductors) which are comprised of individual photovoltaic cells that absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect.

Pre-construction: The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Project site: The project site is that identified area within which the development area and development footprint are located. It is the broader geographic area assessed as part of the BA process, within which direct effects of the proposed project may occur. The project site is ~433ha in extent.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Significant Impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the *Gazette*.

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CHAPTER 1: INTRODUCTION

Becrux Solar PV Project One (Pty) Ltd is proposing the development of a Solar Photovoltaic (PV) Energy Facility and associated infrastructure on Portion 6 of the Farm Goedehoop No. 290, located approximately 7km south-east of Secunda and 15km east of Embalenhle, in the Govan Mbeki Local Municipality, which falls within jurisdiction of the Gert Sibande District Municipality in the Mpumalanga Province (**Figure 1.1**). The facility will have a contracted capacity of up to 19.99MW_{ac}[6] and will be known as Becrux Solar PV Facility.

The purpose of the facility will be to generate electricity for exclusive use by Sasol Limited. Power generated at the facility will be delivered to Sasol Limited by feeding into the grid through a Wheeling Agreement signed with Eskom and/or direct embedded generation. The construction of the PV Facility aims to reduce Sasol's dependence on direct supply from Eskom's national grid for operation activities and demonstrate Sasol's move towards a greener future through procurement of renewable energy from Independent Power Producers (IPPs).

As the project has the potential to impact on the environment, an Environmental Authorisation (EA) is required from the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) subject to the completion of a Basic Assessment (BA) process, as prescribed in Regulations 19 and 20 of the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), as amended. The requirement for EA subject to the completion of a BA process is triggered by the inclusion of, amongst others, Activity 1 of Listing Notice 1 (GNR 327), namely:

"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is more than 10MW but less than 20MW."

This BA Report describes and assesses this proposed project and consists of the following chapters:

- **Chapter 1** provides background to the Becrux Solar PV Facility and the Basic Assessment process.
- **Chapter 2** provides a description of the Becrux Solar PV Facility and the infrastructure associated with the facility.
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- **Chapter 6** outlines the approach to undertaking the Basic Assessment process.
- **Chapter 7** describes the existing biophysical and socio-economic environment within and surrounding the project site.
- **Chapter 8** provides an assessment of the potential issues and impacts (direct, indirect, and cumulative impacts) associated with the Becrux Solar PV Facility and associated infrastructure and presents recommendations for the mitigation of significant impacts.
- **Chapter 9** presents the conclusions and recommendations based on the findings of the BA Report.
- **Chapter 10** provides references used in the compilation of the BA Report.

[6] Alternating Current (AC) - alternating current is an electric current which periodically reverses direction and changes its magnitude continuously with time in contrast to direct current which flows only in one direction.

1.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This BA Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (as amended) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(a) the details of the (i) EAP who prepared the report and (ii) the expertise of the EAP, including a curriculum vitae.	The details of the EAP who prepared the report and the expertise of the EAP are included in **section 1.3**. The curriculum vitae of the EAP, project team and independent specialists are included in **Appendix A**.
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties.	The location of the Becrux Solar PV Facility is included in **section 1.2**, **Table 1.1** and **Figure 1.1**. The information provided includes the 21-digit Surveyor General code of the affected property and the farm name. Additional information is also provided regarding the location of the development which includes the relevant province, local and district municipalities, ward, and current land zoning.

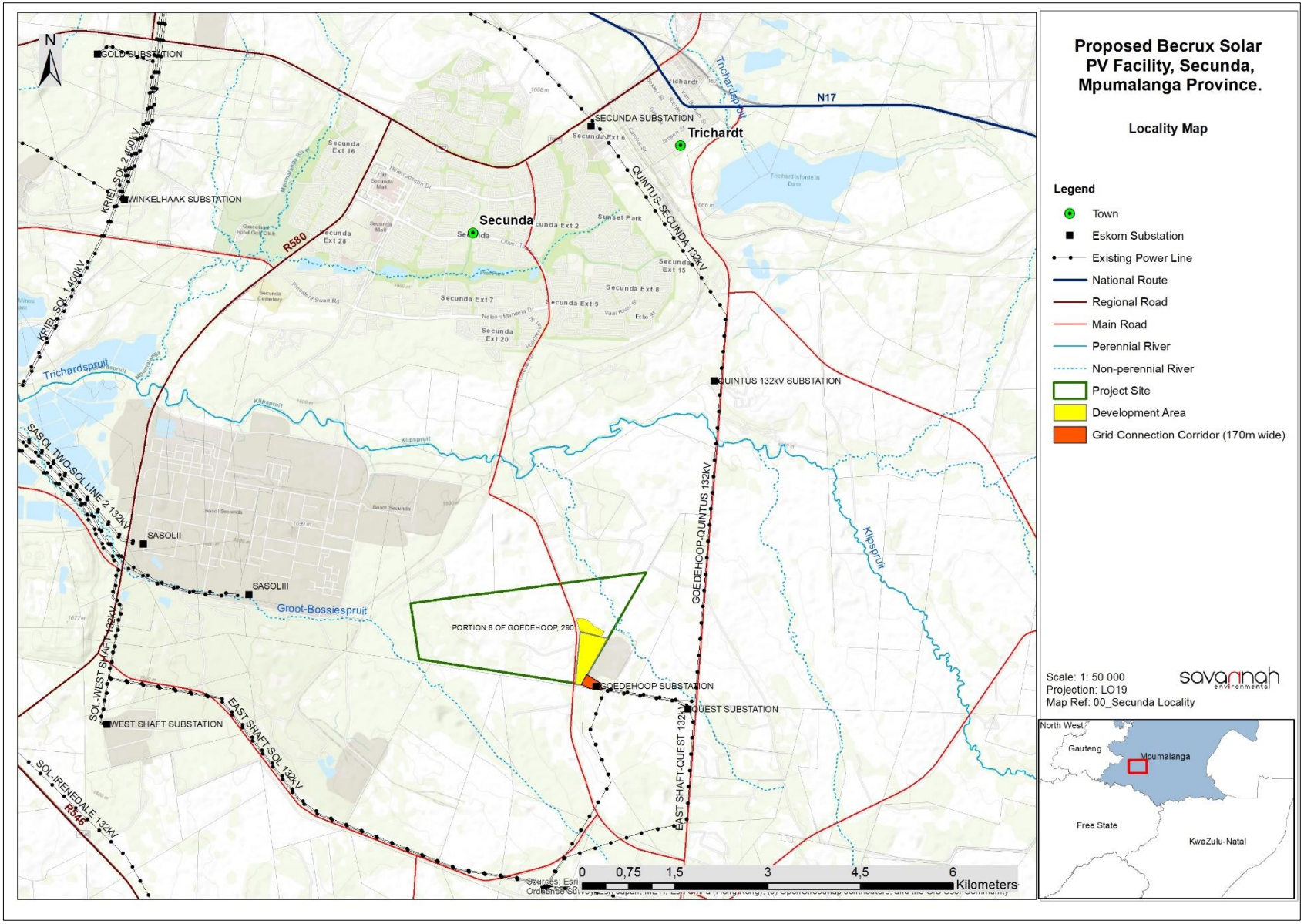

Figure 1.1: Locality map of the project site showing the location of the site in relation to the closest towns in the area (refer to **Appendix K** for A3 map)

1.2 Project Overview

A project site[7] with an extent of up to ~433ha has been identified by Becrux Solar PV Project One (Pty) Ltd as a technically suitable area for the development of the Becrux Solar PV Facility. The project site consists of one affected property, namely, Portion 6 of the Farm Goedehoop No. 290.

A development area[8] of up to ~26.64ha in extent, which has been assessed as part of the BA process, and a much smaller development footprint[9] of up to ~19.95ha, to be placed and sited within the development area, has been identified for the placement of the solar facility infrastructure. Infrastructure associated with the Solar PV Facility will include the following:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- E-house containerised or non-containerised substation.
- 11kV overhead power line for the distribution of the generated power, which will be connected to the existing Goedehoop Substation.
- Laydown area.
- Access gravel road (existing) and internal gravel roads.
- Security booth, O&M building, workshop, storage area and site office.

To evacuate the generated power to Sasol Limited, an 11kV overhead power line will be established to connect the 11kV E-house containerised or non-containerised substation, with a development footprint of up to 32m^2, to the existing Goedehoop Substation. A 170m wide and 400m long grid connection corridor has been identified for the assessment and placement of the overhead power line, which will provide for the avoidance of sensitive environment areas and features and allow for the micro-siting of the power line within the corridor.

The key infrastructure components that form part of the Becrux Solar PV Facility are described in greater detail in Chapter 2 of this BA Report.

Table 1.1: Detailed description of the Becrux Solar PV Facility project site

Province	Mpumalanga Province
District Municipality	Gert Sibande District Municipality
Local Municipality	Govan Mbeki Local Municipality
Ward number(s)	30
Nearest town(s) (measured from the centre of the project site)	Secunda (~7km south-east)

[7] The project site is that identified area within which the development area and development footprint are located. It is the broader geographic area assessed as part of the BA process, within which direct effects of the proposed project may occur. The project site is ~433ha in extent.

[8] The development area is that identified area (located within the project site) where the Becrux Solar PV Facility is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints, and has been assessed within this BA Report and by the respective specialists. The development area is up to ~26.64ha in extent.

[9] The development footprint of the Becrux Solar PV Facility will be located within the ~26.64ha development area and will be a much smaller area within which the PV panels and associated infrastructure will be constructed and operated. The development footprint has been subject to detailed design by the developer through the consideration of sensitive environmental features identified by independent specialists, which need to be avoided by the PV Facility.

Affected Properties: Farm name(s), number(s) and portion numbers	Portion 6 of the Farm Goedehoop No. 290
SG 21 Digit Code (s)	T0IS00000000029000006
Current zoning and Land Use	Zoning: Mining/Industrial Land Use: Agriculture (non-irrigated)
Site co-ordinates (centre of development area)	26°34'17.67"S 29°13'11.66"E
Site co-ordinates (corner coordinates of development area)	Corner 1: 26°34'33.37"S; 29°13'5.48"E Corner 2: 26°34'5.98"S; 29°13'6.69"E Corner 3: 26°33'59.02"S; 29°13'4.31"E Corner 4: 26°34'4.98"S; 29°13'20.79"E Corner 5: 26°34'7.95"S; 29°13'18.98"E Corner 6: 26°34'8.58"S; 29°13'22.90"E Corner 7: 26°34'33.72"S; 29°13'9.12"E

The overarching objective for the planning process is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. These aspects must now be considered within site-specific specialist studies and assessments through the BA process in order to delineate areas of sensitivity within the surrounding area, project site and development area and ultimately inform the placement of the solar facility and associated infrastructure within the areas considered suitable for development.

1.3 Details of the Environmental Assessment Practitioner and Expertise to conduct the BA process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), as amended, Becrux Solar PV Project One (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd as the independent Environmental Assessment consultant to undertake the Basic Assessment process and prepare the BA Report for the Becrux Solar PV Facility. Neither Savannah Environmental nor any of its specialists are subsidiaries of, or are affiliated with Becrux Solar PV Project One (Pty) Ltd. Furthermore, Savannah Environmental does not have any interest in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment, and planning to ensure compliance and evaluate the risk of development, and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

Members of the Savannah Environmental team have considerable experience in basic assessments and environmental management and have been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa, including those associated with electricity generation.

» **Mmakoena Mmola**, the principle author of this Basic Assessment Report, holds a B.Sc. Honours in Geochemistry from the University of the Witwatersrand and 4 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, environmental permitting and authorisations, compliance auditing, public participation, and environmental management programmes. She is registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP), Registration Number: 126748.

» **Tebogo Mapinga,** the principle EAP on this project, is an experienced professional with 14 years across the fields of environment and permitting in both the public and the private sector. She holds a B.Sc. Degree (Majoring in Physiology and Zoology) from the University of Limpopo (Turfloop Campus). Her competencies lie in Environmental Impact Assessments, Basic Assessments, Environmental Screening, Environmental Management Plans, compliance monitoring and obtaining permits for small- and large-scale projects. She is a member of the International Association for Impact Assessments (IAIA) and is a registered Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP).

» **Lehlogonolo Mashego**, the Public Participation Consultant on this project, holds an M.Sc. in Environmental Science as obtained from the University of Witwatersrand. She is a Gauteng Branch Committee Member for International Association for Impact Assessment South Africa (IAIASA) facilitating the students and young professionals' division. She has 5 years of professional working experience in the public participation field; specializing in overall public facilitation, stakeholder engagement, public awareness, stakeholder liaison and project administration. She is responsible for project management of public involvement participation processes for a wide range of projects across South Africa in industries which include but not limited to mining, renewable energy, infrastructure, and recreation. Through her role as an environmental practitioner, she has facilitated a range of Screening Assessments, Basic Assessments, Scoping and Environmental Impact Assessments, Environmental Auditing and Environmental Training.

In order to adequately identify and assess potential environmental impacts associated with the proposed solar PV facility, the following specialist consultants have provided input into this BA Report:

Table 1.2: Specialist consultants which form part of the BA project team.

Specialist	Specialist Study
Lindi Steyn and Martinus Erasmus of The Biodiversity Company	Terrestrial Ecology Impact Assessment
Ivan Baker of The Biodiversity Company	Pedology Impact Assessment
Ivan Baker of The Biodiversity Company	Wetland Impact Assessment
Jenna Lavin and Nicholas Wiltshire of CTS Heritage	Heritage Impact Assessment
Lourens du Plessis of LOGIS	Visual Impact Assessment
Nondumiso Bulunga of Savannah Environmental (Pty) Ltd	Social Impact Assessment

Appendix A includes the curricula vitae of the environmental assessment practitioners from Savannah Environmental and the specialist consultants.

CHAPTER 2: PROJECT DESCRIPTION

This chapter provides an overview of the Becrux Solar PV Facility and details the project scope, which includes the planning/design, construction, operation, and decommissioning activities required for the development.

2.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the proposed project is detailed in **Chapter 1**, **Table 1.1**, as well as **section 2.2.1** below.
3(c)(i)(ii) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or on land where the property has not been defined, the coordinates within which the activity is to be undertaken	A layout map illustrating the development footprint of the Becrux Solar PV Facility, including associated infrastructure is included as **Figure 2.3**. This development footprint has been assessed within this BA Report and the independent specialist studies.
3(d)(ii) a description of the scope of the proposed activity, including a description of the activities to be undertaken including associated structures and infrastructure	A description of the activities to be undertaken with the development of project is included in **Table 2.1** and **Table 2.2**.

2.2 Nature and extent of the Becrux Solar PV Facility

The development of the Becrux Solar PV Facility and associated infrastructure will make electricity capacity available for use by Sasol Limited. The project will be developed in a single phase which will comprise of solar PV technology with a total contracted capacity of up to 19.99MW$_{ac}$. The project will make use of bifacial panels with a single-axis tracking or fixed tilt systems due to the potential to achieve higher annual energy yields whilst minimising the balance of system costs, resulting in the lowest levelized cost of energy. The development of the PV facility will however take into consideration during the final design phase the use of either mono-facial or bi-facial PV panels and fixed tilt or tracking systems.

The Becrux Solar PV Facility will comprise solar panels and inverters which, once installed, will stand up to 3m above ground level. The solar panels will include up to 53 inverters, which will stand at a height of up to 3m above ground.

2.2.1. Overview of the Project Site

The project site is located within the Govan Mbeki Local Municipality and the Gert Sibande District Municipality in the Mpumalanga Province. The project site (with an extent of ~433ha) consists of one affected property, namely, Portion 6 of the Farm Goedehoop No. 290. The development area within the project site is up to ~26.64ha in extent and a much smaller development footprint[10] of up to ~19.95ha will be placed and sited within the development area and utilised for the placement of the solar facility infrastructure.

Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The project site is situated directly adjacent to the south, of the N17 national road, which provides access to the project site and development area (**Figure 2.1**). The R546 is located directly adjacent and to the west of the project site and the R580 is located to the north of the project site. Various secondary tarred and gravel roads provide direct access to the project site and the development area. The routes as indicated in **Figure 2.2** may be utilised, where possible, for accessing the project site, development area and development footprint.

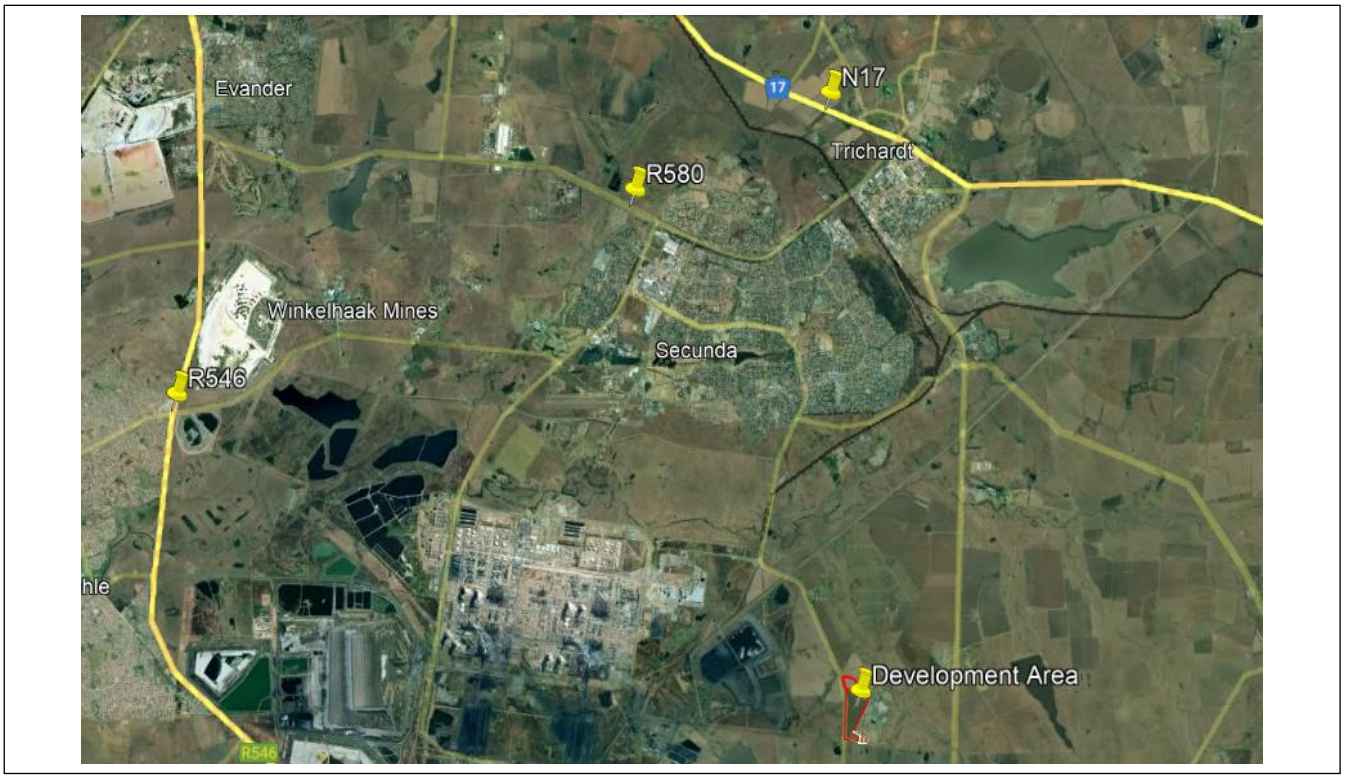

Figure 2.1: Location of the N17 national road, R546 and R580 regional roads in relation to the Becrux Solar PV Facility development area (show in red).

10 The footprint has been subject to detailed design by the developer through the consideration of sensitive environmental features identified by independent specialists, which need to be avoided by the solar facility.

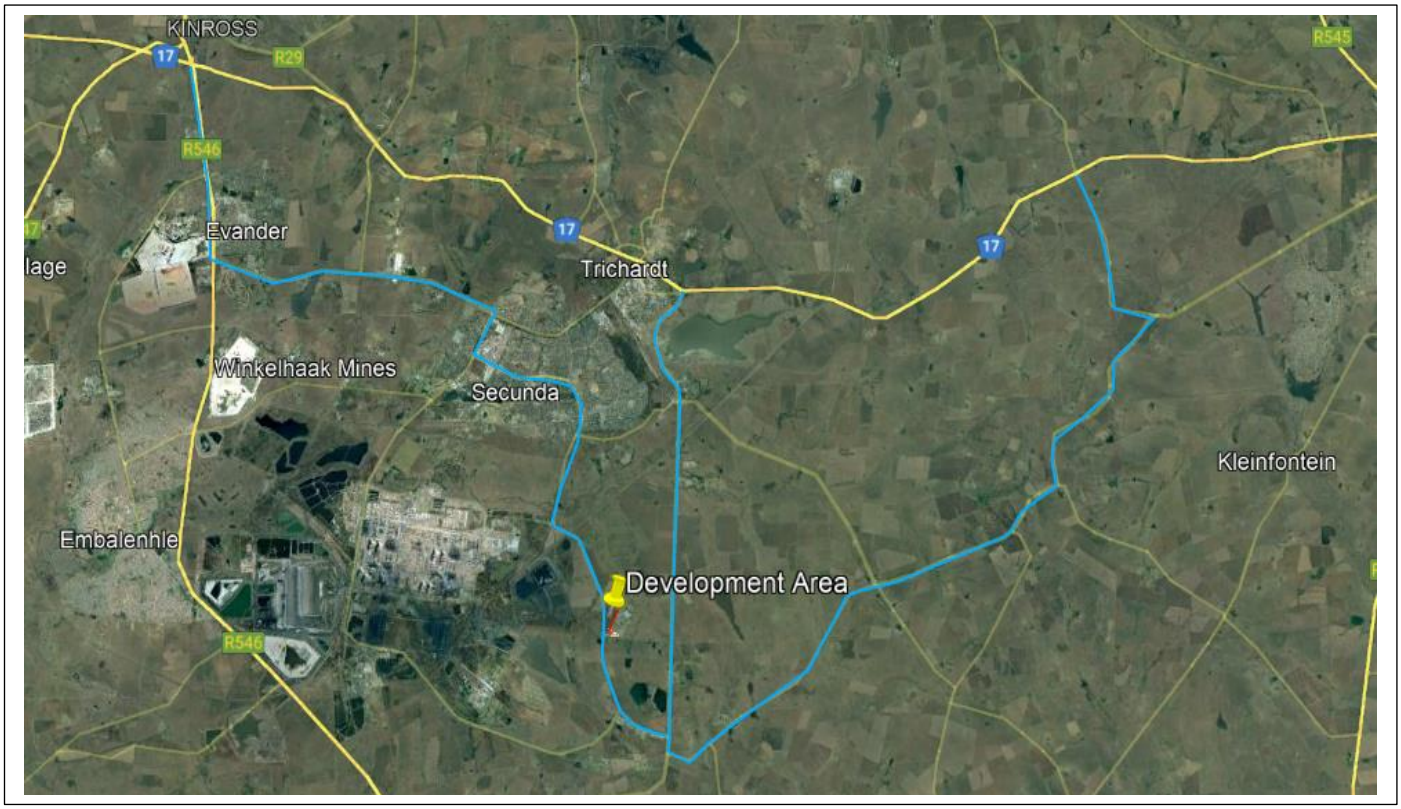

Figure 2.2: Proposed access routes to the Becrux Solar PV Facility (shown in blue)

2.2.2. Components of the Becrux Solar PV Facility

The project site is proposed to accommodate both the PV facility and associated infrastructure, which is required for such a facility, and will include:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- E-house containerised or non-containerised substation.
- 11kV overhead power line for the distribution of the generated power, which will be connected to the existing Goedehoop Substation.
- Laydown area.
- Access gravel road (existing) and internal gravel roads.
- Security booth, O&M building, workshop, storage area and site office.

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.1.** The confirmed details and dimensions of the facility development footprint were assessed as part of the independent specialist studies undertaken as part of the BA process. **Figure 2.3** illustrates the proposed development area for the Becrux Solar PV Facility (including the associated grid connection corridor for the 11kV power line) assessed as part of this BA Report as well as the full extent of the proposed grid connection corridor for the 11kV power line.

Table 2.2 provides the details regarding the requirements and the activities to be undertaken during the project development phases, and **Table 2.3** provides photographs of the construction phase of a solar facility similar in nature to the Becrux Solar PV Facility.

Table 2.1: Details or dimensions of typical infrastructure required for the Becrux Solar PV Facility

Infrastructure	Footprint and dimensions
Contracted capacity of the facility	Up to 19.99MW$_{ac}$
Development area	Up to ~26.64ha
Development footprint (permanent infrastructure area)	Up to ~19.95ha (including all associated infrastructure)
PV panels	» Height: ~2-3m from ground level (installed) » Up to 25 000 panels required » Bi-facial panels with single axis tracking or fixed-tilt mounting structures. However, the development of the PV facility will take into consideration during the final design phase the use of either mono-facial or bi-facial PV panels and fixed tilt or tracking systems.
Area occupied by the E-house containerised or non-containerised substation	Up to ~32m^2
Capacity of the E-house containerised or non-containerised substation	11kV
Grid connection	The proposed 11kV E-house containerised or non-containerised substation will be connected to the existing Goedehoop Substation via a new 11kV overhead power line. One grid connection corridor has been identified for the assessment and placement of the overhead power line. The grid connection corridor comprises a 170m wide and 400m long power line corridor to allow for avoidance of environmental sensitivities and suitable placement within the identified corridor.
Length of the power line	Up to ~400m
Capacity of the power line	11kV
Height of the power line towers (pylons)	Up to 20m
Temporary laydown area	~2000m^2
Security booth, O&M building, workshop, storage area and site office	~400m^2
Access and internal roads	An existing gravel road on the affected property will be utilised to access the development area. The access road is 8m wide and 50m in length. New gravel internal access roads will be established. The internal gravel access roads will be up to 6m wide, and 1km in total length.
Underground cabling	Underground cabling will be installed to connect the string inverters to the central inverters and the central inverters to the E-house containerised or non-containerised substation. The cabling will have a capacity of up to 33kV.

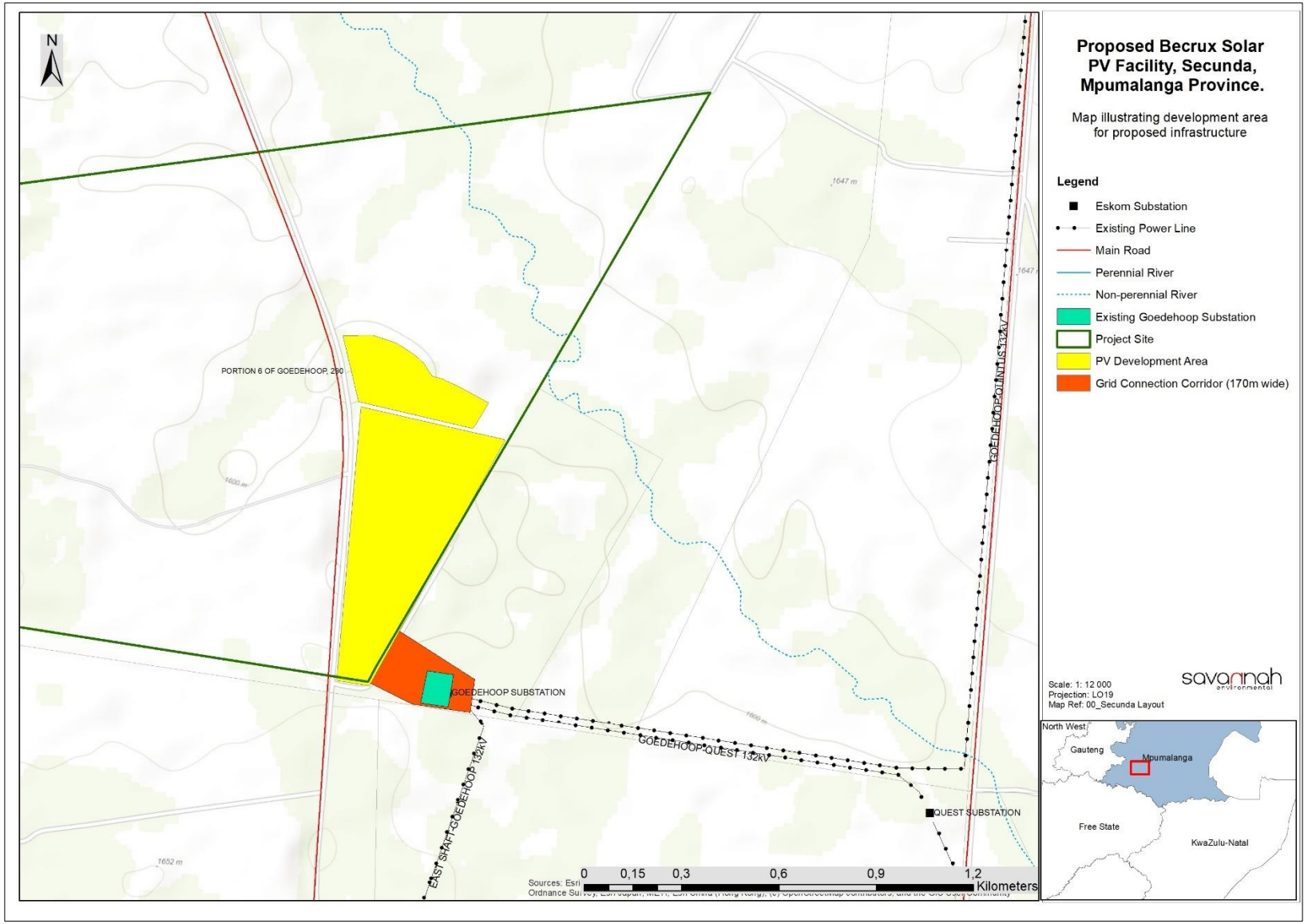

Figure 2.3: Development area (~26.64ha) assessed within this BA Report for the Becrux Solar PV Facility, including the 170m wide and 400m long grid corridor (refer to **Appendix K** for A3 map)

2.2.3 Project Development Phases associated with the Becrux Solar PV Facility

Table 2.2: Details of the project development phases (i.e., construction, operation, and decommissioning)

Pre-construction	
Requirements	» Planning and design of facility
Activities to be undertaken	
Site preparation	» Confirming the integrity of site access to accommodate the required equipment. » Preparation of the site (e.g., laydown area). » Mobilisation of construction equipment.
Conduct surveys prior to construction	» Including, but not limited to a detailed geotechnical survey, site survey and confirmation of the infrastructure micro-siting footprint, survey of the security booth, O&M building, workshop, storage and site office areas to determine and confirm the locations of all associated infrastructure.
Construction Phase	
Requirements	» Project requires Environmental Authorisation from Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) and a wheeling agreement secured with Eskom. » Duration expected to be between 9 – 12 months for the Becrux Solar PV Facility. » Create direct construction employment opportunities: Up to 150 jobs (at peak of construction) created and maintained for approximately 9 – 12 months. » No on-site labour camps will be established. Employees to be accommodated in the nearby towns such as Secunda and transported to and from site on a daily basis. » Overnight on-site worker presence would be mostly limited to security staff. » Security staff will also be present during the night-time of the construction phase. » *Waste* - waste will be minimised, re-used, and recycled as far as practically possible. Where re-use and recycling is not possible, waste will be removed by a sub-contractor or the municipality, where possible, for disposal at a registered facility. Waste containers, including containers for hazardous waste, will be located at easily accessible locations on site when construction activities are undertaken. » *Sanitation* – during the construction phase, mobile chemical toilets or a conservancy tank will be placed within the development area for use by contractors. Alternatively, employees may be requested to utilise existing ablution facilities in close proximity to the PV Facility. » *Electricity supply* - electricity required for construction activities will be available from Eskom distribution networks or the Client facilities in the area, back-up generators will be available on site as well. » *Water supply* – water will be required for the construction phase, which will be approximately 9.2m^3/day for human consumption, washing of equipment, earthworks/dust suppression and civil works. Water will be sourced directly from the Sasol Facility or from a registered water services provider such as the municipality. The current preference is to source water directly from the neighbouring Sasol Facility (discussions are underway with Sasol regarding this option).

Activities to be undertaken	
Establishment of access roads to the site	» An existing gravel access road up to 8m in width and 50m in length will be utilised. » Internal access roads up 6m wide will be established within the site at the commencement of construction.
Undertake site preparation	» Include walk-through of all areas to be developed prior to construction to ensure no nests or fauna species (Species of Conservation Concern) are present in the area. » Including the clearance of vegetation at the footprint of each support structure, establishment of a laydown area, the establishment of internal access roads and excavations for foundations. » Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site. To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected to erosion.
Establishment of laydown areas	» A laydown area for the storage of project components, including the PV panels and civil engineering construction equipment. » The laydown area will also accommodate building materials and equipment associated with the construction of buildings. » No onsite borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas.
Transport of components and equipment to and within the site	» Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site. » Some of the components (i.e., substation transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations. » Typical civil engineering construction equipment will need to be brought to the site (e.g., excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures and site preparation.
Erect PV Panels	» Installation of the solar PV panels and the structural and electrical infrastructure to make the plant operational. » For array installation, typically vertical support posts/piles are driven into the ground. Depending on the results of the geotechnical investigation, a different foundation method may be required. Different options include a screw pile, helical pile, micro-pile or drilled post/pile which may or may not need to be cast in concrete underground at an appropriate depth as determined by the geotechnical investigation. The posts will hold the support structures (tables) on which PV arrays would be mounted. Brackets attach the PV modules to the tables. » Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. » Wire harnesses connect the PV modules to the electrical collection systems.

Establishment of concrete platform and placement of the E-house containerised or non-containerised substation	» The E-house containerised or non-containerised substation will be assembled off-site and thereafter transported to site where it will be mounted on a concrete platform. 
Construction of the overhead power line	Overhead power lines are constructed in the following simplified sequence: » Step 1: Surveying of the development area, engaging with affected landowners, environmental specialist walkthroughs to inform permitting requirements and micro-siting of the pylon infrastructure. » Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and identified environmental sensitivities. » Step 3: Search-and-rescue activities, vegetation clearance and construction of access roads/tracks (where required) and watercourse crossings (where required). » Step 4: Construction of tower foundations. » Step 5: Assembly and erection of infrastructure on site. » Step 6: Stringing of conductors. » Step 7: Rehabilitation of disturbed areas. » Step 8: Continued maintenance.
Establishment of ancillary infrastructure	» Operation and Maintenance buildings, including a security booth, workshop, storage area and site office. » Establishment will require levelling and the excavation of foundations prior to construction.
Connection of PV facility to the E-house containerised or non-containerised substation	» Underground cables and overhead circuits connect the string inverters to the on-site AC electrical infrastructure (central inverter) and ultimately the project's E-house containerised or non-containerised substation. » Excavation of trenches are required for the installation of the cables. Trenches will be approximately 1.2m deep. » Underground cables are planned to follow the internal access roads, as far as possible.
Connect E-house containerised or non-containerised substation to the power grid	» The proposed 11kV E-house containerised or non-containerised substation will be connected to the existing Goedehoop Substation via a new 11kV overhead power line.

Undertake site rehabilitation	» Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed. » On commissioning, access points to the site that will not be required for the operation phase will be closed and prepared for rehabilitation.
Operation Phase	
Requirements	» Duration will be up to 25 years, or longer depending on the need for the project. » Requirements for security and maintenance of the facility. » Employment opportunities relating mainly to operation activities and maintenance. Up to 10 (full-time and temporary) employment opportunities will be available. » *Waste* - waste will be minimised, re-used, and recycled as far as practically possible. Where re-use and recycling is not possible, waste will be removed by a sub-contractor or the municipality, where possible, for disposal at a registered facility. Waste containers, including containers for hazardous waste, will be located at easily accessible locations on site when construction activities are undertaken. » *Sanitation* – during the operation phase, mobile chemical toilets or a conservancy tank will be placed within the development area for use by contractors. Alternatively, employees may be requested to utilise existing ablution facilities in close proximity to the PV Facility. » *Water supply* – water will be required for the operation phase, which will be approximately 2.829m^3/day for cleaning, fire control and general usage. Water will be sourced directly from the Sasol Facility or from a registered water services provider such as the municipality. The current preference is to source water directly from the neighbouring Sasol Facility (discussions are underway with Sasol regarding this option). » Current land-use activities (i.e., agriculture – cultivation) being undertaken within the development area will cease during the operation of the PV facility.
Activities to be undertaken	
Operation and maintenance	» Full time security, maintenance, and control room staff. » PV facility will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » PV facility to be subject to periodic maintenance and inspection. » Disposal of waste products (e.g., oil and other lubricants, etc) in accordance with relevant waste management legislation. » Areas which were disturbed during the construction phase to be utilised should a laydown area be required during operation. » PV panels will be washed during operation utilising clean water or non-hazardous biodegradable cleaning products. Wastewater generated by washing can be allowed to run-off under the panels.
Decommissioning Phase	
Requirements	» Decommissioning of the Becrux Solar PV Facility infrastructure at the end of its economic life. » Potential for repowering of the facility, depending on the condition of the facility at the time. » Expected lifespan of up to 25 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Confirming the integrity of site access to accommodate the required equipment.

	» Preparation of the site (e.g., laydown area and construction platform). » Mobilisation of equipment required for decommissioning.
Disconnect, disassemble, and remove solar facility components	» Disconnect the facility from the grid. » Dismantle all panels, mounting structures and foundations in line with all relevant legislation. » Recycle, repurpose and re-use as much of the decommissioned project components as possible in accordance with regulatory requirements. » Concrete foundations will be removed to a depth as defined by an agricultural specialist. » Backfill the mounting structure holes and rehabilitate the area appropriately. » Visible cables will be removed. » A final site walkthrough will be conducted to remove debris and/or waste generated within the site during the decommissioning process. » Rehabilitation may include top soiling, raking, and/or re-seeding (whichever is appropriate).

It is expected that the areas of the project site affected by the solar facility infrastructure (development footprint) will rehabilitated once the Becrux Solar PV Facility has reached the end of its economic life and all infrastructure has been decommissioned.

Table 2.3: Photographs of the construction phase of a solar facility similar to the Becrux Solar PV Facility (Source:https://medium.com/@solar.dao/how-to-build-pv-solar-plant-6c9f6a01020f; https://www.shutterstock.com/video/clip-1028794-workers-mounting-panels-on-solar-power-plant-construction; https://www.esi-africa.com/renewable-energy/kenya-construction-solar-farm-gets-green-light/)





CHAPTER 3: ALTERNATIVES

This chapter details the preferred site location, activity, and technology alternatives as well as the 'do nothing' option for the Becrux Solar PV Facility.

3.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(g) a motivation for the preferred site, activity, and technology alternative	The identification and motivation for the preferred project site, the development footprint within the development area, the proposed activity and the proposed technology is included in **sections 3.3.1**, **3.3.2** and **3.3.3**.
3(h)(i) details of the alternative considered	The details of all alternatives considered as part of the Becrux Solar PV Facility is included in **sections 3.3.1** – **3.3.4**.
3(h)(ix) the outcome of the site selection matrix	The site selection process followed by the developer in order to identify the preferred project site, development area and development footprint is described in **section 3.3.1**.
3(h)(x) if no alternatives, including alternative locations for the activity were inves tigation, the motivation for not considering such	Where no alternatives have been considered, motivation has been included. This is included in **section 3.3**.

3.2 Alternatives Considered during the BA Process

In accordance with the requirements of Appendix 1 of the 2014 EIA Regulations (GNR 326), as amended, reasonable and feasible alternatives, including but not limited to site and technology alternatives, as well as the 'do-nothing' alternative should be considered.

The DFFE Guidelines for determining alternatives states that the key criteria for consideration when identifying alternatives are that they should be "practicable", "feasible", "relevant", "reasonable" and "viable". Essentially there are two types of alternatives:

» Incrementally different (modifications) alternatives to the project.
» Fundamentally (totally) different alternatives to the project.

In this instance, 'the project' refers to the Becrux Solar PV Facility, a solar energy facility with capacity of up to 19.99MW$_{ac}$, and associated infrastructure proposed to be developed by an Independent Power Producer (IPP) and intended to provide electricity to Sasol Limited by feeding into the grid through a Wheeling Agreement signed with Eskom and/or direct embedded generation.

3.2.1 Consideration of Fundamentally Different Alternatives

Fundamentally different alternatives are usually assessed at a strategic level and, as a result, project specific EIAs (including BA processes) are therefore limited in scope and ability to address fundamentally different

alternatives. At a strategic level, electricity generating alternatives have been addressed as part of the DMRE's current Integrated Resource Plan for Electricity 2010 – 2030 (IRP)[11], and will continue to be addressed as part of future revisions thereto. In this regard, the need for renewable energy power generation from solar energy facilities has been identified as part of the technology mix for power generation in the country for the next 20 years.

The fundamental energy generation alternatives were assessed and considered within the development of the IRP and the need for the development of renewable energy projects has been defined. Therefore, fundamentally different alternatives to the proposed project are not considered within this BA process.

3.2.2 Consideration of Incrementally Different Alternatives

Incrementally different alternatives relate specifically to the project under investigation. "Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives for:

- The property on which, or location where the activity is proposed to be undertaken.
- The type of activity to be undertaken.
- The design or layout of the activity.
- The technology to be used in the activity.
- The operational aspects of the activity.

In addition, the option of not implementing the activity (i.e., the 'do-nothing' alternative) must also be considered.

The sections below describe the incrementally different alternatives being considered as part of the Becrux Solar PV Facility. Where no alternative is being considered, a motivation has been provided as required by the EIA Regulations, 2014 (as amended).

3.3 Project Alternatives under Consideration for the Becrux Solar PV Facility

Table 3.1 provides an overview of the alternatives being considered as part of the Becrux Solar PV Facility.

Table 3.1: Summary of the alternatives considered as part of the Becrux Solar PV Facility

Nature of Alternatives Considered	Description of the Alternative relating to the Becrux Solar PV Facility
Property or Location Alternatives	One project site has been identified for the development of the Becrux Solar PV Facility due to the proximity of the site to the Goedehoop Substation (point of connection to the Eskom grid) and Sasol Limited (the offtaker of the power to be generated by the PV Facility), as well as site-specific characteristics such as the solar resource, land availability (including ownership), topographical considerations, and environmental features. Therefore, no alternative project sites were identified for the development of the proposed project. The project site is up to ~433ha in extent, which is considered to be sufficient for the development of a solar facility with a contracted capacity of up to 19.99MW$_{ac}$. A development area of up to ~26.64ha has been identified by the proponent within the project site for the development and assessed as part of the BA process. A much smaller

[11] The Integrated Resource Plan (IRP) is legislated policy which regulates power generation planning.

Nature of Alternatives Considered	Description of the Alternative relating to the Becrux Solar PV Facility
	development footprint of up to ~19.95ha within this development area has been identified for placement of the solar facility infrastructure.
Activity Alternatives	Since the core business of the project developer/applicant is the development of renewable energy, only the development of a renewable energy facility is considered by Becrux Solar PV Project One (Pty) Ltd. Other development options are thus not technically feasible.
Technology Alternatives	Due to the location of the project site and the suitability of the solar resource, as well as the consideration of environmental factors, only the development of a solar facility is considered feasible. Bi-facial panels with single axis tracking or fixed-tilt mounting structures will be considered for use for the project, subject to detailed design and technical feasibility assessments post the BA process. However, the development of the PV facility will take into consideration during the final design phase the use of either mono-facial or bi-facial PV panels and fixed tilt or tracking systems.
'Do-nothing' Alternative	This is the option to not construct the Becrux Solar PV Facility. No impacts (positive or negative) are expected to occur on the social and environmental sensitive features or aspects located within or within the surrounding areas of the project site. The opportunities associated with the development of the solar facility for Sasol Limited, the affected area and other surrounding towns in the area will not be realised.

These alternatives are described in more detail in the sections which follow.

3.3.1 Property or Location Alternatives

The placement of a solar PV facility is dependent on several factors, namely, land suitability, climatic conditions (solar irradiation levels), topography, the location and extent of the development area, availability of grid connection infrastructure, and the need and desirability of the project. Becrux Solar PV Project One (Pty) Ltd considers the preferred property and site location as being highly favourable and suitable from a technical perspective to establish a solar PV facility due to the following site-specific favourable characteristics:

» **Solar resource:** The economic viability of a solar PV facility is directly dependent on the annual direct solar irradiation values of the area within which it will operate. The Global Horizontal Irradiation (GHI) for the development area is approximately 1 880 – 2060kWh/m^2/annum (refer to **Figure 3.1**). This is considered feasible for the development of a solar PV facility. Based on the solar resource available, no alternative locations are considered.

» **Topography:** The topographical profile of the development area is relatively flat, with a slope between 0 and 13%, and no prominent hills. The majority of the development area is characterised by a gentler slope (between 0 and 5%). The flat topography of the development area is considered beneficial in terms of the construction activities that will be required. From a topographical perspective, there are very few physical constraints present which would have an effect on the construction of the PV facility. Based on the suitable and preferable topography, no location alternatives are considered for the development. Sites that facilitate easy construction conditions (i.e., relatively flat topography, lack of major rock outcrops etc.) are favoured during the site selection process for a solar PV facility, and the proposed development area fits this criterion.

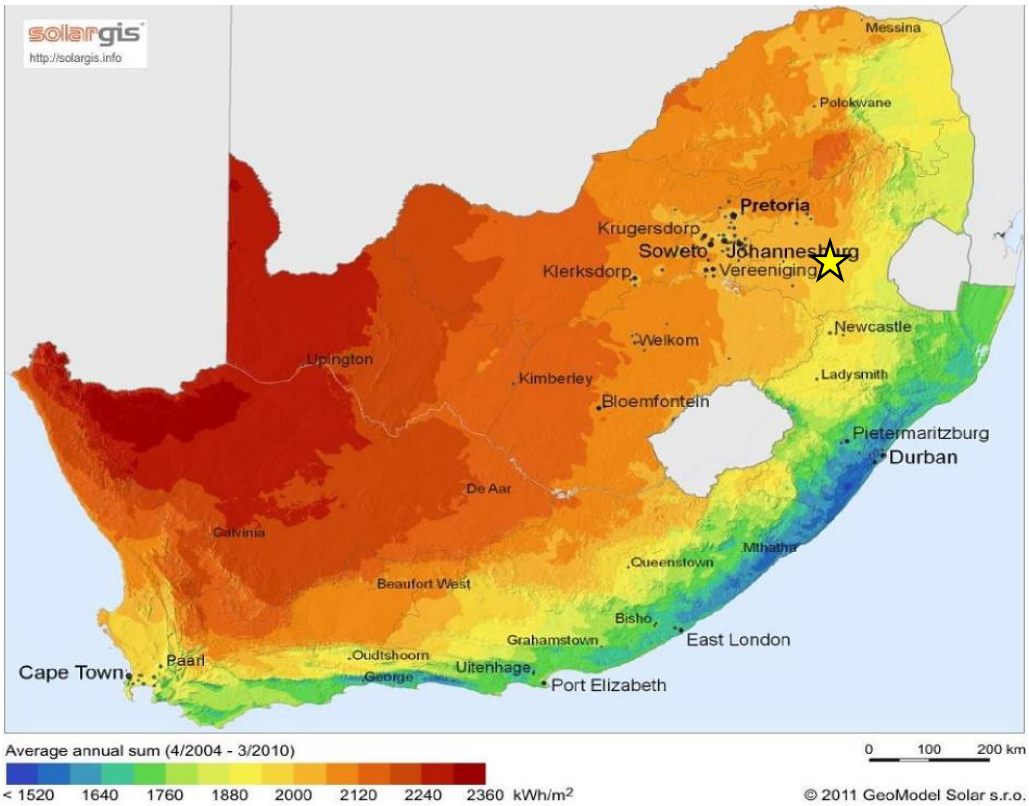

Figure 3.1: Solar irradiation map for South Africa; the position of the proposed Becrux Solar PV Facility is shown by the yellow star on the map (Source: adapted from GeoModel Solar, 2011)

» **Geographical Location** – The development area is located in close proximity to Sasol's operations, the offtaker of the power to be generated by the PV facility and is therefore preferred for development of the proposed PV Facility. No other location alternatives are considered for the development.

» **Land Availability and Suitability** – In order to develop the Becrux Solar PV Facility with a contracted capacity of up to 19.99MW$_{ac}$ and a footprint of up to 19.95ha, sufficient space is required. The project site was identified within the Mpumalanga Province and in the Secunda area following confirmation of a feasible solar resource, the availability of sufficient land for development and a grid connection point. The affected property is owned by Sasol Mining (Pty) Ltd, a subsidiary of Sasol Limited (the offtaker of the power to be generated by the PV Facility) and is located in proximity to a viable grid connection. The property is therefore deemed technically feasible by the project developer for such development to take place. The project site and development area, which are ~433ha and 26.64ha in extent, respectively, were considered by the developer as sufficient for the development of a PV Facility with a development footprint of ~19.95ha.

The broader project site is currently used for mining and industrial purposes, both of which are in alignment with the proposed land use (i.e., the development of a commercial solar PV facility). The development area is currently leased on a short-term basis to a tenant farmer for non-irrigated agricultural activities and as such, these activities would have to cease to accommodate the proposed development. The development of the solar PV facility on this property will however ensure the continuation of an economically viable land use.

» **Access to the Electricity Grid** – A key factor in the siting of any power generation project is a viable grid connection. Following confirmation of sufficient available land for the development of the solar PV facility, the developer considered the possible grid connection points in order to evacuate the

generated power from the PV facility to Sasol Limited. The developer consulted with the Eskom network planners to understand the current capacity of the existing grid connection infrastructure and to identify feasible connection points for the PV facility. The existing Goedehoop Substation located directly adjacent to the east of the site was identified as the preferred grid connection point for the project. Use of the Goedehoop Substation to deliver power generated at the PV facility to Sasol Limited will be done so through a Wheeling Agreement signed with Eskom and/or direct embedded generation.

» **Environmental Screening and consideration of sensitive environmental features** – Following confirmation of the development area as being technically feasible for the development of a solar PV facility, specialist investigations of the development area were undertaken, during which sensitive features were identified. The sensitivity spatial data compiled by the specialist team for the development area and broader project site was provided to Becrux Solar PV Project One (Pty) Ltd prior to lodging of the application for the EA. Through integration of the specialist sensitivity data obtained, Becrux Solar PV Project One (Pty) Ltd optimised the facility layout to consider areas and features of high environmental sensitivity.

The layout optimisation process applied by the developer demonstrates due consideration of the suitability of the project site for the Becrux Solar PV Facility in line with a typical mitigation hierarchy:

1. First Mitigation: avoidance of adverse impacts as far as possible by use of preventative measures (in this instance an environmental screening and integration process assisted in the avoidance of identified sensitive areas).
2. Second Mitigation: minimisation or reduction of adverse impacts to 'as low as practicable' through implementation of mitigation and management measures (in this instance the development of technical mitigation solutions as well as recommendations from the various environmental specialists).
3. Third Mitigation: remedy or compensation for adverse residual impacts, which are unavoidable and cannot be reduced further.

As part of the environmental screening process, as described above, the first tier of avoidance has already been applied. No feasible alternative layouts have been identified for investigation as part of the BA process. Therefore, the development footprint has been fully assessed and the impact of the solar facility ground-truthed by independent specialists. Where any further conflicts in terms of the development footprint and environmental and social sensitivities or features occur, the mitigation strategy will be further implemented to refine the layout in order to meet the objectives of the mitigation hierarchy (i.e., avoid, minimise, mitigate).

As the overall purpose of the facility is to generate power for use by Sasol Limited, Becrux Solar PV Project One (Pty) Ltd has identified Portion 6 of the Farm Goedehoop No. 290 as the most feasible option for the development of the facility. This decision was based on land availability for the development of a solar PV facility; proximity to the Sasol's operations (the offtaker of the power to generated at the PV facility) and the available capacity from the Goedehoop Substation (grid connection point).
Based on the above site-specific attributes and considerations, the development area was identified by Becrux Solar PV Project One (Pty) Ltd as being the most technically feasible and viable site within the broader project site for further investigation in support of an application for EA. As a result, no feasible alternative properties or locations were identified for assessment as part of this BA process.

3.3.2 Activity Alternatives

Becrux Solar PV Project One (Pty) Ltd is a renewable energy project developer and as such will only consider renewable energy activities. The only activity considered for implementation on the identified site is therefore power generation, specifically solar PV power generation, and as such, no activity alternatives are considered as part of this BA process.

3.3.3 Technology Alternatives

Since the development area is unsuitable for wind generation, solar energy has been identified by Becrux Solar PV Project One (Pty) Ltd as the preferred technology for implementation on the development area. Few technology options are available for solar facilities. Those that are considered are usually differentiated by weather and temperature conditions that prevail in the area so that optimality is obtained by the final site selection. Solar energy is considered the most suitable renewable energy technology for this area, based on site location, ambient conditions, and energy resource availability. Solar PV was therefore determined as the most suitable option for further assessment, and no other technology alternatives are being assessed for the project.

Several solar PV technology alternatives are available, including *inter alia*:

- Bi-facial PV panels.
- Mono-facial PV panels.
- Fixed mounted PV systems (static / fixed-tilt panels).
- Single-axis tracking or double-axis tracking systems (with solar panels that rotate around a defined axis to follow the sun's movement).
- Monocrystalline modules, polycrystalline modules, or thin film modules.

The primary difference between PV technologies available relate to the extent and height of the facility; however, the potential for environmental impacts remains similar in magnitude. Fixed mounted PV systems can occupy a smaller extent and have a lower height when compared to tracking PV systems, which require both a larger extent of land, and are taller in height. However, both options are considered acceptable for implementation from an environmental perspective. Bi-facial solar PV panels offer many advantages over mono-facial PV panels as power can be produced on both sides of the module, increasing total energy generation. Monocrystalline, polycrystalline or thin film modules differ mainly in their cost and efficiency values, but do not represent a fundamentally different panel design type from an environmental perspective. The preference will, therefore, be determined on technical considerations and the site conditions. The PV panels are designed to operate continuously for more than 20 years, mostly unattended and with low maintenance. The impacts associated with the construction, operation, and decommissioning of the facility are anticipated to be the same irrespective of the PV panel selected for implementation.

3.3.4. The 'do-nothing' Alternative

The 'do-nothing' alternative is the option of Becrux Solar PV Project One (Pty) Ltd not constructing the Becrux Solar PV Facility on the proposed site and assumes the site remains in its current state. This would result in no environmental or social impacts (positive or negative) as a result of the development of a solar facility within the project site. This alternative will be used as a baseline against which the impacts will be assessed and compared in detail within Chapter 9 of this BA Report.

CHAPTER 4: SOLAR AS A POWER GENERATION TECHNOLOGY

Environmental pollution and the emission of CO_2 from the combustion of fossil fuels through the implementation of conventional power plants constitute a threat to the environment. The use of fossil fuels is reportedly responsible for ~70% of greenhouse gas emissions worldwide. The approach to addressing climate change needs to include a shift in the way that energy is generated and consumed. Worldwide, many solutions and approaches are being developed to reduce emissions. However, it is important to acknowledge that the most cost-effective solution in the short-term is not necessarily the least expensive long-term solution. This holds true not only for direct project costs, but also indirect project costs such as impacts on the environment. Renewable energy is considered a 'clean source of energy' with the potential to contribute greatly to a more ecologically, socially, and economically sustainable future. The challenge however is to ensure that renewable energy projects are able to meet all economic, social and environmental sustainability criteria through the appropriate placement of these facilities.

This chapter explores the use of solar energy as a means of power generation.

4.1. Solar PV Technology

Solar energy facilities, such as those which utilise PV technology, use energy from the sun to generate electricity through a process known as the **Photovoltaic Effect**. Generating electricity using the Photovoltaic Effect is achieved through the use of the following components:

Photovoltaic Modules

PV cells are made of crystalline silicon, the commercially predominant PV technology, that includes materials such as polycrystalline and monocrystalline silicon or thin film modules manufactured from a chemical ink compound. PV cells are arranged in multiples / arrays and placed behind a protective glass sheet to form a PV module (Solar Panel). Each PV cell is positively charged on one side and negatively charged on the opposite side, with electrical conductors attached to either side to form a circuit. This circuit captures the released electrons in the form of an electric current (i.e., Direct Current (DC)). When sunlight hits the PV panels, free electrons are released and flow through the panels to produce direct electrical (DC) current. DC then needs to be converted to alternating current (AC) using an inverter before it can be directly fed into the electrical grid.

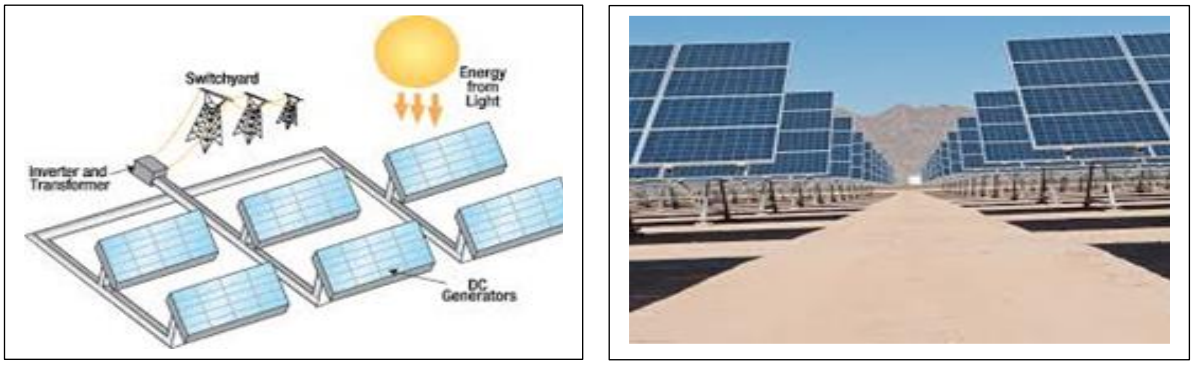

Figure 4.1: Overview of a PV cell, module, and array / panel (Source: pveducation.com)

Inverters

Inverters are used to convert electricity produced by the PV panels from DC into AC, to enable the facility to be connected to a grid connection point. In order to connect a large solar facility such as the one being proposed to a grid connection point, numerous inverters will be arranged in several arrays to collect, and convert power produced by the facility.

Support Structures

PV panels will be fixed to a support structure. PV panels can either utilise fixed / static support structures, or alternatively, they can utilise single or double axis tracking support structures. PV panels which utilise fixed / static support structures are set at an angle (fixed-tilt PV system) so as to optimise the amount of solar irradiation. With fixed / static support structures, the angle of the PV panel is dependent on the latitude of the proposed development and may be adjusted to optimise for summer and winter solar radiation characteristics. PV panels which utilise tracking support structures track the movement of the sun throughout the day so as to receive the maximum amount of solar irradiation.

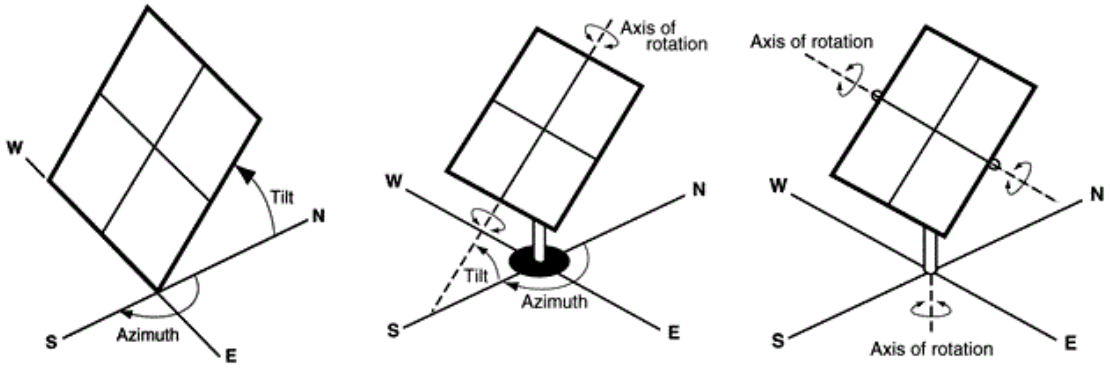

Figure 4.2: Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com))

PV panels are designed to operate continuously for more than 20 years, unattended and with low maintenance.

4.1.1. Bifacial Solar Panel Technology

Becrux Solar PV Project One (Pty) Ltd is proposing to use bifacial tracking technology. Bifacial ("two-faced") modules produce solar power from both sides of the panel. Traditional solar panels capture sunlight on one light-absorbing side. The light energy that cannot be captured is simply reflected away. Bifacial solar panels have solar cells on both sides, which enables the panels to absorb light from the back and the front (refer to **Figure 4.3**). Practically speaking, this means that a bifacial solar panel can absorb light reflected off the ground or another material. In general, more power can be generated from bifacial modules for the same area, without having to increase the development footprint.

The optimum tilt for a bifacial module has to be designed so as to capture a big fraction of the reflected irradiation. Use of trackers is recommended so the modules can track the sun's movement across the sky, enabling them to stay directed to receive the maximum possible sunlight to generate power.

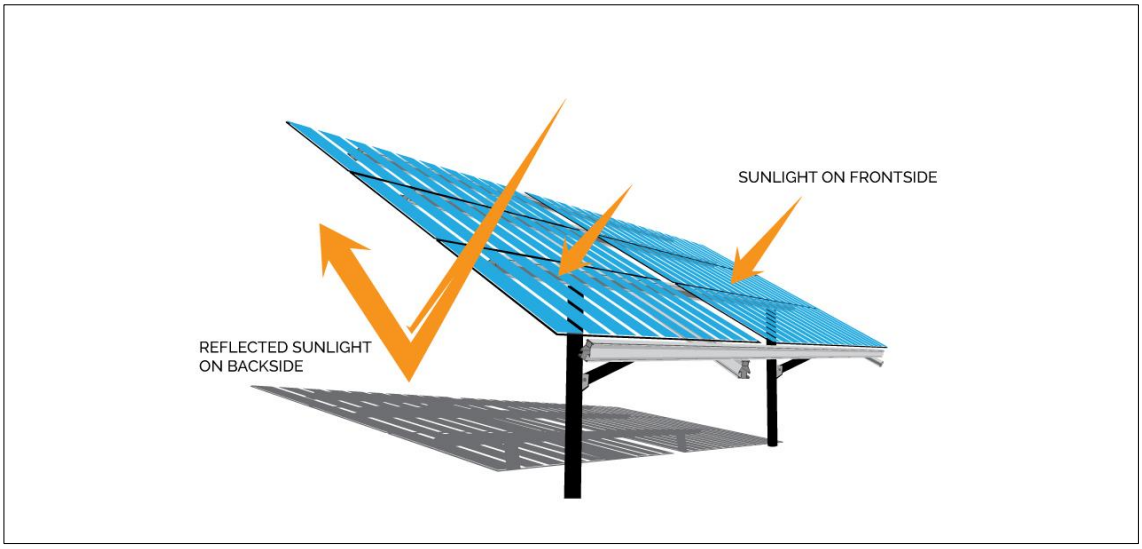

Figure 4.3: Diagram showing how bifacial Solar PV panels work (Source: https://sinovoltaics.com/learning-center/solar-cells/bifacial-solar-modules/)

CHAPTER 5: POLICY, LEGISLATIVE CONTEXT AND NEED AND DESIRABILITY

This Chapter provides an overview of the policy and legislative context within which the development of a solar energy facility such as the Becrux Solar PV Facility and its associated infrastructure is proposed. It identifies environmental legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process which may be applicable to or have bearing on the proposed project. It also provides information which supports the need and justification for the project, as discussed in **section 5.6** and provides a description of the need and desirability of the Becrux Solar PV Facility at the project site considered to be reasonable and feasible by the project developer. Further environmental legislation relevant to the project is described and considered in **Chapter 6** of this BA Report.

5.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(e) a description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report. (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments.	A description of the policy and legislative context within which the Becrux Solar PV Facility is proposed is included and considered within this chapter.
3(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.	The need and desirability of the Becrux Solar PV Facility is included and discussed as a whole within this chapter. The need and desirability for the development of the facility has been considered from an international, national, regional, and site-specific perspective.

5.2 International Policy and Planning Context

A brief review of the most international policies relevant to the establishment of the Becrux Solar PV Facility is provided below in **Table 5.1**. The Becrux Solar PV Facility is considered to be aligned with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Table 5.1: International policies relevant to the Becrux Solar PV Facility

Relevant policy	Relevance to the Becrux Solar PV Facility
United Nations Framework Convention on Climate Change (UNFCCC) and	The Conference of the Parties (COP), established by Article 7 of the UNFCCC, is the supreme body and highest decision-making organ of the Convention. It reviews the

Relevant policy	Relevance to the Becrux Solar PV Facility
Conference of the Party (COP)	implementation of the Convention and any related legal instruments and takes decisions to promote the effective implementation of the Convention. The Conference of the Parties (COP) 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. South Africa signed the Agreement in April 2016 and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. The policy provides support for the Becrux Solar PV Facility which will contribute to managing climate change impacts and assist in reducing GHG emissions in a sustainable manner.
The Equator Principles III (June 2013, as amended in June 2020)	The Equator Principles (EPs) III constitute a financial industry benchmark used for determining, assessing, and managing a project's environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. In addition, these principles are used to ensure that projects financed by the Equator Principles Financial Institutions (EPFI) are developed in a manner that is socially responsible and reflects sound environmental management practices. The EPs are applicable to infrastructure projects (such as the Becrux Solar PV Facility) and apply globally to all industry sectors. Such an assessment should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the Becrux Solar PV Facility. In terms of the EPs, South Africa is a non-designated country (as at 4 March 2020), and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability, and Environmental Health and Safety (EHS) Guidelines. The Becrux Solar PV Facility is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, as amended, published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.
International Finance Corporation (IFC) Performance Standards and Environmental and	The International Finance Corporation's (IFC) Performance Standards (PSs) on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012.

Relevant policy	Relevance to the Becrux Solar PV Facility
Social Sustainability (January 2012)	Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an Environmental and Social Management System (ESMS) appropriate to the nature and scale of the project, and commensurate with the level of its environmental and social risks and impacts be established and maintained. The above-mentioned standard is the overarching standard to which all the other standards relate. Performance Standards 2 through 8 establish specific requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, the standards 2 and 8 describe potential social and environmental impacts that require particular attention specifically within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1. Given the nature of the Becrux Solar PV Facility, it is anticipated (at this stage of the process) that Performance Standards 1, 2, 3, 4, 6, and 8 may be applicable to the project (see box 1 below). • Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts • Performance Standard 2: Labour and Working Conditions • Performance Standard 3: Resource Efficiency and Pollution Prevention • Performance Standard 4: Community Health, Safety and Security • ~~Performance Standard 5: Land Acquisition and Involuntary Resettlement –~~ N/A • Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources • ~~Performance Standard 7: Indigenous Peoples –~~ N/A • Performance Standard 8: Cultural Heritage

5.3 National Policy and Planning Context

A brief review of the most relevant national policies is provided below in **Table 5.2**. The development of the Becrux Solar PV Facility is considered to align with the aims of these policies, even where contributions to achieving the goals therein are only minor.

Table 5.2: National policies relevant to the Becrux Solar PV Facility

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
White Paper on the Energy Policy of the Republic of South Africa (1998)	The White Paper on Energy Policy places emphasis on the expansion of energy supply options to enhance South Africa's energy security. This can be achieved through increased use of renewable energy and encouraging new entries into the generation market. The policy states that the advantages of renewable energy include, minimal environmental impacts during operation in comparison with traditional supply technologies, generally lower running costs, and high labour intensities. Disadvantages include higher capital costs in some cases, lower energy densities, and lower levels of availability, depending on specific conditions, especially with sun and wind-based systems. Nonetheless, renewable resources generally operate from an

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
	unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	The White Paper on Renewable Energy Policy supplements Government's predominant policy on energy as set out in the White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The policy recognises the potential of renewable energy and aims to create the necessary conditions for the development and commercial implementation of renewable energy technologies. The White Paper on Renewable Energy sets out Government's vision, policy principles, strategic goals, and objectives for promoting and implementing renewable energy in South Africa. The country relies heavily on coal to meet its energy needs due to its abundant, and fairly accessible and affordable coal resources. However, massive renewable energy resources that can be sustainable alternatives to fossil fuels, have so far remained largely untapped. The development of additional renewable energy projects will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix.
National Development Plan 2030	The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. In terms of the Energy Sector's role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes: » Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. » Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households. » Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. In formulating its vision for the energy sector, the NDP took the IRP 2010 as its point of departure. Therefore, although electricity generation from coal is still seen as part of the energy mix within the NDP, the plan sets out steps that aim to ensure that, by 2030, South Africa's energy system will look very different to the current situation: coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources – especially wind, solar, and imported hydroelectricity – will play a much larger role. The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Becrux Solar PV Facility supports the NDP through the development of energy-generating infrastructure which will not lead to the generation of GHGs and will result in economic development and growth of the area surrounding the development area.
Integrated Energy Plan (IEP), November 2016	The purpose and objectives of the Integrated Energy Plan (IEP) are derived from the National Energy Act (No. 34 of 2008). The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple aims, some of which include:

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
	» To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector. » To guide the selection of appropriate technologies to meet energy demand (i.e., the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels). » To guide investment in and the development of energy infrastructure in South Africa. » To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors. A draft version of the IEP was released for comment on 25 November 2016. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The development of the IEP is an ongoing continuous process. It is reviewed periodically to take into account changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst others. The 8 key objectives of the integrated energy planning process are as follows: » Objective 1: Ensure security of supply. » Objective 2: Minimise the cost of energy. » Objective 3: Promote the creation of jobs and localisation. » Objective 4: Minimise negative environmental impacts from the energy sector. » Objective 5: Promote the conservation of water. » Objective 6: Diversify supply sources and primary sources of energy. » Objective 7: Promote energy efficiency in the economy. » Objective 8: Increase access to modern energy.
New Growth Path (NGP) Framework, 23 November 2010	The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020; with economic growth and employment creation as the key indicators identified in the NGP. The framework seeks to identify key structural changes in the economy that can improve performance in terms of labour absorption and the composition and rate of growth. To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate employment creation in these areas.
National Climate Change Bill, 2018	On 08 June 2018, the Minister of Environmental Affairs published the National Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The Becrux Solar PV Facility is a renewable energy generation facility and would not result in the generation or release of emissions during its operation.

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
National Climate Change Response Policy, 2011	South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this, the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively. As an integral part of the policy, a set of near-term priority flagship programmes will be implemented to address the challenges of climate change, one of which includes the Renewable Energy Flagship Programme. This flagship programme includes a scaled-up renewable energy programme, based on the current programme specified in the IRP 2010, and using the evolving South African Renewables Initiative led by the Department of Public Enterprise and Department of Trade and Industry (DTI), as a driver for the deployment of renewable energy technologies. The programme will be informed by enhanced domestic manufacturing potential and the implementation of energy efficiency and renewable energy plans by local government. The development of the Becrux Solar PV Facility is aligned with the Renewable Energy Flagship Programme identified under South Africa's NCCRP and could therefore be argued to be aligned with the country's approach to addressing climate change.
National Climate Change Response Strategy for South Africa, 2004	The need for a national climate change policy for South Africa was identified as an urgent requirement during the preparations for the ratification of the UNFCCC in 1997. A process to develop such a policy was thus instituted under the auspices of the National Committee for Climate Change (NCCC), a non-statutory stakeholder body set up in 1994 to advise the Minister on climate change issues and chaired by the then Department of Environmental Affairs and Tourism (DEAT). It was determined that a national climate change response strategy will promote integration between the programmes of the various government departments involved to maximise the benefits to the country as a whole, while minimising negative impacts. Further, as climate change response actions can potentially act as a significant factor in boosting sustainable economic and social development, a national strategy specifically designed to bring this about is clearly in the national interest, supporting the major objectives of the government, including poverty alleviation and the creation of jobs. A number of principles and factors guided the conception of the strategy and are required to be implemented. These are: » Ensuring that the strategy is consistent with national priorities, including poverty alleviation, access to basic amenities, including infrastructure development, job creation, rural development, foreign investment, human resource development and improved health, leading to sustainable economic growth. » Ensuring alignment with the need to consistently use locally available resources. » Ensuring compliance with international obligations. » Recognizing that climate change is a cross cutting issue that demands integration across the work programmes of other departments and stakeholders, and across many sectors of industry, business, and the community. » Focussing on those areas that promote sustainable development.

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
	» Promoting programmes that will build capacity, raise awareness, and improve education in climate change issues. » Encouraging programmes that will harness existing national technological competencies. » Reviewing the strategy constantly in the light of national priorities and international trends. » Recognizing that South Africa's emissions will continue to increase as development is realised. The strategy was devised through an integrated approach and considers policies and programmes of other government departments and the fact that South Africa is a developing country. This will ensure that the principles of sustainable development are adequately served and do not conflict with existing development policies.

5.4 Provincial Policy and Planning Context

A brief review of the most relevant provincial policies is provided below in **Table 5.3**. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
Mpumalanga Vision, 2030 (2013 – 2030)	The Mpumalanga Vision 2030 Strategic Implementation Framework (2013 - 2030) was established as a direct implementation response to the National Development Plan Vision, 2030. The framework describes the province's approach to realising the objectives of the NDP in the provincial context and seeks to achieve the MPG's Provincial Strategic Objectives (PSO's). Mpumalanga Vision, 2030 provides a provincial expression of the key priorities, objectives and targets that enumerated in the NDP and expressed within the policy. It seeks to present and affirm the province's approach towards realising the national vision and development plan. The implementation framework builds on and informs past and existing sectorial and related planning interventions within the province. The Vision 2030 Implementation Framework provides a basis for prioritisation during medium-term and annual planning cycles. The focus of the Mpumalanga Vision 2030 is to provide a summary overview on the facilitation of decision-making and the prioritisation of rolling back poverty, and inequality by raising living standards to an acceptable minimum, which entails a combination of interventions directed at increasing employment, improving the quality of education, productive growth, a social wage and good quality public services. In line with the principles of the NDP, the Vision 2030 highlights socio-economic outcomes such as employment and economic growth as priorities. The Mpumalanga Vision 2030 document formulated a spatial rationale for the province, which is based on nine key drivers, of which key drivers 1 to 6 are focused towards promoting economic development and job creation; key drivers 7 and 8 are focused on human development; and key driver 9 is focused on the conservation and sustainable management of the natural environment. Of relevance to the Becrux Solar PV Facility are key drivers 1 to 6 as the development of the facility will promote economic development and job creation.

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
Mpumalanga Economic Growth and Development Path (2011)	The Mpumalanga Economic Growth and Development Path (MEGDP) is informed by the National Economic Growth Path. According to the MEGDP, the Mpumalanga Province is committed to increasing local economic development and job creation in the agricultural, industrial, manufacturing, green economy, tourism, and mining sectors. The focal point of the Economic Growth and Development Path is the creation of appropriate labour absorbing jobs which will have a positive direct, indirect, and induced effects on the Provincial economy and the living standards of its people. The primary objective of the MEGDP is to grow the economy of the province; balance growth and development in order to creates jobs, reduce poverty and inequality, and improve the socio-economic conditions of the province. The Mpumalanga economic growth and development path also discusses climate change and the green economy as one of the focus areas where government will a prioritise effort to support employment creation. The Industrial Development Corporation (IDC) estimates that 296 000 jobs can be created over a ten-year period through investment in green energy alone. R11.7 billion will be invested in green energy. Government is developing an Integrated Resource Plan for energy that will have clear commitments on the level of green energy and renewable energy. A commitment must be made on procurement that favours the local industry. A higher level of skills will also be needed. Small business policies and regulation of the building industry will need to be considered. The proposed development falls directly in line with the Mpumalanga provincial growth path with regards to employment creation in the renewable energy industry, the benefits it will bring to the local community as well as contributing towards diversifying the local economy towards a greener economy.
Mpumalanga Spatial Development Framework (2013)	The Mpumalanga Spatial Development Vision for the future functional spatial development patterns is based on the integration of sustainable natura resources, economic development and job creation and human development to provide: *a sustainable urban and rural spatial development pattern focussed on a modern ecologically sustainable economy, supported by a suitably skilled labour force and providing for quality of living*. Strategic requirements which need to be addressed include the following: » Harnessing the opportunities provided by urbanisation forces to achieve effective rural development. » Adopting a flexible approach which suits the province and enables sustainable development rather than inhibits growth and development. » Creating world class infrastructure, services and amenities to attract investment. » Integrated infrastructure development planning responding to long term forecasted requirements. » Pro-active planning which integrates aspiring economic activities into the mainstream economies and urban fabric. » Safeguarding existing resources and creating opportunities for renewable energy development. » Consensus on where to develop and not develop the province.

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
	» Connecting the spatial frameworks to catalytic programmes of the Mpumalanga Implementation Framework and Plan. » Creating opportunities for increased international, national, provincial and municipal connectivity, linked by strategic transportation routes in the province. » Achieving improved quality of life in our settlements through formalisation, provision of planned amenities and consolidation of land uses. » Gearing up of spatial planning capacity, skills, systems, and procedures to achieve the vision. The development of Becrux Solar PV Facility supports the Mpumalanga Spatial Development Framework as it is a renewable energy development and is as such assisting the province towards achieving its goal of creating opportunities for renewable energy development.
Mpumalanga Biodiversity Sector Plan (2014)	The Mpumalanga Biodiversity Sector Plan (MBSP) is a guideline which is part of a wider set of national biodiversity planning tools and initiatives that are designed for national legislation and policy. It also guides as a spatial tool to inform permissible land uses that support biodiversity and ecological processes. The MBSP contains various classes of environmental features of conservation value, such as protected areas, irreplaceable areas etc. Mapping of critical biodiversity areas is also provided in this document. According to the map of terrestrial critical biodiversity areas contained in the MBSP, the Mpumalanga Province comprises five areas, namely, protected areas, critical biodiversity areas (optimal and irreplaceable), ecological support areas, other natural areas, and moderately or heavily modified areas. According to the Mpumalanga Biodiversity Sector Plan, the project area overlaps with a heavily modified area.

5.5 Local Policy and Planning Context

The local tiers of government within which the Becrux Solar PV Facility is located is the Govan Mbeki Local Municipality which falls within the jurisdiction of the Gert Sibande District Municipality. The development instruments or policies at both the district and local level contain objectives which are in line with the development of the Becrux Solar PV Facility. These include, economic growth, job creation, community upliftment and poverty alleviation.

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
Gert Sibande District Municipality Integrated Development Plan (IDP) (2020 – 2021)	The vision of the Gert Sibande District Municipality (GSDM) is to be "a community driven district of excellence and development" and the mission of the district is "to support and coordinate our local municipalities to provide excellent services and development". The IDP identifies a number of strategic objectives for the GSDM, which the district plans to achieve to meet each strategic goal. Of relevance to this project is the municipality's objective to facilitate economic growth and development. The IDP also identifies issues within the GSDM which have been raised by the community and of relevance to the proposed project is job creation.

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
	The development of the Becrux Solar PV Facility will, to a certain extent, promote economic development (through the creation of employment and business opportunities) in the GSDM, thereby assisting to address some of the challenges faced by the district municipality, particularly unemployment.
Gert Sibande District Municipality Spatial Development Framework (SDF) (2014)	The Spatial Development Framework notes that the vision for the GSDM is "striving to excel in good governance and quality infrastructure". The mission statement that underpins the vision refers to: » Municipal infrastructure development. » Economic and tourism promotion. » Community and stakeholder participation. » Efficient systems and administration. » Human development. According to the 2011 census date, the level of employment in the GSDM is 38.9% and the poverty rate increased from 43.6% in 1996 to 48.6% in 2010. The issues of unemployment and poverty in the district can, to a certain extent, be addressed by job creation linked to the Becrux Solar PV Facility.
Govan Mbeki Local Municipality IDP (2021-2022)	The vision of the Govan Mbeki Local Municipality is "to be model city and centre for excellence". The mission statement that underpins the vision is as follows: » Providing sustainable, quality services. » Enabling diversified local economic development and job creation. » Ensuring the financial sustainability of the municipality. » Working together with stakeholders. » Empowering the workforce. » Ensuring sound corporate governance. The vision and mission statement are informed by six strategic objectives which the municipality intends to achieve and to be realised over the course of the 5-year term (and potentially continued beyond). Of relevance to the Becrux Solar PV Facility is strategic objective 3, which relates to facilitating and creating an enabling environment for diversified local economic development, social cohesion and job creation. The Becrux Solar PV Facility will, where possible, assist in enhancing local economic development through job creation, skills development, as well as supplier and enterprise development.
Govan Mbeki Local Municipality SDF 2014 - 2034	The SDF for the Govan Mbeki Local Municipality identifies the following six strategic objectives: » Strategic Objective 1: Economic development and job creation supporting guiding development. » Strategic Objective 2: Promoting education, training, and innovation. » Strategic Objective 3: Accommodating urbanisation and transforming human settlements. » Strategic Objective 4: Promoting the development of rural areas within Govan Mbeki that can support sustainable economic, social and engineering infrastructure. » Strategic Objective 5: Protect biodiversity, water and agricultural resources.

Relevant legislation or policy	Relevance to the Becrux Solar PV Facility
	» Strategic Objective 6: Infrastructure investment. The Becrux Solar PV Facility supports the Govan Mbeki Local Municipality SDF as it will contribute towards economic development and job creation. In order to diversify and strengthen the Govan Mbeki economy, the SDF suggests the phasing in of renewable energy options at mining facilities, which include concentrated solar power, wind and natural gas, reducing dependence on coal resources. Although the proposed development will be delivering the generated power to Sasol's Secunda CTL Plant, which is not a mining facility, it will nonetheless reduce the plant's reliance on Eskom, which produces its power from coal resources; thereby supporting the Govan Mbeki Local Municipality SDF.

5.6 Motivation for the Need and Desirability of the Proposed Development

Appendix 1 of the 2014 EIA Regulations (GNR 326), as amended requires that a BA Report include a motivation for the need and desirability of the proposed development, including the need and desirability of the activity in the context of the preferred location. The need and desirability of the development needs to consider whether it is the right time and the right place for locating the type of land-use/activity being proposed. The need and desirability of a proposed development is, therefore, associated with the wise use of land, and should be able to respond to questions such as, but not limited to, what the most sustainable use of the land may be.

5.6.1 Need and Desirability of the Becrux Solar PV Facility

The need and desirability from the perspective of the local community as reflected in the IDP and SDF for the area has been considered in the BA process. In the South African context, developmental needs (community needs) are often determined through the above planning measures (IDP and SDF). Although the renewable energy sector is not explicitly identified as a sector or initiative in all current municipal policy and planning documents as outlined above, it could contribute positively to the needs of the local community, including development, social services, education, and employment opportunities in this area. The Becrux Solar PV Facility will create employment and business opportunities during the construction and operation phases, as well as the opportunity for skills development for the local community. In addition, indirect benefits and spend in the local area will benefit the local community.

Sasol, the off taker of the power to be generated at the Becrux Solar PV Facility, generates 11% of South Africa's greenhouse gas emissions. Sasol's GHG emissions increased in 2021, eroding progress made against their target since 2017. The GHG emissions increase was largely due to no shutdowns at their Secunda operations in 2021 (Sasol Climate Change Report, 2021). To reduce their GHG emissions, Sasol have launched the Future Sasol strategy, with a future ambition to be at net zero emissions by 2050. This is to be achieved through stopping investments in new coal projects, bringing renewable energy on board to its operations and launching a new business unit solely dedicated to sustainable solutions. This is in line with the company's commitment to accelerate its transition to a low carbon world in support of the objectives of the Paris Agreement on climate change.

As a start towards their journey to achieving net zero emissions by 2050 through bring renewable energy on board to their operations, Sasol is looking to integrate 600MW towards their ~1 200MW renewable target. Thereafter, the company aims to complete the remaining 600MW before 2030. Sasol has commenced

multiple renewable energy procurement processes as part of a wider push toward renewables, with the intention of entering into long-term power purchase agreements with Independent Power Producers (IPPs), which would fund, build, and operate the power facilities.

According to the Sasol Climate Change Report (2021), Sasol's largest GHG emissions originate from their CTL facility in Secunda. The need and desirability of the proposed project can therefore be demonstrated in the move to green energy due to growing concerns associated with climate change and the on-going exploitation of non-renewable resources.

5.6.2 Receptiveness of and desirability of the project site to develop the Becrux Solar PV Facility

The placement of a PV facility is strongly dependent on several factors including climatic conditions (solar resource), topography, the location of the site, availability of grid connection, the extent of the site and the need and desirability for the project. From a local level perspective, the project site and development area have specifically been identified by the proponent as being highly desirable from a technical perspective for the development of a PV facility due to the following site characteristics:

» **Solar resource:** The economic viability of a solar PV facility is directly dependent on the annual direct solar irradiation values of the area within which it will operate. The Global Horizontal Irradiation (GHI) for the development area is approximately 1 880 – 2060kWh/m^2/annum. This is considered feasible for the development of a solar PV facility. Based on the solar resource available, no alternative locations are considered.

» **Topography:** The topographical profile of the development area is relatively flat, with a slope between 0 and 13%, and no prominent hills. The majority of the development area is characterised by a gentler slope (between 0 and 5%). The flat topography of the development area is considered beneficial in terms of the construction activities that will be required. From a topographical perspective, there are very few physical constraints present which would have an effect on the construction of the PV facility. Based on the suitable and preferable topography, no location alternatives are considered for the development given that sites that facilitate easy construction conditions (i.e., relatively flat topography, lack of major rock outcrops etc.) are favoured during the site selection process for a solar PV facility, and the proposed development area fits this criterion.

» **Geographical Location** – The development area is located in close proximity to Sasol's operations, the offtaker of the power to be generated by the PV facility and is therefore preferred for development of the proposed PV Facility. No other location alternatives are considered for the development.

» **Land Availability and Suitability** – In order to develop the Becrux Solar PV Facility with a contracted capacity of up to 19.99MW$_{ac}$ and a footprint of up to 19.95ha, sufficient space is required. The preferred project site was identified within the Mpumalanga Province and in the Secunda area following confirmation of a feasible solar resource. The affected property is owned by Sasol (the offtakeruser of the power to be generated by the PV Facility) and is deemed technically feasible by the project developer for such development to take place. The project site and development area (within the project site), which are ~433ha and 26.64ha in extent, respectively, were considered by the developer as sufficient for the development of a PV Facility with a development footprint of ~19.95ha.

The broader project site is currently used for mining and industrial purposes, both of which are in alignment with proposed land use (i.e., the development of a commercial solar PV facility). The development area is currently leased on a short-term basis to a tenant farmer for agriculture (non-irrigated) and as such, agricultural activities would have to cease to accommodate the proposed development. The development of the solar PV facility on this property will however ensure the continuation of an economically viable land use.

» **Access to the Electricity Grid** – A key factor in the siting of any power generation project is a viable grid connection. Following confirmation of sufficient available land for the development of the solar PV facility, the developer considered the possible grid connection points in order to evacuate the generated power from the PV facility to Sasol Limited. The developer consulted with the Eskom network planners to understand the current capacity of the existing grid connection infrastructure and to identify feasible connection points for the PV facility. The existing Goedehoop Substation located directly adjacent to the east of the site was identified as the preferred grid connection point for the project. Use of the Goedehoop Substation to deliver power generated at the PV facility to Sasol Limited will be done so through a Wheeling Agreement signed with Eskom and/or direct embedded generation.

» **Proximity *to Towns with a Need for Socio-Economic Upliftment:*** The proposed project is located near the towns of Secunda, Embalenhle and Trichardt, within the Gert Sibande District Municipality and the Govan Mbeki Local Municipality in the Mpumalanga Province. Access to the project site is ample with the presence of existing roads mainly consisting of national and regional roads. The project site is situated directly adjacent to the south, of the N17 national road, which provides access to the project site and development area. The R546 is located directly adjacent and to the west of the project site and the R580 is located to the north of the project site. Various secondary tarred and gravel roads provide direct access to the project site and the development area. According to the community survey of 2011 by Statistics South Africa, the unemployment rate in the Govan Mbeki Local Municipality is at 63.6%. With the development of the Becrux Solar PV Facility, secondary social benefits can be expected in terms of additional spend in the nearby towns due to the increased demand for goods and services. Considering the above, it is clear that a need for employment opportunities and skills development is present within the area.

Taking into consideration the solar resource, grid access, land availability and suitability, geographical location, access to road infrastructure and proximity to towns with a need for socio-economic upliftment, the development of the Becrux Solar PV Facility within the proposed project site is considered to be desirable.

5.6.3 Benefits of Renewable Energy and the Need and Desirability in the South African Context

The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits include:

Socio-economic upliftment of local communities: The Becrux Solar PV Facility has the potential to create much needed employment for unskilled locals during the construction phase. Where possible, training opportunities will also be afforded to qualified local people who can be upskilled to undertake certain roles during the construction and operation phases. Some of the challenges facing the Local and District municipalities, as detailed in the IDPs include high rates of unemployment and high levels of poverty. The Local and District municipalities are therefore in need of economic development, sustainable employment

opportunities and growth in personal income levels. A study undertaken by the DMRE, National Treasury and the Development Bank of Southern Africa (DBSA) in June 2017 found that employment opportunities created during the construction phase of renewable energy projects implemented to date had created 40% more jobs for South African citizens than anticipated. The study also found that significantly more people from local communities were employed during construction than was initially planned, confirming the potential benefits for local communities associated with the implementation of renewable energy projects.

Resource saving: It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability. Renewable energy also translates into revenue savings, as fuel for renewable energy facilities is free, while compared to the continual purchase of fuel for conventional power stations.

Exploitation of significant renewable energy resource: At present, valuable renewable resources, including biomass by-products, solar irradiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio in South Africa.

Economics: As a result of the excellent resource and competitive procurement processes, both wind power and solar PV power are now proven in South Africa as cheaper forms of energy generation than coal power. They offer excellent value for money to the economy and citizens of South Africa while benefitting society as a whole through the development of clean energy.

Pollution reduction: The release of by-products through the burning of fossil fuels for electricity generation has a particularly hazardous impact on human health and contributes to ecosystem degradation. The use of solar irradiation or wind for power generation is a non-consumptive use of a natural resource which produces zero emissions during its operation.

Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of GHG emissions. South Africa is estimated to currently be responsible for approximately 1% of global GHG emissions (and circa half of those for which Africa is responsible) and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions. The development of Becrux Solar PV Facility and the associated electricity generated as a result of the facility, will result in considerable savings on tons of CO_2 emissions.

Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol and the Paris Agreement, and for cementing its status as a leading player within the international community.

Employment creation: The development, procurement, installation, maintenance and management of renewable energy facilities have significant potential for job creation and skills development in South Africa. The construction phase will create temporary employment opportunities and the operation phase will create limited full-time employment opportunities.

Acceptability to society: Renewable energy offers a number of tangible benefits to society, including reduced pollution concerns, improved human and ecosystem health and climate friendly development.

Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy, which will create jobs and skill local communities which have potential for further renewable energy projects.

Protecting the natural foundations of life for future generations: Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change, thereby securing the natural foundations of life for generations to come; this is the basis of sustainable development.

CHAPTER 6: APPROACH TO UNDERTAKING THE BASIC ASSESSMENT PROCESS

In terms of the EIA Regulations of December 2014 (as amended) published in terms of the NEMA (Act No. 107 of 1998), the construction and operation of the Becrux Solar PV Facility is a listed activity requiring environmental authorisation.

The BA process aims at identifying and describing potential environmental issues associated with the development of the proposed PV facility and associated infrastructure. In order to ensure that a comprehensive assessment is provided to the competent authority and I&APs regarding the impacts of the facility, detailed independent specialist studies were undertaken as part of the BA process.

South Africa has been subject to the enforcement of Government Gazette 43096 which places the country in a national state of disaster limiting the movement of people to curb the spread of the COVID-19 virus. The status of national state of disaster was still relevant at the commencement of the BA process. Considering the limitations in place, a comprehensive consultation process was designed and implemented to cater for the undertaking of a full-scale, innovative public participation process which included I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, ward councillors and other key stakeholders, while remaining within the limits as stipulated by the National Government. This chapter serves to outline the process that was followed during the BA process.

6.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for.	All listed activities triggered as a result of the development of the Becrux Solar PV Facility have been included in **section 6.2**, **Table .61**. The specific project activity relating to the relevant triggered listed activity has also been included in **Table 6.1**.
3(h)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	The details of the public participation process undertaken have been included and described in **section 6.3.2**.
3(h)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	All comments received from the commencement of the BA process have been included and responded to in the Comments and Responses (C&R) Report (**Appendix C8**). All comments raised during the 30-day review and comment period of the BA Report and through on-going consultation with I&APs will be included and responded to as part of a C&R Report (**Appendix C8**) to be submitted as part of the Final BA Report to Mpumalanga DARDLEA for decision-making.

Requirement	Relevant Section
3(h)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.	The methodology used to assess the significance of the impacts of the Becrux Solar PV Facility has been included in **section 6.4**.
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	The assumptions and limitations of the BA process being undertaken for the Becrux Solar PV Facility is included in **section 6.6**.

6.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to the Becrux Solar PV Facility, as identified at this stage in the process, are described in more detail under the respective sub-headings.

6.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(5) of the NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant EA. Since the purpose of the PV facility is to generate power for exclusive use by Sasol Limited and the fact that the project will not be bid into the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), the Mpumalanga DARDLEA has been determined as the Competent Authority.

The need to comply with the requirements of the EIA Regulations published under the NEMA ensures that proponents are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project and application for EA.

The BA process being conducted for the Becrux Solar PV Facility is undertaken in accordance with Section 24(5) of the NEMA, which defines the procedure to be followed in applying for EA, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an EIA process (either a BA or full Scoping and EIA).

Table 6.1 details the listed activities in terms of the EIA Regulations, 2014 (as amended) that apply to the Becrux Solar PV Facility, and for which an application for EA has been submitted to the Mpumalanga DARDLEA. The table also includes a description of the specific project activities that relate to the applicable listed activities.

Table 6.1: Listed activities as per the EIA regulations that are triggered by the Becrux Solar PV Facility

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
GN R327, 08 December 2014 (as amended on 07 April 2017)	1(i)	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is more than 10 megawatts but less than 20 megawatts. ***The Becrux Solar PV Facility will make use of solar energy as a renewable energy resource. The project will have a contracted capacity of up to 19.99MW$_{ac}$.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	12(ii)(a)(c)	The development of – (ii) infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs – (a) within a watercourse; or (c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse. ***The development of the Becrux Solar PV Facility will require the establishment of infrastructure (including internal access roads) with a physical footprint exceeding 100m2 within a watercourse or within 32m of a watercourse identified within the development area. The development footprint of the PV facility will be up to ~19.95ha in extent.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	14	The development and related operation of facilities and infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. ***The development of the Becrux Solar PV Facility will require the construction and operation of facilities and infrastructure for the storage and handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) associated the substation, where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation. ***The facility is located on an active crop field. There is however some vegetation immediately adjacent to the crop field that may be classified as indigenous vegetation. The project would therefore result in the clearance of indigenous vegetation within an area of 1 hectare or more, but less than 20 hectares, for the development of infrastructure.***

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
GN R327, 08 December 2014 (as amended on 07 April 2017)	28(ii)	Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare. ***The total area of land to be developed for the solar PV facility and associated infrastructure will be up to ~19.95ha on a site that is currently (after 1 April 1998) used for agricultural purposes.***
GN R327, 08 December 2014 (as amended on 07 April 2017)	56(ii)	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre – (ii) where no reserve exists, where the existing road is wider than 8 metres. ***The development of the Becrux Solar PV Facility and associated infrastructure may require the widening of a road by more than 6 metres.***
GN R324, 08 December 2014 (as amended on 07 April 2017)	4(f)(i)(bb)	The development of a road wider than 4 metres with a reserve less than 13.5 metres. f. Mpumalanga i. Outside urban areas: (bb) within National Protected Expansion Strategy Focus areas. ***Internal roads between projects components that are 6m wide are proposed. The site is located in the Mpumalanga Province, outside urban areas and overlaps with a National Protected Expansion Strategy Focus area.***
GN R324, 08 December 2014 (as amended on 07 April 2017)	10(f)(i)(bb)	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. f. Mpumalanga i. Outside urban areas: (bb) within National Protected Expansion Strategy Focus areas. ***The development of the Becrux Solar PV Facility will require the construction and operation of facilities and infrastructure for the storage and handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) associated the substation, where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters. The development area is located within the***

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description
		Mpumalanga Province, outside an urban area, and overlaps with an area classified as a Natural Protected Expansion Strategy Focus area.
GN R324, 08 December 2014 (as amended on 07 April 2017)	14(ii)(a)(c)(f)(i)(bb)	The development of – (ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs – (a) within a watercourse; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse f. in Mpumalanga (i) Outside urban areas (bb) within National Protected Expansion Strategy Focus areas. ***The development of the Becrux Solar PV Facility will require the establishment of infrastructure (including internal access roads) with a physical footprint exceeding 10m2 within a watercourse or within 32m of a watercourse identified within the development area. The development footprint of the PV facility will be up to ~19.95ha in extent. The project site is located within Mpumalanga, outside of an urban area and overlaps with a National Protected Expansion Strategy Focus area.***
GN R324, 08 December 2014 (as amended on 07 April 2017)	18(f)(i)(bb	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. f. Mpumalanga i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas. ***The development of the Becrux Solar PV Facility and associated infrastructure may require the widening of a road by more than 4 metres, outside urban areas and within a National Protected Area Expansion Strategy Focus area.***

6.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e., the Regional Department of Water and Sanitation). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 6.1 lists the possible Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a General Authorisation (GA), or in the form of a Water Use License

(WUL). The table also includes a description of those project activities which relate to the applicable Water Uses.

Table 6.1: List of Water Uses published under Section 21 of NWA, as amended.

Activity No.	Description of Water Use
Section 21 (c)	Impeding or diverting the flow of water in a watercourse. ***The development footprint considered for the establishment of the Becrux Solar PV Facility is associated with the presence of wetlands and drainage lines. Activities pertaining to the establishment of the PV facility might encroach on the wetlands and drainage lines which may lead to an impediment and diversion of the flow of water in the watercourses.***
Section 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water resource. ***The sewage generated during the operation phase will be collected and treated as per normal standards using a septic or conservancy tank. Sewage may also be stored in a conservancy tank and collected either by a honey-sucker truck or a service provider (contractor) for treatment at a licensed facility. This activity requires a license (GA if volumes are below 10 000m^3) in terms of the NWA.***
Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse. ***The development footprint considered for the establishment of the PV facility is associated with the presence of wetlands and drainage lines. Activities pertaining to the establishment of the PV facility might encroach on the wetlands and drainage lines which may lead to the altering of the characteristics of the watercourses.***

An application for a Water Use Authorisation (WUL or GA) for the above-mentioned identified water uses will be made by the applicant once a positive EA has been received.

6.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

- *a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- *b. the construction of a bridge or similar structure exceeding 50m in length;*
- *c. any development or other activity which will change the character of a site –*
  - *i). exceeding 5 000m² in extent; or*
  - *ii). involving three or more existing erven or subdivisions thereof; or*
  - *iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or*

iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the Becrux Solar PV Facility, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).

6.3 Overview of the Basic Assessment Process for the Becrux Solar PV Facility

Key tasks undertaken for the BA included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of the completed Application for Environmental Authorisation to the competent authority (i.e., Mpumalanga DARDLEA) in terms of Regulations 5 and 6 of the EIA Regulations, 2014 (GNR 326), as amended.
- Undertaking a public participation process in accordance with Chapter 6 of GNR 326, and the Department of Environmental Affairs (2017), Public Participation guidelines in terms of the NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa (hereinafter referred to as "the Guidelines") in order to identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR 326), as amended, and the requirements of the Specialist Protocols published in Regulation GNR 320, issued on 20 March 2020 and 30 October 2020.
- Preparation of a BA Report and EMPr in accordance with the requirements of Appendix 1 and Appendix 4 of GNR 326.
- 30-day public and authority review period of the BA Report.
- Compilation of a C&R Report detailing the comments raised by I&APs, addressing these comments in detail and finalisation of the BA Report.
- Submission of a final BA Report to the Mpumalanga DARDLEA for review and decision-making.

The tasks are discussed in detail in the sub-sections below.

6.3.1. Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

Since the purpose of the PV facility is to generate power for exclusive use by Sasol Limited and the fact that the project will not be bid into the REIPPPP, the Mpumalanga DARDLEA has been determined as the Competent Authority. Consultation with the Mpumalanga DARDLEA and all other relevant Organs of State will continue throughout the BA process. To date, this consultation has included the following:

- Holding a pre-application meeting with the Mpumalanga DARDLEA on 13 October 2021 (via the Microsoft Teams Platform) to discuss and agree with the department on who the relevant Competent Authority is for the proposed development and present the details thereof.
- Submission of the application form for Environmental Authorisation to the Mpumalanga DARDLEA.
- Submission of the BA Report for review and comment by:
  - The competent and commenting authorities.
  - State departments that administer laws relating to a matter affecting the environment relevant to an application for Environmental Authorisation.
  - Organs of State which have jurisdiction in respect of the activity to which the application relates.

The submissions to the Mpumalanga DARDLEA, as listed above, were undertaken via courier. A record of all authority correspondence undertaken during the BA process is included in **Appendix B**.

6.3.2. Public Participation Process

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GN R326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GN R326) (as amended) and is being followed for this proposed project.

The Public Participation Process undertaken for the proposed development of the Becrux Solar PV Facility considers the restrictions and limitations imposed by Government through section 27 (2) of the Disaster Management Act (Act No. 57 of 2002) of 2002 and the Directions issued by the Minister of the Department of Forestry, Fisheries and the Environment (DFFE) in terms of consultations with I&APs.

The alternative means of undertaking consultation have been designed and implemented by Savannah Environmental to ensure that I&APs are afforded sufficient opportunity to access project information and raise comments on the project through an interactive web-based platform (i.e. online stakeholder engagement platform) readily available and accessible to any person registering their interest in the project, and ensures that the public participation process is undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014 as amended. The alternative means of undertaking consultation considers the limitations applied by the Disaster Management Act Regulations prohibiting the gathering of people, as well as limitations which certain I&APs may have in terms of access to computers and internet as well as access to public spaces currently not open for operation that inhibits access to hard copy documentation. The online stakeholder engagement platform implemented by Savannah Environmental for the project allowed the EAP to visually present details regarding the project as well as consultation documentation, including project maps and plans, presentations,

and posters. The platform also contains the BA Report available for review. The use of an online tool enables stakeholders and I&APs to explore the project-specific content in their own time, and still enables them to participate in a meaningful way in the consultation process.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the BA process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. It affords I&APs opportunities to provide input into and receive information regarding the BA process in the following ways:
During the BA process:

- Provide an opportunity to submit comments regarding the project.
- Assist in identifying reasonable and feasible alternatives.
- Contribute relevant local information and knowledge to the environmental assessment.
- Allow registered I&APs to verify that their comments have been recorded, considered and addressed, where applicable, in the environmental investigations.
- Foster trust and co-operation.
- Generate a sense of joint responsibility and ownership of the environment.
- Comment on the findings of the environmental assessments.

During the decision-making phase:

- To advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process therefore aims to ensure that:

- Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review.
- The information presented during the public participation process is presented in such a manner, i.e., local language and technical issues, that it avoids the possible alienation of the public and prevents them from participating.
- Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.
- Various ways are provided to I&APs to correspond and submit their comments i.e., fax, post, email, SMS, WhatsApp or by sending a Please-call-me notification.
- An adequate review period is provided for I&APs to comment on the findings of the BA Report.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, as amended, the following key public participation tasks are required to be undertaken:

- Fix a notice board at a place conspicuous to the public at the boundary or on the fence of—
  - (i) the site where the activity to which the application relates is or is to be undertaken; and
  - (ii) any alternative site mentioned in the application.
- Give written notice to:
  - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;

(iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
(iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
(v) the municipality which has jurisdiction in the area;
(vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
(vii) any other party as required by the competent authority.

- Place an advertisement in one local newspaper.
- Open and maintain a register of I&APs and Organs of State.
- Release of a BA Report for a 30-day review and comment period.
- Prepare a C&R Report which documents the comments received on the BA process and during the 30-day review and comment period and the responses provided by the project team.

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations, 2014 (as amended), the following summarises the key public participation activities implemented. The schematic below provides an overview of the tools that are available to I&APs and stakeholders to access project information and interact with the public participation team to obtain project information and resolve any queries that may arise, and to meet the requirements for public participation.

i. Stakeholder identification and register of I&APs	•Register as an I&AP on the online platform or via completion of a form and provison of contact information, by responding to an advert, or sending a 'please call me' which will be responded to with a telephone call. •State interest in the project. •Receive all project related information via email, post or other appropriate means.
ii. Advertisments and notifications	•Advertisements, site notices and/or radio announcements and notifications provide information and details on the project and where to access project information. •Notifications regarding the BA process and availability of project report for public review to be sent via email, post or SMS notifications.
iii. Public Involvement and consultation	•Distribution of a BID providing details on the project and how I&APs can become involved in the process. •Submission of comments or queries via email or post to the PP team. •Virtual presentations available via the online platform. •Availability of project information via the online platform, email, post and telephonic platforms such as WhatsApp, and including telephonic discussions to provide description of information verbally. •An opportunity for I&APs and stakeholders to request virtual meetings with the project team.
iv. Comment on the BA Report	•Availability of the project report via the online platform for a 30-day comment period. Hard copies to be available only where sanitary conditions can be assured. •Submission of comments via email or post to the PP team. •Comments recorded and responded to, as part of the process.
v. Identification and recording of comments	•Comments and Responses Report, including all comments received to be included in the reporting. •Comments received during BA process to be included in the BA Report.

i. Stakeholder identification and Register of Interested and Affected Parties

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
    (a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP.
    (b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register.
    (c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the greater surrounding area and a registration process involving the completion of a reply form. Key stakeholders and affected and surrounding landowners (including occupiers) have been identified and registered on the project database. Other stakeholders are required to formally register their interest in the project through either directly contacting the Savannah Environmental Public Participation team via phone, message (SMS and WhatsApp), email or fax, or registering their interest via the online stakeholder engagement platform. An initial list of key stakeholders identified and registered is listed in **Table 6.3**.

Table 6.3: Initial list of Stakeholders identified for inclusion in the project database during the public participation process for the Becrux Solar PV Facility

Organs of State
National Government Departments
Department of Forestry, Fisheries, and the Environment
Department of Mineral Resources and Energy
Department of Agriculture, Land Reform and Rural Development
Department of Water and Sanitation
Government Bodies and State-Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
South African Radio Astronomy Observatory (SARAO)
Telkom SA SOC Limited
Transnet SA SOC Limited
Provincial Government Departments
Mpumalanga Department Agriculture, Rural Development, Land and Environmental Affairs
Mpumalanga Department of Economic Development and Tourism
Mpumalanga Department of Public Works, Roads and Transport
Mpumalanga Provincial Heritage Resources Authority
Mpumalanga Tourism and Parks Agency
Local Government Departments
Gert Sibande District Municipality
Govan Mbeki Local Municipality – including the Ward Councillor, ward committee members, community representative or local community forum members
Commenting Stakeholders
BirdLife South Africa
Endangered Wildlife Trust (EWT)
SENTECH
Wildlife and Environment Society of South Africa (WESSA)
Landowners
Affected landowner (Sasol)

Neighbouring landowners, tenants, and occupiers

As per Regulation 42 of the EIA Regulations, 2014 (as amended), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names[12] of:

- All persons who requested to be registered on the database through the use of the online stakeholder engagement platform or in writing and disclosed their interest in the project.
- All Organs of State which hold jurisdiction in respect of the activity to which the application relates.
- All persons who submitted written comments or attended virtual meetings and viewed the narrated presentations on the Savannah Environmental online platform during the public participation process.

I&APs have been encouraged to register their interest in the BA process from the onset of the project, and the identification and registration of I&APs will be on-going for the duration of the BA process. The database of I&APs will be updated throughout the BA process and will act as a record of the I&APs involved in the public participation process.

ii. Advertisements and Notifications

40.(2)(a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of – (i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) Any alternative site.
40.(2)(b)	Giving written notice, in any of the manners provided for in section 47Dof the Act, to – (i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area; (iv) The municipality which has jurisdiction in the area; (v) Any organ of state having jurisdiction in respect of any aspect of the activity; and (vi) Any other party as required by the competent authority.
40.(2)(c)	Placing an advertisement in – (i) One local newspaper; or (ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
40.(2)(d)	Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and

[12] Contact details and addresses have not been included in the I&AP database as this information is protected by the Protection of Personal Information Act (No 4 of 2013).

40.(2)(e)	Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to – (i) Illiteracy; (ii) Disability; or (iii) Any other disadvantage.

The BA process was announced with an invitation to the Organs of State, potentially affected and neighbouring landowners (including occupiers) and general public to register as I&APs and to actively participate in the process. This was achieved via the following:

- Compilation of a background information document (BID) (refer to **Appendix C3**) providing technical details on the project, details of the BA process being undertaken and how I&APs can become involved in the BA process. The BID and the BA process notification letter announcing the BA process and inviting I&APs to register on the project's database were distributed via email on **14 January 20212**. Evidence of distribution is contained in **Appendix C3** of the BA Report. The BID is also available electronically on the Savannah Environmental website (https://www.savannahsa.com/public-documents/energy-generation/).
- Placement of site notices announcing the BA process at visible points along the boundary of the project site (i.e., the boundary of the affected property), in accordance with the requirements of the EIA Regulations on **14 January 2022**. Photographs of the site notices and the GPS co-ordinates of the locations where the site notices were placed are contained within **Appendix C2** of the BA Report.
- Placement of an advertisement in one local newspaper (The Ridge Times Newspaper (in English)) on **18 January 2022**. This advert:
  - announced the availability of the BA Report and details of the review period; and
  - provided all relevant details to access the Savannah Environmental online stakeholder engagement platform.

  A copy of the newspaper advert as sent to the newspaper and the advert tear sheet are included in **Appendix C2** of the BA Report Report.
- The BA Report has been made available for review and comment by I&APs from **21 January 2022** to **21 February 2022.** The BA Report has been made available on the Savannah Environmental website and all registered I&APs have been notified of the availability on **21 January 2022** via email which included the link to access the report on the Savannah Environmental website. The evidence of distribution of the BA Report will be included in the final BA Report, which will be submitted to the Mpumalanga DARDLEA.

iii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the surrounding area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities have been and will continue to be provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

Table 6.4: Public involvement for the Becrux Solar PV Facility

Activity	Date
Distribution of the BID, process notification letters and stakeholder reply form announcing the BA process and inviting I&APs to register on the project database.	14 January 2022

Activity	Date
The BID and electronic reply form was also made available on the online stakeholder engagement platform.	
Placement of site notices along the boundary of the project site, including placement of further notices in Secunda.	14 January 2022
Announcement of the BA process and availability of the BA Report for a 30-day review and comment period, including details on how to access the BA Report via the online stakeholder engagement platform, in one local newspaper: » Ridge Times Newspaper (English advertisement)	18 January 2022
Distribution of notification letters announcing the availability of the BA Report for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the surrounding area (including neighbouring landowners), registered I&APs and key stakeholder groups.	21January 2022
30-day review and comment period of the BA Report.	Friday, 21 January 2022 to Monday, 21 February 2022
Meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: » Landowners. » Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations). » Where an I&AP does not have access to a computer and/or internet to participate in a virtual meeting telephonic discussions (including WhatsApp video call) will be set-up and minuted for inclusion. The preferred language of the I&AP will be considered when setting up these discussions.	To be held during the 30-day review and comment period.
On-going consultation (i.e., telephone liaison; e-mail communication) with all I&APs.	Throughout BA process

iv. Registered I&APs entitled to Comment on the BA Report

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

(2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –

(a) A lack of skills to read or write;

(b) Disability; or

(c) Any other disadvantage;

Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database have been notified via letter of the release of the BA Report for a 30-day review and comment period, invited to provide comment on the BA Report, and informed of the manner in which, and timeframe within which such comment must be made. The report has been made available in soft copies to I&APs due to restrictions and limitations on public spaces during the national state of disaster related to COVID-19.

The BA Report has also been made available on the Savannah Environmental website (i.e., online stakeholder engagement platform) (https://www.savannahsa.com/public-documents/energy-generation/). The notification was distributed at the commencement of the 30-day review and comment period, on **21 January 2022.** Where I&APs were not able to provide written comments (including SMS and WhatsApp), other means of consultation, such as telephonic discussions will be used to provide the I&APs with a platform to verbally raise their comments on the proposed development.

All comments raised as part of the discussions and written comments submitted during the 30-day review and comment period will recorded and included in **Appendix C6** and **Appendix C7** of the BA Report.

v. Identification and Recording of Comments

Comments raised by I&APs to date have been collated into a C&R Report which is included in **Appendix C8** of the BA Report. The C&R Report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised. The C&R Report will consist of written comments received.

Meeting notes of all virtual meetings and discussions undertaken during the 30-day review and comment period will be included in **Appendix C7** of the final BA Report.

The C&R Report will be updated with all comments received during the 30-day review and comment period and will be included as **Appendix C8** of the final BA Report that will be submitted to the Mpumalanga DARDLEA for decision-making.

6.4. Outcomes of the DFFE Web-Based Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (included as **Appendix L** of the BA Report) for the Becrux Solar PV Facility is applicable as it triggers Regulation 19 of the EIA Regulations, 2014 (as amended). **Table 6.5** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team considering the development area under consideration.

Table 6.5: Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of the Becrux Solar PV Facility

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Agricultural Impact Assessment	High	The Pedology Impact Assessment (which includes an assessment of the agricultural potential of the site) has been undertaken for the Becrux Solar PV Facility and is included in this BA Report as **Appendix F**.
Landscape/Visual Impact Assessment	Very high	A Visual Impact Assessment has been undertaken for the Becrux Solar PV Facility and is included in this BA Report as **Appendix H.**
Archaeological and Cultural Heritage Impact Assessment	Low	A Heritage Impact Assessment (which covers both archaeological and cultural aspects of the development area and development footprint) has been undertaken for the Becrux Solar PV Facility and is included in this BA Report as **Appendix G**.
Palaeontology Impact Assessment	Very high	The Heritage Impact Assessment (included as **Appendix G** of the BA Report) includes an assessment of palaeontological resources within the development area and development footprint.
Terrestrial Biodiversity Impact Assessment	Very high	An Ecological Impact Assessment (including flora and fauna) has been undertaken for the Becrux Solar PV Facility and is included as **Appendix D** of the BA Report.
Aquatic Biodiversity Impact Assessment	Low	An Aquatic Impact Assessment has been undertaken for the Becrux Solar PV Facility and is included as **Appendix E** of the BA Report.
Avian Impact Assessment	Very high	An Ecological Impact Assessment (including avifauna) has been undertaken for the Becrux Solar PV Facility and is included as **Appendix D** of the BA Report.
Civil Aviation Assessment	Medium	The Civil Aviation Authority will be consulted throughout the BA process to obtain input on the proposed project.
Defence Assessment	Low	The project site is not located within close proximity of any military base.
RFI Assessment	Low	The project site under consideration for the development of the Becrux Solar PV Facility is located outside of an Astronomy Advantage Area and within an area that as classified as having low sensitivity for telecommunication. The South African Radio Astronomy Observatory (SARAO) will however be consulted during the 30-day review and comment period of the BA Report to provide written comment on the proposed development.
Social Impact Assessment	The screening report does not indicate a rating for this theme.	A Social Impact Assessment has been undertaken for the Becrux Solar PV Facility and is included in the BA Report as **Appendix I**.
Plant Species Assessment	Medium	An Ecological Impact Assessment (including flora and fauna) has been undertaken for the Becrux Solar PV Facility and is included as **Appendix D** of the BA Report.
Animal Species Assessment	Medium	

6.5. Assessment of Issues Identified through the BA Process

From the screening tool results, as well as through consideration of the questions as detailed within the DFFE Guideline on Need and Desirability, issues identified as requiring investigation within the BA Process were identified. The specialist studies undertaken as well as the specialist consultants involved in the assessment of these impacts are indicated in **Table 6.6** below.

Table 6.6: Specialist consultants appointed to evaluate the potential impacts associated with the Becrux Solar PV Facility

Specialist	Field of Study	Appendix
Lindi Steyn, Martinus Erasmus and Andrew Husted of The Biodiversity Company	Ecology (including flora, fauna and avifauna)	Appendix D
Ivan Baker and Andrew Husted of The Biodiversity Company	Wetlands	Appendix E
Ivan Baker and Andrew Husted of The Biodiversity Company	Pedology (soils)	Appendix F
Jenna Lavin and Nicholas Wiltshire of CTS Heritage	Heritage (including archaeology and palaeontology)	Appendix G
Lourens du Plessis of LOGIS	Visual	Appendix H
Nondumiso Bulunga of Savannah Environmental (Pty) Ltd and Tony Barbour of Tony Barbour Environmental Consulting	Social	Appendix I

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the Becrux Solar PV Facility. Issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected;
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high);
- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - Medium-term (5–15 years) – assigned a score of 3;
  - Long term (> 15 years) - assigned a score of 4; and
  - Permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- The **status**, which is described as either positive, negative or neutral;
- The degree to which the impact can be reversed;
- The degree to which the impact may cause irreplaceable loss of resources;
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M) P; where

S = Significance weighting.
E = Extent.
D = Duration.
M = Magnitude.
P = Probability.

The **significance weightings** for each potential impact are as follows:

- **< 30 points:** Low (i.e., where this impact would not have a direct influence on the decision to develop in the area);
- **30-60 points:** Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated); and
- **> 60 points:** High (i.e., where the impact must have an influence on the decision process to develop in the area).

Specialist studies also considered cumulative impacts associated with similar developments within a 30km radius of the proposed project. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e., whether the addition of the proposed project in the area will increase the impact). In this regard, specialist studies considered whether the construction of the proposed development will result in:

- Unacceptable risk.
- Unacceptable loss.
- Complete or whole-scale changes to the environment or sense of place.
- Unacceptable increase in impact.

A conclusion regarding whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports. As the proponent has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations, 2014 (as amended)), the mitigation of significant impacts is discussed. An assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. An Environmental Management Programme (EMPr) that includes all the mitigation measures recommended by the specialists for the management of significant impacts is included as **Appendix J**.

6.6 Assumptions and Limitations of the BA Process

The following assumptions and limitations are applicable to the studies undertaken within this BA process:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- It is assumed that the project site, development area and development footprint for the PV facility identified by the developer represents a technically suitable site for the establishment of the Becrux Solar PV Facility, which is based on the design undertaken by technical consultants for the project.
- This report and its investigations are project-specific, and consequently, the environmental team did not evaluate any other power generation alternatives.

Refer to the specialist studies in **Appendices D – I** for specialist study specific limitations.

6.7 Legislation and Guidelines that have informed the preparation of this Basic Assessment Report

The following legislation and guidelines have informed the scope and content of this BA Report:

- National Environmental Management Act (Act No. 107 of 1998).
- EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended).
- Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations;
- Department of Environmental Affairs (2017), Integrated Environmental Management Guideline: Guideline on Need and Desirability.
- Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation.
- International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Table 6.7 provides an outline of the legislative permitting requirements applicable to the Becrux Solar PV Facility as identified at this stage in the project process.

Table 6.7: Applicable Legislation, Policies and/or Guidelines associated with the development of the Becrux Solar PV Facility

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* * *Prevent pollution and ecological degradation,* * *Promote conservation, and* * *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No. 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. Considering the capacity of the proposed solar PV facility (i.e., contracted capacity of 19MWac) and the	Mpumalanga DARDLEA – competent authority	The listed activities triggered by the proposed project have been identified and are being assessed as part of the BA process currently underway for the project. The BA process will culminate in the submission of a final BA Report to the competent authority in support of the application for EA.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	triggering of Activity 1 of Listing Notice 1 (GN R.327), a Basic Assessment process is required in support of the application for EA.		
National Environmental Management Act (No 107 of 1998) (NEMA)	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA, every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	Mpumalanga DARDLEA	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the life cycle of the project.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any	Mpumalanga DARDLEA Govan Mbeki Local Municipality By-Laws	Noise impacts are expected to be associated with the construction phase of the project. Minimal noise is expected during operation. As the site is located away from noise sensitive receptors and communities, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of the legislation.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	person, machine, device or apparatus or any combination thereof (Regulation 04). Furthermore, the South African noise control regulations describe a disturbing noise as any noise that exceeds the ambient noise by more than 7dB (ambient noise in rural areas being approximately 45dB). This difference is usually measured at the complainant's location should a noise complaint arise. Therefore, if a new noise source is introduced into the environment, irrespective of the current noise levels, and the new source is louder than the existing ambient environmental noise by more than 7dB, the complainant will have a legitimate complaint.		
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use), is permissible under a GA, or if a responsible authority waives the need for a licence. Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)).	Regional DWS	Wetlands and drainage lines are present within the development footprint for the Becrux Solar PV Facility as identified in the Wetland Impact Assessment (**Appendix E**). Where the development activities impede or divert the flow of water in a watercourse, or alter the bed, banks, course or characteristics of a watercourse, Section 21(c) and 21(i) of the NWA (Act 36 of 1998) would be triggered and the project proponent would need to apply for a WUL or register a GA with the DWS. The sewage generated during the operation phase will be collected and treated as per normal standards using a septic or conservancy tank. Sewage may also be stored in a conservancy tank and collected either by a honey-sucker truck or

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).		a service provider (contractor) for treatment at a licensed facility. This activity requires a license (GA if volumes are below 10 000m^3) in terms of the NWA.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining right or permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources and Energy (DMRE)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of the NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.		In terms of Section 53 of the MPRDA, approval is required from the Minister of Mineral Resources and Energy to ensure that the proposed development does not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dustfall rates for residential and non-residential areas. In accordance with the Regulations (GNR 827), any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme. Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after	Mpumalanga DARDLEA Gert Sibande District Municipality	In the event that the project results in the generation of excessive levels of dust, the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed. However, with mitigation measures implemented, the Becrux Solar PV Facility is not anticipated to result in significant dust generation and at this stage, a dust fall monitoring programme is not deemed required.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.		
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority. Section 38(1) of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.	South African Heritage Resources Agency (SAHRA) Mpumalanga Provincial Heritage Resource Authority	A full Heritage Impact Assessment (HIA) (with field work) has been undertaken as part of the BA process (refer to **Appendix G** of this BA Report). No heritage and palaeontological resources of significance were identified within the development area. Should a heritage resource be impacted upon, a permit may be required from SAHRA or the Mpumalanga Provincial Heritage Resource Authority in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows:	DFFE Mpumalanga DARDLEA	Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species. An Ecological Impact Assessment (including flora and fauna) has been undertaken as part of the BA process (refer

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable, and protected species (GNR 151), as amended in 2020 (GNR 627). » TOPS Regulations (GNR 152). NEM:BA provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process, including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 1002, 9 December 2011, GG 34809).		to **Appendix D**). No protected flora and fauna species which require a permit under NEM:BA were identified within the development area.
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864). The updated NEMBA Alien and Invasive Species Regulations were gazetted on 25 September 2020 (in force from 1 March 2021) and the updated	DFFE Mpumalanga DARDLEA	The Ecological Impact Assessment (**Appendix D**) identified Six (6) invasive alien plant species within the development area. These species are listed under the Alien and Invasive Species List, 2020, Government Gazette No. GN1003 as Category 1b. Category 1b species must be controlled by implementing an Invasive Alien Plant Management Programme, in compliance with section 75 of the NEM:BA.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Alien and Invasive Species list was gazetted on 18 September 2020 (in force 1 March 2021).		
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) Regulations (GN R1048) (CARA Regulations)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GN R1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GN R1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species. It should be noted that the CARA regulations for the legal obligations regarding alien invasive plants in South Africa have been superseded by the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004) – Alien and Invasive Species (AIS) Regulations which were promulgated on 1 October 2014 (as amended in 2020). However, CARA has not been repealed and is still included as a reference point to use in terms of the management of invasive alien plans where certain species may not be included in the NEM: BA alien invasive species list.	Department of Agriculture, Land Reform and Rural Development (DALRD)	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E (GN R1048) where Category 1, 2 or 3 plants occur, a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting, or burning. » Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734 (as updated in 2018). The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister".	DFFE	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. The Ecological Impact Assessment (**Appendix D**) identified no protected trees that may require a license in terms of the NFA within the development area.
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to	DFFE	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Becrux Solar PV Facility, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.		
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from the Department of Health (DoH).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 921), a BA or EIA is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.	DFFE – Hazardous Waste Mpumalanga DARDLEA – General Waste	No waste listed activities are triggered by the Becrux Solar PV Facility, and as such, no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and	South African National Roads Agency (SANRAL) – national roads	An abnormal load/vehicle permit will be required to transport the various

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.	Mpumalanga Department of Public Works, Roads and Transport	components to site for construction. These include: » Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. » Depending on the trailer configuration and height when loaded, some of the project components may not meet specified dimensional limitations (height and width).
Astronomy Geographic Advantage Act (Act No. 21 of 2007) (AGA)	The Astronomy Geographic Advantage (AGA) Act (No. 21 of 2007) provides for the preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy; for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas and for matters connected thereto. Chapter 2 of the Act allows for the declaration of astronomy advantage areas whilst Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of	Department of Science and Technology.	The site proposed for the development of the Becrux Solar PV Facility is located within the Mpumalanga Province and therefore falls outside of the areas considered to be uniquely suited in terms of nationally significant astronomy advantage areas.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	astronomy advantage areas include, amongst others, the following: * Restrictions on use of radio frequency spectrum in astronomy advantage areas; * Declared activities in core or central astronomy advantage area; * Identified activities in coordinated astronomy advantage area; and * Authorisation to undertake identified activities.		
Aviation Act (Act No 74 of 1962) 13th amendment of the Civil Aviation Regulations (CARS) 1997	Any structure exceeding 45m above ground level or structures where the top of the structure exceeds 150m above the mean ground level, the mean ground level considered to be the lowest point in a 3km radius around such structure. Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified. Overhead wires, cables etc., crossing a river, valley or major roads shall be marked and in addition their supporting towers marked and lighted if an aeronautical study indicates it could constitute a hazard to aircraft.	South African Civil Aviation Authority (SACAA) Air Traffic and Navigation Services SOC Limited (ATNS)	This Act will find application during the operation phase of the Becrux Solar PV Facility. Appropriate marking of project infrastructure >45m above ground level, such as the powerline, is required to meet the specifications. as detailed in the CAR Regulations Part 139.01.33. An obstacle approval (or confirmation that no approval is required) would be required to be obtained from the South African CAA.
Provincial Policies / Legislation			
Mpumalanga Nature Conservation Act (No. 10 of 1998) (MNCA)	This Act makes provision with respect to nature conservation in the Mpumalanga province. It provides for, among other things, protection of wildlife, hunting, fisheries, protection of endangered fauna and flora as listed in the Convention on international Trade in Endangered Species of Wild Fauna and Flora, the control of harmful animals, freshwater pollution, and enforcement.	Mpumalanga DARDLEA	An Ecological Impact Assessment (including flora and fauna) has been undertaken as part of the BA process (refer to **Appendix D**). No protected flora and fauna species which require a permit under the MNCA were identified within the development area.

6.7.1 The IFC EHS Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The following IFC EHS Guidelines have relevance to the Becrux Solar PV Facility:

- IFC EHS General Guidelines
- IFC Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants

The application of the General EHS Guidelines should be tailored to the hazards and risks associated with a project and should take into consideration site-specific variables which may be applicable, such as host country context, assimilative capacity of the environment, and other project factors. In instances where host country regulations differ from the standards presented in the EHS Guidelines, whichever is the more stringent of the two in this regard should be applied.

The General EHS Guidelines include consideration of the following:

- Environmental:
  - Air Emissions and Ambient Air Quality
  - Energy Conservation
  - Wastewater and Ambient Water Quality
  - Water Conservation
  - Hazardous Materials Management
  - Waste Management
  - Noise
  - Contaminated Land
- Occupational Health and Safety:
  - General Facility Design and Operation
  - Communication and Training
  - Physical Hazards
  - Chemical Hazards
  - Biological Hazards
  - Radiological Hazards
  - Personal Protective Equipment (PPE)
  - Special Hazard Environments
  - Monitoring
- Community Health and Safety:
  - Water Quality and Availability
  - Structural Safety of Project Infrastructure
  - Life and Fire Safety (L&FS)
  - Traffic Safety
  - Transport of Hazardous Materials
  - Disease Prevention
  - Emergency Preparedness and Response
- Construction and Decommissioning:
  - Environment
  - Occupational Health & Safety
  - Community Health & Safety

6.7.2 IFC Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (2015)

While no Industry Sector EHS Guidelines have been developed for PV Solar Power, the IFC has published a Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (IFC, 2015). Chapter 8 of the Project Developer's Guide pertains to Permits, Licensing and Environmental Considerations, and states that in order to deliver a project which will be acceptable to international lending institutions, environmental and social assessments should be carried out in accordance with the requirements of the key international standards and principles, namely the Equator Principles and the IFC Performance Standards.

Some of the key environmental considerations for solar PV power plants contained within the Project Developer's Guide include:

Construction Phase Impacts

Construction activities lead to temporary air emissions (dust and vehicle emissions), noise related to excavation, construction and vehicle transit, solid waste generation and wastewater generation from temporary building sites and worker accommodation. In addition, Occupational Health and Safety (OHS) is an issue that needs to be properly managed during construction in order to minimise the risk of preventable accidents leading to injuries and / or fatalities. Proper OHS risk identification and management measures should be incorporated in every project's management plan and standard Engineering, Procurement and Construction (EPC) contractual clauses.

Response:
Impacts associated with the construction phase of the development have been identified and assessed as part of the detailed independent specialist studies undertaken as part of the BA process. Where applicable, appropriate mitigation measures with which to minimise the significance of construction phase impacts have been identified and included in the EMPr prepared for Becrux Solar PV Facility and attached as **Appendix J** to this BA Report.

Water Usage

Although water use requirements are typically low for solar PV plants, clusters of PV plants may have a high cumulative water use requirement in arid areas where local communities rely upon scarce groundwater resources. In such scenarios, water consumption should be estimated and compared to local water abstraction by communities (if any), to ensure no adverse impacts on local people. O&M methods in relation to water availability and use should be carefully reviewed where risks of adverse impacts to community usage are identified.

Further, many projects are likely to be constructed in areas with a scarcity of water and electricity. Therefore, the use of these resources during construction and operation of the plant may have an impact on the local economy. Careful siting and design of the projects should minimise this potential impact.

Response:
Water will be required for the construction phase, which will be approximately 9.2m^3/day for human consumption, washing of equipment, earthworks/dust suppression and civil works. Water will also be required for the operation phase, which will be approximately 2.829m^3/day for cleaning, fire control and general usage. Water will be sourced directly from the Sasol Facility or from a registered water services provider such as the municipality. The current preference is to source water directly from the neighbouring Sasol Facility (discussions are underway with Sasol regarding this option).

Land Matters

As solar power is one of the most land-intensive power generation technologies, land acquisition procedures and in particular the avoidance or proper mitigation of involuntary land acquisition / resettlement are critical to the success of the project. This includes land acquired either temporarily or permanently for the project site itself and any associated infrastructure – i.e., access roads, powerlines and construction camps (if any). If involuntary land acquisition is unavoidable, a Resettlement Action Plan (RAP) (dealing with physical displacement and any associated economic displacement) or Livelihood Restoration Plan (LRP) (dealing with economic displacement only) will be required. This is often a crucial issue with respect to local social license to operate and needs to be handled with due care and attention by suitably qualified persons.

Response:
Becrux Solar PV Facility and its associated infrastructure is proposed on a property owned by Sasol, the off taker of the power to be generated by the facility. A landowner / lease agreement has been entered into between Becrux Solar PV Project One (Pty) Ltd and the Sasol to provide for the utilisation of the land for the development of the solar facility and its associated infrastructure. No involuntary land acquisition or resettlement is required or will take place as a result of the project as the affected property is owned by Sasol.

Landscape and Visual Impacts

Key impacts can include the visibility of the solar panels within the wider landscape and associated impacts on landscape designations, character types and surrounding communities. Common mitigation measures to reduce impacts can include consideration of layout, size and scale during the design process and landscaping / planting in order to screen the modules from surrounding receptors. Note that it is important that the impact of shading on energy yield is considered for any new planting requirements. Solar panels are designed to absorb, not reflect, irradiation. However, glint and glare should be a consideration in the environmental assessment process to account for potential impacts on landscape / visual and aviation aspects.

Response:
Potential visual impacts associated with the development of Becrux Solar PV Facility have been assessed as part of the Visual Impact Assessment specialist study conducted as part of the BA process. Measures required to avoid, or if avoidance is not possible minimise, and mitigate any negative visual impacts have been identified, and are contained within the EMPr prepared for the project and attached as **Appendix J** to this BA Report.

Ecology and Natural Resources

Potential impacts on ecology can include habitat loss / fragmentation, impacts on designated areas and disturbance or displacement of protected or vulnerable species. Receptors of key consideration are likely to include nationally and internationally important sites for wildlife and protected species such as bats, breeding birds and reptiles. Ecological baseline surveys should be carried out where potentially sensitive habitat, including undisturbed natural habitat, is to be impacted, to determine key receptors of relevance to each site. Mitigation measures can include careful site layout and design to avoid areas of high ecological value or translocation of valued ecological receptors. Habitat enhancement measures could be considered where appropriate to offset adverse impacts on sensitive habitat at a site, though avoidance of such habitats is a far more preferable option.

Response:
Potential ecological impacts associated with the development of Becrux Solar PV Facility have been assessed as part of the Ecology Impact Assessment (refer to **Appendix D**) conducted as part of the BA process. Measures with which to avoid, or if avoidance is not possible minimise, and mitigate any negative ecological impacts have been identified, and are contained within the EMPr prepared for the project and attached as **Appendix J** to this BA Report. Areas of ecological sensitivity are reflected in an environmental sensitivity map prepared for the project and have been utilised to inform the facility layout so that such areas are suitably avoided.

Cultural Heritage

Potential impacts on cultural heritage can include impacts on the setting of designated sites or direct impacts on below-ground archaeological deposits as a result of ground disturbance during construction. Where indicated as a potential issue by the initial environmental review / scoping study, field surveys should be carried out prior to construction to determine key heritage and archaeological features at, or in proximity to, the site. Mitigation measures can include careful site layout and design to avoid areas of cultural heritage or archaeological value and implementation of a 'chance find' procedure that addresses and protects cultural heritage finds made during a project's construction and/or operation phases.

Response:
Heritage impacts associated with the development of the Becrux Solar PV Facility have been assessed as part of the Heritage Impact Assessment conducted as part of the BA process (refer to **Appendix G**), which includes the consideration of heritage, archaeological, and palaeontological resources. Measures with which to avoid, or if avoidance is not possible minimise, and mitigate any negative heritage impacts (including those on heritage, archaeology, and palaeontology) have been identified, and are contained within the EMPr prepared for the project and attached as **Appendix J** to this BA Report.

Transport and Access

The impacts of transportation of materials and personnel should be assessed in order to identify the most appropriate transport route to the site while minimising the impacts on project-affected communities. The requirement for any oversized vehicles / abnormal loads should be considered to ensure access is appropriate. Onsite access tracks should be permeable and developed to minimise disturbance to agricultural land. Where project construction traffic has to traverse local communities, traffic management

plans should be incorporated into the environmental and social management plan and EPC requirements for the project.

Response:
The project site can be readily accessed via existing access roads in the region. Within the facility development footprint, access will be required from new / existing roads for construction purposes (and limited access for maintenance during operation). The facility layout has been determined following the identification of site related sensitivities.

The national, regional, secondary, and proposed internal access roads will be used to transport all components and equipment required during the construction phase of the solar PV facility. Some of the components (i.e., on-site substation transformer) may be defined as abnormal loads in terms of the National Road Traffic Act (No. 93 of 1996) (NRTO) by virtue of the dimensional limitations. A permit will be required in accordance with Section 81 of the National Road Traffic Act (No. 93 of 1996) (NRTA) which pertains to vehicles and loads which may be exempted from provisions of the Act.

Drainage / Flooding

A review of flood risk should be undertaken to determine if there are any areas of high flood risk associated with the site. Existing and new drainage should also be considered to ensure run-off is controlled to minimise erosion.

Response:
A stormwater management plan will be prepared prepared for the project and included within the project EMPr attached as **Appendix J** of this BA Report.

Consultation and Disclosure

It is recommended that early-stage consultation is sought with key authorities, statutory bodies, affected communities and other relevant stakeholders. This is valuable in the assessment of project viability and may guide and increase the efficiency of the development process. Early consultation can also inform the design process to minimise potential environmental impacts and maintain overall sustainability of the project. The authorities, statutory bodies and stakeholders that should be consulted vary from country to country but usually include the following organisation types:

- Local and / or regional consenting authority.
- Government energy department / ministry.
- Environmental agencies / departments.
- Archaeological agencies / departments.
- Civil aviation authorities / Ministry of Defence (if located near an airport).
- Roads authority.
- Health and safety agencies / departments.
- Electricity utilities.
- Military authorities.

Community engagement is an important part of project development and should be an on-going process involving the disclosure of information to project-affected communities. The purpose of community

engagement is to build and maintain over time a constructive relationship with communities located in close proximity to the project and to identify and mitigate the key impacts on project-affected communities. The nature and frequency of community engagement should reflect the project's risks to, and adverse impacts on, the affected communities.

Response:
A Public Participation Process, as prescribed by Chapter 6 of the 2014 EIA Regulations (GNR 326), is being conducted as part of the BA process being undertaken for the project. This Public Participation Process includes consultation with key authorities, affected and surrounding landowners, local communities, and other relevant stakeholders.

Environmental and Social Management Plan (ESMP)

Whether or not an ESIA or equivalent has been completed for the site, an ESMP should be compiled to ensure that mitigation measures for relevant impacts of the type identified above (and any others) are identified and incorporated into project construction procedures and contracts. Mitigation measures may include, for example, dust suppression during construction, safety induction, training and monitoring programs for workers, traffic management measures where routes traverse local communities, implementation of proper waste management procedures, introduction of periodic community engagement activities, implementation of chance find procedures for cultural heritage, erosion control measures, fencing off of any vulnerable or threatened flora species, and so forth. The ESMP should indicate which party will be responsible for (a) funding, and (b) implementing each action, and how this will be monitored and reported on at the project level. The plan should be commensurate to the nature and type of impacts identified.

Response:
Impacts associated with the construction phase of the development have been identified and assessed as part of the independent specialist studies undertaken as part of the BA process. Appropriate mitigation measures with which to minimise the significance of negative impacts have been identified and are included in the EMPr prepared for the project and attached as **Appendix J** to this BA Report.

CHAPTER 7: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the local environment that will be affected by the development of the Becrux Solar PV Facility. This information is provided to assist the reader in understanding the features present within the project site and development area and the possible effects of the project on the environment within which it is proposed. Aspects of the biophysical, social, and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from both existing information available for the area as well as collected field data by specialist consultants and aims to provide the context within which this BA process is being conducted.

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of the EIA Regulations, 2014 (as amended) - Appendix 1: Content of Basic Assessment Reports:

REQUIREMENT	RELEVANT SECTION
3(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the project site and development area, as well as the broader environment, are described and considered within this chapter and include the following:
	The regional setting within which the project site and development area are located is described in **section 7.2**.
	The climatic conditions of the area within which the project is located is discussed in **section 7.3**.
	The biophysical characteristics of the project site, development area and the surrounding areas is described in **section 7.4**. This includes the topography and terrain, geology, soils and agricultural potential and the ecological profile of the site (i.e., broad-scale vegetation patterns, critical biodiversity areas and broad-scale processes, surface water features, terrestrial fauna and avifauna).
	The heritage of the project site, development area and the surrounding areas (including the archaeology and palaeontology) is discussed in **section 7.5**.
	The visual quality of the affected environment is discussed in **section 7.6**.
	The social context within which the project site is located is described in **section 7.7**.

A more detailed description of each aspect of the affected environment is included in the specialist reports contained within the **Appendices D - I**.

7.2. Regional Setting

The Becrux Solar PV Facility is situated on Portion 6 of the Farm Goedehoop No. 290, located approximately 7km south-east of Secunda and 15km east of Embalenhle, in the Govan Mbeki Local Municipality, which forms part of the Gert Sibande District Municipality in the Mpumalanga Province.

7.2.1 Mpumalanga Province

The Mpumalanga Province, within which the project site is located, is the second-smallest province in South Africa and is located in the north-eastern part of the country, bordering Swaziland and Mozambique (Mpumalanga Spatial Development Framework, 2018). The Mpumalanga province covers an area of 76 495km^2 and has a population of 4 335 964, making it one of the most populous provinces in South Africa (Mpumalanga Spatial Development Framework, 2018). Mpumalanga is known for its mining, manufacturing, forestry, and service sectors. The Maputo Corridor, which links Mpumalanga with Gauteng and Maputo in Mozambique, harbours extensive potential in terms of economic development and growth for the region (Mpumalanga Spatial Development Framework, 2018). The Mpumalanga Province comprises of three district municipalities, namely, Ehlanzeni, Gert Sibande and Nkangala (refer to **Figure 7.1**) – which contain seventeen local municipalities collectively, with the project site being located within the Gert Sibande District Municipality.

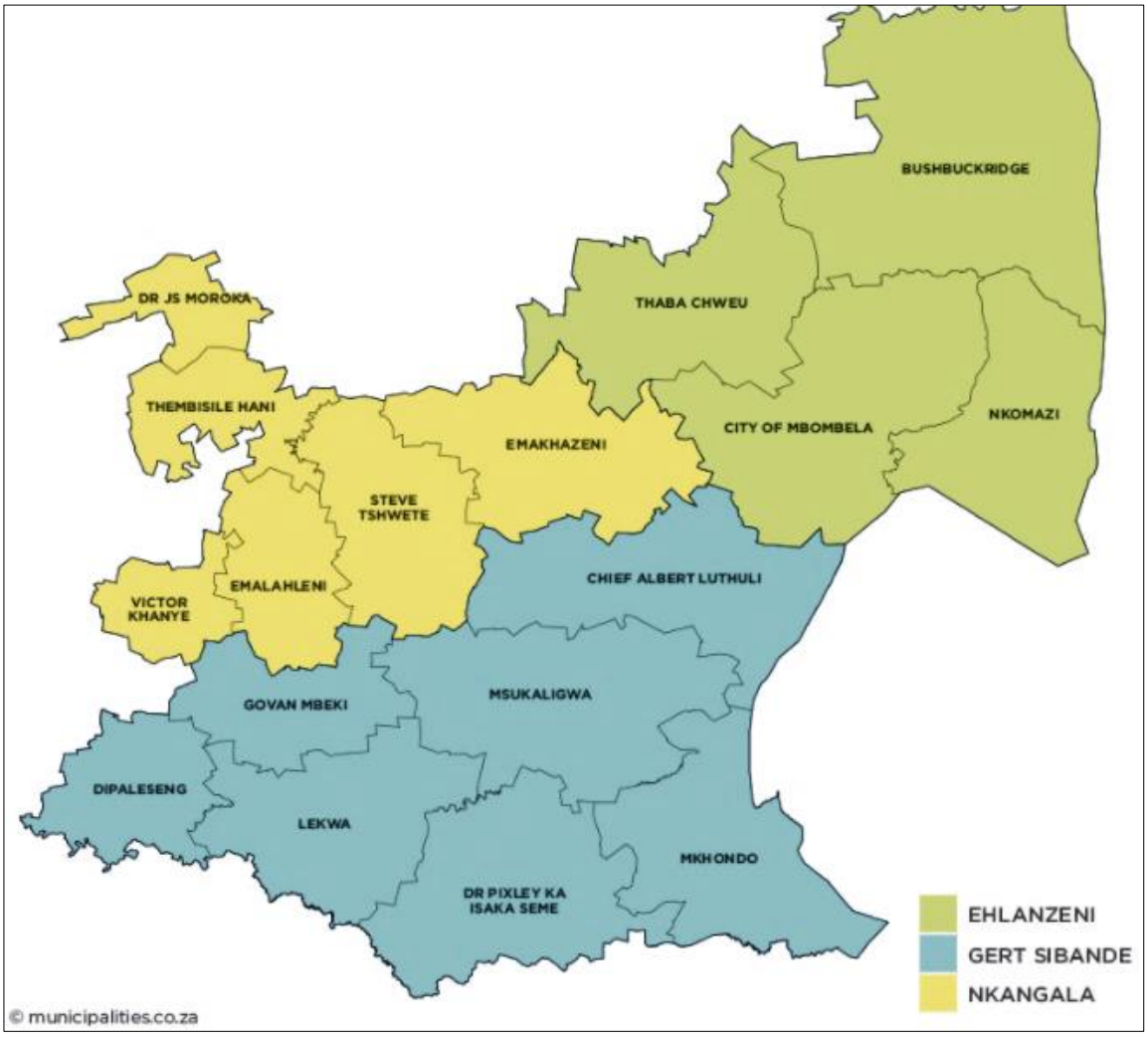

Figure 7.1: District municipalities of the Mpumalanga Province (Source: Municipalities of South Africa)

7.2.2 Gert Sibande District Municipality

The Gert Sibande District Municipality is a Category C municipality[13] bordered by the Ehlanzeni and Nkangala District Municipalities to the north, KwaZulu-Natal and the Free State to the south, Swaziland to the east, and Gauteng to the west. It is the largest of the three districts in the Mpumalanga Province, making up almost half of its geographical area. The Gert Sibande District Municipality comprises seven local municipalities, namely, Govan Mbeki, Chief Albert Luthuli, Msukaligwa, Dipaleseng, Mkhondo, Lekwa and Dr Pixley ka Isaka Seme (refer to **Figure 7.2**). According to Stats SA (2016 Community Survey), Gert Sibande's population increased from 1 043 194 in 2011 to 1 135 409 people in 2016. This makes the district the smallest district in terms of population amongst the three districts in the province. The economy of the Gert Sibande District Municipality is driven by manufacturing, agriculture, transport, trade, community services, construction, electricity, finance and mining.

Figure 7.2: Local municipalities of the Gert Sibande District Municipality (Source: Municipalities of South Africa)

7.2.3 Govan Mbeki Local Municipality

The Govan Mbeki Local Municipality has the largest underground coal mining complex in the world, which makes it an important strategic area within the national context. It covers an aerial extent of 2 955km^2 and is bordered by the Nkangala District in the north, Dipaleseng and Lekwa in the south, Msukaligwa in the east, and the Gauteng Province in the west. It is one of the smallest of seven municipalities that make up the district, accounting for 9% of its geographical area. Secunda is the seat of the municipality, as well as the seat of the district municipality. According to Stats SA (2011), the population in Govan Mbeki Local

[13] A municipality that has municipal executive and legislative authority in an area that includes more than one municipality.

Municipality's sits at 340 091. Primary economic sectors in the municipality include mining, manufacturing, trade, and construction.

7.3. Climatic Conditions

The climate of the broader project site is characterised by high and low extreme temperatures during summer and winter, respectively, with frost frequently occurring (refer to **Figure 7.3**). The mean annual precipitation for this region reaches approximately 662mm and is characterised by summer rainfall.

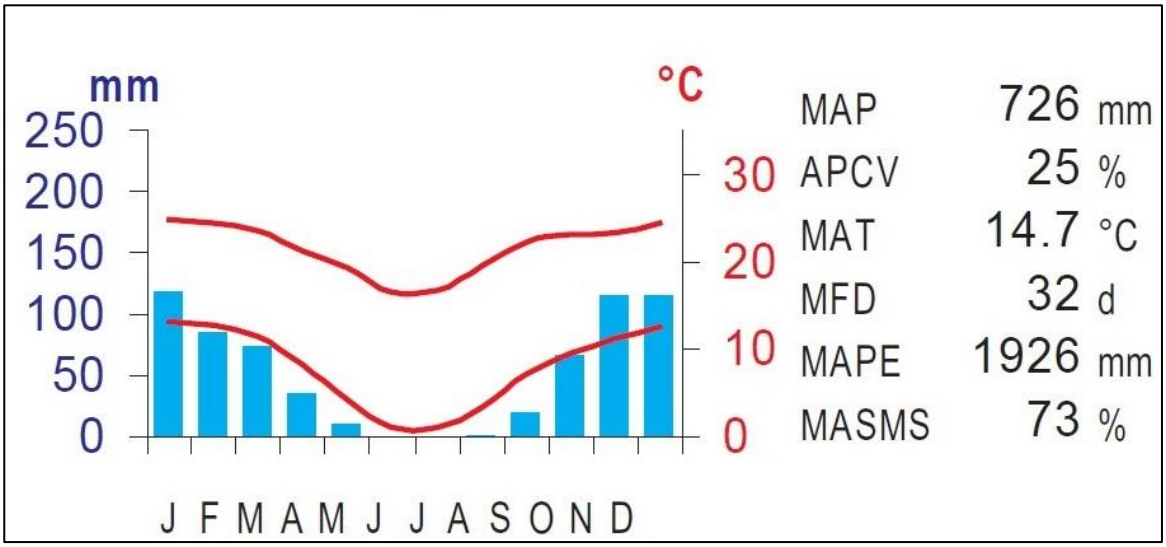

Figure 7.3: Climate diagram for the region (Mucina & Rutherford, 2006)

7.4. Biophysical Characteristics of the Study Area

7.4.1. Topography and Terrain

The topography or terrain morphology of the region is broadly described as *Slightly Undulating Plains* of the *Interior Plain*. The slope of the entire project site is relatively even (flat) with a gradual drop (approximately 100m) from the north-eastern and southern sections of the project site to the Klipspruit River which flows south of Secunda. The proposed development area itself is located at an average elevation of 1 615m above sea level and has an even slope to the north.

The slope percentage of the development area and immediate surrounds was determined and is illustrated in **Figure 7.4**. The slope percentage ranges from 0 to 13%, with the majority of the are being characterised by a gentler slope (between 0 and 5%).

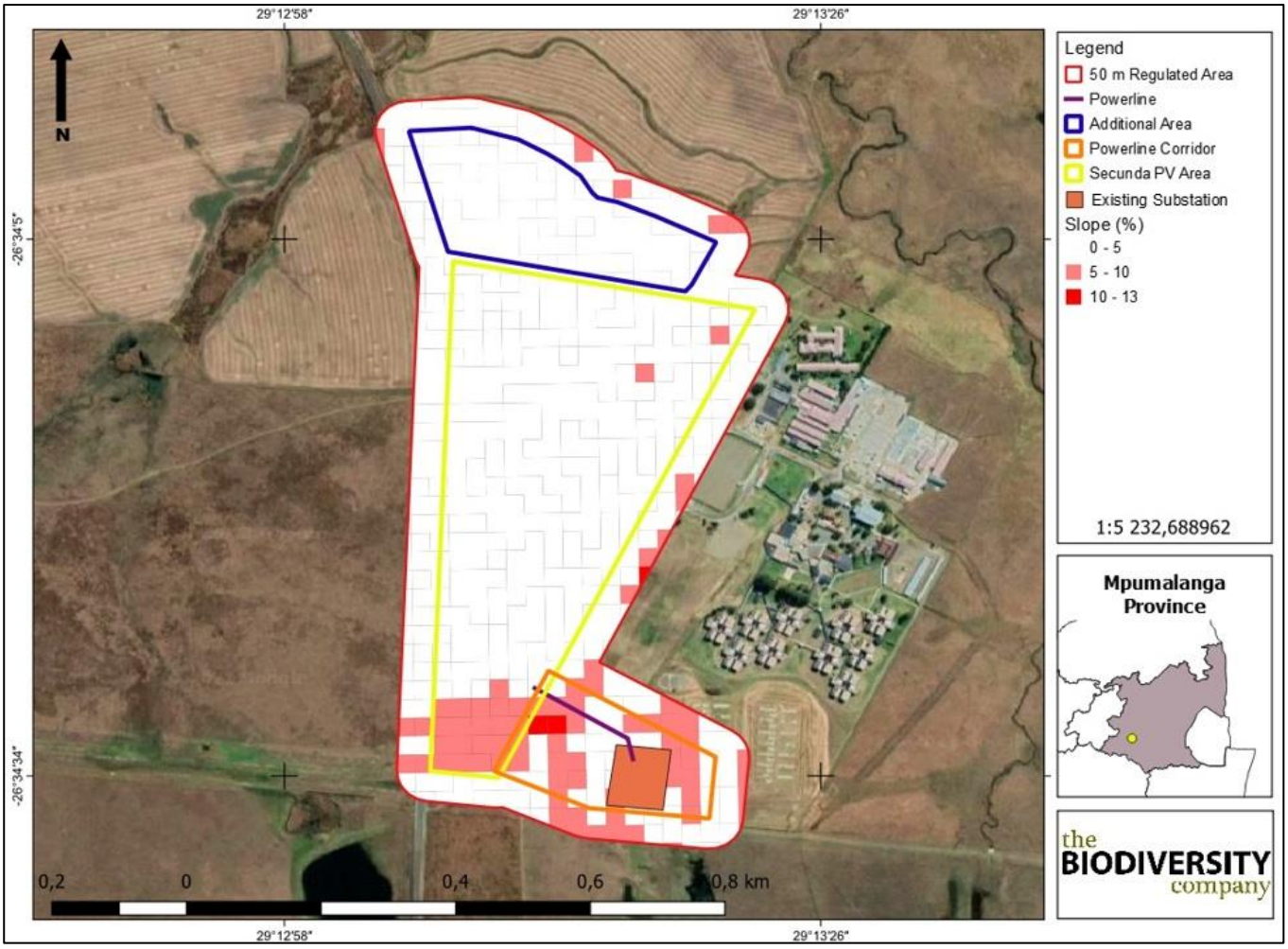

Figure 7.4: Slope percentage of the 50m regulated area

7.4.2. Geology, Soils and Agricultural Potential

Geological Setting of the Project Site

The geology of the site is characterised by the Madzaringwe Formation shale, mudstone, and sandstone of the Karoo Supergroup or the Karoo Suite dolerites which feature prominently in this area (refer to **Figure 7.5**). To the west, the rocks of Ventersdorp, Transvaal and Witwatersrand Supergroups are significant with the south being characterised by the Volksrust Formation from the Karoo Supergroup.

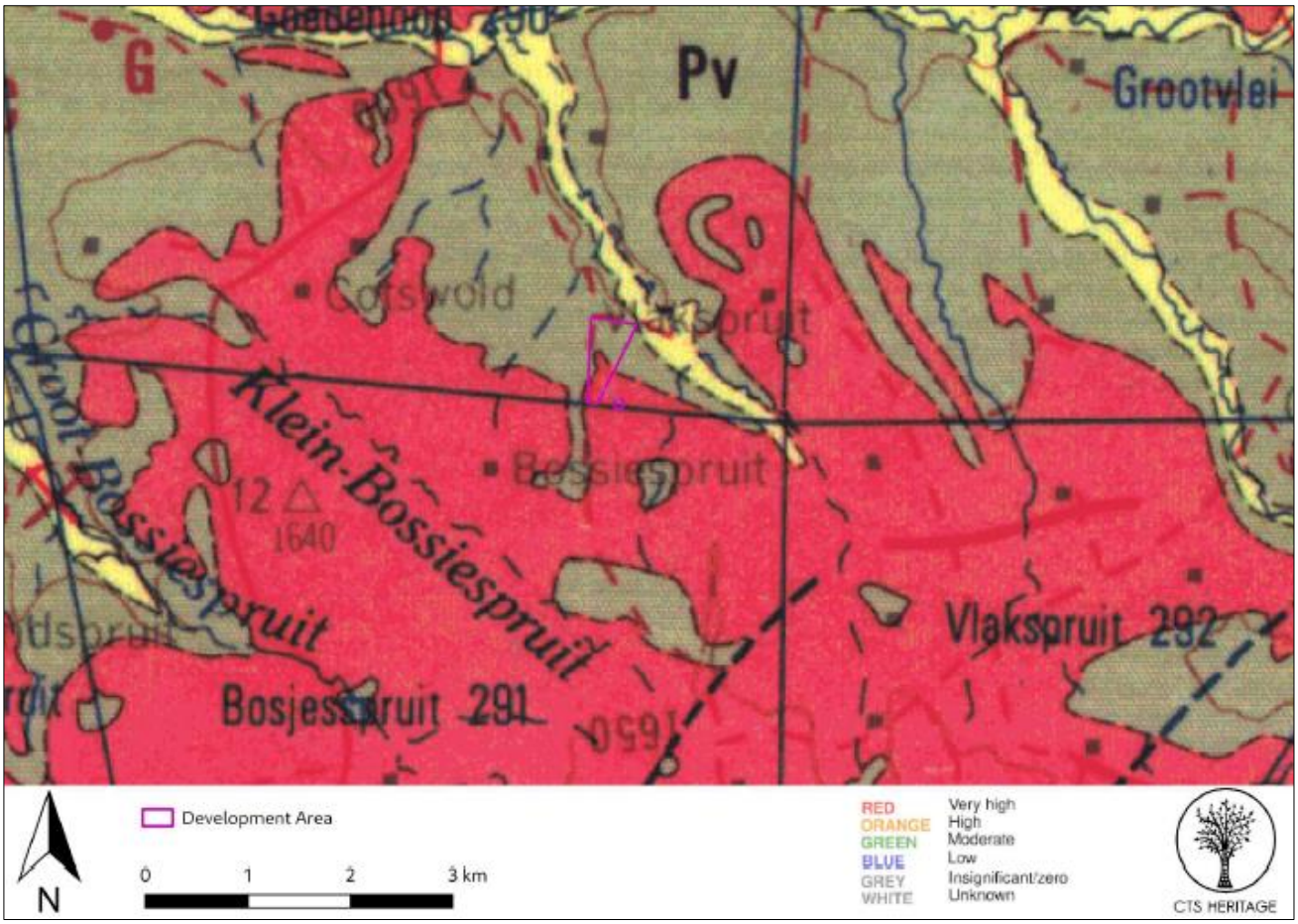

Figure 7.5: 1:50 0000 Geology Map 2628 East Rand from the Council of Geoscience. The development area is underlain by sediments of the Vryheid Formation (Pv) of the Ecca Group as well as non-fossiliferous Jurassic Dolerites (Jd).

Soil Forms, Land Capability and Agricultural Potential of the Project Site

According to the land type database (Land Type Survey Staff, 1972 - 2006), the development area is characterised by the Ea 17 land type, which consists of one or more of the following soils: Vertic, Melanic, and red structured diagnostic horizons, of which these soils are all undifferentiated.

Soil profiles were studied up to a depth of 1.2m to identify specific diagnostic horizons which are vital in the soil classification process as well as to determine the agricultural potential and land capability. The following diagnostic horizons were identified during the pedology site assessment (refer to **Figure 7.6**):

» Gley horizon;
» Lithocutanic horizon;
» Vertic topsoil; and
» Melanic topsoil.

Figure 7.6: Diagnostic soil horizons identified during the site assessment. A) Melanic topsoil. B) Gley topsoil. C) Transition from Vertic topsoil to gley horizon. D) Vertic topsoil with signs of wetness (unconsolidated material with signs of wetness)

During the pedology site assessment, five soil forms were identified and delineated within the 50m regulated area as illustrated in **Figure 7.7**, namely, Glenrosa, Deep Arcadia, Shallow Arcadia, Darnall and Rensburg.

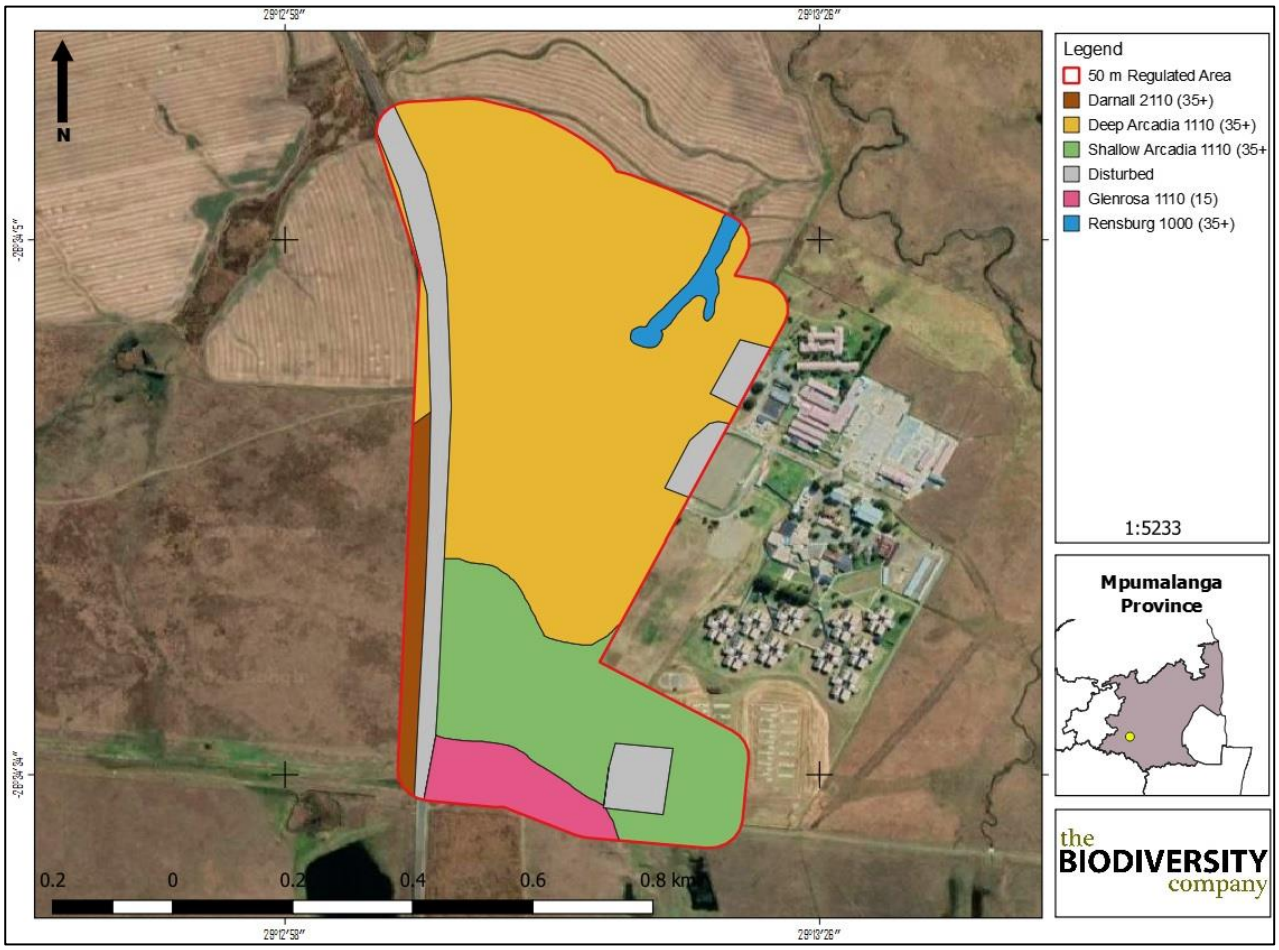

Figure 7.7: Soil delineations within the development area, including the 50m regulated area

The land capability was determined by using the guidelines described in "The farming handbook" (Smith, 2006). The delineated soil forms were clipped into the three different slope classes (0-3%, 3-7% and 7-12%) to determine the land capability of each soil form. The delineated soil forms were then grouped together in six different land capability classes (land capability 1, 2, 3, 4, V and 6). The land capabilities for the development area, including the 50m regulated area, are described in **Table 7.1** and illustrated in **Figure 7.8**.

Table 7.1: Land capability for the soils within the development area, including the 50m regulated area

Land Capability Class	Definition of Class	Conservation Need	Use-Suitability	Percentage of Land Capability within Development Area	Land Capability Group	Sensitivity
1	None to Slight	Local climate is favourable for good yields for a wide range of adapted crops throughout the year		1.9	Arable	Very High
2	Slight	Local climate is favourable for a wide range of adapted crops and a year-round growing season. Moisture stress and lower temperatures increase risk and decreases yields		42.2	Arable	High
3	Moderate limitations. Some erosion hazard	Special conservation practice and tillage methods	Rotation crops and ley (50%)	19.2	Arable	High
4	Severe limitations. Low arable potential.	Intensive conservation practice	Long term leys (75%)	19.8	Arable	Moderate
V	Water course and land with wetness limitations	Protection and control of water table	Improved pastures, suitable for wildlife	4.6	Grazing	Low
6	Limitations preclude cultivation. Suitable for perennial vegetation	Protection measures for establishment, e.g., sod-seeding	Veld, pastures and afforestation	1.4	Grazing	Low

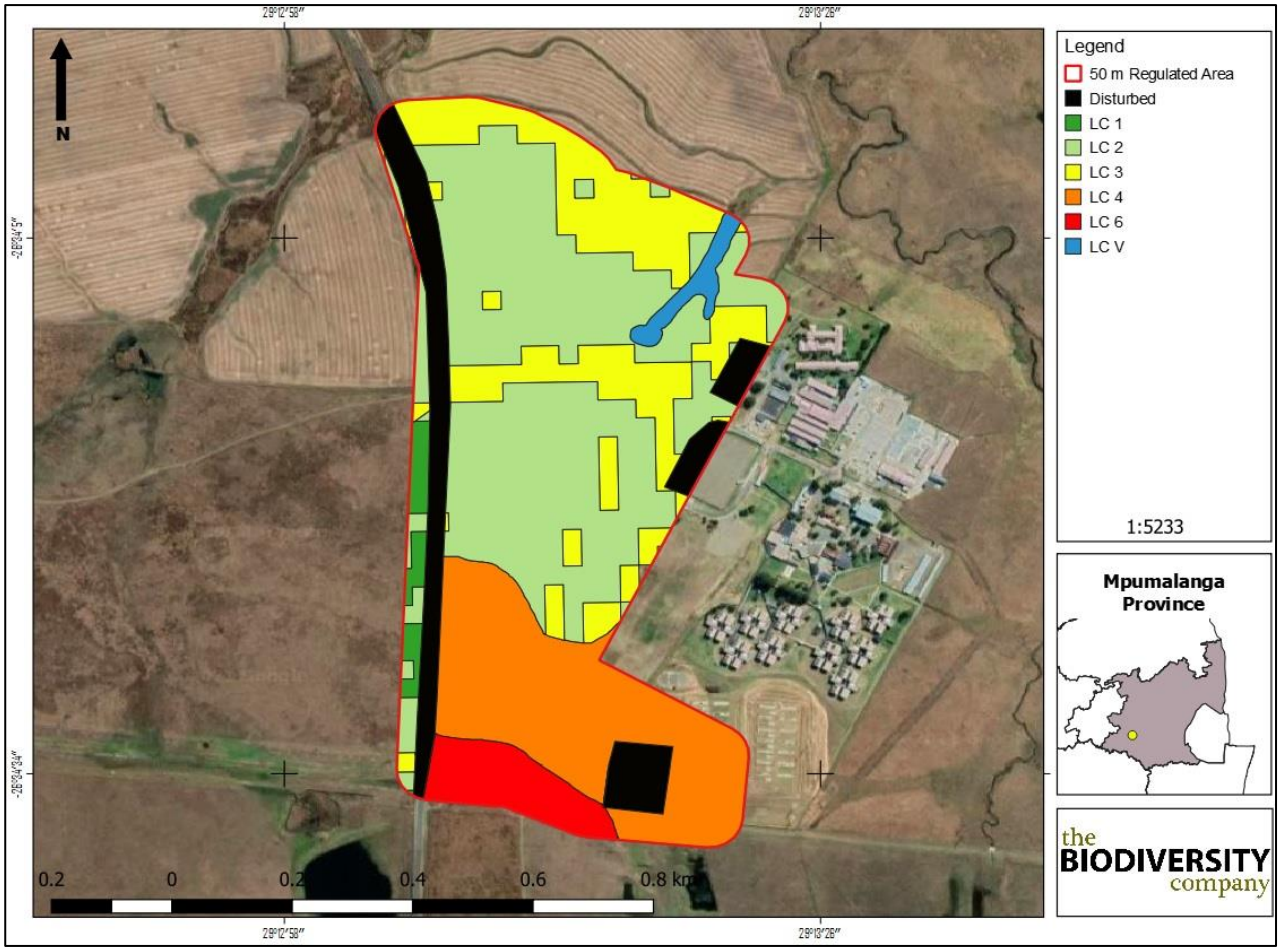

Figure 7.8: Land capability classes for the development area, including the 50m regulated area

The land potential or agricultural potential is determined by combining the land capability results and the climate capability for the region. From the six land capability classes, four land potential levels have been determined by means of the Guy and Smith (1998) methodology. Land capability 1 and 2 have been reduced to a land potential level L4 due to climatic limitations. Land capability classes 3 and 4 have been calculated to be land potential "L5" with the land capability 6 areas being associated with L6 conditions. The land capability V has been allocated a land potential "Vlei" considering its hydromorphic characteristics. The land potential is detailed in **Table 7.2** and illustrated in **Figure 7.9**.

Table 7.2: Land potential for soils within the development area, including the 50m regulated area

Land Potential	Percentage	Description of Land Potential Class	Sensitivity
4	44.1	**Moderate potential.** Moderately regular and/or severe to moderate limitations due to slope, soil, temperatures or rainfall. Appropriate permission is required before ploughing virgin land.	Moderate
5	39	**Restricted potential.** Regular and/or severe to moderate limitations due to soil, temperatures, slope o0r rainfall.	Moderate
6	1.4	**Very restricted potential.** Regular and/or severe limitations due to soil, slope, temperatures or rainfall. Non-arable.	Low
Vlei	4.6	Wetland (grazing and wildlife)	Low

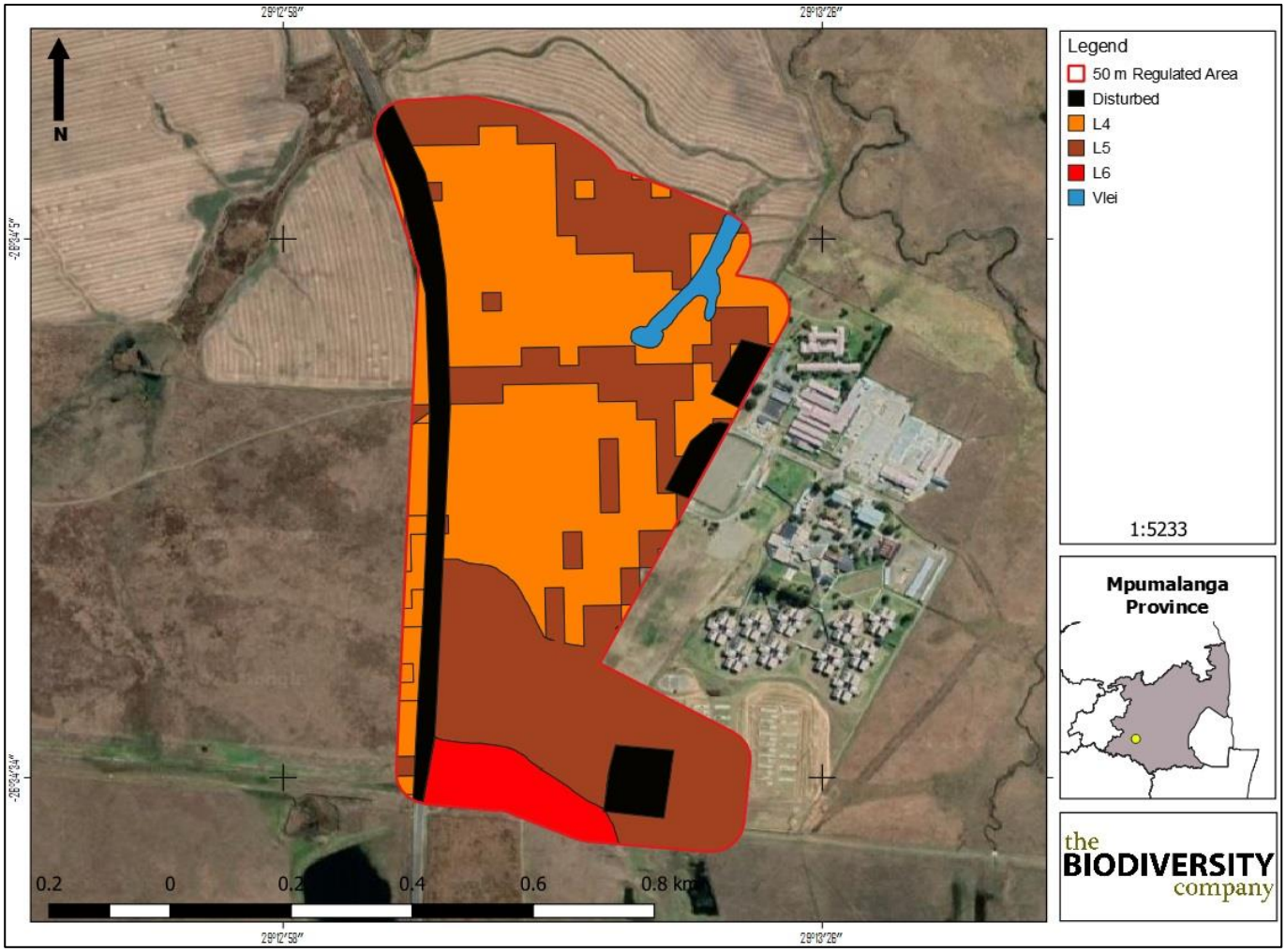

Figure 7.9: Land potential within the development area, including the 50m regulated area

7.4.3 Land Use

Five different land uses have been identified within the proposed development area, namely "Crops", "Disturbed", "Built-Up", "Grassland" and "Wetlands" (refer to **Figure 7.10**).

Land use activities within the broader region are predominantly described as maize farming (predominantly dryland agriculture) and cattle farming, with the mining activities and the Sasol Secunda CTL Plant prominently visible within the study area. The town of Secunda is located to the north and hosts a number of secondary industries, retail services and recreational facilities. The Secunda Airfield is located south-west of the town at a distance of approximately 6km (north-west) from the proposed Becrux Solar PV Facility. Farm settlements or residences occur at irregular intervals throughout the study area.

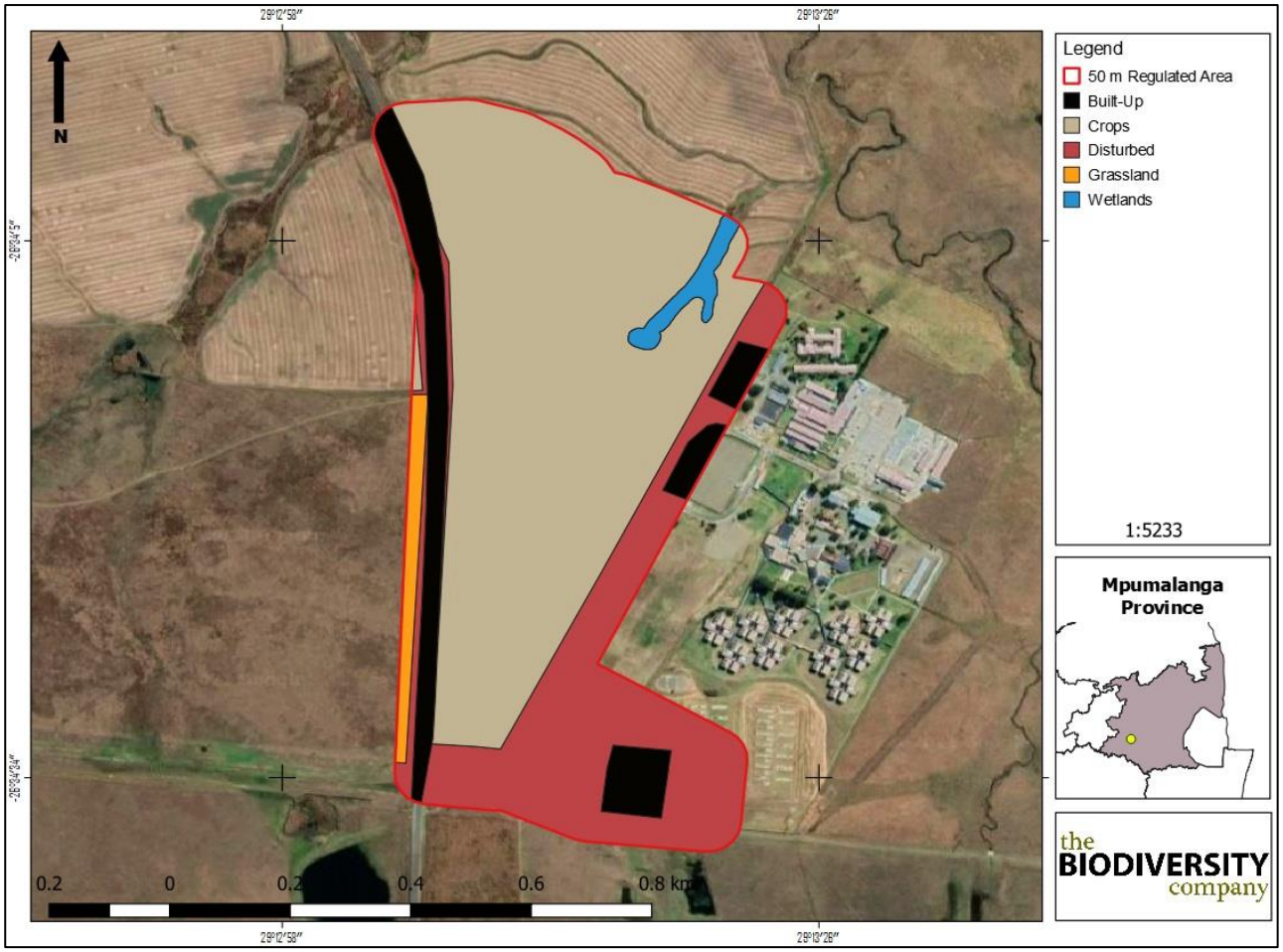

Figure 7.10: Different land uses within the proposed development area, including the 50m regulated area

7.4.4. Ecological Profile of the Broader Study Area and the Project Site

i. Broad-Scale Vegetation Patterns

The project site is situated within the grassland biome which is centrally located in southern Africa and adjoins all except the desert, fynbos and succulent Karoo biomes. The grassland biome comprises many different vegetation types. According to Mucina and Rutherford (2006), the project site is situated within the Soweto Highveld Grassland vegetation type (refer to **Figure 7.11**).

Soweto Highveld Grassland

The Soweto Highveld Grassland vegetation type is found in Mpumalanga, Gauteng and to a small extent also in neighboring Free State and North-West Provinces. This vegetation type typically comprises an undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus, Eragrostis racemosa, Heteropogon contortus* and *Tristachya leucothrix*. Scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover.

The following species are important in the **Soweto Highveld Grassland** vegetation type:

» **Graminoids:** *Andropogon appendiculatus, Brachiaria serrata, Cymbopogon pospischilii, Cynodon dactylon, Elionurus muticus , Eragrostis capensis, E. chloromelas, E. curvula, E. plana, E. planiculmis, E.*

racemosa, Heteropogon contortus, Hyparrhenia hirta, Setaria nigrirostris, S. sphacelata, Themeda triandra, Tristachya leucothrix, Andropogon schirensis, Aristida adscensionis, A. bipartita, A. congesta, A. junciformis subsp. galpinii, Cymbopogon caesius, Digitaria diagonalis, Diheteropogon amplectens, Eragrostis micrantha, E. superba, Harpochloa falx, Microchloa caffra, Paspalum dilatatum (Mucina & Rutherford, 2006).

- **Herbs:** *Hermannia depressa, Acalypha angustata, Berkheya setifera, Dicoma anomala, Euryops gilfillanii, Geigeria aspera var. aspera, Graderia subintegra, Haplocarpha scaposa, Helichrysum miconiifolium, H. nudifolium var. nudifolium, H. rugulosum, Hibiscus pusillus, Justicia anagalloides, Lippia scaberrima, Rhynchosia effusa, Schistostephium crataegifolium, Selago densiflora, Senecio coronatus, Vernonia oligocephala, Wahlenbergia undulata* (Mucina & Rutherford, 2006).
- **Geophytic *Herbs*:** *Haemanthus humilis subsp. hirsutus, H. montanus. Herbaceous Climber: Rhynchosia totta* (Mucina & Rutherford, 2006).
- **Low Shrubs**: *Anthospermum hispidulum, A. rigidum subsp. pumilum, Berkheya annectens, Felicia muricata, Ziziphus zeyheriana* (Mucina & Rutherford, 2006).

According to Mucina & Rutherford (2006), the Soweto Highveld Grassland is classified as Endangered. By 2006, nearly half of the area of occupancy of this vegetation type had already been transformed by cultivation, urban sprawl, mining and building of road infrastructure. The amount of area transformed has most likely increased substantially. Some Soweto Grassland areas have been flooded by dams including Grootdraai, Leeukuil, Trichardtsfontein, Vaal and Willem Brummer.

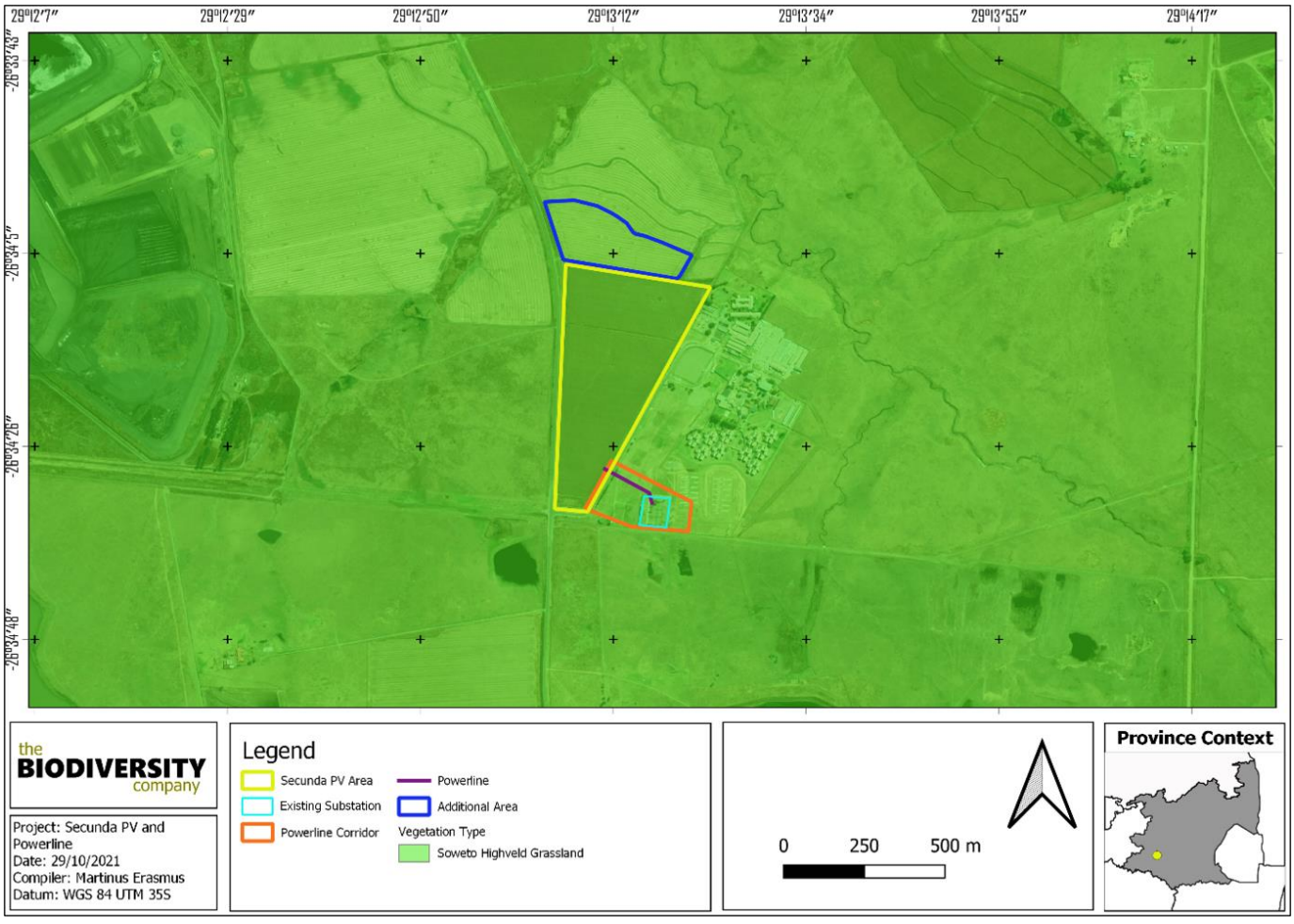

Figure 7.11: Map illustrating the vegetation type associated with the development area

ii. Listed Plant Species

The POSA database indicates that 391 species of indigenous plants are expected to occur within the project site. Six (6) species of conservation concern (SCC), based on their conservation status, could be expected to occur within the project site and are provided in **Table 7.3** below.

Table 7.3: Threatened flora species that may occur within the project site

Family	Taxon	Author	IUCN	Ecology
Apocynaceae	*Miraglossum davyi*	(N.E.Br.) Kupicha	VU	Indigenous; Endemic
Apocynaceae	*Stenostelma umbelluliferum*	(Schltr.) Bester & Nicholas	NT	Indigenous; Endemic
Asphodelaceae	*Kniphofia typhoides*	Codd	NT	Indigenous; Endemic
Asteraceae	*Cineraria austrotransvaalensis*	Cron	NT	Indigenous; Endemic
Fabaceae	*Argyrolobium campicola*	Harms	NT	Indigenous; Endemic
Iridaceae	*Gladiolus robertsoniae*	F.Bolus	NT	Indigenous; Endemic

None of the species of conservation concern listed in **Table 7.3** were confirmed within the project site during the field survey undertaken in November 2021. A total of twenty-six (26) tree, shrub, herbaceous and graminoid plant species were however recorded in the development area during the field assessment. No plant species protected in terms of the Mpumalanga Biodiversity Conservation Act (No.10 of 1998) and the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA) were recorded during the field survey of the development area.

iii. Protected Tree Species

During the field survey undertaken in November 2021, no tree species protected in terms of the National Forest Act (No. 84 of 1998) were recorded within the project site.

iv. Critical Biodiversity Areas and Ecological Support Areas

The key output of a systematic biodiversity plan is a map of biodiversity priority areas. The map delineates Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Other Natural Areas (ONAs), Protected Areas (PAs), and areas that have been irreversibly modified from their natural state.

Figure 7.12 shows the development area superimposed on the Terrestrial CBA map. The development area overlaps with a heavily modified area.

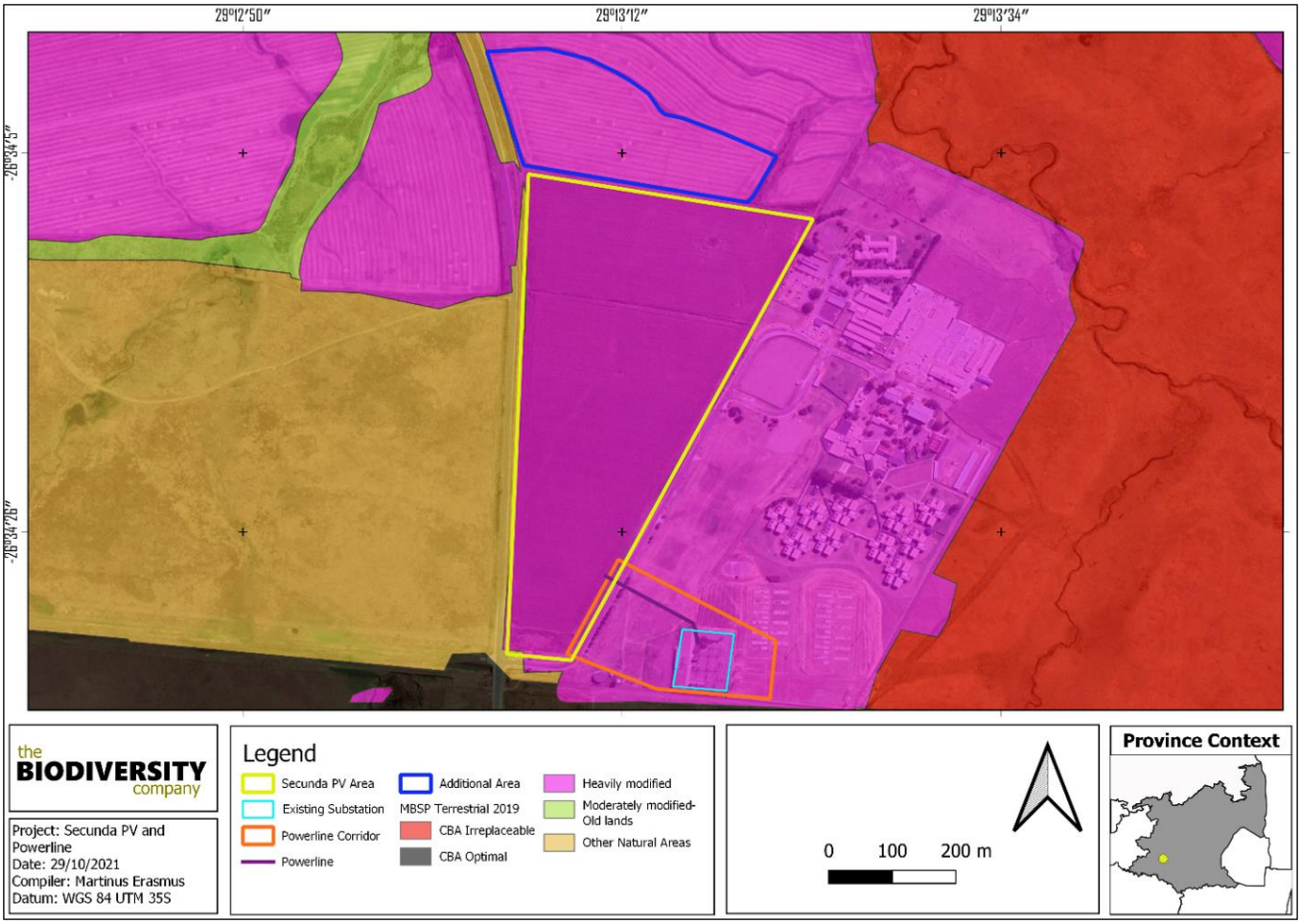

Figure 7.12: Extract of the Mpumalanga Biodiversity Sector Plan for the project showing that the development area falls within a site classified as heavily modified

v. Ecosystem Threat Status and Protection Level

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed project overlaps with a VU ecosystem (refer to **Figure 7.13**).

The Ecosystem Protection Level is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed project overlaps with a NP ecosystem (refer to **Figure 7.14**).

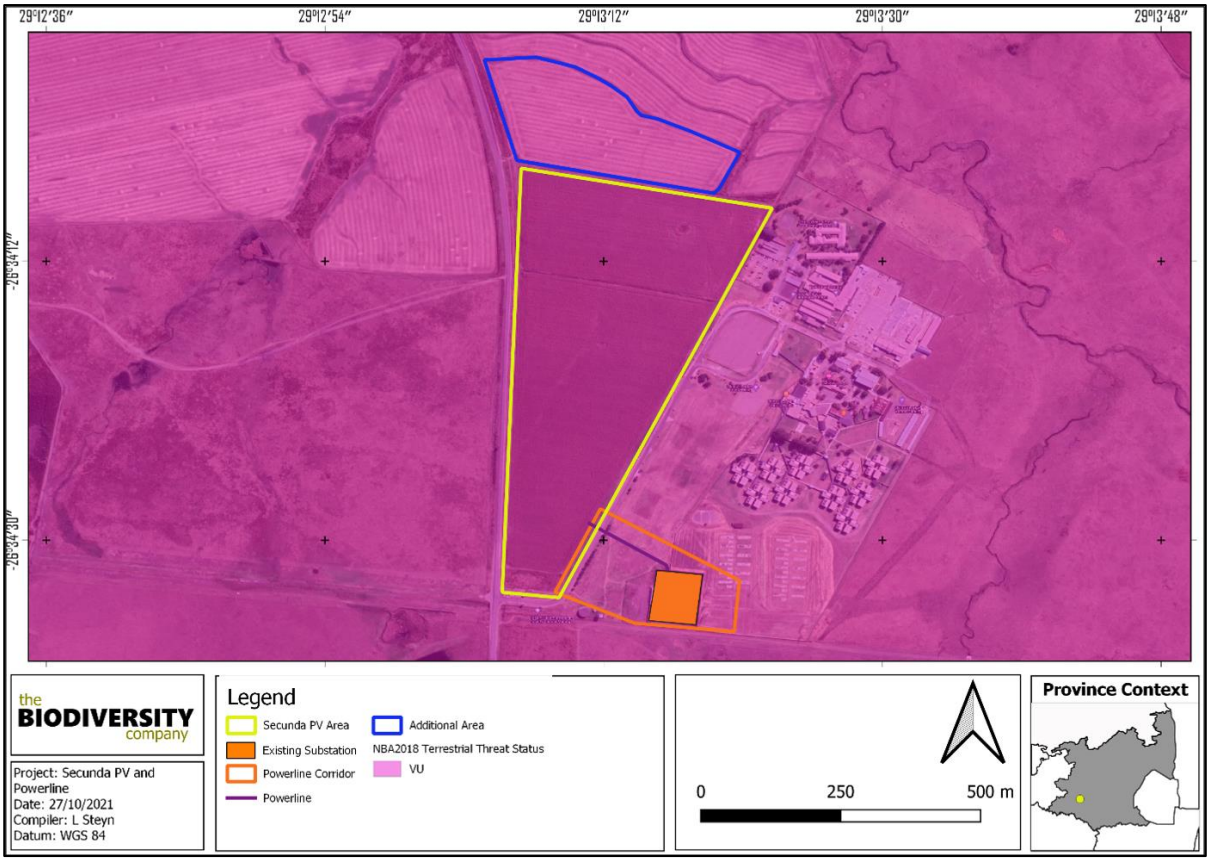

Figure 7.13: Map illustrating that the development area falls within a Vulnerable ecosystem

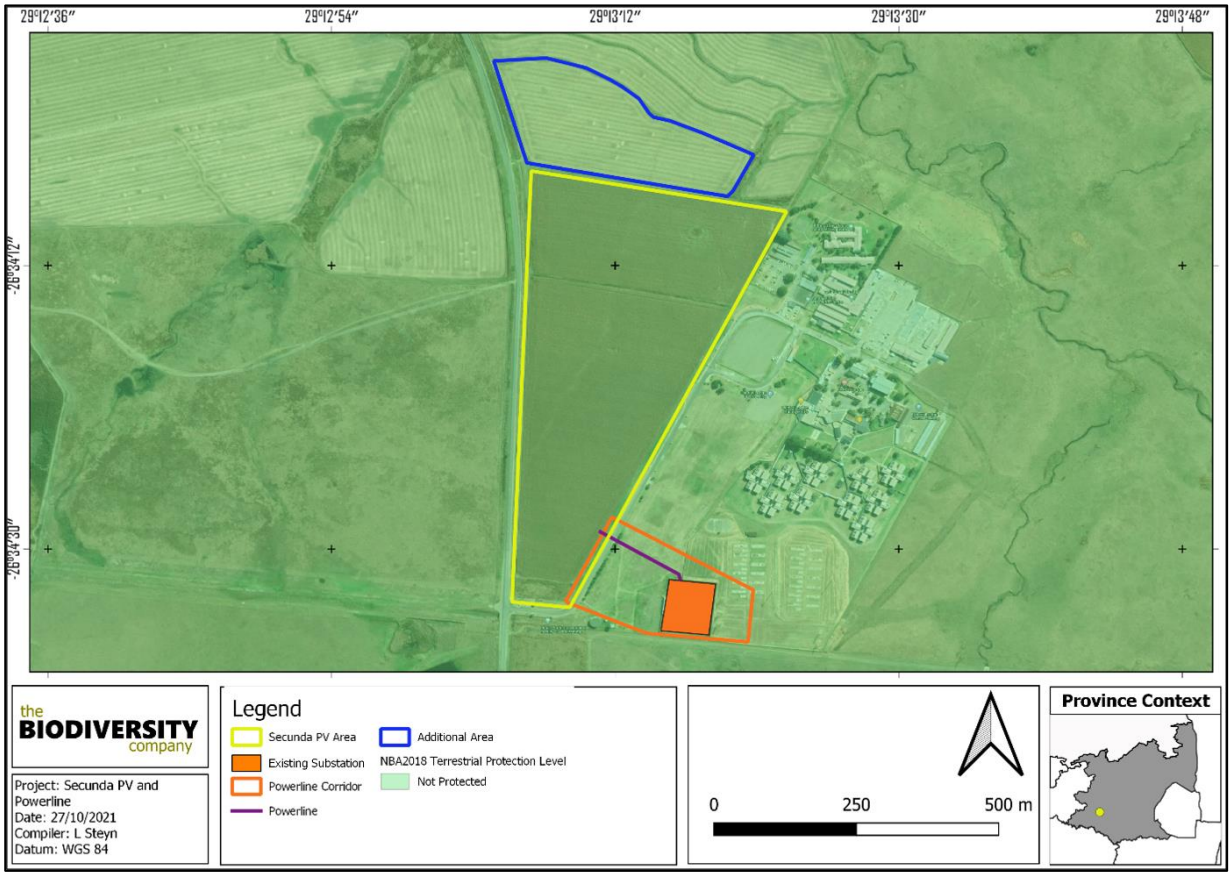

Figure 7.14: Map illustrating that the development area falls within an ecosystem that is Not Protected

vi. Conservation areas

National Protected Area Expansion Strategy 2017 (NPAES) focus areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine-scale planning which may identify a range of different priority sites based on local requirements, constraints, and opportunities. The development area partially overlaps with a NPAES focus area (refer to **Figure 7.15**).

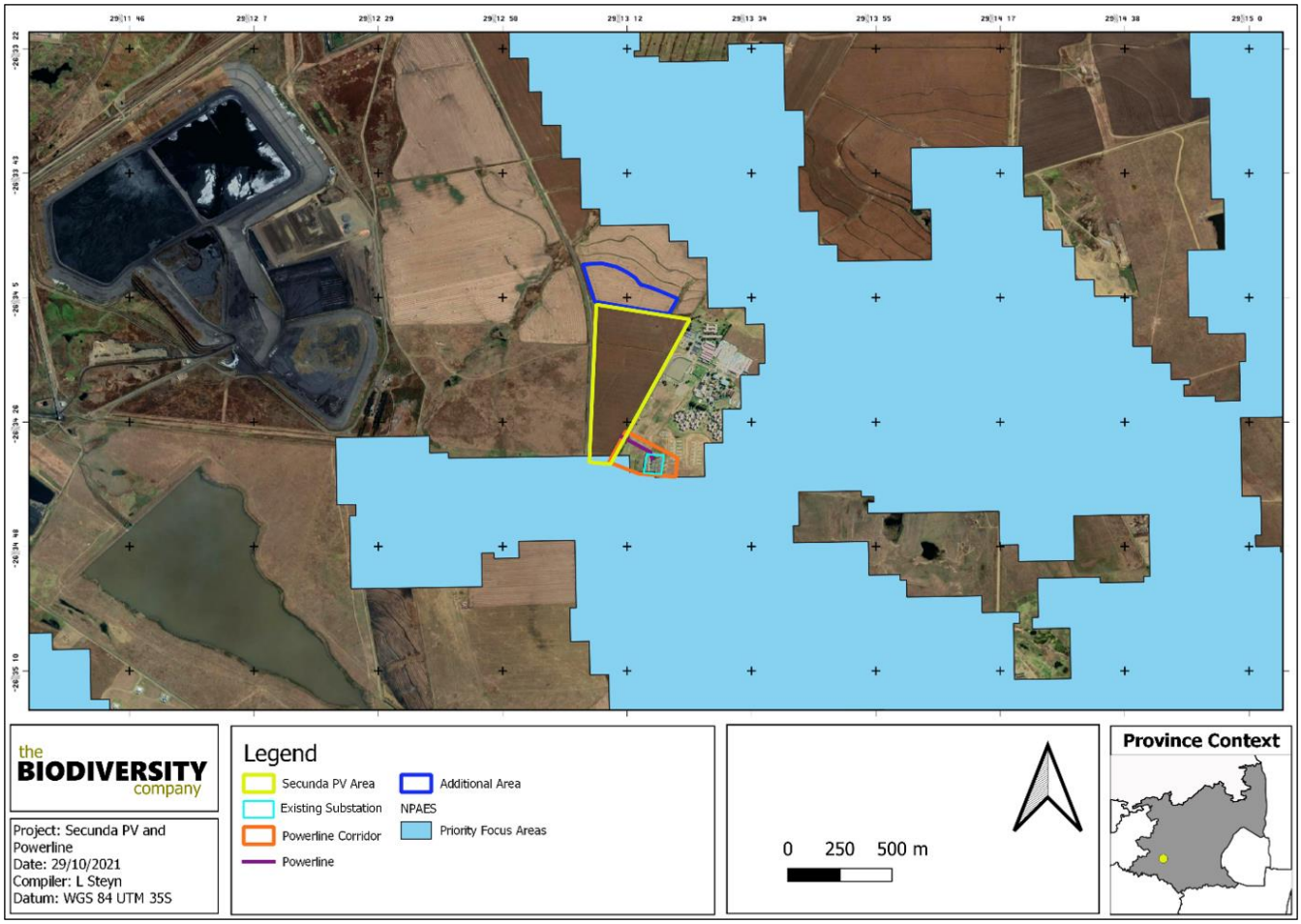

Figure 7.15: The development area in relation to the National Protected Areas Expansion Strategy focus areas

The development area in relation to the Mpumalanga Protected Areas Expansion Strategy (MPAES) focus areas can be seen in **Figure 7.16**. The development area does not overlap any MPAES areas; however, it occurs in proximity to an MPAES area.

No formally protected or conservation areas were identified within the development area.

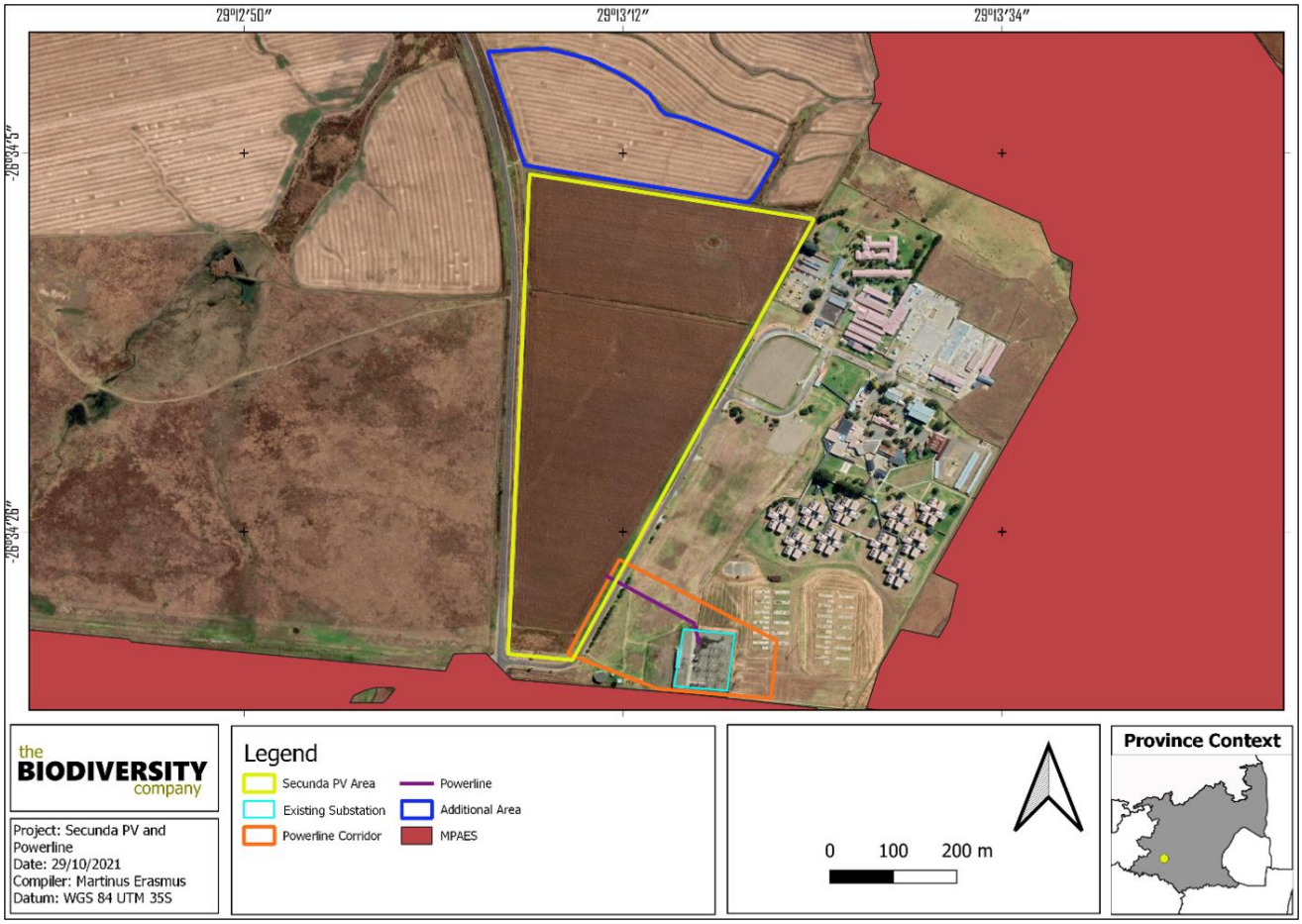

Figure 7.16: The development area in relation to the Mpumalanga Protected Areas Expansion Strategy focus areas

vii. Ecological sensitivity of the site

Three main habitats were identified and delineated within the development area, namely drainage lines, wetlands and transformed grassland. All habitats within the development area were allocated a sensitivity category using the guidelines for interpreting site ecological importance in the context of the proposed development activities (refer to **Table 7.4**). The sensitivity ratings of the habitat types delineated are illustrated in **Figure 7.17**. According to **Figure 7.17**, the wetland is regarded as being of high ecological sensitivity; the drainage lines have a low ecological sensitivity rating; and the modified grassland is considered to be of very low ecological sensitivity.

Areas rated as High sensitivity and their buffers in proximity to the development area should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to these areas.

Table 7.4: Guidelines for interpreting site ecological importance in the context of the proposed development activities

Site Ecological Importance	Interpretation in relation to proposed development activities
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.

Site Ecological Importance	Interpretation in relation to proposed development activities
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

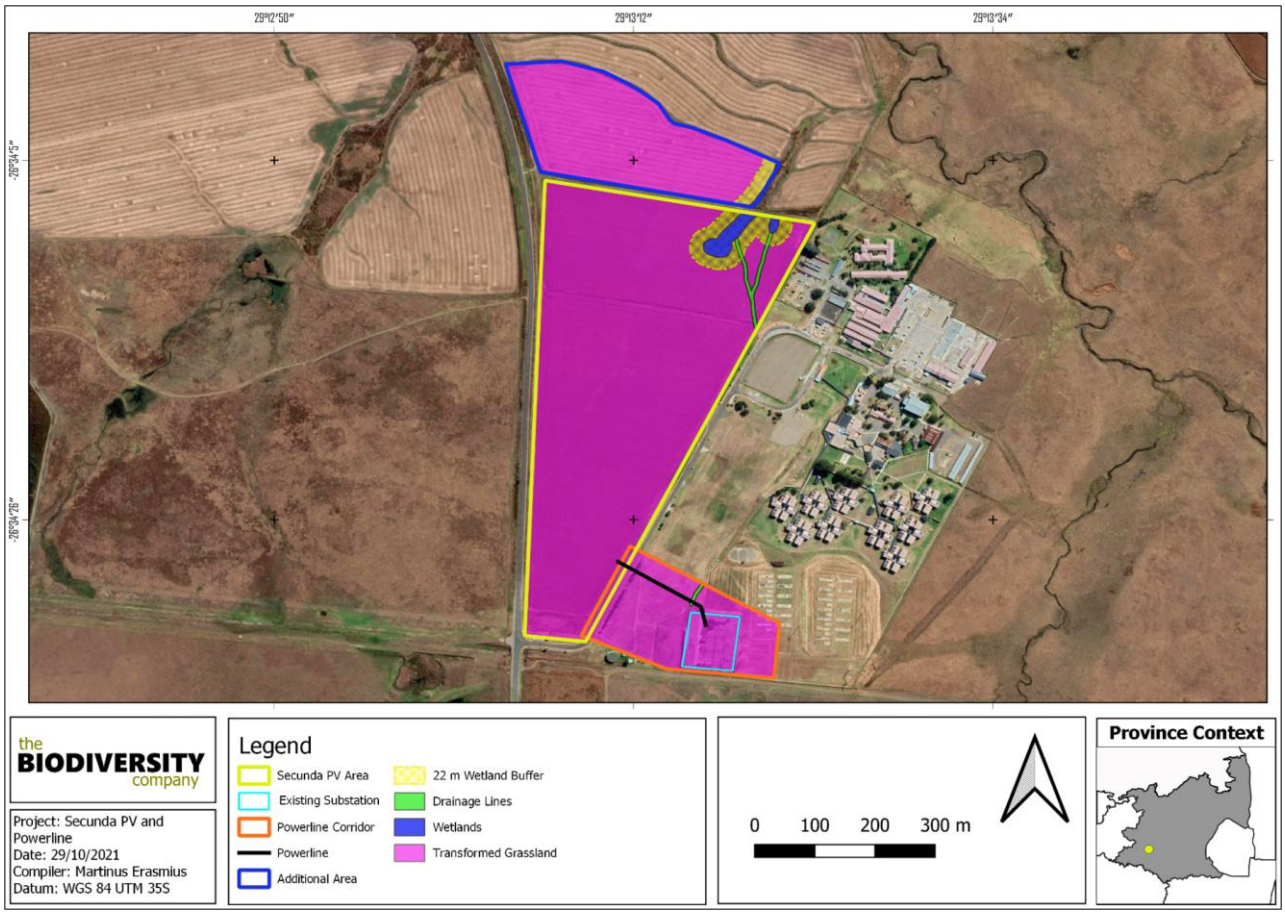

Figure 7.17: Sensitivity of the development area

viii. Terrestrial Fauna Communities

Mammals

The IUCN Red List Spatial Data lists seventy (70) mammal species that could be expected to occur within the area. This list excludes large mammal species that are limited to protected areas. Seventeen (17) of these expected species are regarded as threatened, thirteen (13) of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the project site as well as the close proximity to urban development. Threatened mammal species expected to occur within the project siteare detailed below in **Table 7.5**.

Table 7.5: Threatened mammal species that are expected to occur within the project site

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Amblysomus septentrionalis	Highveld Golden Mole	NT	NT	Low
Aonyx capensis	Cape Clawless Otter	NT	NT	Moderate

Atelerix frontalis	South Africa Hedgehog	NT	LC	Low
Crocidura maquassiensis	Makwassie musk shrew	VU	LC	Low
Dasymys incomtus	African Marsh rat	NT	LC	Low
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Low
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Low
Leptailurus serval	Serval	NT	LC	Moderate
Mystromys albicaudatus	White-tailed Rat	VU	EN	Low
Ourebia ourebi	Oribi	EN	LC	Low
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	Low
Pelea capreolus	Grey Rhebok	NT	NT	Low
Poecilogale albinucha	African Striped Weasel	NT	LC	Moderate
Redunca fulvorufula	Mountain Reedbuck	EN	LC	Low

None of the threatened mammal species expected to occur within the project site were observed during the field survey. However, two (2) mammal species were observed during the survey based on either direct observation or the presence of visual tracks and signs, namely, the Cape Porcupine and Scrub Hare. None of these species are recorded as species of conservation concern.

Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, forty-four (44) reptile species are expected to occur within the area. Three (3) are regarded as threatened, namely, Coppery Grass Lizard, Nile Crocodile and Giant Dragon Lizard. All three species have a low likelihood of occurrence based on the disturbed nature of the area and the lack of suitable habitat.

No reptile species were recorded in the development area during the survey period. However, there is the possibility of more species being present as certain reptile species are secretive.

Amphibians

Based on the IUCN Red List Spatial Data and the AmphibianMap, twenty-two (22) amphibian species are expected to occur within the area. One (1) species is of conservation concern, namely the Giant Bull Frog (*Pyxicephalus adspersus*), which is listed as near threatened on a regional scale, has a moderate likelihood of occurrence in the project site.

No amphibian species were recorded in the development area during the survey period.

ix. Avifauna

No Important Bird Areas (IBAs) were recorded within the project site. The closest IBA, i.e., the Amersfoort-Bethal-Carolina IBA, is located approximately 28km from the development area.

The SABAP2 Data lists one hundred and ninety-seven (197) avifauna species that could be expected to occur within the area. Fifteen (15) of these expected species are regarded as threatened (refer to **Table 7.6**). Twelve (12) species have a low likelihood of occurrence based on the lack of suitable habitat.

Table 7.6: Threatened avifauna species that are expected to occur within the project site

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Calidris ferruginea	Sandpiper, Curlew	LC	NT	Low
Circus macrourus	Harrier, Pallid	NT	NT	Low
Circus ranivorus	Marsh-harrier, African	EN	LC	Low
Coracias garrulus	Roller, European	NT	LC	Moderate
Eupodotis caerulescens	Korhaan, Blue	LC	NT	Low
Falco biarmicus	Falcon, Lanner	VU	LC	High
Falco vespertinus	Falcon, Red-footed	NT	NT	Moderate
Glareola nordmanni	Pratincole, Black-winged	NT	NT	Low
Grus paradisea	Crane, Blue	NT	VU	Low
Hydroprogne caspia	Tern, Caspian	VU	LC	Low
Oxyura maccoa	Duck, Maccoa	NT	NT	Low
Phoeniconaias minor	Flamingo, Lesser	NT	NT	Low
Phoenicopterus roseus	Flamingo, Greater	NT	LC	Low
Rostratula benghalensis	Painted-snipe, Greater	NT	LC	Low
Sagittarius serpentarius	Secretarybird	VU	VU	Low

Twenty-one avifauna species were recorded in the project site during the survey based on either direct observation, vocalisations, or the presence of visual tracks and signs (refer to **Table 7.7**). None of the species recorded in the project site are considered as species of conservation concern.

Table 7.7: List of avifauna species recorded in the project site

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Apus apus	Swift, Common	Unlisted	LC
Bostrychia hagedash	Ibis, Hadeda	Unlisted	LC
Bubulcus ibis	Egret, Cattle	Unlisted	LC
Burhinus capensis	Thick-knee, Spotted	Unlisted	LC
Columba livia	Dove, Rock	Unlisted	LC
Corvus albus	Crow, Pied	Unlisted	LC
Elanus caeruleus	Kite, Black-shouldered	Unlisted	LC
Euplectes progne	Widowbird, Long-tailed	Unlisted	LC

Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC
Myrmecocichla formicivora	Chat, Anteating	Unlisted	LC
Numida meleagris	Guineafowl, Helmeted	Unlisted	LC
Passer domesticus	Sparrow, House	Unlisted	LC
Passer melanurus	Sparrow, Cape	Unlisted	LC
Ploceus cucullatus	Weaver, Village	Unlisted	LC
Saxicola torquatus	Stonechat, African	Unlisted	LC
Spilopelia senegalensis	Dove, Laughing	Unlisted	LC
Streptopelia capicola	Turtle-dove, Cape	Unlisted	LC
Sturnus vulgaris	Starling, Common	Unlisted	LC
Threskiornis aethiopicus	Ibis, African Sacred	Unlisted	LC
Vanellus armatus	Lapwing, Blacksmith	Unlisted	LC
Vanellus coronatus	Lapwing, Crowned	Unlisted	LC

x. Aquatic Features

The wetland areas within the project site were delineated in accordance with the then DWAF (2005) guidelines. Seven (7) hydrogeomorphic (HGM) units were identified within the 500m regulated area, namely, unchanneled valley bottom wetlands (HGM 1,3 and 7), a seep (HGM 6), a depression (HGM 2) and a floodplain (HGM 5) (refer to **Figure 7.18**). Of these wetland systems, only HGM 1, 2 and 3 are expected to be at an appreciable level of risk due to the locality of these systems being within and in close proximity to the proposed PV development area.

An ecological importance and sensitivity assessment was undertaken for the three wetlands systems (i.e., HGM 1, 2 and 3). Various components pertaining to the protection status of a wetland are considered for the ecological importance and sensitivity assessment, including Strategic Water Resource Areas (SWSA), the National Freshwater Ecosystem Priority Areas (NFEPA) wet vegetation protection status and the protection status of the wetland itself, considering the National Biodiversity Assessment (NBA) dataset. The ecological importance and sensitivity of the units was determined to be High for HGM 3 and Moderate for the HGM 1 and HGM 2.

A pre-mitigation buffer zone of 30m is recommended for the wetland systems delineated within the 500m regulated area, which can likely be decreased to 22m if suitable avoidance and mitigation measures are implemented. Although the artificial wetlands and drainage lines have not been assigned any buffer zones, it is worth noting that the major drainage lines delineated need to be conserved throughout the construction and operation phases.
A risk assessment was conducted, in accordance with the requirements of GN 509, published in the Government Gazette (no. 40229) under Section 39 of the NWA in August 2016. The GN 509 process provides an allowance to apply for a WUL for Section 21(c) & (i) under a GA, as opposed to a full WULA.

Two post-mitigation scenarios have been considered for this risk assessment, namely avoidance of the wetland buffers and impedance into the wetland buffers. The findings risk assessment indicate that various aspects scored "Moderate" pre-mitigation significance ratings. Considering the scenario where the applicant adheres to the buffer zones, all of the post-mitigation significance ratings are expected to be

decreased to "Low". In the event that the buffers are impeded on, some of the aspects are expected to still be associated with "Moderate" post-mitigation significance ratings.

Should the 22m buffer zone be impeded on, the first and second steps in the mitigation hierarchy (avoidance and minimising impacts) cannot be met. Therefore, the third step in the mitigation hierarchy (rehabilitation) will need to be implemented. It should be noted that the 22m buffer can only be impeded on up to the 10m mark (therefore 12m from the edge of the buffer) to avoid direct impacts to the wetland.

As part of the impact assessment results, it has been determined that all risks posed by the proposed activities are characterised by "Low" post-mitigation significance ratings. Considering these findings, it is the specialist's opinion that the proposed activities can be favourably considered on condition that all mitigations measures be implemented, including the adherence to the 22m buffer zone.

In terms of water use authorisation, proceeding with the proposed activities and avoiding the wetland buffer zone will constitute "Low" post-mitigation significance ratings, ultimately only requiring general authorisation. By impeding into the buffer zones, a water use license will be required with the condition of rehabilitation (i.e., rehabilitating HGM1 and 2 to "Largely Modified" after construction).

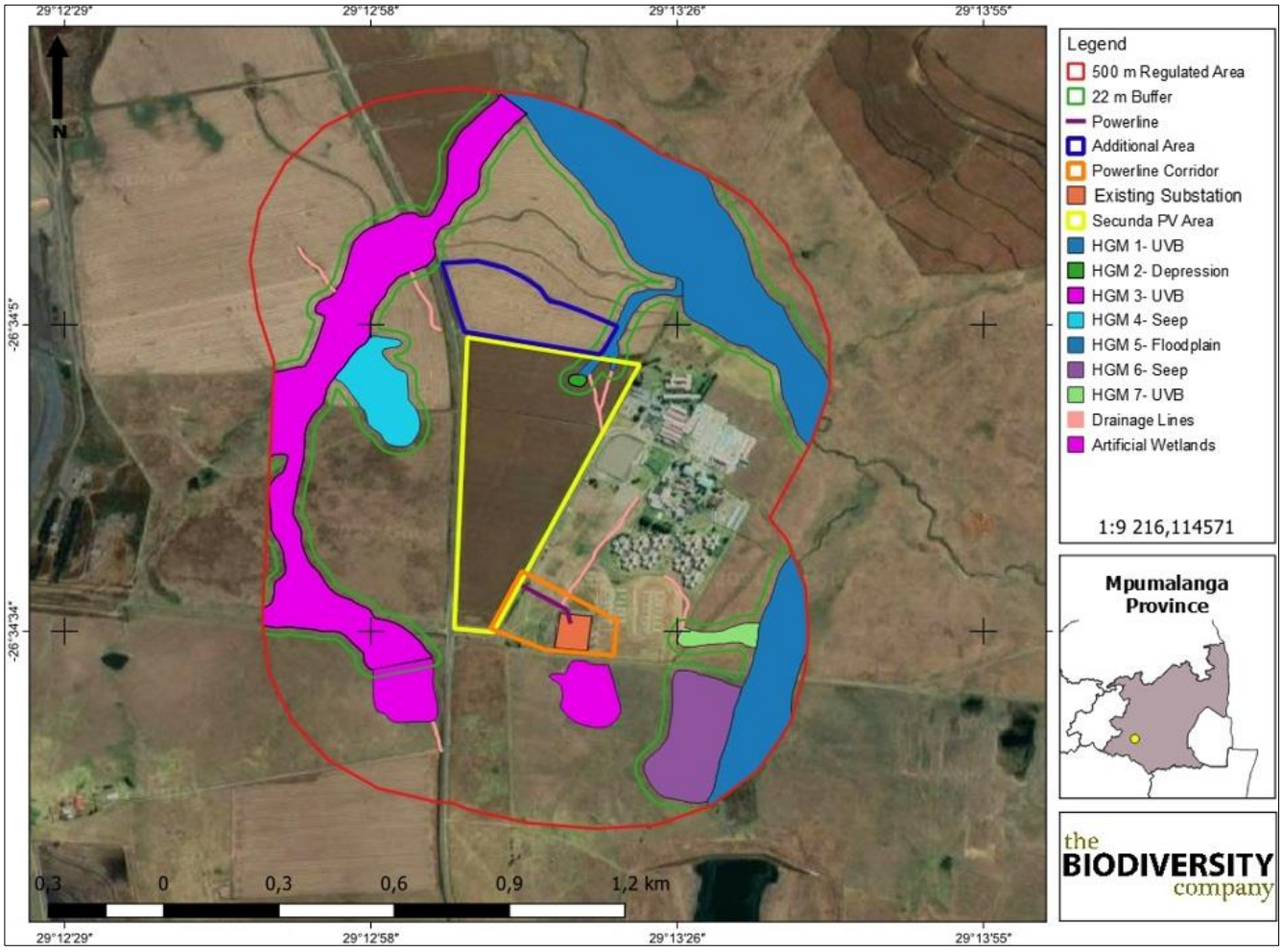

Figure 7.18: Delineated wetlands within the 500m regulated area, including their associated buffer zones

7.5. Heritage Resources

7.5.1 Archaeological Resources

The archaeological field assessment documented a sparse number of isolated stone artefacts in secondary contexts (refer to **Figure 7.19**), suggesting the area may have been traversed intermittently by Stone Age groups potentially through periods of both the Early Stone Age and the Later Stone Age.

No artefact quality raw material was found within the footprint, indicating that the stone artefacts were transported into the area by foragers prior to discard. The raw materials exploited were cobbles of high-quality quartzite that would have been available in a high-energy river system in the broader vicinity of the development area.

All archaeological finds were documented in ex-situ contexts, which is further supported by the extensive evidence for agricultural activity, including the redistribution of topsoil for planting purposes, and the bioturbation resulting from grazing and trampling. The potential for finding a dateable in-situ archaeological horizon based on current surface observations appears to be low.

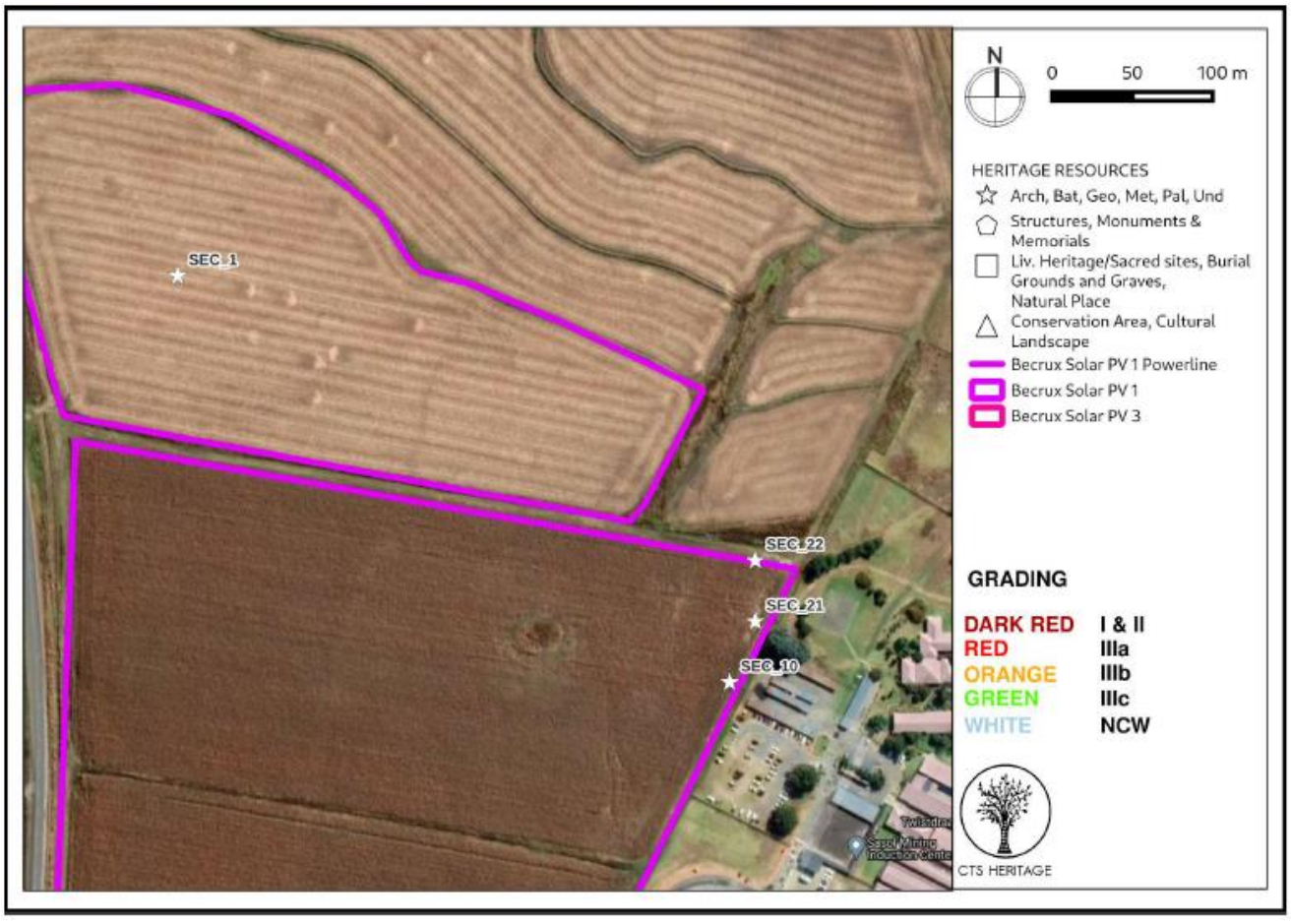

Figure 7.19: Heritage resources identified during the field assessment, relative to the proposed development

7.5.2 Palaeontology

According to the SAHRIS Palaeo sensitivity Map, the development area is underlain by sediments of zero and very high palaeontological sensitivity (refer to **Figure 7.20**). The palaeontologically sensitive geology of

the area is ascribed to the Vryheid Formation of the Ecca Group of sediments. While the sediments underlying the development area have high levels of palaeontological sensitivity, the nature of the excavations associated with PV facilities tends to be shallow (<3m) and as such, the likelihood of impacting intact Vryheid Formation sediments is low.

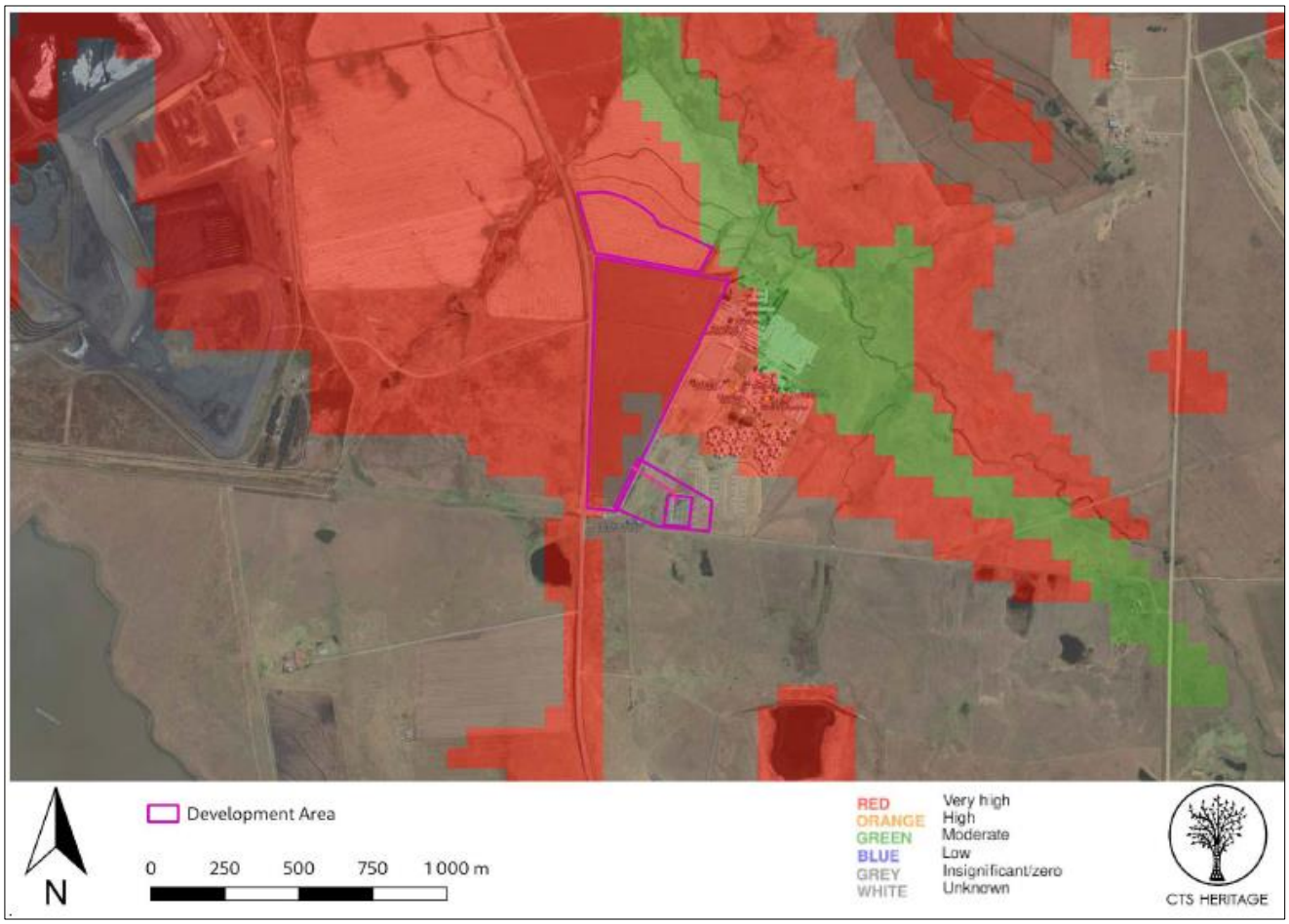

Figure 7.20: Palaeontological sensitivity of the development area and the broader study area

7.5.3 Built Environment and Cultural Landscapes

There are no buildings within the development area and the current landscape consists of remnant farming plots wedged in between heavy industrial activity (Brandspruit Coal Mine) and Secunda's chemical plants.

7.6. Visual Quality

The identified site for the proposed PV facility is located adjacent (west) of the Riaan Rademan Training Facility (Sasol Mining), approximately 7km south-east of Secunda on Portion 6 of the farm Goedehoop No. 290. This farm is located in an area that has a distinct rural and agricultural character, with mining activity (mine dumps/slimes dams) located west of the proposed development site at a distance of less than 1km. The Sasol Secunda CTL Plant is located west of these mine dumps, with most of the plant shielded from the proposed PV facility site. The only visible structures from the development area are the significantly tall smokestacks and flare stacks protruding above the mine dumps. The Goedehoop Substation is located at a distance of 300m east of the proposed site. Other substations in the study area include the East Shaft Substation, the Quest Substation and the Quintus Substation.

A great number of power lines, associated with these substations and the mining and industrial activities in the area, traverse the study area.

7.6.1. Potential Visual Exposure – Solar PV Facility

A viewshed analysis was undertaken for the proposed solar PV facility (refer **to Figure 7.21**). The viewshed analysis was undertaken from a representative number of vantage points within the development footprint at an offset of 4m above ground level. This was done in order to determine the general visual exposure (visibility) of the area under investigation, simulating the maximum height of the proposed structures (PV panels and inverters) associated with the facility. The viewshed analysis includes the effect of vegetation cover and existing structures on the exposure of the proposed infrastructure.

According to the viewshed analysis for the solar PV facility, it is envisaged that the structures, where visible from shorter distances (e.g., less than 1km and potentially up to 3km), and where sensitive visual receptors may find themselves within this zone, may constitute a high visual prominence, potentially resulting in a visual impact. This may include residents of the farm dwellings within a 1 - 3km radius of the development area, as well as observers travelling along the Secunda secondary road in closer proximity to the facility, and especially where the road traverses the development site.

The incidence rate of sensitive visual receptors is however expected to be relatively low, due to the generally remote location of the proposed development and the low number of exposed homesteads. It is further expected that the majority of observers within the region (and observers travelling along the Secunda secondary road) may be associated with the Sasol Secunda Plant in some way or another, potentially mitigating the potential visual impact to some degree.

7.6.2. Potential Visual Exposure – 11kV power line

The proposed Becrux solar PV facility is located virtually adjacent to the Goedehoop Substation. It is expected that the existing power line infrastructure at this substation and the relatively constrained dimensions of the proposed infrastructure (i.e., a relatively short 11kV power line), would largely absorb the potential visual exposure of the power line. The visual amenity of this area has largely been compromised by the presence of the existing power line and substation structures.

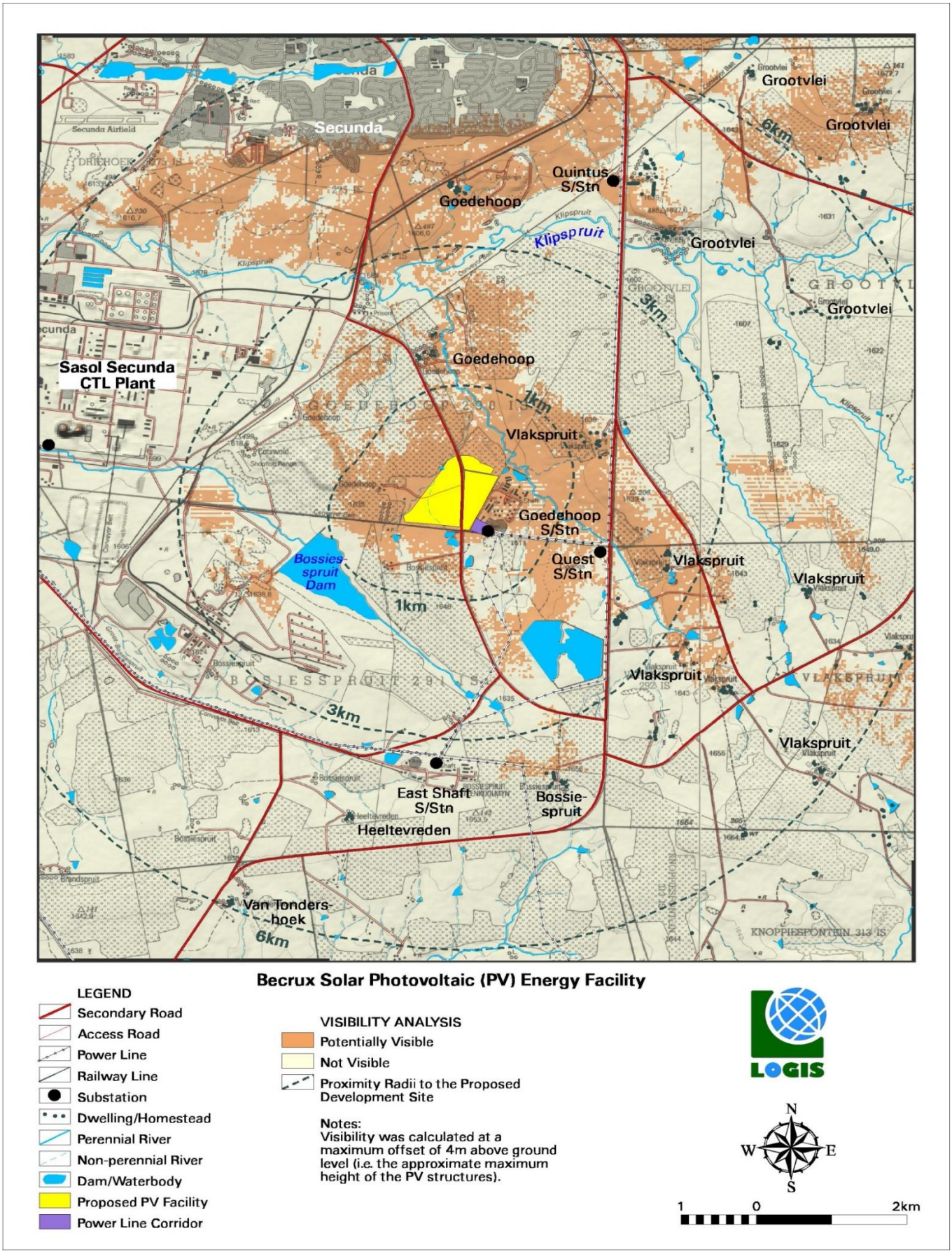

Figure 7.21: Viewshed analysis of the proposed Becrux Solar PV Facility

7.7 Socio-Economic Profile

i Profile of the Broader Area

The Govan Mbeki Local Municipality is approximately 2 960.1km^2 in extent, which equates to 114.9 people per square kilometre. It has a population of 340 091, which is about one-third (1 135 409)of the figure in Gert Sibande District Municipality. Between 2001 and 2011, the Govan Mbeki Local Municipality experienced a positive population growth of 3% per year.

According to Census 2011, the significant majority (86%) of the Govan Mbeki Local Municipality population is Black African; followed secondly by Whites (12%), and Coloured and Indian/Asian (1%). This population structure corresponds to that of Gert Sibande District Municipality and the Mpumalanga Province.

The Govan Mbeki Local Municipality is slightly male dominated, with males making up just over half (52%) of the municipal population, and females the remaining 48%. This correlates with the Provincial population which is also slightly female dominated (comprising 49% males, and 51% females), but differs from the District and National populations which are both female dominated.

Of the Govan Mbeki Local Municipality labour force (i.e., individuals aged between 15 and 64 years), the majority (32.4%) are not economically active. The economically inactive proportion of the Govan Mbeki Local Municipality's labour force is slightly lower than that of the Gert Sibande District Municipality (39.4%). Approximately, 3.6% of the Govan Mbeki Local Municipality's labour force is unemployed.

The average annual income in the Govan Mbeki Local Municipality is R225 000, which is more than double the amount in Gert Sibande (R30 000).

ii Profile of the Immediately Affected Area

The Becrux Solar PV Facility is proposed on Portion 6 of the Farm Goedehoop No. 290, located ~7km south-east of Secunda and 15km east of Embalenhle within Ward 5 of the Govan Mbeki Local Municipality, which forms part of the Gert Sibande District Municipality. The closest major town to the project site is Secunda, which is the most important urban centre in the municipal area, with Embalenhle being the largest.

Commercial agriculture is the most dominant land use in the area, including several commercial maize and soya farms and a variety of livestock and game farming. Livestock kept is mostly cattle, with some sheep and goat farming. Game farming is mostly limited to springbuck, blesbuck, ostrich and gnu. Livestock is usually sold at auctions, whereas game is hunted on the farms. Residential land use is limited to several landowning families, farmworkers and tenants occupying homesteads located within the rural sections of the study area. It is estimated that at least a few farm workers live on the rural properties in the primary study area. This includes labourers, contractors as well as their spouses and children. Informal discussions during field investigations highlighted the family arrangements.

Mining, particularly coal mining, is also an important land use, with Secunda being the most active business hub in the municipality. The expansion of industrial activity and mining, while promoting economic growth, has led to the encroachment of agricultural land.

CHAPTER 8: ASSESSMENT OF IMPACTS

This chapter serves to assess the significance of the positive and negative impacts (direct, indirect, and cumulative) expected to be associated with the development of the Becrux Solar PV Facility and associated infrastructure. This assessment has considered the construction of a solar PV facility with a contracted capacity of up to 19.99MW$_{ac}$, within a development footprint of approximately of up to 19.95ha. Infrastructure associated with the facility will include the following:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- E-house containerised or non-containerised substation.
- 11kV overhead power line for the distribution of the generated power, which will be connected to the existing Goedehoop Substation.
- Laydown area.
- Access gravel road (existing) and internal gravel roads.
- Security booth, O&M building, workshop, storage area and site office.

The full extent of the project site (~433ha), including the development area (~26.64ha) within the project site, as well as the proposed development footprint (~19.95ha), was considered through the BA process (refer to **Figure 8.1**). Onsite sensitivities were identified through the review of existing information, desktop evaluations and detailed field surveys of the development area by various specialists.

The sections which follow provide a summary of the specialist input for each field of study in terms of the positive and negative impacts which are expected to occur, the significance of the impacts, the opportunity for mitigation of the impacts and where necessary, enhancement of the impacts, to an acceptable level. Note that impacts associated with decommissioning are expected to be similar to those associated with construction activities. Therefore, these impacts are not considered separately within this chapter. This section of the report must be read together with the detailed specialist studies contained in **Appendix D** to **I**.

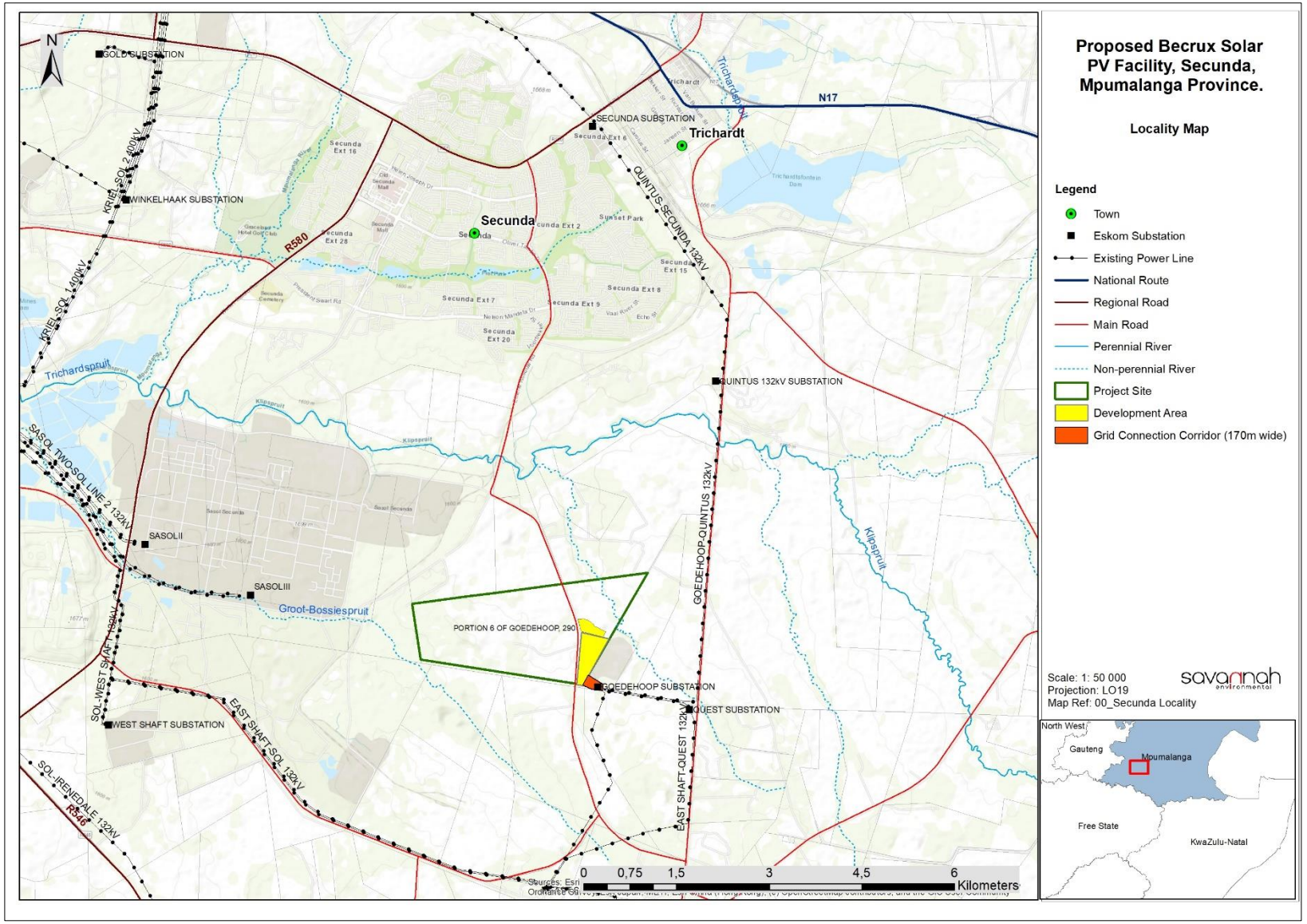

Figure 8.1: Map showing the project site and development area for the Becrux Solar PV Facility and associated infrastructure considered as part of this BA process (refer to **Appendix K** for A3 map).

The development of the Becrux Solar PV Facility will comprise the following phases:

» *Pre-Construction and Construction* – will include pre-construction surveys; site preparation; establishment of access roads, and a temporary laydown area; construction of foundations involving excavations; the transportation of components/construction equipment to site; manoeuvring and operating vehicles for unloading and installation of equipment; erecting PV panels; laying cabling; establishment of a concrete platform and placement of an e-house containerised or non-containerised substation on the platform; establishment of ancillary infrastructure; construction of an 11kV power line; and commissioning of new equipment and site rehabilitation. The construction phase for the facility is estimated at 9 - 12 months.

» *Operation* – will include the operation of the solar PV facility and the generation of electricity which will be delivered to Sasol Limited by feeding into the grid through a Wheeling Agreement signed with Eskom and/or direct embedded generation. The operation phase of the facility is expected to be approximately up to 25 years (with maintenance).

» *Decommissioning* – depending on the economic viability of the solar PV facility, the length of the operation phase may be extended beyond a 25-year period. At the end of the project's life, decommissioning will include site preparation; disassembling of the components of the PV facility and its associated infrastructure; clearance of the relevant infrastructure at the PV panel area; and rehabilitation. Note that impacts associated with decommissioning are expected to be similar to those associated with construction activities.

8.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(h)(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed, (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated.	The impacts and risk associated with the development of the Becrux Solar PV Facility, including the nature, significance, consequence, extent, duration and probability of the impacts and the degree to which the impact can be reversed and cause an irreplaceable loss of resources are included in **sections 8.3.2, 8.4.2, 8.5.2, 8.6.2, 8.7.2, 8.8.2.**
3(h)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The positive and negative impacts associated with the development of the Becrux Solar PV Facility are included in **sections 8.3.2, 8.4.2, 8.5.2, 8.6.2, 8.7.2, 8.8.2.**
3(h)(viii) the possible mitigation measures that could be applied and the level of residual risk.	The mitigation measures that can be applied to the impacts associated with the Becrux Solar PV Facility are included in **sections 8.3.2, 8.4.2, 8.5.2, 8.6.2, 8.7.2, 8.8.2.**
3(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including (i) a description of all environmental issues and risks that	A description of all environmental impacts identified for the Becrux Solar PV Facility during the BA process, and the extent to which the impact significance can be reduced through the implementation of the recommended

Requirement	Relevant Section
were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures,.	mitigation measures provided by the specialists are included in **sections 8.3.2, 8.4.2, 8.5.2, 8.6.2, 8.7.2, 8.8.2.**
3(j) an assessment of each identified potentially significant impact and risk, including (i) cumulative impacts, (ii) the nature, significance and consequences of the impact and risk, (iii) the extent and duration of the impact and risk, (iv) the probability of the impact and risk occurring, (v) the degree to which the impact and risk can be reversed, (vi) the degree to which the impact and risk may cause irreplaceable loss of resources and, (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	An assessment of each impact associated with the development of the Becrux Solar PV Facility, including the nature and significance, the extent and duration, the probability, the reversibility, and the potential loss of irreplaceable resources, as well as the degree to which the significance of the impacts can be mitigated are included in **sections 8.3.2, 8.4.2, 8.5.2, 8.6.2, 8.7.2, 8.8.2.**
3(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.	Mitigation measures recommended by the various specialists for the reduction of the impact significance are included in **sections 8.3.2, 8.4.2, 8.5.2, 8.6.2, 8.7.2, 8.8.2.**
3(j)(i) an assessment of each identified potentially significant impact and risk, including cumulative impacts.	The cumulative impacts associated with the development of the Becrux Solar PV Facility are included and assessed within **section 8.9**.

8.2. **Quantification** of Areas of Disturbance on the Site

The maximum area of disturbance that will result from the construction of the PV facility and associated infrastructure will be approximately ~19.95ha, some of which will be temporary and will be rehabilitated following construction. A 170m wide and 400m long grid connection corridor has been identified for the assessment and placement of an 11kV overhead power line that will be up to ~400m in length and will connect the solar PV facility to the Goedehoop Substation. The grid connection corridor will provide for the avoidance of sensitive environmental features and allow for the micro-siting of the power line within the corridor. Only tower footprints along the overhead power line will be cleared. The overhead power line will be accessed via a service jeep track or the existing access roads within the Rademan Training Facility located to the east of the development area.

It should be noted that the site currently has an existing road which will be used to access the site. The access road may be widened and upgraded for the solar PV facility, essentially reducing the extent of disturbance resulting from access road construction.

8.3. Potential Impacts on Ecology (Flora and Fauna)

The development of the Becrux Solar PV Facility and associated infrastructure is likely to result in a variety of impacts on ecology, including flora, fauna and avifauna. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D** for more details).

8.3.1 Description of Ecological Impacts

Impacts on the ecology of the development area are expected to occur during the construction, operation and decommissioning phases of the Becrux Solar PV Facility. The following impacts are identified and assessed for the project:

» Destruction, fragmentation and degradation of habitats and ecosystems resulting from the physical removal of vegetation (if present), the construction of internal access roads, soils dust precipitation and random events such as fire.

» Spread and/or establishment of alien and/or invasive species due to vegetation removal (if present), vehicles potentially spreading seeds, unsanitary conditions surrounding infrastructure and thus promoting the establishment of alien and/or invasive rodents and the establishment of infrastructure suitable for breeding activities of alien and/or invasive birds.

» Direct mortality of fauna due to the clearing of vegetation (if present), vehicle collision, pollution of water resources by dust effects and chemical spills and the intentional killing of fauna for food resulting from unregulated/unsupervised outdoor activities.

» Reduced dispersal/migration of fauna resulting from loss of landscape used as a corridor, compacted roads and the removal of vegetation (if present).

» Environmental pollution due to water runoff, spills from vehicles, machinery and erosion.

» Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust and light pollution resulting from the operation of machinery and vehicles on site.

8.3.2 Impact tables summarising the significance of impacts on ecology during construction, operation and decommissioning (with and without mitigation)

Construction Phase Impacts

Nature: Loss of vegetation within development footprint (if present) Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Low (2)
Duration	Permanent (5)	Short term (2)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (48)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, although this impact cannot be well mitigated as the loss of vegetation (if present) is unavoidable but will however be limited	
Mitigation: » Areas rated as High sensitivity and their buffers (refer to **Figure 9.1**) (i.e., the depression wetland) in proximity to the development areas, should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to these areas from construction workers and machinery. The infrastructure should be realigned to prioritise development within low sensitivity areas. Mitigated development in medium sensitivity areas is permissible.		

- » Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further than that proposed for the project. Clearing of vegetation outside of the project footprint should be minimised and avoided where possible.
- » Where possible, existing access routes and walking paths must be made use of.
- » A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.
- » The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.
- » It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.
- » All laydown areas, chemical toilets etc. should be restricted to very low or low sensitivity areas. Materials where possible may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas.
- » Toilets at the recommended Health and Safety standards must be provided. These should be emptied regularly, to prevent staff from using the surrounding vegetation.
- » The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Under no circumstances may domestic waste be burned on site.
- » If applicable, a hydrocarbon spill management plan must be put in place, to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor / Operator shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment may occur on site, unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.
- » All personnel and contractors to undergo Environmental Awareness Training prior to the commencement of construction activities. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species (if present), their identification, conservation status and importance; and biology, habitat requirements and management requirements in the EA and EMPr. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.

Residual Impacts:
The loss of vegetation (if present) within the development footprint is an unavoidable consequence of the project and cannot be entirely mitigated. Therefore the residual impact as a result of the proposed project is rated low due to the limited extent of vegetation. The residual impact would however be low.

Nature: Introduction of alien species and pests
Degradation and loss of surrounding natural vegetation

	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (56)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:
- » Compilation of and implementation of an alien vegetation management plan.

- The footprint area of construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.
- Waste management must be a priority and all waste must be collected and stored adequately. Waste should be disposed of at a licensed facility. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. Furthermore, the following should be implemented insofar as waste management is concerned:
  - Refuse bins will be emptied and secured;
  - Temporary storage of domestic waste shall be in covered waste skips; and
  - Maximum domestic waste storage period will be 10 days.
- A pest control plan must be put in place and implemented.
- Suitable temporary solid waste facilities are to be incorporated into the design to prevent unsanitary conditions. These are to be cleared weekly and waste collected by the local waste management department.
- All construction staff must be encouraged to recycle.
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation, to prevent erosion during flood events and strong winds. This will also reduce the likelihood of encroachment by alien invasive plant species.

Residual Impacts:
Long-term broad scale invasive alien species infestation and infestation by pests if not mitigated.

Nature: Displacement of faunal community due to habitat loss, direct mortalities and disturbance
Construction activities will likely lead to direct mortality of fauna due to earthworks, vehicle collisions, accidental hazardous chemical spills and persecution. Disturbance due to dust and noise pollution and vibration may disrupt behaviour.

	Without mitigation	**With mitigation**
Extent	Moderate (3)	Very low (2)
Duration	Short term (2)	Very short term (1)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (36)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, to some extent. Noise and disturbance cannot be well mitigated. Impacts on fauna due to human presence, such as vehicle collisions, poaching, and persecution can be mitigated.	

Mitigation:

- The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to promote compliance in this regard.
- Speed limits must be put in place during the construction phase.
- Noise must be kept to an absolute minimum during the evenings and at night where possible, to minimize all possible disturbances to amphibian species and nocturnal mammals.
- No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to raise awareness in this regard.
- Outside lighting should be designed and limited to minimise impacts on fauna where possible. All outside lighting should be directed away from highly sensitive areas where possible. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (green/red) lights should be used wherever possible.
- All construction workers and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits and the requirements of the Environmental Management Programme (EMPr) and other permits that may be issued for the project (i.e., biodiversity permit, etc), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.
- Schedule activities and operations during least sensitive periods (between May and August) where possible, to avoid migration, nesting and breeding seasons.
- Any excavations or holes must be conducted in a progressive manner. Should the holes/excavations stay open overnight they must be covered temporarily, to ensure no small fauna species fall in.

- » A qualified Environmental Control Officer must be on site when construction begins. The area must be walked through with a suitably qualified specialist prior to construction, to ensure no faunal species remain in the habitat and get killed. Should animals (including SCCs) not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated.
- » Ensure that any cables and connections are insulated successfully to reduce electrocution risk.
- » A hydrocarbon spill management plan must be put in place, to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor / Operator shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment may occur on site, unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.
- » All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance; and biology, habitat requirements and management requirements in the EA and EMPr. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.

Residual Impacts:
Long-term broad scale invasive alien species infestation if not mitigated.

Operation Phase Impacts

Nature: Continued fragmentation and degradation of habitats and ecosystems
Disturbance created during the construction phase will leave the project area vulnerable to erosion and invasive alien species encroachment.

	Without mitigation	**With mitigation**
Extent	Moderate (3)	Low (2)
Duration	Long term (4)	Very short term (1)
Magnitude	Low (4)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (44)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	

Mitigation:
- » Speed limits must be put in place to reduce erosion through putting up signs to promote compliance.
- » Speed bumps must be built to force slow speeds.
- » Reduce the dust generated by vehicle movement, especially the earthmoving machinery, through wetting the soil surface.
- » Existing access routes and walking paths must be made use of.
- » A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.

Residual Impacts:
There is still the potential for erosion and invasive alien species encroachment even with the implementation of control measures but would have a low impact.

Nature: Spread of alien and/or invasive species
Degradation and loss of surrounding natural vegetation

	Without mitigation	**With mitigation**

Extent	High(4)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (56)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

» An alien vegetation management plan must be implemented during operation.
» It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.

Residual Impacts:

Long-term broad scale invasive alien species infestation if not mitigated.

Nature: Ongoing displacement and direct mortalities of faunal community due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration

The operation and maintenance of the proposed development may lead to disturbance or persecution of fauna in the vicinity of the development.

	Without mitigation	**With mitigation**
Extent	Low (2)	Very low (1)
Duration	Long term (4)	Short term (2)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (30)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

» Noise must be kept to an absolute minimum during the evenings and at night where possible, to minimise all possible disturbances to amphibian species and nocturnal mammals.
» No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to raise awareness in this regard.
» All outside lighting should be directed away from highly sensitive areas where possible. Fluorescent and mercury vapour lighting should be avoided and sodium vapour (green/red) lights should be used wherever possible.
» Heat generated from the substation, if any, must be monitored to ensure it does not negatively affect the local fauna.
» Ensure that any cables and connections are insulated successfully to reduce electrocution risk.
» Monitoring (to be undertaken by the Site Manager, or relevant designated personnel) of the entire overhead power line route must be undertaken to detect bird carcasses, and to enable the identification of any potential areas of high impact to be marked with bird flappers if not already done so. Monitoring should be undertaken at least once a month for the first year of operation.
» A hydrocarbon spill management plan must be put in place, to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Operator shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment may occur on site, unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.

» All personnel and contractors to undergo Environmental Awareness Training prior to being granted access to the site. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance; and biology, habitat requirements and management requirements in the EA and EMPr. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided. » Storm Water run-off & Discharge Water Quality monitoring must be undertaken on a monthly basis.
Residual Impacts: Disturbance from maintenance activities will occur albeit at a low and infrequent level.

Decommissioning Phase Impacts

While no specific impacts have been identified for the decommissioning phase, it is considered that the impacts expected for the construction phase, and the mitigation measures recommended will also be relevant to the decommissioning phase.

8.3.3 Overall Result

Based on the current layout for the Becrux Solar PV Facility, no project infrastructure is expected to have a significant impact on the vulnerable ecosystem and Protected Areas Expansion Strategy focus area as these have been found to be modified. No faunal component of significance was observed, which further reduced the impact significance of the development on terrestrial biodiversity. Historically, agriculture and the current land use (i.e., non-irrigated agriculture) has led to the deterioration of these habitats and as such, the classification of development area as heavily modified area is corroborated.

Considering that this area has been identified as being of low significance for biodiversity maintenance and ecological processes, development may proceed. All mitigation measures recommended by the specialist must be considered by the issuing authority for authorisation and included in the project EMPr. No fatal flaws are evident for the proposed project.

8.4. Potential Impacts on Aquatic Ecology

The development of the Becrux Solar PV Facility is likely to result in a variety of impacts from an aquatic perspective. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E** for more details).

A total of seven (7) wetland systems were identified and delineated within the 500m regulated area surrounding the development area (refer to **Figure 8.2**), three (3) of which could potential be impacted upon (either directly or indirectly) by the proposed activities i.e., HGM 1, 2 and 3. The seven wetland systems comprised both natural and artificial systems. HGM 1, 2 and 3 are classified as a natural systems.

Overall, HGM 1, 2 and 3 scored Intermediate in terms of wetland ecosystem systems. It should however be noted that HGM 2 scored considerably higher indirect benefits than HGM 1 and 3. The overall Present Ecological State (PES) for HGM 1 and 3 has been calculated to be "Seriously Modified", with HGM 2 being scored "Largely Modified".

The Ecological Importance and Sensitivity (EIS) of the units was determined to be High for HGM 3 and Moderate for the HGM 1 and HGM 2. A 22m buffer has been recommended around the delineated wetland units.

A risk assessment was conducted, in accordance with the requirements of GN 509, published in the Government Gazette (no. 40229) under Section 39 of the NWA in August 2016. The GN 509 process provides an allowance to apply for a WUL for Section 21(c) & (i) under a GA, as opposed to a full WULA.

Two post-mitigation scenarios have been considered for this risk assessment, namely avoidance of the wetland buffers and impedance into the wetland buffers. The findings of the risk assessment indicate that various aspects scored "Moderate" pre-mitigation significance ratings. Considering the scenario where the applicant adheres to the buffer zones, all of the post-mitigation significance ratings are expected to be decreased to "Low". In the event that the buffers are impeded on, some of the aspects are expected to still be associated with "Moderate" post-mitigation significance ratings.

Should the 22m buffer zone be impeded on, the first and second steps in the mitigation hierarchy (avoidance and minimising impacts) cannot be met. Therefore, the third step in the mitigation hierarchy (rehabilitation) will need to be implemented. It should be noted that the 22m buffer can only be impeded on up to the 10m mark (therefore 12m from the edge of the buffer) to avoid direct impacts to the wetland.

8.4.1 Description of Impacts on Aquatic Ecology

The impact on aquatic ecology identified to be associated with the construction and operation phases of the Becrux Solar PV Facility relates to the loss of wetland functionality.

8.4.2 Impact tables summarising the significance of impacts on aquatic ecology during construction and operation (with and without mitigation)

The impact assessment focuses on the activities that are expected to pose threats towards the unchanneled valley bottom wetlands (HGM 1 and 3) and depression (HGM 2) wetland which are likely to be impacted upon (either directly or indirectly) by the proposed activities (refer to **Figure 8.2**) due to the locality of these systems being within and in close proximity to the proposed PV development area. All proposed activities are expected to be long-term (> 15 years) and have been considered "permanent" on this basis, which renders the decommissioning phase irrelevant.

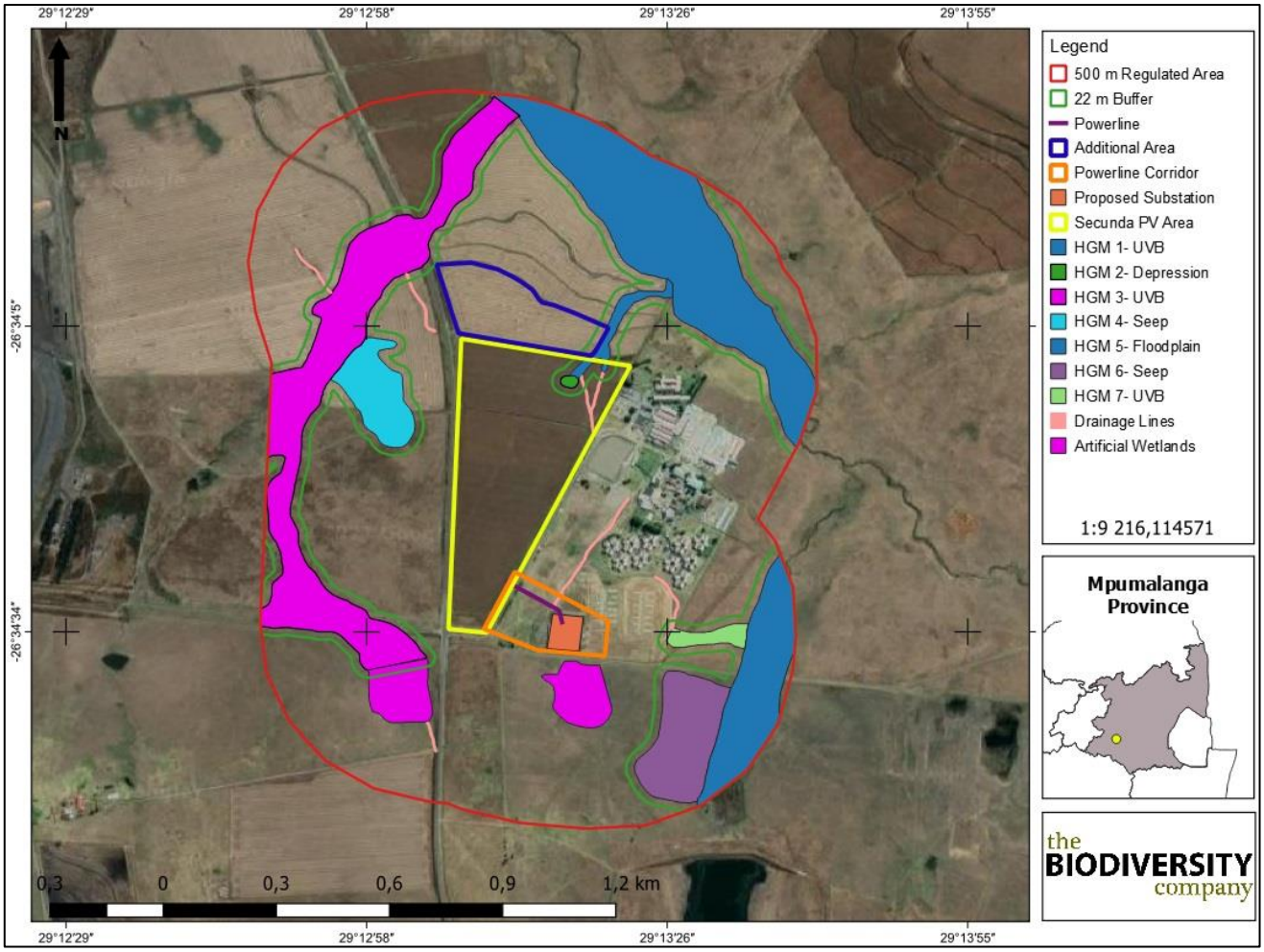

Figure 8.2: Delineated wetlands within the 500m regulated area, including their associated buffer zones

Construction Phase Impacts

During the construction phase, heavy vehicles (trucks) will be used to transport PV structures throughout the footprint area with reliance on manual labour for finer refinement. No vegetation is located within this area due to the dominance of crop fields. Potential sedimentation is possible during the construction phase, although limited due to the clay nature of the soil in the footprint area.

It is evident from the impact calculations that in a pre-mitigation state, significant impacts are expected. The main mitigation objective would be to realign the proposed layout in such a manner that the 22m buffer zone around the identified wetlands is adhered to. In the event that this recommendation is adhered to, considerably lower impacts are foreseen which ultimately results in a post-mitigation significance rating of "Low".

Nature: Loss of wetland functionality		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Very High (10)	Low (4)
Probability	Definite (5)	Improbable (2)
Significance	**High (70)**	**Low (16)**
Status (positive or negative)	Negative	Negative

Reversibility	Moderate	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

- HGM 1, 2 and 3, including their associated 22m buffer zones, must be avoided by construction activities.
- Existing roads must be used as much as possible.
- Proper stripping and stockpiling techniques must be followed.
- Avoid preferential surface flow paths.
- Storage of potential contaminants must be undertaken in bunded areas.
- All contractors must have spill kits available and be trained in the correct use thereof.
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".
- No cleaning or servicing of vehicles, machines and equipment in water resources.
- Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area and these must be serviced regularly.
- Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.
- All waste generated on-site must be adequately managed and separated and recycling of different waste materials should be supported.
- Demarcate footprint areas to be stripped of topsoil.
- Exposed areas must be ripped and vegetated to increase surface roughness.
- All machinery and equipment should be inspected regularly for faults and possible leaks. These should be serviced off-site or designated areas.
- Crossings (where possible) are to be constructed during the low flow period.
- Subject to the completion of a detailed stormwater management plan, well-engineered, and wide enough culvert systems should be installed at all drainage systems, including those minor systems not identified during the site assessment.
- It is critical to spread flows across the system, avoiding incisions in the landscape caused by concentrated flows. Temporary stormwater channels should be filled with aggregate and/or logs (branches included) to dissipate flows.
- It is recommended that the material surrounding and holding the culverts in place at road crossings include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability to accommodate flooding and very low flows.
- The culverts used in the design should be as large as possible, partially sunken and energy dissipating material must be placed at the discharge area of each culvert to prevent erosion of these areas.
- Culverts should avoid inundation (damming) of upstream areas by facilitating streamflow and catering properly for both low flows and high flows.
- Surface run-off from the roads flowing down the embankments often scours the watercourse on the sides of the culvert causing sedimentation of the channel. This should be catered for with adequate concreted stormwater drainage depressions and channels with energy dissipaters that channel these flows into the river in a controlled manner.
- The culvert installations should further take into account the scouring action of high flows and gabion structures or similar should be placed on both sides of the culvert on the embankments both upstream and downstream. This will serve as retention of the soils from scouring around and underneath the culvert structures aiding in the protection of the structure.
- Large aggregate outsourced or from the project area (if available) can be used for energy dissipation in the channel downstream of the culverts to reduce the likelihood of scouring the riverbed and sedimentation of the catchment. It is preferable that larger aggregate be used to avoid flows removing material from the site.
- Signs of erosion must be addressed immediately to prevent further erosion.
- Silt traps and fences must be placed in the preferential flow paths along the road to prevent sedimentation of the watercourse.

Residual Impacts:

Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.

Operation Phase Impacts

During the operational phase, very little impacts are foreseen. Vegetation cover will naturally re-establish itself in the area after construction practices cease. Maintenance of vegetation as well as the occasional maintenance of PV structures will have to be carried out throughout the life of the project. It is expected that these maintenance practices can be undertaken by means of manual labour. Overland flow dynamics are expected to improve due to the change in land sue use from baron crop fields to a PV area predominantly being covered in basal cover.

Considering the low magnitude of impacts as well as the fact that the 22 m buffer zone has been taken into consideration in the layout of the facility, very little impacts are expected pre- and post-mitigation for the proposed operational phase.

Nature: Loss of wetland functionality		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (18)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

- Existing roads must be used as much as possible.
- Storage of potential contaminants must be undertaken in bunded areas.
- The operator and all contractors must have spill kits available and all staff be trained in the correct use thereof.
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".
- No cleaning or servicing of vehicles, machines and equipment in or near water resources.
- Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.
- All machinery and equipment should be inspected regularly for faults and possible leaks. These should be serviced off-site where possible or at designated areas within the footprint of the solar PV facility.
- Surface run-off from the roads flowing down the embankments often scours the watercourse on the sides of the culvert causing sedimentation of the channel. This should be catered for with adequate concreted stormwater drainage depressions and channels with energy dissipaters that channel these flows into the river in a controlled manner.
- Signs of erosion must be addressed immediately to prevent further erosion.

Residual Impacts:
Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.

8.4.3 Overall Result

Seven (7) HGM units were identified of which only three (3) systems (HGM 1, 2 and 3) have been included in the functional assessment due to these systems being at an appreciable level of risk posed by the proposed

development. These wetland systems have been determined to all have "Intermediate" average ecosystem service scores with the overall present ecological state of the systems ranging from "Largely Modified" to "Seriously Modified". The importance and sensitivity score of HGM 1 and 2 is calculated to be "Moderate", with HGM 3 scoring "High". A 22m buffer zone has been recommended for the conservation of the delineated wetlands.

As part of the impact assessment results, it has been determined that all risks posed by the proposed activities are characterised by "Low" post-mitigation significance ratings. Considering these findings, it is the specialist's opinion that the proposed activities can be favourably considered on condition that all mitigations measures be implemented, including the adherence to the 22m buffer zone.

In terms of water use authorisation, proceeding with the proposed activities and avoiding the wetland buffer zone will constitute "Low" post-mitigation significance ratings, ultimately only requiring general authorisation. By impeding into the buffer zones, a water use license will be required with the condition of rehabilitation (i.e., rehabilitating HGM1 and 2 to "Largely Modified" after construction).

8.5. Assessment of Impacts on Land Use, Soil and Agricultural Potential

Based on the sensitivity of the Becrux Solar PV Facility development area (see Chapter 6 and **Appendix F**), a full impact assessment was undertaken in accordance with the relevant specialist protocols published in GNR 320 of 20 March 2020. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix F** for more details).

8.5.1 Description of Impacts on Land Use, Soil and Agricultural Potential

The impact on soils identified to be associated with the construction and operation phases of the Becrux Solar PV Facility relates to the loss of land capability.

8.5.2 Impact tables summarising the significance of impacts on land use, soil and agricultural potential during construction and operation (with and without mitigation)

The impact assessment considers the calculated sensitivities associated with the soil resources expected to be impacted upon by the relevant components. All proposed activities are expected to be long term (> 15 years) and have been considered "permanent" on this basis, which renders the decommissioning phase irrelevant. The proposed PV area is assessed separately from the proposed power line considering the difference in intensity as well as the sensitivity of impacts upon soil resources. This impact assessment purely focuses on the impacts expected towards natural resources (in specific, the soil and associated land capability).

8.5.2.1 Proposed PV Area

Construction Phase Impacts

During the construction phase, heavy vehicles (trucks) will be used to transport PV structures throughout the footprint area with reliance on manual labour for finer refinement. No vegetation is located within this area due to the dominance of crop fields. Potential erosion is possible during the construction phase, although limited due to the clay nature of the soil in the footprint area.

It is evident from the impact calculations provided in the table below that in a pre-mitigation state, moderate impacts are expected. The main mitigation objective would be to limit the area to be impacted upon by means of concrete pylons where possible by installing pylons directly into the soil surface. In the event that this recommendation be adhered to, lower impacts are foreseen which ultimately results in a post-mitigation significance rating of "Low". It has however been communicated to the specialist that this recommendation might not be feasible depending on the Geotechnical findings, therefore, a "Medium" post-mitigation significance rating will be relevant until more details surrounding the proposed foundations are made available.

Nature: Loss of land capability		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Medium (30)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Limit the area to be impacted upon by means of concrete pylons where possible by installing pylons directly into the soil surface. » Develop and implement a rehabilitation management and monitoring plan. The plan must be developed at least 2 months prior to the implementation of soil stripping. » Vegetate all stockpiles after stripping/removing soils. » Continuously monitor erosion on site. » Any erosion problems observed to be associated with the project infrastructure must be rectified as soon as possible. » Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion. » Topsoil must be removed and stored separately from subsoil. Topsoil must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.		
Residual Impacts: Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

Operation Phase Impacts

Nature: Loss of land capability		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Long Term (4)	Long Term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Medium (36)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Monitor compaction on site during the timeframe assigned for the life of the PV plant. » Continuously monitor erosion on site.		
Residual Impacts: Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

8.5.2.2 Proposed Power Line

Construction Phase Impacts

During the construction phase, heavy vehicles (trucks) will be used to transport power line structures throughout the power line corridor / servitude with reliance on manual labour for finer refinement. During this phase, impacts are expected towards low sensitivity soil resources in the form of excavations and installations of power line pylons.

It is evident from the impact calculations that limited impacts are expected considering the low sensitivity of soil resources in the area, and the extent of the footprint associated with the placement of the proposed power line which will be < 1km in length. The proposed activities are therefore not expected to reduce the land capability of this area any further.

Nature: Loss of land capability		
	Without mitigation	**With mitigation**
Extent	Low (2)	Low (2)
Duration	Short Term (2)	Short Term (2)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (16)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Develop and implement a rehabilitation management and monitoring plan. The plan must be developed at least 2 months prior to the implementation of soil stripping. » Continuously monitor erosion on site.		
Residual Impacts:		

Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.

Operation Phase Impacts

The only impacts expected towards the land capability of the area during the operation of the power line includes potential erosion at the base of the power line pylons. These impacts, together with the low sensitivity of the area, are expected to be minor. The pre-and post-mitigation significance ratings have been calculated to be "Low".

Nature: Loss of land capability		
	Without mitigation	**With mitigation**
Extent	Very Low (1)	Very Low (1)
Duration	Long Term (4)	Long Term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (14)**	**Low (14)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Monitor compaction on site throughout the operational phase. » Continuously monitor erosion on site.		
Residual Impacts: Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to.		

8.5.3 Overall Result

Various soil forms have been identified in the study area which have been divided into six (6) main land capability classes according to depth, texture, hydromorphic properties etc. (namely land capability class I, II, III, IV, V and VI). These land capability classes range from a "Low" to a "High" sensitivity, which concurs with the findings from the DFFE Screening Tool (refer to **Appendix L**). From these six classes as well as the poor climatic capability of "C7", four land potential levels were calculated, namely land potential 3, 5, 6 and "vlei". Therefore, the overall land potential is "Moderate" to "Low".

Considering the low post-mitigation significance ratings for all the aspects and phases, it is the specialist's opinion that no significant impacts towards the land capability resources are foreseen. Thus, the proposed development should be considered favourably by the relevant Competent Authority.

8.6. Assessment of Impacts on Heritage Resources

Potential impacts on heritage resources and the relative significance of the impacts are summarised below (refer to **Appendix G** for more details).

8.6.1 Description of the Heritage Impacts

Archaeological Resources

The ephemeral isolated archaeological finds within the study area were exclusively associated with the planted regions of the development area and occurred in secondary contexts and therefore have limited potential for modern scientific analyses (due to the ex situ spatial contexts of the finds and limited possibility of radiometric dating).

The field assessment conducted revealed no significant archaeological resources located within the development footprint. Four observations of archaeological resources were recorded, and these have all been determined to not be conservation-worthy and have been sufficiently recorded in the Heritage Impact Assessment.

Palaeontological Heritage

In terms of impacts to palaeontological heritage, based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the proposed Solar Facility area, or within the power line corridor. The geological structures suggest that the rocks are the correct age and type to contain fossils, i.e., fossil plant impressions of the *Glossopteris* flora, but the rocks are covered by sandy soils and vegetation. The site visit confirmed that there were no rocky outcrops and no fossils in the sandy soils. Since there is a small chance that fossils from the below ground Vryheid Formation may be disturbed, a Fossil Chance Find Protocol has been recommended. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

Built Environment and Cultural Landscape

There are no buildings within the development area and the current landscape consists of remnant farming plots wedged in between heavy industrial activity (Brandspruit Coal Mine) and Secunda's chemical plants.

8.6.2 Impact tables summarising the significance of impacts on heritage during construction (with and without mitigation)

Construction Phase Impacts

Nature: Impact of the proposed development to archaeological resources It is possible that significant archaeological resources may be impacted by the proposed development.		
	Without mitigation	**With mitigation**
Extent	Local (1) – limited to the development footprint	Local (1) - limited to the development footprint
Duration	Permanent (5) – where manifest, the impact will be permanent	Permanent (5) - where manifest, the impact will be permanent
Magnitude	Medium (6) – four (4) archaeological sites of low scientific significance were identified within the area proposed for development	Low (2) – four (4) archaeological sites of low scientific significance were identified within the area proposed for development

Probability	Probable (3) – it is possible that significant archaeological resources will be impacted	Improbable (1) – it is unlikely that significant archaeological resources will be impacted
Significance	**Medium (36)**	**Low (8)**
Status (positive or negative)	Negative	Neutral
Reversibility	Any impacts to heritage resources that do occur are irreversible	
Irreplaceable loss of resources?	Possible	Not likely
Can impacts be mitigated?	Yes	
Mitigation: » Should any buried archaeological resources or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.		
Residual Impacts: Loss of archaeological resources		

Nature: Impact of the proposed development to palaeontological resources It is possible that buried palaeontological resources may be impacted by the proposed development.		
	Without mitigation	**With mitigation**
Extent	Local (1) – limited to the development footprint	Local (1) - limited to the development footprint
Duration	Permanent (5) – where manifest, the impact will be permanent	Permanent (5) - where manifest, the impact will be permanent
Magnitude	Low (4) – According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments that have very high palaeontological sensitivity. However, excavations associated with PV facilities tends to be shallow (<3m) and as such, the likelihood of impacting intact Vryheid Formation sediments is low	Low (2) - According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments that have very high palaeontological sensitivity. However, excavations associated with PV facilities tends to be shallow (<3m) and as such, the likelihood of impacting intact Vryheid Formation sediments is low
Probability	Improbable (1) – it is unlikely that significant fossils will be impacted	Improbable (1) - it is unlikely that significant fossils will be impacted
Significance	**Low (10)**	**Low (8)**
Status (positive or negative)	Negative	Negative
Reversibility	Any impacts to palaeontological resources that do occur are irreversible	
The irreplaceable loss of resources?	Possible	Not likely
Can impacts be mitigated?	Yes	
Mitigation: » The Chance Fossils Finds procedure must be implemented during the course of construction. Actions to be undertaken as per the procedure are as follows: o One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material. o Once a workman notices possible fossil material, he/she should report this to the ECO or site agent. Procedure to follow if it is likely that the material identified is a fossil: - The ECO or site agent must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found.		

- The ECO or site agent must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates.
- The ECO or site agent must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including:
  - The date.
  - A description of the discovery.
  - A description of the fossil and its context (e.g. position and depth of find).
  - Where and how the find has been stored.
  - Photographs to accompany the preliminary report (the more the better):
    - A scale must be used.
    - Photos of location from several angles.
    - Photos of vertical section should be provided.
    - Digital images of hole showing vertical section (side).
- » Upon receipt of this Preliminary Report, SAHRA will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary. Digital images of fossil or fossils.
- o Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation.
- o If the find cannot be stabilised, the fossil may be collect with extreme care by the ECO or the site agent and put aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.
- o No work may continue in the vicinity of the find until SAHRA has indicated, in writing, that it is appropriate to proceed.

Residual Impacts:
Loss of palaeontological resources

8.6.3 Overall Result

The area proposed for development has an overall low level of archaeological sensitivity and as such, it is therefore very unlikely that the proposed development will have a negative impact to significant archaeological heritage. According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of the Vryheid Formation that have very high palaeontological sensitivity. Excavations associated with PV facilities tends to be shallow (<3m) and as such, the likelihood of impacting intact Vryheid Formation sediments is low; hence the impact on palaeontological resources Is rated as being of low significance.

» The mitigation measures articulated in the VIA (2021) completed for this project are implemented.
» The Chance Fossil Finds Procedure is implemented during the course of construction activities.
» Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

8.7. Assessment of Visual Impacts

Negative impacts on visual receptors will occur during the undertaking of construction activities and the operation of the Becrux Solar PV Facility. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix H** for more details).

8.7.1 Description of Visual Impacts

The combined results of the visual exposure, viewer incidence/perception and visual distance of the proposed PV facility are displayed on **Figure 8.3**. Here the weighted impact and the likely areas of impact have been indicated as a visual impact index. Values have been assigned for each potential visual impact per data category and merged to calculate the visual impact index per data category and merged to calculate the visual impact index.

The criteria (previously discussed in this report) which inform the visual impact index are:

» Visibility or visual exposure of the structures.
» Observer proximity or visual distance from the structures.
» The presence of sensitive visual receptors.
» The perceived negative perception or objections to the structures (if applicable).
» The visual absorption capacity of the vegetation cover or built structures (if applicable).

An area with short distance visual exposure to the proposed infrastructure, a high viewer incidence and a potentially negative perception (i.e., a sensitive visual receptor) would therefore have a **higher** value (greater impact) on the index. This helps in focussing the attention to the critical areas of potential impact and determining the potential **magnitude** of the visual impact.

The index indicates that **potentially sensitive visual receptors** within a 1km radius of the PV facility may experience a **very high** visual impact. The magnitude of visual impact on sensitive visual receptors subsequently subsides with distance to; **high** within a 1–3km radius (where/if sensitive receptors are present) and **moderate** within a 3–6km radius (where/if sensitive receptors are present). Receptors beyond 6km are expected to have a **low** potential visual impact.

Magnitude of the potential visual impact
The PV facility is expected to have a visual impact of **very high** magnitude on observers travelling along the Secunda secondary road where it traverses the proposed development area.

The facility may have a visual impact of **high** magnitude on the following observers:

Residents of/or visitors to:
» Goedehoop (north).
» Vlakspruit (north-east).
» Vlakspruit (east).

The facility may have a visual impact of **moderate** magnitude on the following observers:

Residents of/or visitors to:
» Secunda outlying.
» Goedehoop (far north).
» Vlakspruit (south-east).
» Bossiespruit.

Where homesteads are derelict or deserted, the visual impact will be non-existent, until such time they are inhabited again.

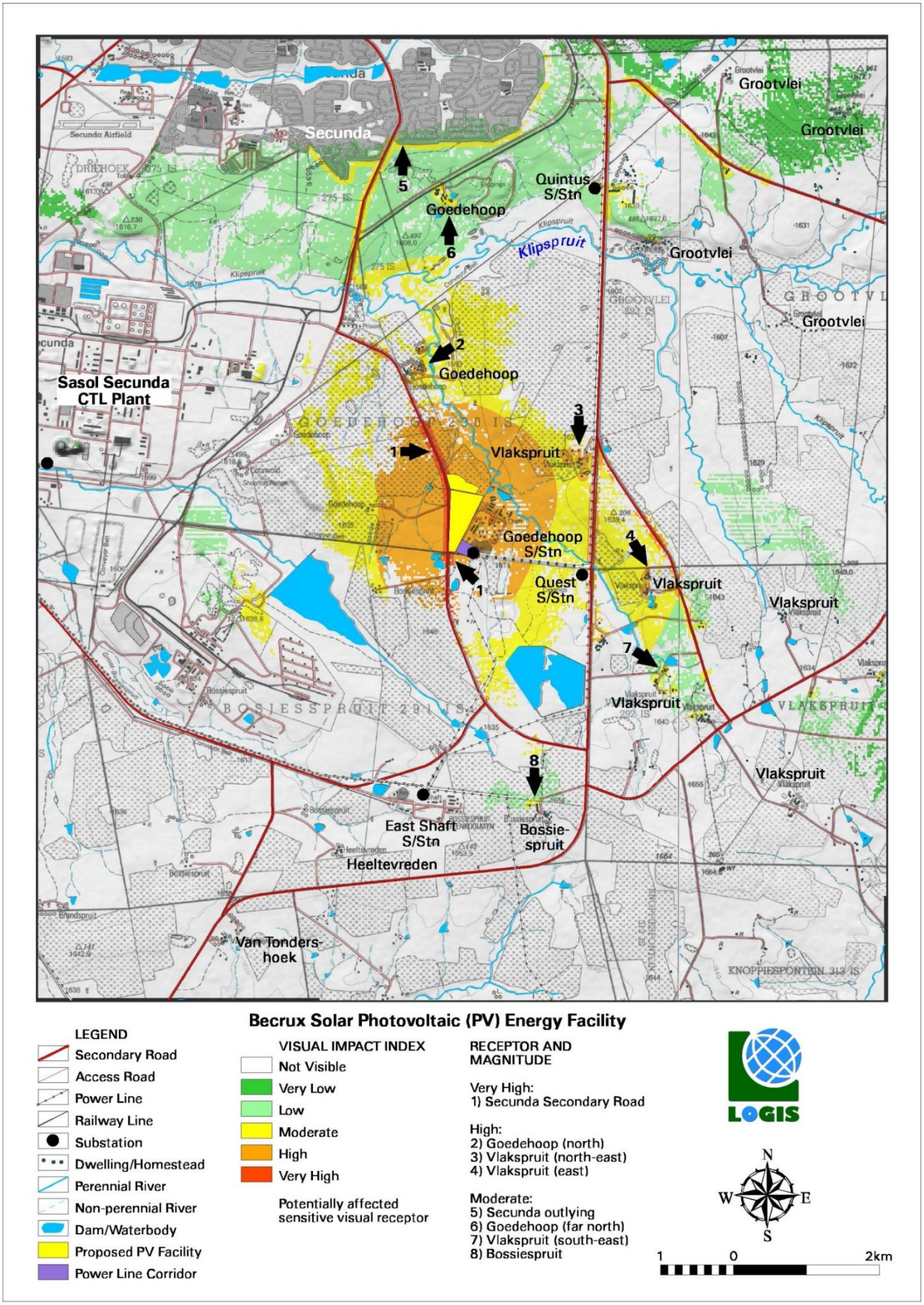

Figure 8.3: Visual impact index and potentially affected sensitive visual receptors

8.7.2 Impact table summarising the significance of visual impacts during construction, operation and decommissioning (with and without mitigation)

Construction, Operation and Decommissioning Phase Impacts

Nature: Potential visual impact of construction activities on sensitive visual receptors in close proximity to the proposed PV facility and ancillary infrastructure.
During construction, there may be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and landowners in the area.

Construction activities may potentially result in a moderate (significance rating = 40), temporary visual impact, that may be mitigated to low (significance rating = 24).

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Probable (3)
Significance	**Moderate (40)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Planning:

» Retain and maintain natural vegetation (if present) immediately adjacent to the development footprint.

Construction:

» Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase, where possible.
» Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
» Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
» Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
» Reduce and control construction dust using approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent).
» Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
» Rehabilitate all disturbed areas (if present/if required) immediately after the completion of construction works.

Residual Impacts:
None, provided rehabilitation works are carried out as specified.

Nature: Potential visual impact on sensitive visual receptors located within a 1km radius of the PV facility.
The PV facility is expected to have a moderate (to potentially high) visual impact (significance rating = 56) on observers travelling along the Secunda secondary road. There are no homesteads within a 1km radius of the proposed PV facility structures. The facility would be highly visible from the Riaan Rademan (Sasol) Training Centre, but observers at this locality are associated with Sasol and are assumed to be supportive of the development.

Mitigation of this impact is not possible. Only best practise measures can be implemented.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)

Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Moderate (6)
Probability	Highly Probable (4)	Probable (3)
Significance	**Moderate (56)**	**Moderate (36)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, however best practice measures are recommended.	

Generic best practise mitigation/management measures:

Planning:

» Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible.
» Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns.

Operations:

» Maintain the general appearance of the facility as a whole.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

Residual Impacts:

The visual impact will be removed after decommissioning, provided the PV facility infrastructure is removed. Failing this, the visual impact will remain.

Nature: Potential visual impact on sensitive visual receptors within the region (1 – 3km radius).

The operational PV facility could have a moderate visual impact (significance rating = 39) on observers (residents and road users) located between a 1 – 3km radius of the PV facility structures, both before and after the implementation of mitigation measures.

Mitigation of this impact is not possible. Only best practise measures can be implemented

	Without mitigation	**With mitigation**
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Moderate (45)**	**Moderate (39)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, however best practice measures are recommended.	

Generic best practise mitigation/management measures:

Planning:

» Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible.

Operations:

» Maintain the general appearance of the facility as a whole.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.

» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

Residual Impacts:
The visual impact will be removed after decommissioning, provided the PV facility infrastructure is removed. Failing this, the visual impact will remain.

Nature: Potential visual impact of operational, safety and security lighting of the facility at night on observers in close proximity to the proposed PV facility.
Lighting impacts relate to the effects of glare and sky glow. The source of glare light is unshielded luminaries which emit light in all directions, and which are visible over long distances.

Sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the number of light sources. Each new light source, especially upwardly directed lighting, contribute to the increase in sky glow. It is possible that the PV facility may contribute to the effect of sky glow within the environment which is currently undeveloped.

Mitigation of direct lighting impacts and sky glow entails the pro-active design, planning and specification of lighting for the facility. The correct specification and placement of lighting and light fixtures for the PV facility and the ancillary infrastructure (e.g., workshop and storage facilities) will go far to contain rather than spread the light.

The following table summarises the assessment of this anticipated impact, which is likely to be of moderate significance, and may be mitigated to low.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Moderate (6)
Probability	Probable (3)	Improbable (2)
Significance	**Moderate (42)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, however best practice measures are recommended.	

Generic best practise mitigation/management measures:
Planning and Operation:
» Shield the sources of light by physical barriers (walls, vegetation, or the structure itself).
» Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights.
» Make use of minimum lumen or wattage in fixtures.
» Make use of down-lighters, or shielded fixtures.
» Make use of Low Pressure Sodium lighting or other types of low impact lighting.
» Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

Residual Impacts:
The visual impact will be removed after decommissioning, provided the PV facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

Nature: Potential visual impact of solar glint and glare as a visual distraction and possible air travel hazard.
Glint and glare occur when the sun reflects of surfaces with specular (mirror-like) properties. Examples of these include glass windows, water bodies and potentially some solar energy generation technologies (e.g., parabolic troughs and CSP heliostats). Glint is generally of shorter duration and is described as "a momentary flash of bright light", whilst glare is the reflection of bright light for a longer duration.

The visual impact of glint and glare relates to the potential it has to negatively affect sensitive visual receptors in relative close proximity to the source (e.g. residents of neighbouring properties), or aviation safety risk for pilots (especially where the source interferes with the approach angle to the runway). The Federal Aviation Administration (FAA) of the United States of America have researched glare as a hazard for aviation pilots on final approach and may prescribe specific glint and glare studies for solar energy facilities in close proximity to aerodromes (airports, airfields, military airbases, etc.). It is generally possible to mitigate the potential glint and glare impacts through the design and careful placement of the infrastructure.

PV panels are designed to generate electricity by absorbing the rays of the sun and are therefore constructed of dark-coloured materials and are covered by anti-reflective coatings. Indications are that as little as 2% of the incoming sunlight is reflected from the surface of modern PV panels (i.e., such as those proposed for the Becrux PV Facility) especially where the incidence angle (angle of incoming light) is smaller i.e. the panel is facing the sun directly. This is particularly true for tracker arrays that are designed to track the sun and keep the incidence angle as low as possible.

The proposed PV facility is not located near any operational airports or airfields. The Secunda airfield is located south-west of the town at a distance of approximately 6.25km (north-west) from the proposed Becrux PV Facility, at the closest. The potential visual impact related to solar glint and glare as an air travel hazard is expected to be of low significance, due to the long distance in between the proposed PV facility and the airfield. No mitigation of this impact is required since the PV facility is not expected to interfere with aircraft operations at the airfield.

	Without mitigation	**With mitigation**
Extent	Local (2)	N.A.
Duration	Long term (4)	N.A.
Magnitude	Low (4)	N.A.
Probability	Improbable (2)	N.A.
Significance	**Low (20)**	N.A.
Status (positive or negative)	Negative	N.A.
Reversibility	Reversible (1)	N.A.
Irreplaceable loss of resources?	No	N.A.
Can impacts be mitigated?	Not required.	
Mitigation: N.A.		
Residual Impacts: N.A.		

Nature: Potential visual impact of solar glint and glare as a visual distraction and possible hazard to road users.
There are no major (national or arterial) roads in close proximity to the PV facility, but the Secunda secondary road traverses the PV facility site.

Based on research and industry experience, the glint and glare from tracking panels with back tracking towards ground-based receptors are most common when the panels are flat in the morning/evening. This is when the larger incidence angle (angle of incoming light) yields more reflected light. Therefore, users of the Secunda secondary road may be at risk of glint and glare impacts due its close proximity to the PV facility, especially during sunrise or sunset.

Fixed tilt PV mounting structures (in the southern hemisphere) are generally orientated to the north. The potential for glint and glare impacts is therefore expected to primarily occur on higher-lying land located north, north-east and north-west of the PV structures. This is ultimately dependent on the tilt angle of the PV panels, where 0 degrees is flat and 90 degrees is perpendicular to the ground.

The visual impacts associated with glint and glare is expected to have a moderate (to potentially high) visual impact (significance rating = 56) on observers travelling along the Secunda secondary road without the implementation of the recommended mitigation measures.

These glint and glare impacts may be mitigated if the PV panels are shielded from the Secunda secondary road by means of planted vegetation cover, or solid fencing along the road servitude. If the PV panels are not exposed to road users, the impacts associated with glint and glare is expected to be low. Additional mitigation measures along this road (within a 1km radius of the facility) may include the reduction of the speed limit and the introduction of traffic calming devices (e.g., speed bumps) as a safety precaution against high-speed accidents caused by glare impacts on drivers.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Moderate (6)
Probability	Highly Probable (4)	Improbable (2)
Significance	**Moderate (56)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Planning and Operation:

» Use anti-reflective panels and dull polishing on structures, where possible and industry standard.
» Adjust tilt angles of the panels if glint and glare issues become evident, where possible.
» Investigate the potential to screen the PV facility from the Secunda secondary road (located within 1km of the facility) with planted vegetation cover or solid fencing, where possible.

Residual Impacts:

The visual impact will be removed after decommissioning, provided the PV facility infrastructure is removed. Failing this, the visual impact will remain.

Nature: Potential visual impact of solar glint and glare on static ground-based receptors (residents of homesteads) in close proximity to the PV facility.

There are no homesteads located within a 1km radius of the proposed PV facility. The closest homestead (Vlakspruit) is located 1.3km north-east of the facility. The intensity of the light reflected from the solar panels decreases with increasing distance and is directly proportional to the size of the PV array, which in this case is a relatively small 19.99MW_{ac} installation.

Solar glint and glare impacts on static ground-based receptors is expected to be of low significance, both before and after mitigation measures are implemented

Mitigation of this impact is possible and both specific measures as well as general "best practice" measures are recommended in order to reduce/mitigate the potential visual impact. The table below illustrates this impact assessment.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (2)	Improbable (2)
Significance	**Low (24)**	**Low (20)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Planning and Operation:

» Use anti-reflective panels and dull polishing on structures, where possible and industry standard.
» Adjust tilt angles of the panels if glint and glare issues become evident, where possible.
» If specific sensitive visual receptors are identified during operation, investigate screening at the receptor site, where possible.

Residual Impacts:

The visual impact will be removed after decommissioning, provided the PV facility infrastructure is removed. Failing this, the visual impact will remain.

Nature: Visual impact of the ancillary infrastructure during the operation phase on observers in close proximity to the structures.

On-site ancillary infrastructure associated with the PV facility includes an 11kV power line, inverters, low voltage cabling between the PV arrays, meteorological measurement station, internal access roads, workshop, office buildings, etc.

No dedicated viewshed analyses have been generated for the ancillary infrastructure, as the range of visual exposure will fall within that of the PV arrays. The anticipated visual impact resulting from this infrastructure is likely to be of low significance both before and after mitigation.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (20)**	**Low (20)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	

Generic best practise mitigation/management measures:

Planning:

» Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint/power line servitude where possible.

Operations:

» Maintain the general appearance of the infrastructure.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

Residual Impacts:

The visual impact will be removed after decommissioning, provided the ancillary infrastructure is removed. Failing this, the visual impact will remain.

Decommissioning Phase Impacts

The visual impact will be removed after decommissioning, provided the solar facility infrastructure is removed and the area rehabilitated. Failing this, the visual impact will remain.

8.7.3 Overall Result

The findings of the Visual Impact Assessment undertaken for the proposed 19.99MW$_{ac}$ PV facility is that the visual environment surrounding the site, especially within a 1 - 3km radius, may be visually impacted during the anticipated operational lifespan of the facility (i.e., a minimum of 20 years).

This impact is primarily applicable to the individual Becrux PV Facility and no cumulative visual impacts are expected.

The following is a summary of impacts remaining, assuming mitigation as recommended, is exercised:

- During construction, there may be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Construction activities may potentially result in a **moderate**, temporary visual impact that may be mitigated to **low**.
- The PV facility is expected to have a **moderate** (to potentially **high**) visual impact on observers travelling along the Secunda secondary road. There are no homesteads within a 1km radius of the operational PV facility structures. The facility would be highly visible from the Riaan Rademan (Sasol) Training Centre, but observers at this locality are associated with Sasol and are assumed to be supportive of the development. The impacts may be contained to **moderate** significance, if the proposed impact mitigation measures are implemented.
- The operational PV facility could have a **moderate** visual impact on observers (residents and road users) located between a 1 – 3km radius of the PV facility structures, both before and after the implementation of mitigation measures.
- The anticipated impact of lighting at the PV facility is likely to be of **moderate** significance and may be mitigated to **low**.
- The potential visual impact related to solar glint and glare as an air travel hazard is expected to be of **low** significance, due to the long distance in between the proposed PV facility and the Secunda Airfield. No mitigation of this impact is required since the PV facility is not expected to interfere with aircraft operations at the airfield.
- The potential visual impact of solar glint and glare as a visual distraction and possible hazard to road users is expected to have a **moderate** (to potentially **high**) visual impact on observers travelling along the Secunda secondary road. These glint and glare impacts may be mitigated if the PV panels are shielded from the Secunda secondary road by means of planted vegetation cover, or solid fencing along the road servitude. If the PV panels are not exposed to road users (due to the project being screened from the road users) the impacts associated with glint and glare is expected to be of **low** significance. Additional mitigation measures along this road (within a 1km radius of the facility) may include the reduction of the speed limit and the introduction of traffic calming devices (e.g. speed bumps).
- There are no homesteads located within a 1km radius of the proposed PV facility. The closest homestead (Vlakspruit) is located 1.3km north-east of the facility. The potential visual impact of solar glint and glare on static ground-based receptors (residents of homesteads) in closer proximity to the PV facility is therefore expected to be of **low** significance.
- The anticipated visual impact resulting from the construction of on-site ancillary infrastructure is likely to be of **low** significance both before and after mitigation.
- The anticipated visual impact of the proposed PV facility on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of **low**

significance. This is due to the relatively low viewer incidence within close proximity to the proposed development site and the presence of existing mining and industrial activities within the region.
» The anticipated cumulative visual impact of the proposed Becrux PV facility is expected to be of **low** significance.

The anticipated visual impacts listed above (i.e., post mitigation impacts) range from **moderate** to **low** significance. Anticipated visual impacts on sensitive visual receptors (if and where present) in close proximity to the proposed facility are not considered to be fatal flaws for the proposed PV facility.

Considering all factors, it is recommended that the development of the facility as proposed be supported; subject to the implementation of the recommended mitigation measures and management programme included in the VIA.

8.8. Assessment of Social Impacts

Potential social impacts and the relative significance of the impacts associated with the development of the Becrux Solar PV Facility are summarised below (refer to **Appendix I**).

8.8.1 Description of Social Impacts

Impacts are expected to occur with the development of the Becrux Solar PV Facility during the construction, operation and decommissioning phases. Both positive and negative impacts are identified and assessed.

Positive and negative impacts during construction include:
» Direct employment opportunities
» Economic multiplier effects
» Influx of jobseekers and change in population
» Safety and security impacts
» Impacts on daily living and movement patterns
» Nuisance impacts, including noise and dust
» Visual impacts and impacts on the sense of place

Positive and negative impacts during operation include:
» Direct employment opportunities
» Development of clean, renewable energy infrastructure
» Visual impact and impact on sense of place
» Impacts associated with the loss of agricultural land

8.8.2 Impact tables summarising the significance of social impacts during construction, operation and decommissioning (with and without mitigation measures)

Construction Phase Impacts

The majority of social impacts associated with the project are anticipated to occur during the construction phase of the development and are typical of the type of social impacts generally associated with construction activities. These impacts will be temporary and short-term (~9 - 12 months) but could have long-term effects on the surrounding social environment if not planned or managed appropriately. It is therefore necessary that the detailed design phase be conducted in such a manner so as not to result in

permanent social impacts associated with the ill-placement of project components or associated infrastructure or result in the mis-management of the construction phase activities.

Nature: Employment opportunities and skills development The creation of employment opportunities and skills development opportunities during the construction phase for the country and local economy.		
	Without mitigation	**With mitigation**
Extent	Local – Regional (3) - The impact will occur at a local, regional and national level.	Regional (4) - The impact will occur at a local, regional and national level.
Duration	Short-term (1) - The construction period will last for one year at most.	Short-term (1) - The construction period will last one year at most.
Magnitude	Low (4) - The impact will occur at a local, regional and national level.	Moderate (6) - The creation of employment opportunities will assist to an extent in alleviating unemployment levels within the area.
Probability	Probable (3) - Construction of the project will result in the creation of a number of direct employment opportunities, which will assist in addressing unemployment levels within the area and aid in skills development of communities in the area.	Definite (5) - Construction of the project will result in the creation of a number of direct and indirect employment opportunities, which will assist in addressing unemployment levels within the area and aid in skills development of communities in the area.
Significance	**Low (24)**	**Medium (55)**
Status (positive or negative)	Positive	Positive
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Impacts can be enhanced	
Enhancement measures: To enhance local employment, skills development and business opportunities associated with the construction phase the following measures should be implemented: » It is recommended that the local employment policy be adopted where possible to maximise the opportunities made available to the local labour force. Becrux Solar PV Project One (Pty) Ltd should make it a requirement for contractors to implement a 'locals first' policy, especially for semi and low skilled job categories., if this is not possible, then the broader focus areas should be considered for sourcing workers. » Employment opportunities will be for the immediate local area, Govan Mbeki Local Municipality. If this is not possible, then the broader focus areas should be considered for sourcing employees. » During the recruitment selection process, consideration must be given to women. » It is recommended that realistic local recruitment targets be set for the construction phase. » Training and skills development programmes should be initiated prior to the commencement of the construction phase.		
Residual Impacts: Improved pool of skills and experience in the local area		

Nature: Multiplier effects on the local economy Significance of the impact from the economic multiplier effects from the use of local goods and services		
	Without mitigation	**With mitigation**

Extent	Local – Regional (4) - Will include mostly local and some regional impacts.	Local – Regional (4) - SMME capacity building will limit procurement from outside the local municipality
Duration	Long-term (4) - Will continue for the duration of the project due to legal obligation to pay taxes.	Long-term (4) - As for pre-enhancement
Magnitude	Low (4) - Will derive from increased cash flow from wages, local procurement, economic growth, taxes and LED and HRD initiatives.	Low (4) - Mitigation will likely increase intensity of multiplier effects as it will concentrate impact to local area, sustainability of initiatives will also be increased if aligned with other those of other institutions
Probability	Probable (3) - Will depend on proportion of local spending by employees; capacity of local enterprises to supply; effectiveness of LED and HRD initiatives; and contributions to local government.	Definite (5) - Increased local employment and procurement as well as skilled SMME's skill enhance likelihood of benefits to local economy
Significance	**Medium (36)**	**Medium (60)**
Status (positive or negative)	Positive	Positive
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Impacts can be enhanced	

Enhancement measures:

- It is recommended that a local procurement policy is adopted by the developer to maximise the benefit to the local economy, where feasible (Govan Mbeki Local Municipality).
- Becrux Solar PV Project One (Pty) Ltd should develop a database of local companies, specifically Historically Disadvantaged (HD) companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work, where applicable.
- It is a requirement to source as much goods and services as possible from the local area where possible.
- Engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers, where feasible.

Residual Impacts:
Improved local service sector and growth in local business

Nature: Safety and security
Temporary increase in safety and security concerns associated with the influx of people during the construction phase

	Without mitigation	**With mitigation**
Extent	Local – Regional (3) – Safety concerns will affect nearby communities.	Local (2) - Safety measures will likely restrict impacts on nearby communities
Duration	Short-term (2) - Will be limited to the construction phase which is one year at most.	Short-term (2) - As for pre-mitigation
Magnitude	Low (4) - Could place the lives of neighbouring community members at risk.	Low (4) - Appropriate mitigation will reduce the risk of this project

Probability	Probable (3) - Likely to occur as the developer will aim to source employment locally	Improbable (2) - As for pre-mitigation
Significance	**Low (27)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

» Access in and out of the construction area should be strictly controlled by a security company.
» The appointed EPC contractor must appoint a security company and appropriate security procedures are to be implemented to limit access to the site and surrounding areas.
» The contractor must ensure that open fires on the site for heating, smoking or cooking are not allowed except in designated areas.
» Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.
» A comprehensive employee induction programme which covers land access protocols, fire management and road safety should be prepared.
» A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.

Residual Impacts:
None anticipated.

Nature: Disruption of daily living and movement patterns
Temporary increase in traffic disruptions and movement patterns during the construction phase

	Without mitigation	**With mitigation**
Extent	Local (2) - Will affect road users from nearby communities.	Local (2) - Safety measures will likely restrict impacts on road users.
Duration	Short-term (2) - Will be limited to the construction phase which is one year at most.	Short-term (2) - As for pre-mitigation.
Magnitude	Moderate (6) - Will affect the quality of life of neighbouring communities.	Low (4) - Appropriate mitigation will reduce the risk of this project.
Probability	Highly probable (4) - Traffic would need to be considered in the area.	Improbable (2) - As for pre-mitigation.
Significance	**Medium (40)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

- » All vehicles must be road worthy and drivers must be qualified, obey traffic rules, follow speed limits and be made aware of the potential road safety issues.
- » Heavy vehicles should be inspected regularly to ensure their road safety worthiness.
- » Implement penalties for reckless driving for all drivers during the construction phase as a way to enforce compliance to traffic rules.
- » Avoid heavy vehicle activity during 'peak' hours (when people are driving to and from work).
- » The developer and EPC contractors must ensure that any damage / wear and tear caused by construction related traffic to the roads is repaired.
- » A comprehensive employee induction programme which covers land access protocols and road safety should be prepared.
- » A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.

Residual Impacts:

None anticipated.

Nature: Increased pressure on local services/resources

Added pressure on economic and social infrastructure during construction as a result of in-migration of people

	Without mitigation	**With mitigation**
Extent	Local (2) - May affect resource management on local district municipal level.	Local (2) - Project resources to managed during the construction of this project.
Duration	Medium - term (3) - Influx related pressure on services will start during construction and continue during the operational phase.	Short-term (2) - As for pre-mitigation.
Magnitude	Moderate (6) - Intensify existing service delivery and resource problems and backlogs, especially sewerage and road networks.	Low (4) - Appropriate mitigation will reduce the risk of this project.
Probability	Probable (3) - Population influx will affect the ability of the local municipality to meet increased demand	Improbable (2) - As for pre-mitigation.
Significance	**Medium (33)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

- » A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.

Residual Impacts:

Possibility of outside workers remaining in the area after construction is completed and subsequent pressure on local infrastructure.

Nature: Nuisance impacts (noise& dust) Nuisance impacts in terms of temporary increase in noise and dust, and the wear and tear on private farm roads for access to the site.		
	Without mitigation	**With mitigation**
Extent	Local (1) – This will remain within the project extent from construction activities.	Local (1) – Mitigation measures will assist with increasing the impact.
Duration	Short-term (2) – Dust generated from site clearance and noise during construction from equipment and other source of noise include vehicle traffic during the construction phase.	Short-term (2) – As for pre-mitigation.
Magnitude	High (8) - Dust impacts and noise nuisance from construction activities.	Moderate (6) – Appropriate mitigation will reduce the risk of this project.
Probability	Highly probable (4) – Movement of heavy construction vehicles during the construction phase has a potential to create noise, damage to roads and dust.	Improbable (2) – As for pre-mitigation.
Significance	**Medium (44)**	**Low (18)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays and holiday periods where feasible. » Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. » Ensure all vehicles are road worthy, drivers are qualified and are made aware of the potential noise and dust issues. » A CLO should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.		
Residual Impacts: None anticipated		

Operation Phase Impacts

Nature: Job creation during operation The creation of employment opportunities and skills development opportunities during the operation phase for the country and local economy		
	Without mitigation	**With mitigation**
Extent	Regional (3) – Any new positions are likely to be filled by persons living in the local municipal area.	Regional (3) – As for pre-enhancement.
Duration	Long term (4) – Project will be for up to 25 years.	Long-term (4) – As for pre-enhancement.

Magnitude	Low (4) – It is anticipated that ~10 jobs will be generated during the operation phase. A number of highly skilled personnel may need to be recruited from outside the local municipal area.	Low (4) - Mitigation will maximise local job creation.
Probability	Probable (3) – Employment opportunities will be created during the operation phase	Highly Probable (4) – Mitigation will maximise probability that any local recruitment targets are achieved, and local benefits optimised.
Significance	**Medium (33)**	**Medium (44)**
Status (positive or negative)	Positive	Positive
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Impacts can be enhanced	
Enhancement measures: » It is recommended that a local employment policy is adopted by the developer to maximise the project opportunities being made available to the local community. » Enhance employment opportunities for the immediate local area, Govan Mbeki Local Municipality. If this is not possible, then the broader focus areas should be considered for sourcing employees. » The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. » The developer / operator should establish vocational training programs for the local employees to promote the development of skills.		
Residual Impacts: Improved pool of skills and experience in the local area		

Nature: Development of clean, renewable energy infrastructure		
	Without mitigation	**With mitigation**
Extent	National (4) - The generation of renewable energy will contribute to South Africa's electricity market and relieve the national grid.	National (4) - As for pre-enhancement.
Duration	Long term (4) - Bringing renewable energy sector to the Govan Mbeki Local Municipality economy may contribute to the diversification of the local economy and provide greater economic stability.	Long term (4) - As for pre-enhancement.
Magnitude	Low (4) – The proposed facility will only generate up to 19.99MW_{ac}.	Low (4) - As for pre-enhancement.
Probability	Highly Probable (4) - Facility will help reduce the total carbon emissions associated with non-renewable energy generation.	Highly Probable (4) - As for pre-enhancement.
Significance	**Medium (48)**	**Medium (48)**

Status (positive or negative)	Positive	Positive
Reversibility	Yes	Yes
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Impact does not require mitigation, but rather enhancement. No enhancement measures are anticipated.	
Enhancement measures: » None anticipated		
Residual Impacts: Reduce carbon emissions through the use of renewable energy and contribute to reducing global warming		

Nature: Visual impacts and impacts on sense of place Visual impacts and impacts on sense of place associated with the operation phase of the project		
	Without mitigation	**With mitigation**
Extent	Regional (3)- Dependant on the demographics of the population that resides in the area and their perceptions.	N.A. – Mitigation not possible.
Duration	Long term (4) - Impact on sense of place relates to the change in the landscape character and visual impact of the proposed solar energy facility, which will persist for the duration of the operation phase.	N.A. – Mitigation not possible.
Magnitude	Low (4) – There is power station located next to the site, the power and transmission lines, roads and the substation are infrastructural and disrupting elements that currently affect visual resources and sense of place in the immediate local area.	N.A. – Mitigation not possible.
Probability	Improbable (2) - There are no tourist attractions located adjacent to the property and therefore the anticipated impact on the area's visual quality and sense of place is low.	N.A. – Mitigation not possible.
Significance	**Low (22)**	**N.**A. – Mitigation not possible.
Status (positive or negative)	Negative	N.A.
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	
Mitigation: » Mitigation of this impact is not possible. Only best practise measures as detailed in the VIA can be implemented.		
Residual Impacts: None anticipated if the visual impact will be removed after decommissioning, provided the solar energy facility infrastructure is removed and the site is rehabilitated to its original (current) status		

Nature: Impacts associated with the loss of agricultural land Development on agricultural land and removal of potential agricultural production		
	Without mitigation	**With mitigation**
Extent	Local (1) - The impact will occur at local level.	Local (1) - As for pre-mitigation.
Duration	Long term (4) - The development footprint on which the solar energy facility will be developed will be removed from agricultural production for the duration of the operation phase of the facility.	Long term (4) - As for pre-mitigation.
Magnitude	High (8) – Agricultural production will cease as a result of the construction and operation of the PV facility	Low (4) - As for pre-mitigation.
Probability	Probable (3) - Land uses will be affected by development.	Probable (3) - As for pre-mitigation.
Significance	**Medium (39)**	**Low (27)**
Status (positive or negative)	Negative	Negative
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Keep the project footprint as small as possible.		
Residual Impacts: The implications in terms of food production and security could also threaten jobs of workers employed in the agricultural activities.		

Decommissioning Phase Impacts

Upon the expiry of the Becrux Solar PV Facility lifespan, the facility would need to be disbanded, although the facility would likely be upgraded in order to maintain and prolong the lifespan of the facility.

If the facility is decommissioned, the land will be rehabilitated in order to return it to pre-project conditions. This also means that all impacts, whether positive or negative, which take place during the operational phase will cease to exist. At the same time spending on the disassembly of the components and rehabilitation of land will increase the demand for construction services and other industries, thus stimulating economic activity in the local area, albeit over a temporary period.

Social impacts stimulated during the decommissioning phase are expected to be similar to those that took place during the construction phase. They will also be temporary in nature, but most likely will take a much shorter time than the construction phase. All of the positive impacts can be enhanced to increase the benefits to the local communities, while the negative impacts could be mitigated. The impacts though are expected to be of low significance due to the very short duration and, therefore, of lower magnitude. Enhancement and mitigation measures proposed for the construction phase impacts would also apply to the decommissioning phase. Overall, the impact that would ensue during the decommissioning phase will mostly be of low significance.

8.8.3 Overall Result

Key Findings

From a social perspective, it is concluded that the project is supported, but that mitigation and enhancement measures should be implemented and adhered to. Positive and negative social impacts have been identified. The assessment of the key issues indicated that there are no negative impacts that can be classified as fatal flaws, and which are of such significance that they cannot be successfully mitigated. Positive impacts could be enhanced to maximise the benefits of the project by implementing appropriate enhancement measures and through careful planning. Based on the social assessment, the following general conclusions and findings can be made:

- The potential negative social impacts associated with the construction phase are typical of construction related projects and not just focussed on the construction of PV facilities (these relate to influx of non-local workforce and jobseekers, intrusion and disturbance impacts, safety and security) and could be reduced with the implementation of the mitigation measures proposed.
- Employment opportunities will be created in the construction and operation phase and the impact is rated as positive even if only a small number of individuals benefit in this regard.
- The proposed project could assist the local economy in creating entrepreneurial development, especially if local business could be involved in the provision of general material and services during the construction and operational phases.
- Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other sectors.
- The proposed development also represents an investment in infrastructure for the generation of clean, renewable energy, which, given the challenges created by climate change, represents a positive social benefit for society as a whole.

Recommendations

The following recommendations are made based on the Social Impact Assessment and a thorough review of the concerns and suggestions raised by stakeholders and interested and affected parties during the stakeholder engagement process to date. The proposed mitigation measures should be implemented to limit the negative impacts and enhance the positive impacts. Based on the social assessment, the following recommendations are made:

- In terms of employment related impacts, it is important to consider that job opportunities for the unskilled and semi-skilled are scarce commodities in the study area and could create competition among the local unemployed. Introducing an outside workforce will therefore most likely worsen local endeavours to obtain jobs and provoke discontent as well as put pressure on the local services available. Local labour should be utilised to enhance the positive impact of employment creation in the area. Local businesses should be involved with the construction activities where possible. It is imperative that local labour be sourced to ensure that benefits accrue to the local communities. Preference should thus be given to the use of local labour during the construction and operational phases of the project as far as possible.
- Locals should also be allowed an opportunity to be included in a list of possible local suppliers and service providers, enhancing the multiplier effect. This aspect would serve to mitigate other subsequent

negative impacts such as those associated with the inflow of outsiders to the area, the increased pressure on the infrastructure and services in the area, as well as the safety and security concerns.
» Impacts associated with the construction period should be carefully mitigated to minimise any possible dust and noise pollution.
» Safety and security concerns should be taken into account during the planning and construction phases of the proposed project.

Overall Conclusion

The proposed Becrux Solar PV Facility and associated infrastructure is unlikely to result in permanent damaging social impacts and is expected to result in some benefits at a local and regional level. From a social perspective, it is concluded that the project should be developed subject to the implementation of the recommended mitigation measures and management actions contained in the Social Impact Assessment (**Appendix I**).

8.9. Assessment of Cumulative Impacts

As identified and assessed in section 8.3 – 8.8, the proposed Becrux Solar PV Facility may have impacts (positive and negative) on natural resources, the social environment and on the people living in the area surrounding the project. The preceding impact assessment sections have reported on the assessment of the impacts associated with the PV facility in isolation from other similar developments.

As a result of the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme and the interest of various companies in procuring energy from IPPs to reduce their carbon footprint and reliance on Eskom, there has been a substantial increase in interest in solar PV facility developments in South Africa, each with associated grid infrastructure. It is, therefore, important to follow a precautionary approach in accordance with NEMA to ensure that the potential for cumulative impacts[14] is considered and avoided where possible.

This section assesses the potential for the impacts associated with the Becrux Solar PV Facility to become more significant when considered in combination with other known or proposed renewable energy projects within the area. It is important to note that there are numerous industrial and mining developments in the area within which the PV facility is proposed, and that the area has been extensively transformed by these developments (refer to **Figure 8.4**).

8.9.1 Approach taken to Assess Cumulative Impacts

The cumulative impacts that have the potential to result from the development of the Becrux Solar PV Facility when considered with other similar developments in the area include the following (refer to **Appendices D – I** for more details:

» Unacceptable loss of habitat within the region, which would thereby impact the ecological processes in the region.

[14] Cumulative impacts in relation to an activity are defined in the Environmental Impact Assessment Regulations (Government Notice R326) as the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

- Unacceptable loss of wetland functionality through disturbance associated with construction activities.
- Loss of land capability.
- Cumulative Impact to the known archaeological and palaeontological resources.
- The potential cumulative visual impact of the PV facility on the visual quality of the landscape.
- An increase in employment opportunities, skills development and business opportunities associated with the establishment of more than one solar energy facility.

It is important to explore the potential for cumulative impacts as this will lead to a better understanding of these impacts and the potential for mitigation that may be required to ensure that the concentration of renewable energy projects do not lead to detrimental environmental impacts. For practical purposes, a sub-regional scale of 30km has been selected for this cumulative impact evaluation.

Figure 8.5 indicates the location of the Becrux Solar PV Facility in relation to all other known and viable (i.e., projects with a valid EA) solar renewable energy projects located within a radius of 30km from the development area under assessment. These renewable projects were identified using the DFFE Renewable Energy Database and current knowledge of projects being proposed and developed in the area.

There is only one renewable energy facility with a valid EA within a 30km radius of the development area for the Becrux Solar PV Facility, namely, the 65.9MW Eskom Tutuka Photovoltaic (PV) Energy Facility located near Standerton in the Mpumalanga Province.

The potential for cumulative impacts is summarised in the sections that follow and has been considered within the specialist studies (refer to **Appendices D – I**).

There is a level of uncertainty as to whether the authorised facility indicated in **Figure 8.5** will be implemented. This results in it being difficult to quantitatively assess the potential cumulative impacts. The cumulative impacts of known solar renewable energy facilities in the surrounding area and the Becrux Solar PV Facility are therefore qualitatively assessed in this section.

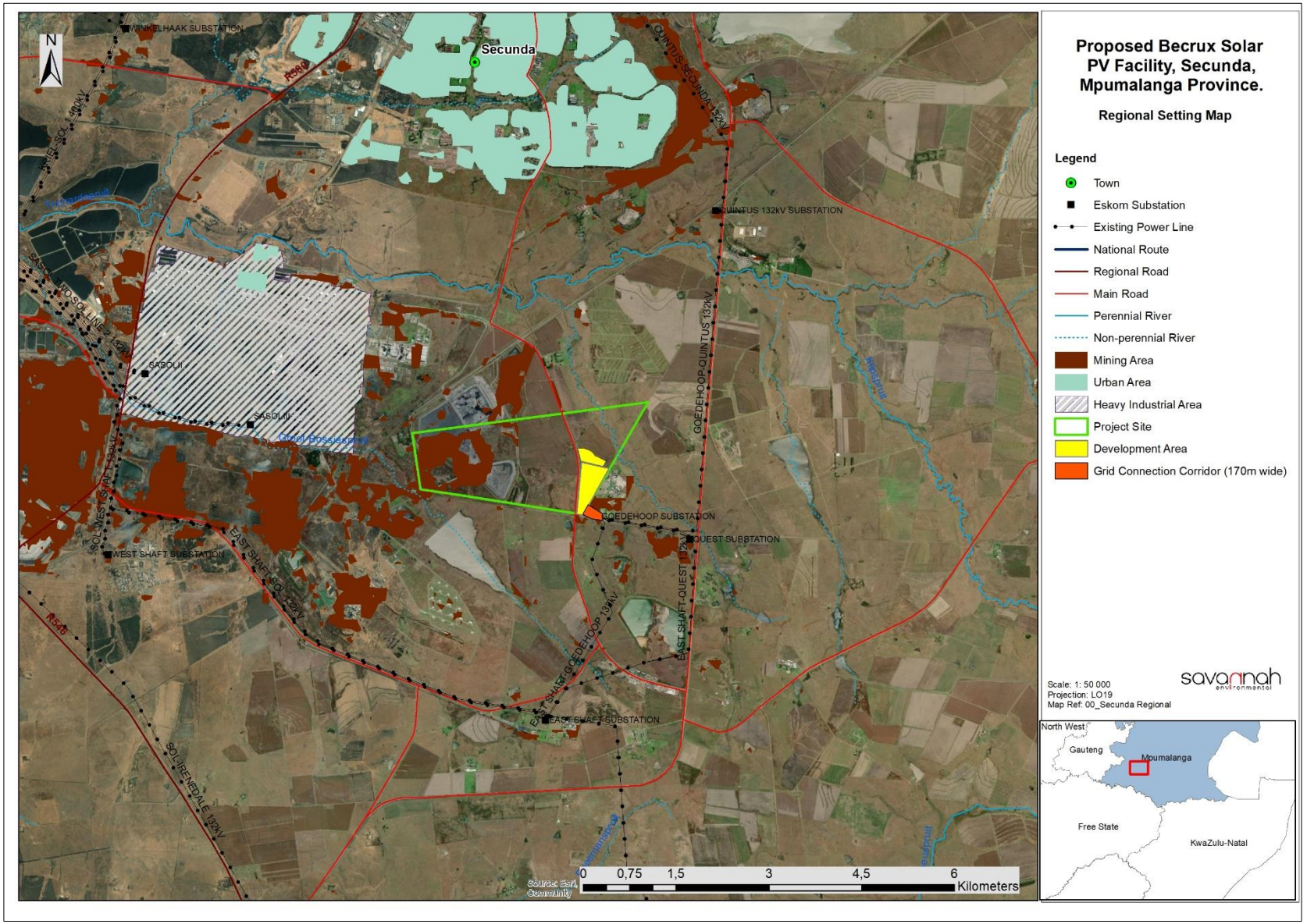

Figure 8.4: Mining operations and industrial areas located in proximity to the proposed Becrux Solar PV Facility (refer to **Appendix K** for A3 map)

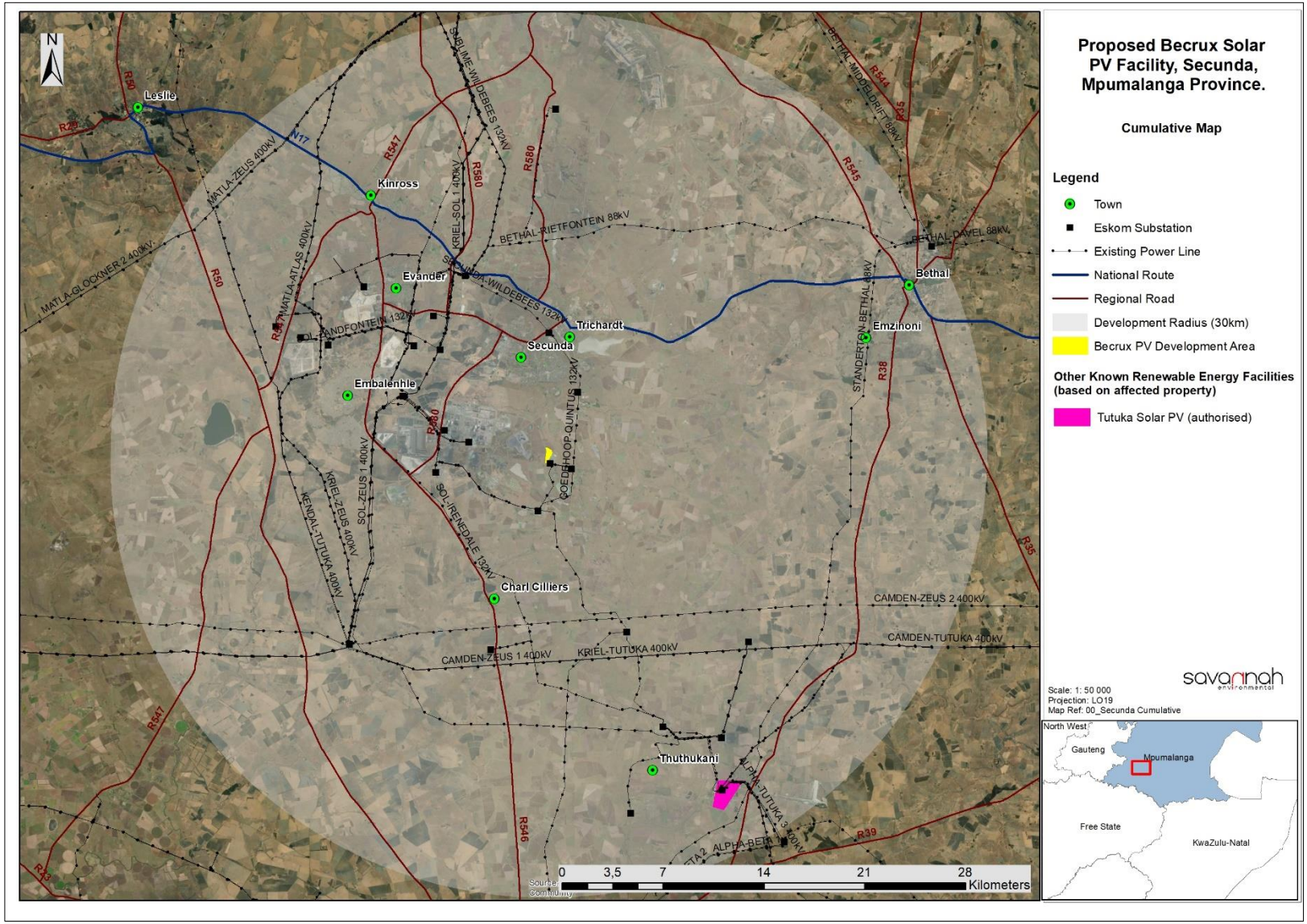

Figure 8.5: Identified solar PV projects located within a 30km radius of the Becrux Solar PV Facility development area that is considered as part of the cumulative impact assessment (refer to **Appendix K** for A3 map)

8.9.2 Cumulative Impacts on Ecology (Flora, Fauna and Avifauna)

Cumulative impacts are assessed in context of the extent of the proposed project area; other developments in the area; and general habitat loss and transformation resulting from other activities in the area.

Nature: Cumulative habitat loss within the region The development of the proposed infrastructure will contribute to cumulative habitat loss especially in the ecological corridors on the edge of the agricultural field and thereby impact the ecological processes in the region. It should however be noted that the site under consideration is transformed.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Low (2)	Low (2)
Duration	Short term (2)	Short term (2)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (16)**	**Low (16)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation » Areas rated as High sensitivity and their buffers (refer to **Figure 9.1**) in proximity to the development areas, should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to these areas from construction workers and machinery. The infrastructure should be realigned to prioritise development within low sensitivity areas. Mitigated development in medium sensitivity areas is permissible. » Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further than that proposed for the project. Clearing of vegetation outside of the project footprint should be minimized and avoided where possible. » All laydown areas, chemical toilets etc. should be restricted to very low and low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas. » Where possible, existing access routes and walking paths must be made use of. » A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.		

8.9.3 Cumulative Impacts on Aquatic Ecology

Cumulative impacts within the proposed PV area and its surroundings have been determined to be low. Even though the health of the relevant wetland systems has been impaired over the last few decades as a result of cultivation, infrastructure and grazing, it is worth noting that the proposed land use is expected to have fewer impacts than the current land use (cultivation).

Nature: Loss of wetland functionality		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Low (2)	Low (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)

Significance	**Low (18)**	**Low (18)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation

» Existing roads must be used as much as possible.
» Proper stripping and stockpiling techniques must be followed.
» Avoid preferential surface flow paths.
» Storage of potential contaminants must be undertaken in bunded areas.
» All contractors must have spill kits available and be trained in the correct use thereof.
» All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".
» No cleaning or servicing of vehicles, machines and equipment in water resources or within the respective buffer areas.
» Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area.
» Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.
» All waste generated on-site must be adequately managed and separated and recycling of different waste materials should be supported.
» Demarcate footprint areas to be stripped of topsoil to avoid unnecessary stripping of topsoil.
» Exposed areas must be ripped and vegetated to increase surface roughness.
» All machinery and equipment should be inspected regularly for faults and possible leaks. These should be serviced off-site or designated areas.
» Crossings are to be constructed during the low flow period.
» Well-engineered, and wide enough culvert systems should be installed at all drainage systems, including those minor systems not identified during the site assessment.
» It is critical to spread flows across the system, avoiding incisions in the landscape caused by concentrated flows. Temporary stormwater channels should be filled with aggregate and/or logs (branches included) to dissipate flows.
» It is recommended that the material surrounding and holding the culverts in place include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability to accommodate flooding and very low flows.
» The culverts used in the design should be as large as possible, partially sunken and energy dissipating material must be placed at the discharge area of each culvert to prevent erosion of these areas.
» The use of larger culverts will prevent the build-up of debris by allowing the free movement of debris through the large culverts.
» Culverts should avoid inundation (damming) of upstream areas by facilitating streamflow and catering properly for both low flows and high flows.
» Surface run-off from the roads flowing down the embankments often scours the watercourse on the sides of the culvert causing sedimentation of the channel. This should be catered for with adequate concreted stormwater drainage depressions and channels with energy dissipaters that channel these flows into the river in a controlled manner.
» The culvert installations should further take into account the scouring action of high flows and gabion structures or similar should be placed on both sides of the culvert on the embankments both upstream and downstream. This will serve as retention of the soils from scouring around and underneath the culvert structures aiding in the protection of the structure.
» Large aggregate outsourced or from the project area (if available) can be used for energy dissipation in the channel downstream of the culverts to reduce the likelihood of scouring the riverbed and sedimentation of the catchment. It is preferable that larger aggregate be used to avoid flows removing material from the site.
» Signs of erosion must be addressed immediately to prevent further erosion.

» Silt traps and fences must be placed in the preferential flow paths along the road to prevent sedimentation of the watercourse.

8.9.4 Cumulative Impacts on Land Use, Soil and Agricultural Potential

Cumulative impacts within the proposed PV area and its surroundings have been determined to be low. Soil resources in the area have been impacted upon by means of built-up areas, yet, not to such an extent that the larger integrity of soil resources within the area are at stake.

Nature: Loss of land capability		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Low (2)	Low (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (18)**	**Low (18)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation: » Investigate the possibility of avoiding large concrete areas. » Develop and implement a rehabilitation management and monitoring plan. » Demarcate all access routes. » Vegetate all stockpiles after stripping/removing soils. » Store potential contaminants in bunded areas. » All contractors must have spill kits available and be trained in the correct use thereof. » All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping". » No cleaning or servicing of vehicles, machines and equipment in water resources. » Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems. » Continuously monitor erosion on site. » Monitor compaction on site.		

8.9.5 Cumulative Impacts on Heritage Resources

Due to the low incidence of archaeological and palaeontological resources identified for this area, no negative cumulative impact is anticipated to these resources.

Nature: Cumulative impact to known archaeological and palaeontological resources.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Local (1)	Local (1)
Duration	Medium-term (3)	Long-term (4)
Magnitude	Low (4)	Low (5)
Probability	Improbable (2)	Probable (3)
Significance	**Low (16)**	**Medium (30)**

Status	Neutral	Neutral
Reversibility	High	Low
Irreplaceable loss of resources	Unlikely	Unlikely
Can impacts be mitigated?	N.A.	
Mitigation: None		

8.9.6 Cumulative Visual Impacts

There is only one authorised solar energy facility within the larger region. This is the proposed Eskom 65.9MW Solar PV facility at the Tutuka coal-fired power station, approximately 25km south-east of the proposed Becrux PV facility. Given the constrained visual exposure of the proposed Becrux PV facility and the long distance between the facilities, no cumulative visual exposure (or combined visual impact) is expected.

Nature: The potential cumulative visual impact of the PV facility on the visual quality of the landscape.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Local (2)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Very improbable (1)
Significance	**Moderate (36)**	**Low (11)**
Status	Negative	Negative
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	

General best practice mitigation/management measures:

Planning:

» Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible.

Operations:

» Maintain the general appearance of the facility as a whole.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use.
» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.

8.9.7 Cumulative Social Impacts

Cumulative impacts have been considered as this energy facility has the potential to result in significant positive cumulative impacts, specifically since the establishment of a number of Solar energy facilities in the Local Municipality will create a number of socio-economic opportunities for the area, which in turn, will result in a positive social benefit. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. Benefits to the local, regional and national economy through employment and procurement of services could be substantial should many renewable energy facilities proceed. This benefit will increase significantly should critical mass be reached that allows local companies to develop the necessary skills to support construction and maintenance activities and that allows for components of the renewable energy facilities to be

manufactured in South Africa. Furthermore, at municipal level, the cumulative impact could be positive and could incentivise operation and maintenance companies to centralize and expand their activities towards education and training.

Nature: An increase in employment opportunities, skills development and business opportunities with the establishment of more than one solar energy facility		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Regional (3)	Regional (3)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium (33)**	**Medium (39)**
Status (positive or negative)	Positive	Positive
Reversibility	N/A	N/A
Irreplaceable loss of resources?	N/A	N/A
Can impacts be mitigated?	Yes	Yes
Confidence in findings: High.		
Mitigation: » The establishment of a number of solar energy facilities in the area does have the potential to have a positive cumulative impact on the area in the form of employment opportunities, skills development and business opportunities. The positive benefits will be enhanced if local employment policies are adopted and local services providers are utilised by the developers to maximise the project opportunities available to the local community.		

8.9.8 Conclusion Regarding Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The most significant of these will be the contribution towards a reduction in greenhouse gas emissions and consequent assistance with climate change mitigation.

Cumulative impacts are expected to occur with the project throughout all phases of its life cycle and within all areas of study considered as part of this BA Report. The main aim for the assessment of cumulative impacts is to test and determine whether the development will be acceptable within the landscape proposed for the development; and if the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

There is only one renewable energy facility proposed within a 30km radius of the project, namely, the Eskom 65.9 MW Solar PV facility at the Tutuka coal-fired power station, approximately 25km south-east of the proposed Becrux Solar PV Facility. Based on the specialist cumulative assessment and findings; the development of the project; and its contribution to the overall impact of all existing and proposed renewable energy facilities within a 30km radius, it was concluded that cumulative impacts will be of a low to medium significance. Therefore, the development of the project will not result in unacceptable, high cumulative impacts, nor a whole-scale change of the environment; and is therefore considered acceptable from a cumulative impact perspective.

A summary of the cumulative impacts is included in **Table 8.1** below.

Table 8.1: Summary of the cumulative impact significance for the Becrux Solar PV Facility

Specialist assessment	Overall significance of impact of the proposed project considered in isolation (negative unless indicated otherwise) (with mitigation)	Cumulative significance of impact of the project and other projects in the area (negative unless indicated otherwise) (with mitigation)
Ecology (flora, fauna and avifauna)	Low	Low
Aquatic Ecology	Low	Low
Land Use, Soil and Agricultural Potential	Low	Low
Heritage (archaeology and palaeontology)	Low	Medium
Visual	Medium	Low
Social	Medium	Medium

8.10. Assessment of the 'Do Nothing' Alternative

The 'do-nothing' alternative (i.e. no-go alternative) is the option of not constructing the Becrux Solar PV Facility. Should this alternative be selected, there would be no environmental impacts on the site or to the surrounding local area due to the construction and operation activities of a PV facility. All baseline information provided in this report relates to the current situation on site and in the surrounding area, and can be considered the no-go alternative as this situation would remain if the project does not proceed. Impacts are limited to the status quo. All negative impacts, specifically related to the development of the PV facility, discussed in this report will not materialise. In addition, positive impacts identified to be associated with the project will be foregone.

Becrux Solar PV Project One (Pty) Ltd is proposing the development of a PV facility which aims to supply power to Sasol Limited in order to reduce Sasol's dependence on direct supply from Eskom's national grid for operation purposes and demonstrate Sasol's move towards a greener future through procurement of renewable energy from IPPs. Should the facility not be constructed, Sasol's reliance on fossil fuel-based power as a sole source of power to their facilities.

Failure to establish an exclusive power supply source for Sasol's facilities near Secunda would also result in a constant demand of power to be supplied from Eskom, adding pressure on the grid infrastructure in the region (and would require the additional consumption of fossil fuels to achieve the same level of electrical supply to Sasol). The electricity demand in South Africa is placing increasing pressure on the country's existing power generation capacity. There is therefore a need for additional electricity generation options to be developed throughout the country.

The support for renewable energy policy is guided by the need to address climate change. South Africa has a very attractive range of renewable resources, particularly solar and wind. Renewable applications are in fact the least-cost energy service in most cases, particularly when social and environmental costs are considered. The generation of electricity from renewable energy in South Africa offers several socio-economic and environmental benefits, including:

» ***Exploitation of our significant renewable energy resource:*** At present, valuable national resources, including biomass by-products, solar radiation and wind power, remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.

- ***Pollution reduction***: The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation.
- ***Climate friendly development:*** The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through reducing greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for ~1% of global GHG emissions and currently ranked 9th worldwide in terms of per capita CO_2 emissions.
- ***Employment creation:*** The sale, development, installation, maintenance, and management of renewable energy facilities have significant potential for job creation in South Africa.
- ***Acceptability to society:*** Renewable energy offers various tangible benefits to society, including reduced pollution concerns; improved human and ecosystem health; and climate friendly development.
- ***Support to a new industry sector:*** The development of renewable energy offers the opportunity to establish a new industry within the South African economy.

Environmental costs identified for the project include:

- Spread and/or establishment of alien and/or invasive species.
- Direct mortality of fauna.
- Reduced dispersal/migration of fauna.
- Environmental pollution.
- Loss of land capability.

The costs associated with the project are anticipated to occur at a site-specific level. The significance can be largely reduced through the application of appropriate mitigation measures; and the appropriate placement of infrastructure within areas of lower sensitivity identified on site. The project's benefits are expected to occur at a larger scale (i.e., national, regional, and local level); and partially offset the localised environmental costs of the project.

8.10.1 Conclusion

The 'do-nothing' alternative is the continuation of the existing land use, i.e. maintain the status quo. As detailed in the sections above, there would be no environmental impacts on the site or to the surrounding local area due to the construction and operation activities of a PV facility with the implementation of this alternative. All negative impacts, specifically related to the development of the PV facility, discussed in this report will not materialise.

From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with the project. All impacts associated with the project can be mitigated to acceptable levels. The 'do-nothing' alternative will not assist Sasol Limited in addressing issues such as diversifying their electricity supply at their facilities near Secunda and reducing the total carbon emissions from the operations. The benefits associated with the project outweigh the costs. The costs of the 'do-nothing' alternative are expected to outweigh the benefits and therefore, this alternative is not preferred and not proposed to be implemented for the project.

CHAPTER 9: CONCLUSIONS AND RECOMMENDATIONS

Becrux Solar PV Project One (Pty) Ltd is proposing the development of a Solar Photovoltaic (PV) Energy Facility and associated infrastructure on Portion 6 of the Farm Goedehoop No. 290, located approximately 7km south-east of Secunda and 15km east of Embalenhle, in the Govan Mbeki Local Municipality, which falls within jurisdiction of the Gert Sibande District Municipality in the Mpumalanga Province.

The Solar PV Facility will have a contracted capacity of up to 19.99MW$_{ac}$ and will use bi-facial panels with single axis tracking or fixed tilt systems to harness the solar resource on the project site. The purpose of the facility will be to generate electricity for exclusive use by Sasol Limited. The construction of the Solar PV Facility aims to reduce Sasol's dependence on direct supply from Eskom's national grid for operation purposes and demonstrate Sasol's move towards a greener future through procurement of renewable energy from IPPs.

A project site with an extent of up to ~433ha has been identified by Becrux Solar PV Project One (Pty) Ltd as a technically suitable area for the development of the Becrux Solar PV Facility.

A development area has been identified within the project site and assessed as part of the BA process. The development area is up to ~26.64ha in extent and the much smaller development footprint of up to ~19.95ha will be placed and sited within the development area. Infrastructure associated will the Solar PV Facility to enable the facility to generate up to 19.99MW$_{ac}$ will include the following:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- E-house containerised or non-containerised substation.
- 11kV overhead power line for the distribution of the generated power, which will be connected to the existing Goedehoop Substation.
- Laydown area.
- Access gravel road (existing) and internal gravel roads (new).
- Security booth, Operations & Maintenance building, workshop, storage area and site office.

Power generated at the facility will be delivered to Sasol Limited by feeding into the grid through a Wheeling Agreement signed with Eskom and/or direct embedded generation. To evacuate the generated power to Sasol Limited, an 11kV overhead power line will be established to connect the 11kV E-house containerised or non-containerised substation, with a development footprint of up to 32m^{2}to the existing Goedehoop Substation. A 170m wide and 400m long grid connection corridor has been identified for the assessment and placement of the overhead power line, which will provide for the avoidance of sensitive environment areas and features and allow for the micro-siting of the power line within the corridor.

A summary of the recommendations and conclusions for the proposed project is provided in this Chapter.

9.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	A summary of the findings of the specialist studies undertaken for the Becrux Solar PV Facility has been included in **section 9.2**.
3(l) an environmental impact statement which contains (i) a summary of the key findings of the environmental impact assessment, (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	An environmental impact statement containing the key findings of the environmental impacts of the Becrux Solar PV Facility has been included as **section 9.5**. An environmental sensitivity and layout map of the Becrux Solar PV Facility has been included as **Figure 9.1** which overlays the development footprint (as assessed within the BA) of the PV facility with the environmental sensitive features located within the development and immediate surrounds. A summary of the positive and negative impacts associated with the Becrux Solar PV Facility has been included in **section 9.2**.
3(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	All conditions required to be included in the Environmental Authorisation of the Becrux Solar PV Facility have been included in **section 9.7**.
3(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	A reasoned opinion as to whether the Becrux Solar PV Facility should be authorised has been included in **section 9.6**.

9.2 Evaluation of the Becrux Solar PV Facility

The preceding chapters of this report, together with the specialist studies contained within **Appendices D-I**, provide a detailed assessment of the potential impacts that may result from the development of the Becrux Solar PV Facility. This chapter concludes the environmental assessment of the Solar PV Facility by providing a summary of the results and conclusions of the assessment of both the project site and development footprint for the Becrux Solar PV Facility. In so doing, it draws on the information gathered as part of the BA process, the knowledge gained by the environmental specialists and the EAP and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws or unacceptable impacts were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of sensitive features within the development footprint as specified by the specialists.

The potential environmental impacts associated with the Becrux Solar PV Facility identified and assessed through the BA process include:

» Impacts on ecology, flora, fauna and avifauna.
» Impacts on aquatic ecology.
» Impacts on land use, soils, and agricultural potential.
» Impacts on heritage resources, including archaeology and palaeontology.
» Visual impacts on the area imposed by the components of the facility.
» Positive and negative social impacts.

9.2.1 Impacts on Ecology (including flora, fauna and avifauna)

The Becrux Solar PV Facility falls within the Soweto Highveld Grassland vegetation type. No plant species protected in terms of the Mpumalanga Biodiversity Conservation Act (No.10 of 1998) and the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA) were recorded during the field survey of the development area. In addition, no tree species protected in terms of the National Forest Act (No. 84 of 1998) were identified on site.

The development area was superimposed on the Mpumalanga Biodiversity Sector Plan and was found to fall within a site classified as heavily modified. In terms of ecosystem threat status and protection level, the proposed project overlaps with a vulnerable ecosystem and falls within an area that is categorised as "Not Protected".

The development area partially overlaps with a National Protected Area Expansion Strategy (NPAES) focus area but does not overlap with any Mpumalanga Protected Areas Expansion Strategy (MPAES) areas. However, the development area is located in proximity to an MPAES area. No formally protected or conservation areas in terms of the National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEM:PAA) were identified within the development area.

Three main habitats were identified and delineated within the development area, namely drainage lines, wetlands and transformed grassland. All habitats within the development area were allocated a sensitivity category using the guidelines for interpreting site ecological importance in the context of the proposed development activities. According to these guidelines, the wetlands are regarded as being of high ecological sensitivity; the drainage lines have a low ecological sensitivity rating; and the modified grassland is considered to be of very low ecological sensitivity.

Areas rated as High sensitivity and their buffers in proximity to the development area should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to these areas.

No mammal, reptile, and amphibian species of conservation concern were recorded during the survey period for the development area. Twenty-one (21) avifauna species were recorded in the project area during the survey based on either direct observation, vocalisations, or the presence of visual tracks and signs. None of the species recorded in the project area are considered as species of conservation concern.

Based on the development footprint for the Becrux Solar PV Facility, no project infrastructure is expected to have a significant impact on the vulnerable ecosystem and Protected Areas Expansion Strategy focus

area as these have been found to be modified. No faunal species of significance were observed, which further reduced the impact significance of the development on terrestrial biodiversity. Historically, agriculture and the current land use (i.e., non-irrigated agriculture) has led to the deterioration of these habitats and as such, the classification of development area as heavily modified area is corroborated.

Considering that this area has been identified as being of low significance for biodiversity maintenance and ecological processes, impacts are expected to be of low significance and the specialist has recommended that development may proceed. All mitigations measures prescribed must be considered by the competent authority for authorisation and included in the project EMPr. No fatal flaws are evident for the proposed project and there are no terrestrial ecological considerations that should prevent it from proceeding.

9.2.2 Impacts on Aquatic Ecology

A total of seven (7) wetland systems were identified and delineated within the 500m regulated area surrounding the development area, three (3) of which could potential be impacted upon (either directly or indirectly) by the proposed activities i.e., HGM 1, 2 and 3. The seven wetland systems comprised both natural and artificial systems. HGM 1, 2 and 3 are classified as a natural systems.

Overall, HGM 1, 2 and 3 scored Intermediate in terms of wetland ecosystem systems. It should however be noted that HGM 2 scored considerably higher indirect benefits than HGM 1 and 3. The overall Present Ecological State (PES) for HGM 1 and 3 has been calculated to be "Seriously Modified", with HGM 2 being scored "Largely Modified".

The Ecological Importance and Sensitivity (EIS) of the units was determined to be High for HGM 3 and Moderate for the HGM 1 and HGM 2. A 22m buffer has been recommended around the delineated wetland units.

A risk assessment was conducted, in accordance with the requirements of GN 509, published in the Government Gazette (no. 40229) under Section 39 of the NWA in August 2016. The GN 509 process provides an allowance to apply for a WUL for Section 21(c) & (i) under a GA, as opposed to a full WULA.

Two post-mitigation scenarios have been considered for this risk assessment, namely avoidance of the wetland buffers and impedance into the wetland buffers. The findings of the risk assessment indicate that various aspects scored "Moderate" pre-mitigation significance ratings. Considering the scenario where the applicant adheres to the buffer zones, all of the post-mitigation significance ratings are expected to be decreased to "Low". In the event that the buffers are impeded on, some of the aspects are expected to still be associated with "Moderate" post-mitigation significance ratings.

Should the 22m buffer zone be impeded on, the first and second steps in the mitigation hierarchy (avoidance and minimising impacts) cannot be met. Therefore, the third step in the mitigation hierarchy (rehabilitation) will need to be implemented. It should be noted that the 22m buffer can only be impeded on up to the 10m mark (therefore 12m from the edge of the buffer) to avoid direct impacts to the wetland.

As part of the impact assessment results, it has been determined that all risks posed by the proposed activities are characterised by "Low" post-mitigation significance ratings. Considering these findings, it is

the specialist's opinion that the proposed activities can be favourably considered on condition that all mitigations measures be implemented, including the adherence to the 22m buffer zone.

In terms of water use authorisation, proceeding with the proposed activities and avoiding the wetland buffer zone will constitute "Low" post-mitigation significance ratings, ultimately only requiring general authorisation. By impeding into the buffer zones, a water use license will be required with the condition of rehabilitation (i.e., rehabilitating HGM1 and 2 to "Largely Modified" after construction).

9.2.3 Impacts on Land Use, Soil and Agricultural Potential

Various soil forms were identified within the Becrux Solar PV Facility development area, namely, Glenrosa, Deep Arcadia, Shallow Arcadia, Darnall and Rensburg. There soils forms have been divided into six main land capability classes according to depth, texture, hydromorphic properties etc. (namely land capability class I, II, III, IV, V and VI). These land capability classes range from a "Low" to a "High" sensitivity, which concurs with the findings from the DFFE Screening Tool. From these six classes as well as the poor climatic capability of "C7"[15], four land potential levels were calculated, namely land potential 3, 5, 6 and "vlei". Therefore, the overall land potential is considered to be"Moderate" to "Low".

Considering the low post-mitigation significance ratings for all the aspects and phases, it is the specialist's opinion that no significant impacts towards the land capability resources are foreseen. Thus, the proposed development should be considered favourably by the relevant Competent Authority provided the recommended mitigation measures are implemented.

9.2.4 Impacts on Heritage Resources (archaeology and palaeontology)

Analysis of the various components of the Heritage Impact Assessment (HIA) indicates a mitigated low negative impact on heritage resources. The key findings of the HIA are as follows:

- Archaeological resources: No significant archaeological resources were identified within the development footprint. Four observations of archaeological resources were recorded. These have all been determined to not be conservation-worthy and have been sufficiently recorded in the HIA.
- Palaeontology: The area proposed for the PV Facility is underlain by Vryheid sediments of zero and very high palaeontological sensitivity. An assessment of the possible impacts of the proposed project on palaeontological resources has shown that unmitigated and mitigated impacts consist of a low negative impact, mostly confined to the construction phase of the project, as excavations associated with PV facilities tends to be shallow (<3m) and as such, the likelihood of impacting intact Vryheid Formation sediments is low. In addition, the footprint is currently being utilised for non-irrigated agricultural activities and as such, it is unlikely that any palaeontological resources will be encountered during excavations.
- Buildings and Cultural landscape: There are no buildings within the development area and the current landscape consists of remnant farming plots wedged in between heavy industrial activity (Brandspruit Coal Mine) and Secunda's chemical plants. Impacts on cultural landscape are expected to be of low significance due to the presence of existing mining and industrial activities within the region.

[15] Severe to Very Severe - Severely restricted choice of crops due to heat and moisture stress.

The overall impact of the Becrux Solar PV Facility on the identified heritage resources is considered as acceptable after the recommendations below have been implemented:

» The mitigation measures articulated in the VIA (2021) completed for this project are implemented.
» The Chance Fossil Finds Procedure is implemented during the course of construction activities.
» Should any buried archaeological resources or human remains or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.

Impacts on heritage resources can be mitigated to acceptable levels allowing for the development to be authorised.

9.2.5 Visual Impacts

The findings of the Visual Impact Assessment undertaken for the proposed 19.99MW$_{ac}$ PV facility is that the visual environment surrounding the site, especially within a 1 - 3km radius, may be visually impacted during the anticipated operational lifespan of the facility (i.e., a minimum of 20 years).

The following is a summary of impacts remaining, assuming mitigation as recommended, is exercised:

» During construction, there may be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Construction activities may potentially result in a **moderate**, temporary visual impact that may be mitigated to **low**.
» The PV facility is expected to have a **moderate** (to potentially **high**) visual impact on observers travelling along the Secunda secondary road. There are no homesteads within a 1km radius of the operational PV facility structures. The facility would be highly visible from the Riaan Rademan (Sasol) Training Centre, but observers at this locality are associated with Sasol and are assumed to be supportive of the development. The impacts may be contained to **moderate** significance, if the proposed impact mitigation measures are implemented.
» The operational PV facility could have a **moderate** visual impact on observers (residents and road users) located between a 1 – 3km radius of the PV facility structures, both before and after the implementation of mitigation measures.
» The anticipated impact of lighting at the PV facility is likely to be of **moderate** significance and may be mitigated to **low**.
» The potential visual impact related to solar glint and glare as an air travel hazard is expected to be of **low** significance, due to the long distance in between the proposed PV facility and The Secunda Airfield. No mitigation of this impact is required since the PV facility is not expected to interfere with aircraft operations at the airfield.
» The potential visual impact of solar glint and glare as a visual distraction and possible hazard to road users is expected to have a **moderate** (to potentially **high**) visual impact on observers travelling along the Secunda secondary road. These glint and glare impacts may be mitigated if the PV panels are shielded from the Secunda secondary road by means of planted vegetation cover, or solid fencing along the road servitude. If the PV panels are not exposed to road users (due to the project being screened from the road users) the impacts associated with glint and glare are expected to be of **low** significance. Additional mitigation measures along this road (within a 1km radius of the facility) may

include the reduction of the speed limit and the introduction of traffic calming devices (e.g., speed bumps).

- There are no homesteads located within a 1km radius of the proposed PV facility. The closest homestead (Vlakspruit) is located 1.3km north-east of the facility. The potential visual impact of solar glint and glare on static ground-based receptors (residents of homesteads) in closer proximity to the PV facility is therefore expected to be of **low** significance.
- The anticipated visual impact resulting from the construction of on-site ancillary infrastructure is likely to be of **low** significance both before and after mitigation.
- The anticipated visual impact of the proposed PV facility on the regional visual quality, and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of **low** significance. This is due to the relatively low viewer incidence within close proximity to the proposed development site and the presence of existing mining and industrial activities within the region.
- The anticipated cumulative visual impact of the proposed Becrux PV facility is expected to be of **low** significance.

The anticipated visual impacts listed above (i.e., post mitigation impacts) range from **moderate** to **low** significance. Anticipated visual impacts on sensitive visual receptors (if and where present) in close proximity to the proposed facility are not considered to be fatal flaws for the proposed PV facility. This impact is primarily applicable to the individual Becrux PV facility, and no cumulative visual impacts are expected.

Considering all factors, it is recommended by the specialist that the development of the facility as proposed be supported; subject to the implementation of the recommended mitigation measures and management programme included in the VIA.

9.2.6 Socio-economic Impacts

Impacts are expected to occur with the development of the Becrux Solar PV Facility during the construction, operation and decommissioning phases. Both positive and negative impacts are identified and assessed.

Positive and negative impacts during construction include:

- Direct employment opportunities
- Economic multiplier effects
- Influx of jobseekers and change in population
- Safety and security impacts
- Impacts on daily living and movement patterns
- Nuisance impacts, including noise and dust
- Visual impacts and impacts on the sense of place

Positive and negative impacts during operation include:

- Direct employment opportunities
- Development of clean, renewable energy infrastructure
- Visual impact and impact on sense of place
- Impacts associated with the loss of agricultural land

From a social perspective, it is concluded by the specialist that the project is supported, but that mitigation measures should be implemented and adhered to. The assessment of the key issues indicated that there are no negative impacts that can be classified as fatal flaws, and which are of such significance that they cannot be successfully mitigated. Positive impacts could be enhanced by implementing appropriate enhancement measures and through careful planning. Based on the social assessment, the following general conclusions and findings can be made:

- The potential negative social impacts associated with the construction phase are typical of construction related projects and not just focussed on the construction of PV facilities (these relate to influx of non-local workforce and jobseekers, intrusion and disturbance impacts, safety and security) and could be reduced with the implementation of the mitigation measures proposed.
- Employment opportunities will be created in the construction and operation phase and the impact is rated as positive even if only a small number of individuals benefit in this regard.
- The proposed project could assist the local economy in creating entrepreneurial development, especially if local business could be involved in the provision of general material and services during the construction and operational phases.
- Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other sectors.
- The proposed development also represents an investment in infrastructure for the generation of clean, renewable energy, which, given the challenges created by climate change, represents a positive social benefit for society as a whole.

The proposed Becrux Solar PV Facility and associated infrastructure is unlikely to result in permanent damaging social impacts. From a social perspective, it is concluded that the project should be developed subject to the implementation of the recommended mitigation measures and management actions contained in the Social Impact Assessment

9.2.7 Assessment of Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The degree of significance of these cumulative impacts is difficult to predict without detailed studies based on more comprehensive data/information on each of the receptors and the site-specific developments. The alignment of renewable energy developments with South Africa's National Energy Response Plan and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The economic benefits of renewable energy developments at a local, regional and national level have the potential to be significant.

There is only one renewable energy facility proposed within a 30km radius of the project, namely, the Eskom 65.9 MW Solar PV Facility at the Tutuka coal-fired power station, approximately 25km south-east of the proposed Becrux Solar PV Facility.

A summary of the cumulative impacts is included in **Table 9.1** below.

Table 9.1: Summary of the cumulative impact significance for the Becrux Solar PV Facility

Specialist assessment	Overall significance of impact of the proposed project considered in isolation (negative unless indicated otherwise) (with mitigation)	Cumulative significance of impact of the project and other projects in the area (negative unless indicated otherwise) (with mitigation)
Ecology (flora, fauna and avifauna)	Low	Low
Aquatic Ecology	Low	Low
Land Use, Soil and Agricultural Potential	Low	Low
Heritage (archaeology and palaeontology)	Low	Medium
Visual	Medium	Low
Social	Medium	Medium

Based on the specialist cumulative assessment and findings; the development of the project and its contribution to the overall impact of all existing and proposed renewable energy facilities within a 30km radius, it was concluded that cumulative impacts will be of a low to medium significance. Therefore, the development of the project will not result in unacceptable, high cumulative impacts, nor a whole-scale change of the environment; and is therefore considered acceptable from a cumulative impact perspective. It is important to note that there are numerous industrial and mining developments in the area within which the PV facility is proposed, and that the area has been extensively transformed by these developments.

9.3. Environmental Sensitivity Analysis

As part of the specialist investigations undertaken within the project development area, specific environmental features and areas were identified. The environmental features identified within and directly adjacent to the development area and development footprint are illustrated in **Figure 9.1**. The following points provide a description of the sensitivities identified within the development area:

» **Ecological features:**
Three main habitats were identified and delineated within the development area, namely drainage lines, wetlands and transformed grassland. All habitats within the development area were allocated a sensitivity category using the guidelines for interpreting site ecological importance in the context of the proposed development activities. According to these guidelines, the wetland is regarded as being of high ecological sensitivity; the drainage lines have a low ecological sensitivity rating; and the modified grassland is considered to be of very low ecological sensitivity. Areas rated as High sensitivity and their buffers in proximity to the development area should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to these areas.

» **Aquatic Ecology:**
A total of seven (7) wetland systems were identified and delineated within the 500m regulated area surrounding the development area (refer to Figure 8.2), three (3) of which could potentially be impacted upon (either directly or indirectly) by the proposed activities (i.e., HGM 1, 2 and 3). The Ecological Importance and Sensitivity (EIS) of these units was determined to be High for HGM 3 and Moderate for the HGM 1 and HGM 2 and a 22m buffer has been recommended around these wetland systems. Currently, it is anticipated that should the 22m buffer be impeded upon the proposed activities, a Water Use License will be required with the condition of rehabilitation (i.e., rehabilitating

HGM1 and 2 to "Largely Modified" after construction). Should the proposed activities avoid the wetland buffer zone, the application will fall within the ambit of a General Authorisation.

» **Soils:**
Two classes of land capability sensitivity are located within the development area, namely "Moderate" and "High". No no-go areas have been identified and no buffers have been recommended.

» **Heritage Resources:**
During the survey of the Becrux Solar PV Facility, no significant archaeological resources were identified within the development area. According to the SAHRIS Palaeo sensitivity Map, the PV Facility is underlain by sediments of zero and very high palaeontological sensitivity. The palaeontologically sensitive geology of the area is ascribed to the Vryheid Formation of the Ecca Group of sediments. While the sediments underlying the development area are associated with a high palaeontological sensitivity, the nature of the excavations associated with PV facilities tends to be shallow (<3m) and as such, the likelihood of impacting intact Vryheid Formation sediments is low. In addition, the footprint is currently being utilised for non-irrigated agricultural activities and as such, it is unlikely that any palaeontological resources will be encountered during excavations. From a heritage perspective, no no-go areas have been identified and no buffers have been recommended for the PV facility. However, given the very high palaeontological sensitivity of the development area, the specialist recommended that a Chance Fossil Finds Procedure be implemented during the course of construction activities.

» **Visual:**
Potentially sensitive visual receptors were identified within 1km, 1-3km, 3-6km and beyond 6km of the proposed development area. Impacts on receptors within a 1km radius of the PV facility are likely to be of very high magnitude. Visual receptors within a 1km radius of the PV facility include observers travelling along Secunda secondary road. Impacts on receptors within a 1-3km radius from the PV facility are expected to be of high magnitude. Visual receptors within a 1-3km radius of the PV facility include residents of/visitors to Goedehoop (north), Vlakspruit (north-east), and Vlakspruit (east). The PV facility may have a moderate visual impact on receptors within a 3-6km radius of the facility. Visual receptors within a 3-6km radius include residents of/or visitors to Secunda (outlying), Goedehoop (far north), Vlakspruit (south-east), and Bossiespruit. Receptors beyond 6km are expected to have a low potential visual impact. No no-go areas have been identified and no buffers have been recommended from a visual perspective.

» **Social:**
Sensitive receptors from a social perspective are similar to those identified from a visual perspective, as detailed above. No no-go areas have been identified and no buffers have been recommended from a social perspective.

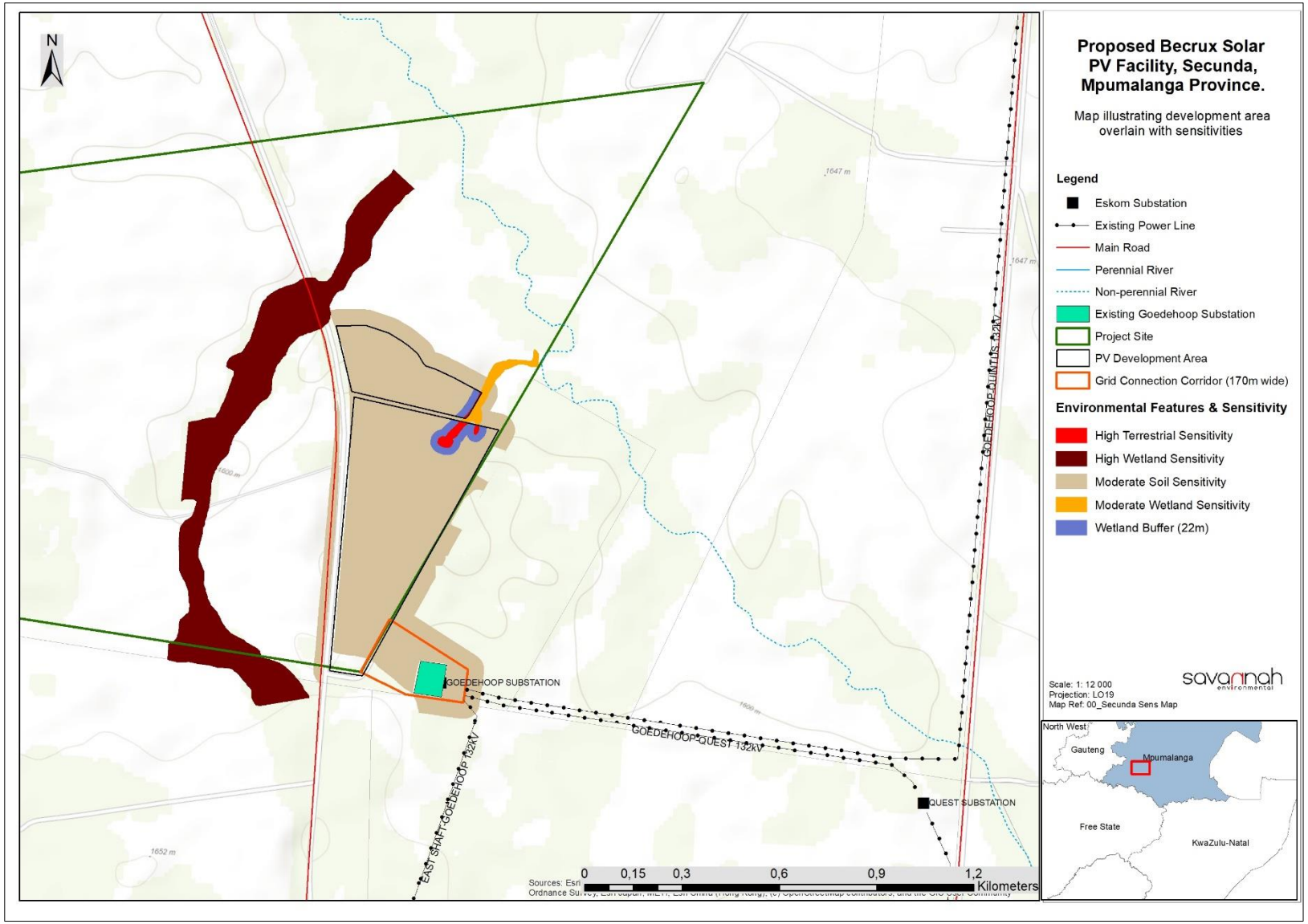

Figure 9.1: The development area (up to ~26.64ha) of the Becrux Solar PV Facility, as assessed within this BA Report, overlain on the identified environmental sensitive features (refer to **Appendix K for** A3 map)

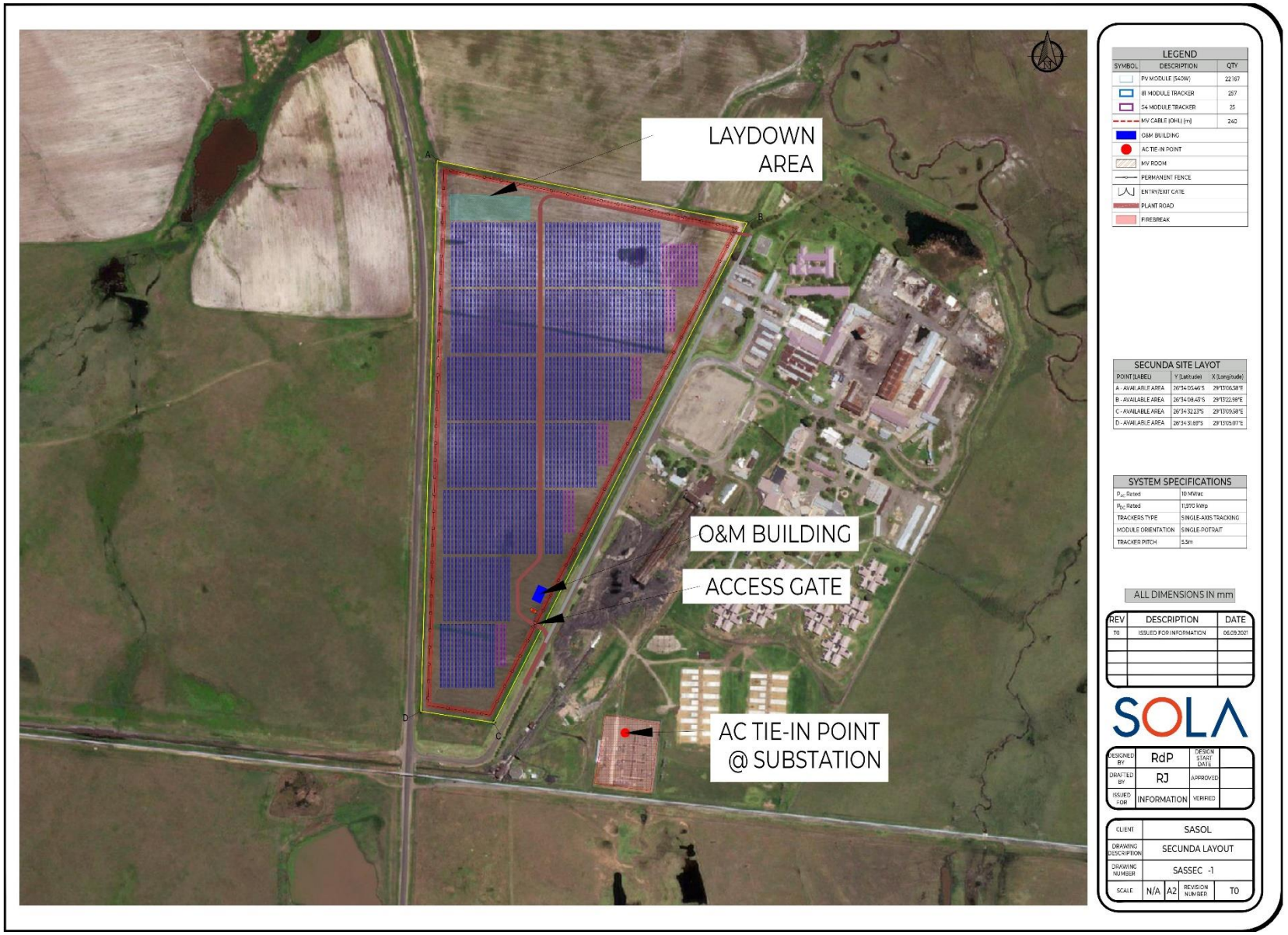

Figure 9.2: Layout for the Becrux Solar PV Facility considered within this BA Report (refer to **Appendix K** for A3 map)

9.4. Optimisation of the Layout

The development footprint, as assessed, has been overlain with the relevant environmental sensitivities in **Figure 9.1**. HGM 1 and 2, including their associated 22m buffer, are located within the proposed development footprint as illustrated in **Figure 9.1**. These wetland systems are regarded to be of high terrestrial sensitivity and have been classified as no-go areas from an ecological perspective. To ensure avoidance of these sensitive environmental features, the facility layout has been optimised by the project developer as illustrated in **Figure 9.3**.

This approach ensures the application of the mitigation hierarchy (i.e., avoid, minimise, mitigate and offset) to the Becrux Solar PV project, which ultimately ensures the avoidance, reduction and/or mitigation of all identified detrimental or adverse impacts on sensitive features as far as possible. The optimised facility layout is recommended as the preferred layout for implementation (refer to **Figure 9.4**).

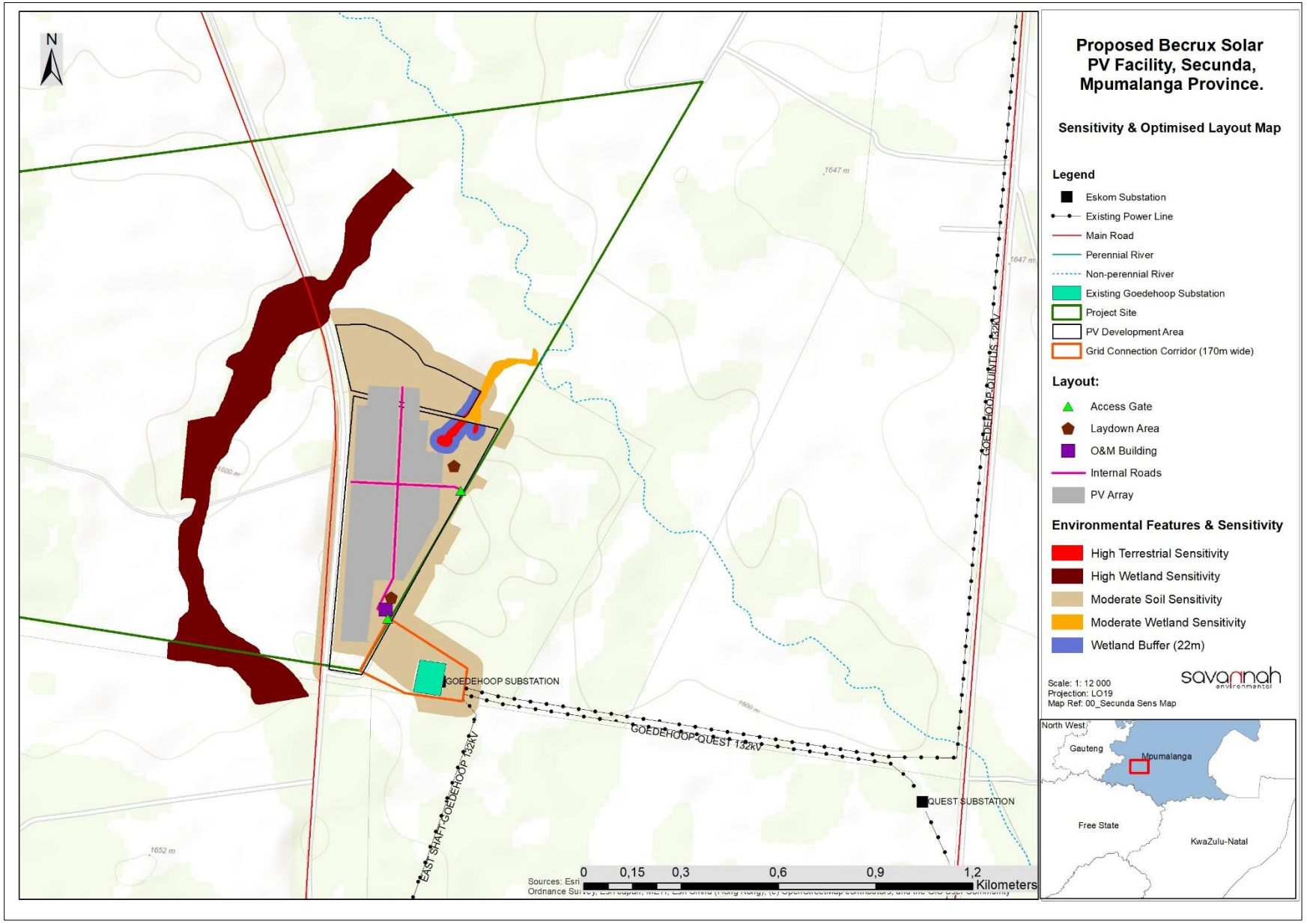

Figure 9.3: Environmental sensitivity map overlain with the optimised layout of proposed Becrux Solar PV Facility (refer to **Appendix K for** A3 map)

9.5. Environmental Costs versus Benefits of the Project

Environmental costs (including those to the natural environment and social environment) can be anticipated at a local and site-specific level and are considered acceptable provided the mitigation measures as outlined in the BA report and the EMPr are implemented and adhered to. No fatal flaws have been identified. These environmental costs could include:

- Loss of land capability as the development area is currently leased on a short-term basis to a tenant farmer for agriculture (non-irrigated) and as such, agricultural activities would have to cease to accommodate the proposed development. Based on the medium sensitivity to the soils within the development footprint, this impact will be of medium to low significance pre- and post-mitigation for both the construction and operation phases.
- There will be visual impacts of very high and high significance associated with the PV facility as the Becrux Solar PV Facility will be visible within a 1km radius and a 1-3km radius of the PV facility. No mitigation of this impact is possible (i.e., the structures will be visible in the landscape), but general mitigation and management are required as best practise to minimise secondary visual impacts which may arise from mismanagement of the site. Given that the development area is surrounded by heavy industrial activity (Brandspruit Coal Mine) and Secunda's chemical plants, the visual impacts associated with the PV facility are considered to be acceptable as visual receptors will view the facility in the context of the mining and industrial areas surrounding the site.
- Impacts on archaeological resources will be of low significance as no significant archaeological resources were identified within the development footprint. Although the site falls within an area of zero and very high palaeontological sensitivity, the nature of the excavations associated with PV facilities tends to be shallow (<3m) and as such, the likelihood of impacting intact sediments of very high palaeontological sensitivity is low. As a result, impacts on palaeontological resources are also expected to be of low significance. In addition, the footprint is currently being utilised for non-irrigated agricultural activities and as such, it is unlikely that any palaeontological resources will be encountered during excavations.
- Impacts on the social environment include impacts on the sense of place and the creation of direct employment opportunities that could occur during both construction and operation. These impacts though will only affect local communities either temporarily or over the long term.

Benefits of the Becrux Solar PV Facility include the following:

- The project will result in important economic benefits at the local and regional scale through job creation, income and other associated downstream economic development. These will persist during the pre-construction, construction, operation and decommissioning phases of the project.
- The development area is currently leased on a short-term basis to a tenant farmer for agriculture (non-irrigated) and as such, agricultural activities would have to cease to accommodate the proposed development. The development of the solar PV facility on this property will however ensure the continuation of an economically viable land use.
- The project contributes towards the Provincial and Local goals for the development of renewable energy as outlined in the respective IDPs.
- The PV facility is a climate friendly development. The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through reducing greenhouse gas (GHG) emissions. South

Africa is estimated to be responsible for ~1% of global GHG emissions and currently ranked 9th worldwide in terms of per capita CO_2 emissions.

» The PV facility will contribute towards pollution reduction as it will not entail the release of by-products through the burning of fossil fuels for electricity generation, but will utilise a renewable energy resource, in this case solar radiation.

The benefits of the Becrux Solar PV Facility are expected to occur at a national, regional, and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure in the development area within medium and low sensitive areas, and through the avoidance of features and areas considered to be of very high and high sensitivity, the benefits of the project are expected to partially offset the localised environmental costs of the PV facility.

9.6. Overall Conclusion (Impact Statement)

A technically viable development area for the project was proposed by Becrux Solar PV Project One (Pty) Ltd and assessed as part of the BA process. The environmental assessment of the development area was undertaken by independent specialists and their findings have informed the results of this BA Report. Becrux Solar PV Project One (Pty) Ltd has proposed a technically viable layout for the project and associated infrastructure, which has been assessed as part of the independent specialist studies. The Specialists considered desktop data, results from field work, existing literature and the National Web-based Environmental Screening Tool to inform the identification of sensitivities.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the implementation of the project.

From an ecological perspective, the site is located outside any Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and formally protected or conservation areas. The proposed development area does however overlap a vulnerable ecosystem and an NPAES focus area. Three habitats, namely, a wetland, drainage lines and transformed grassland were identified within the development area. Only the wetland is regarded to be of high ecological sensitivity and has been declared as a no-go area for development, including its associated 22m buffer. No faunal component of significance was observed, which further reduced the impact significance of the development on terrestrial biodiversity. Overall, there are no specific long-term impacts likely to be associated with the development of the Becrux Solar PV Facility that cannot be reduced to a low significance. There are no fatal flaws associated with the development and no terrestrial ecological considerations that should prevent it from proceeding.

From an aquatic perspective, a total of seven (7) wetland systems were identified and delineated within the 500m regulated area surrounding the development area, three (3) of which could potentially be impacted upon (either directly or indirectly) by the proposed activities (i.e., HGM 1, 2 and 3). The Ecological Importance and Sensitivity (EIS) of these units was determined to be High for HGM 3 and Moderate for the HGM 1 and HGM 2 and a 22m buffer has been recommended around these wetland systems.

From a soils perspective, two classes of land capability sensitivity were found to be located within the development area, namely "Moderate" and "High". No no-go areas have been identified and no buffers have been recommended from a soils perspective.

No sensitivities or heritage sites that are conservation-worthy were identified from a heritage perspective within the development area of the PV facility. Visual receptors that are likely to experience very high and high visual impacts as a result of the PV facility structures were identified within a 1km and 1-3km radius of the PV facility. Overall, the post mitigation significance of the visual impacts is expected to range from moderate to low given that the development area is surrounded by heavy industrial activity (Brandspruit Coal Mine) and Secunda's chemical plants.

The Social Impact Assessment has identified short-term (construction related) impact indicators and operational related social impact indicators. The assessment of the proposed facility, and its net effect from a social perspective, indicates that the project would generate greater socio-economic benefits during both the construction and operational phases than the potential losses that could occur as a result of its establishment.

As detailed in the cost-benefit analysis, the benefits of the Becrux Solar PV Facility are expected to occur at a national, regional and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure in the development area within medium and low sensitive areas, and through the avoidance of features and areas considered to be of very high and high sensitivity, the benefits of the project are expected to partially offset the localised environmental costs of the PV facility.

Based on the conclusions of the specialist studies undertaken, it can be concluded that the development of the Becrux Solar PV Facility based on the current layout as provided by the developer will not result in unacceptable environmental impacts (subject to the implementation of the recommended mitigation measures).

9.7. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the development footprint proposed by the developer within the development area, the avoidance of the sensitive environmental features within the development area, as well as the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the Becrux Solar PV Facility is acceptable within the landscape and can reasonably be authorised. The proposed layout as provided by the developer (**Figure 9.3**) is considered to be the most appropriate from an environmental perspective as it avoids identified sensitivities and recommended buffer areas.

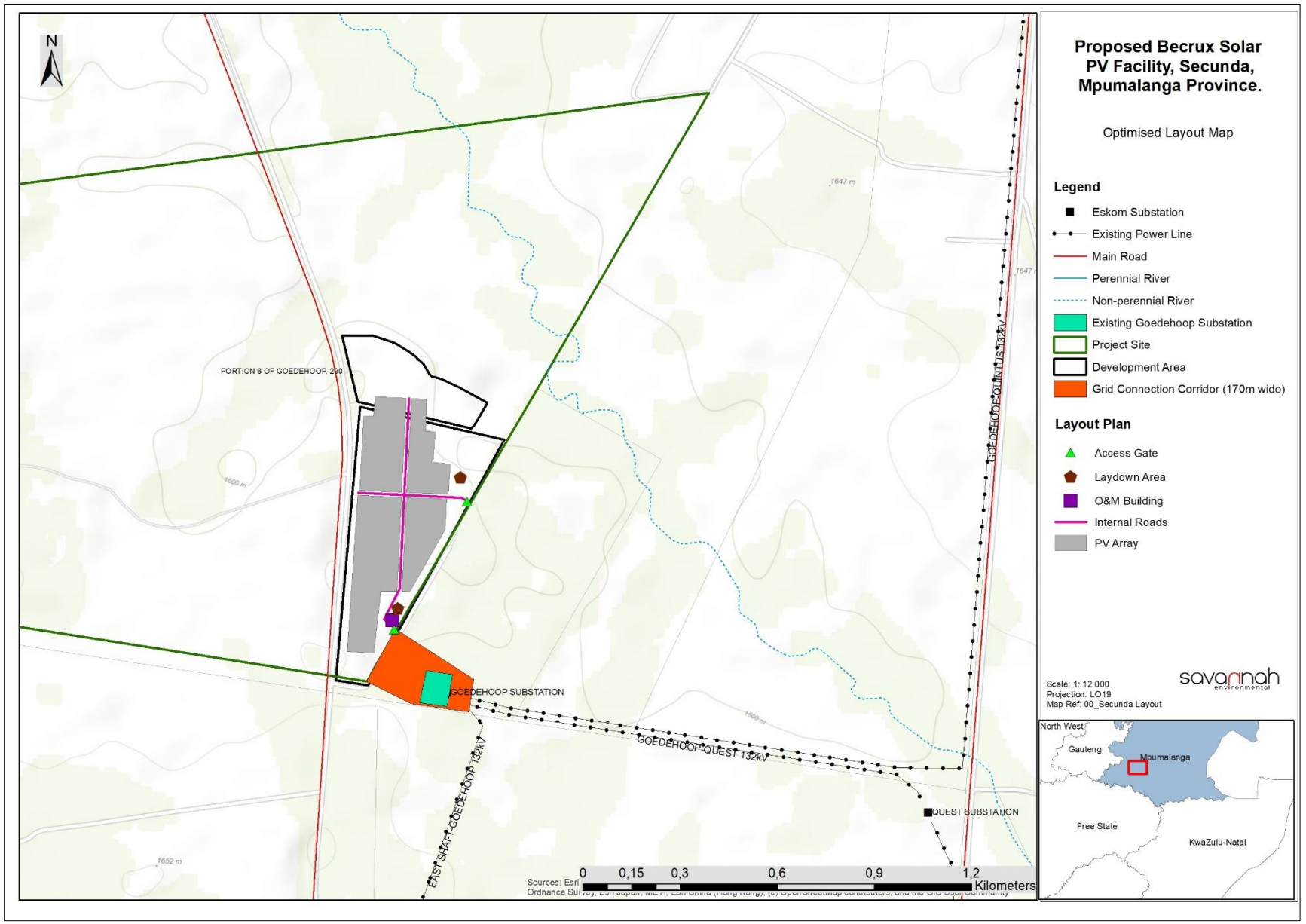

Figure 9.4: Layout proposed for authorisation for the Becrux Solar PV Facility (refer to **Appendix K for** A3 map)

The following infrastructure would be included within an authorisation issued for the project:

- Solar PV array comprising PV modules and mounting structures.
- Inverters and transformers.
- Cabling between the panels.
- E-house containerised or non-containerised substation.
- 11kV overhead power line for the distribution of the generated power, which will be connected to the existing Goedehoop Substation.
- Laydown area.
- Access gravel road (existing) and internal gravel roads (new).
- Security booth, Operations & Maintenance building, workshop, storage area and site office.

The following key conditions would be required to be included within an authorisation issued for the Becrux Solar PV Facility:

- All mitigation measures detailed within this BA report, as well as the specialist reports contained within **Appendices D to I** are to be implemented.
- The EMPr as contained within **Appendix J** of this BA report should form part of the contract with the Contractors appointed to construct and maintain the solar facility in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the Becrux Solar PV Facility is considered key in achieving the appropriate environmental management standards as detailed for this project.
- Following the final design of the Becrux Solar PV Facility, a revised layout must be submitted to Mpumalanga DARDLEA for review and approval prior to commencing with construction. No development is permitted within the identified no-go areas as detailed in **Figure 9.1.**
- A qualified environmental control officer must be on site when construction begins. The area must be walked through with a suitably qualified specialist prior to construction, to ensure no faunal species remain in the habitat and get killed. Should animals (including SCCs) not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated.
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".Should any buried archaeological resources or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward.
- The Chance Fossils Finds procedure must be implemented during the course of construction.
- Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns.
- All other relevant environmental permits must be obtained prior to the construction of the facility.

The period for which the EA is required to remain valid is 10 years from the date of authorisation, with a period of 10 years for the design, planning, construction, and commissioning of the activity to be concluded.

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268333	Francois P Coetzee, Joanna Behrens	23/04/2015	HIA Phase 2	PHASE II: CULTURAL HERITAGE PROJECT OF THE FARM RIETVLEY 320 IS, SASOL FINE ASH DAM (FAD) 6. Investigation focussing on Site 1, Site 3 and Site 6 on the farm Rietvley 320 IS (Portions 3, 8, 9, 10 and Remaining Extent 2), Govan Mbeki Local Municipality, Gert Sibande District Municipality, Mpumalanga
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