# TRANSALLOYS SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY MPUMALANGA PROVINCE

Basic Assessment Report

February 2023

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# PROJECT DETAILS

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|---|---|---|
| **DFFE Reference** | : | TBD |
| **Title** | : | Basic Assessment Process: Transalloys Solar PV Energy Facility, Mpumalanga Province |
| **Authors** | : | Savannah Environmental<br>Candy Mahlangu<br>Jo-Anne Thomas |
| **Specialists** | : | The Biodiversity Company<br>CTS Heritage<br>LOGIS<br>Tony Barbour |
| **Applicant** | : | Transalloys (Pty) Ltd |
| **Report Status** | : | Basic Assessment Report for Public Review |
| **Date** | : | February 2023 |

**When used as a reference this report should be cited as:** Savannah Environmental (2022). Environmental Management Programme: Transalloys Solar Photovoltaic (PV) Energy Facility, Mpumalanga Province

# PURPOSE OF THE BA REPORT AND INVITATION TO COMMENT

Transalloys (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Basic Assessment (BA) process for the Transalloys Solar 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 (No. 107 of 1998) (NEMA).

This BA Report consists of ten chapters, as follows:

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

- **Chapter 1** provides background to the Transalloys Solar PV Energy Facility and the Basic Assessment process.
- **Chapter 2** provides a description of the Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility as well as the need and desirability of the facility within the project site.
- **Chapter 6** outlines the approach to undertaking the BA 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 Transalloys Solar PV Energy 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 specialist studies undertaken.
- **Chapter 10** provides references used in the compilation of the BA Report.

The 30-day period for review is from 10 February 2023 to 13 March 2023. The report is available for public review at (https://savannahsa.com/public-documents/energy-generation/transalloys-solar-pv-energy-facility/ ). All comments received and recorded during the 30-day review and comment period will be included, considered, and addressed within the final BA Report to be submitted to the Competent Authority for consideration.

Comments should be submitted in writing on or before 13 March 2023 to the contact person below

| Please submit your comments by **13 March 2023**to: |
|---|
| **Bregardia Rabbie** of **Savannah Environmental**<br>PO Box 148, Sunninghill, 2157<br>Tel: 011-656-3237<br>Mobile: 060 978 8396<br>Fax: 086-684-0547<br>Email: publicprocess@savannahsa.com |

Comments can be made as written submission via fax, post, or email

# EXECUTIVE SUMMARY

Transalloys (Pty) Ltd propose to develop a commercial Solar Photovoltaic (PV) Energy Facility and associated electrical infrastructure on Portions 34 and 35 of the farm Elandsfontein 309JS and Portions 20 and 24 of the farm Schoongezicht 308JS, adjacent to their smelter complex on Clewer Road 1034, eMalahleni, in the Emalahleni Local Municipality. The project is located in the greater Nkangala District Municipality of Mpumalanga Province, approximately 34km west of Middelburg and 37km east of Bronkhorstspruit. The entire extent of the site falls within the Emalahleni Renewable Energy Development Zone (REDZ9)[1] and the International Corridor of the Strategic Transmission Corridors[2] (**Figure 1.1**).

A development area of up to ~100ha and with a development footprint of up to ~67.9has been identified by Transalloys (Pty) Ltd for the establishment of the PV facility. The proposed facility will have a contracted capacity of up to 55MW and will include the following infrastructure:

- Solar PV array comprising PV modules and mounting structures (Bi-facial panels with single axis tracking are preferred over fixed-axis or double axis tracking systems, and mono-facial panels. However, the preferred panel technology will be confirmed during the final design phase.)
- Inverters and on-site transformers with total capacity up to 53MVA.
- Cabling between the project components.
- Underground 33kV power line to connect the solar PV facility to the existing Transalloys Substation
- Site control building and Site Security office, operations and control, and maintenance and storage laydown areas.
- Access roads and internal distribution roads.

To evacuate the generated power to Transalloys Smelter, a 33kV underground power line will be established to connect the on-site facility transformers to the existing Transalloys Substation. This proposed power line will run within the Transalloys property, parallel to the existing internal distribution roads.

The PV facility is proposed in order to partially meet Transalloys' current electricity needs and future expansion requirements. The plant will be a captive generating plant whereby generated electricity will be fed directly into the smelter complex for direct consumption. The development of the power plant project would effectively mean that Transalloys would become less dependent on the Eskom electricity grid, thereby creating additional capacity within the Eskom grid for use by other electricity users.

[1] The REDZ are zones identified by the Department of Forestry Fisheries and the Environment (DFFE) as geographical areas of strategic importance for the development of large-scale solar PV and wind energy development activities and which have been earmarked for the development of renewable energy facilities within South Africa as per GNR144 of 26 February 2021.

[2] The Strategic Transmission Corridors are identified by the Department of Forestry Fisheries and the Environment (DFFE) as geographical areas of strategic importance for the development the supporting large scale electricity transmission and distribution infrastructure in terms of Strategic Integrated Project 10: Electricity Transmission and distribution. This is as per GNR113 of February 2018.

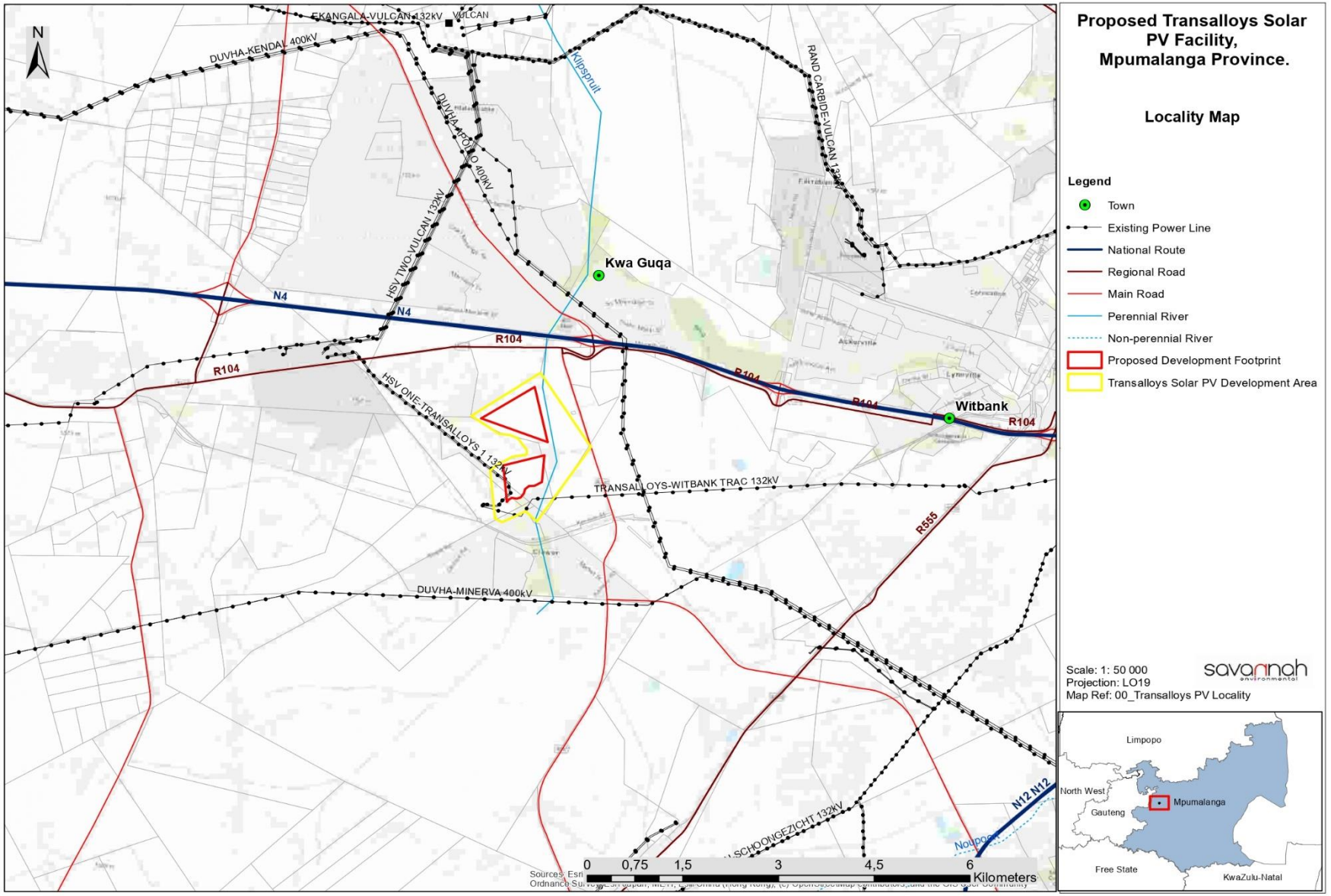


**Figure 1.1:** Locality map of the project site showing the location of the site in relation to the closest towns of the area (refer to **Appendix 0** for A3 map)

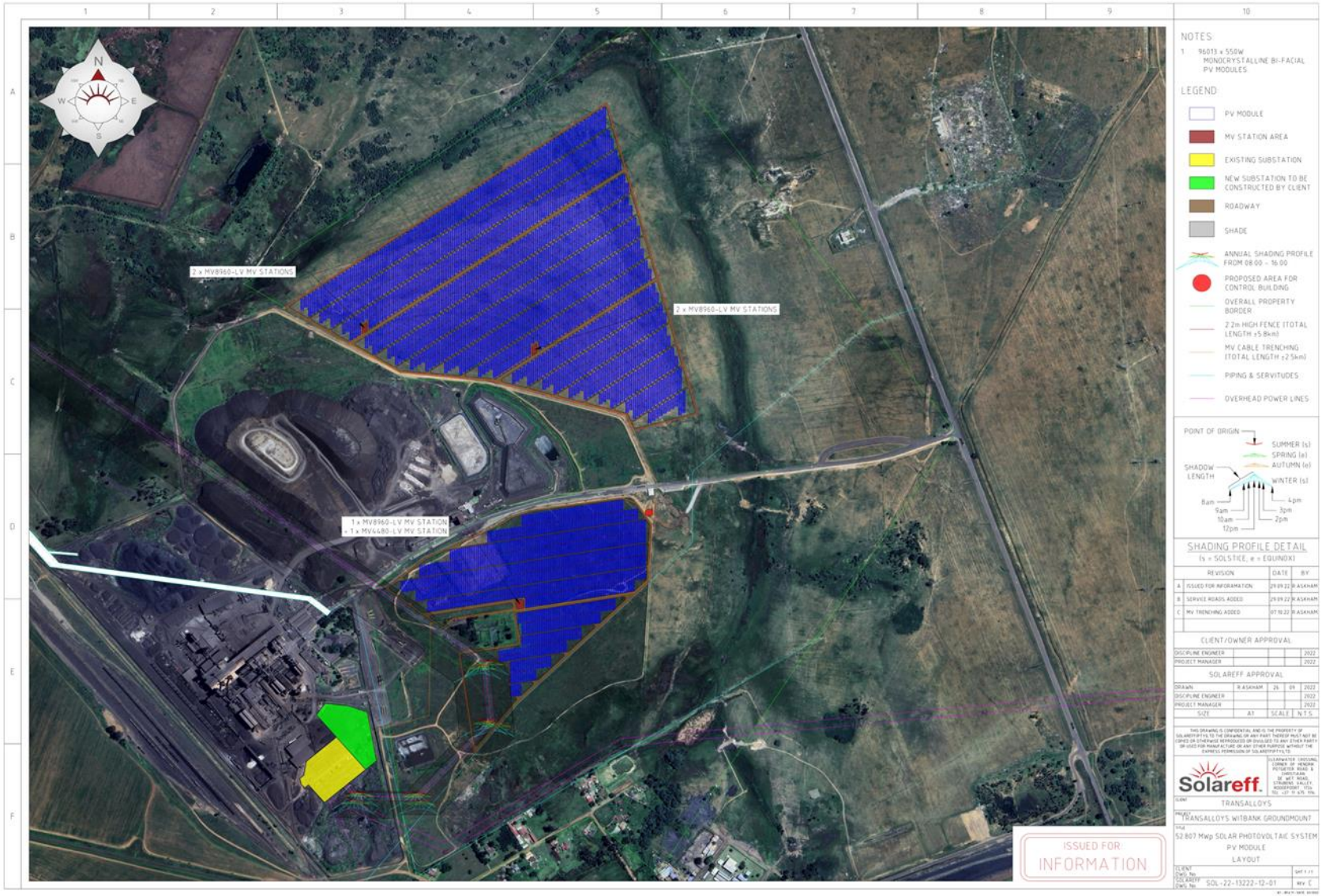


**Figure 1.2:** The entire extent of the development footprint (~67.9ha) layout as assessed within this BA Report for the Transalloys Solar PV Energy Facility

## 2. Evaluation of the Transalloys Solar PV Energy Facility

The BA Report, together with the specialist studies contained within **Appendices D-J** provide a detailed assessment of the potential impacts that may result from the development of the Transalloys Solar PV Energy Facility.

No environmental fatal flaws were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of no-go features or buffers within the project development area by the development footprint and the undertaking of monitoring, as specified by the specialists.

The potential environmental impacts associated with the Transalloys Solar PV Energy Facility identified and assessed through the BA process include:

» Impacts on ecology, including flora, fauna and wetlands
» Impacts on avifauna
» Impacts to soils and agricultural potential
» Impacts on heritage resources, including archaeology and palaeontology
» Visual impacts on the area imposed by the components of the facility
» Social impacts.

The development footprint, as assessed in the BA Report is presented in **Figure 1.2**.

### *2.1. Impacts on Ecology (including flora and fauna)*

The Transalloys Solar PV Energy Facility falls within the Eastern Highveld Grassland vegetation type. The vegetation of this vegetation type is characterised by short and dense grasslands that occur in moderately undulating plains which include low hills and pan depressions.

The project area overlaps with CBA irreplaceable and CBA optimal areas according to the provincial conservation plan, however, following the findings of this assessment most of the local habitat is considered to exist in a degraded state. It is noted that certain sections of the project area represent more intact areas of habitat (the wetland areas), and these are considered to be more functional with regards to the CBA status of the project area, whereby they should be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems, and land uses should maximise the retention of biodiversity pattern and ecological process. To ensure this it is important that the management outcomes presented above be adhered to, in order to properly mitigate the negative environmental impacts that will stem from the project activities.

Fauna and flora SCC have a moderate expectancy of occurrence across the project area. While two species, *Zantedeschia aethiopica* and *Crinum macowanii*, listed as protected under Schedule 11 of the Mpumalanga Nature Conservation Act (Act 10 of 1998) were recorded within the wetland habitat. The previous Pre-Construction Walk-Through Report compiled by *Nkurenkuru* Ecology & Biodiversity in 2019 found additional *Crinum macowanii* individuals along the secondary grassland habitat. As such it is recommended that a wet season walkthrough of the project be conducted prior to the commencement of the project construction phase.

The terrestrial biodiversity assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The project area is instead assigned an overall sensitivity that ranges from 'Very Low' to 'Medium', with the exception of the wetland areas that has been assigned a 'High' sensitivity.

Considering that the area proposed for the facility has been identified as being of low significance for biodiversity maintenance and ecological processes, it is the specialist's opinion that the development may proceed. All mitigations measures prescribed herein must be considered by the issuing authority for authorisation. No fatal flaws are evident for the proposed project.

### *2.2. Impacts on Avifauna*

Sixty-six (66) bird species were recorded in the point counts of the survey, while twenty-two (22) species were recorded during incidental observations. One of the species recorded was a SCC, the Lanner Falcon *(Falco biarmicus),* it was observed flying over the project area, no nest of this species was observed in the project area. A nest of a provincially protected Hamerkop *(Scopus umbretta)* was observed, based on its lower schedule 5 protection level only a 50 m buffer was placed around the nest, and this must be treated as a "No-Go" area. The feeding groups recorded in the project area were dominated by insectivores, followed by granivores and omnivores. It is believed a summer survey in the migratory season of avifauna would yield higher numbers of bird species, especially those of water birds due to the high numbers of water resources in the project area. The water resources and their buffers (as per the wetland report TBC, 2022) in the project area must be treated as "No-Go' areas. As a result of the high amount of water resources in the project area the collision risk is regarded as higher. This risk can be mitigated by the installation of white strips on the edge of the PV panels and bird diverters along the whole length of the power line (should this be overhead).

Based on the current types of bird species recorded in the project area the development will not have a high residual impact should all the mitigations and recommendations be implemented. Based on the desktop and field findings it is the opinion of the specialist that the project, may be favourably considered, on condition that all prescribed mitigation measures and supporting monitoring are implemented.

### *2.3. Impacts on Soil and Agricultural Potential*

A total of five (5) wetlands were identified and assessed within the 500 m regulated area namely three hillslope seep wetland a channelled valley bottom wetland as well as a unchanneled valley bottom wetland. HGM 4 scored overall PES scores of C – "Moderately Modified" due to the modification to the hydrology and vegetation of the wetland through anthropogenic activities. HGM 1, HGM 2 and HGM 5 units scored overall PES scores of D – "Largely Modified". HGM 2 unit scored PES score of E – "Seriously Modified". All the HGM units scored "High" importance and sensitivity scores due to the high protection level of both the wet veg and wetland units. The average ecosystem service score ranges between "Moderately Low" and "Moderately High".

The buffer size for the proposed development was determined to be 15m post mitigation buffer to the wetland systems.

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. A Water Use Licence is required for the development of the Transalloys Solar PV Energy Facility.

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 HGM 2 and 4 to "Largely Modified" after construction).

### *2.4. Land Use, Soil and Agricultural Potential*

Three main sensitive soil forms were identified within the project area, namely the Nkonkoni, Clovelly and Tubatse soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with "Low" and "Moderate high" sensitivities, which correlates with the "Moderate" sensitivities finding from the baseline assessment associated with land potential 3 and 4.

The project area is associated with arable soils. However, the available climatic conditions of low annual rainfall and high evapotranspiration potential severely limits crop production significantly resulting in land capabilities with "Low" and "Moderate high" sensitivities. Moreover, most soil profiles in the assessment area are shallow, which also limit field crop root penetrations. Depth limitations can also expose most of the soils to the effect of erosion. The land capabilities associated with the assessment area are suitable for livestock grazing, however limitations in the profile depth can restrict some of the cropping practices.

It is the specialist's opinion that the proposed Transalloys Solar PV Energy Facility project will have limited impact on the agricultural production ability of the land. The proposed Solar PV project can be developed on the crop fields identified as high sensitivity by the DFFE screening tool, (2022) with measures in place. Transalloys Pty Ltd. is the landowner of the high crop field land use. The proposed Transalloys Solar PV Energy Facility may be favourably considered but all prescribed mitigation measures and recommendations must be considered by the issuing authority.

### *2.5. Impacts on Heritage Resources (archaeology, palaeontology and cultural landscape)*

Based on the heritage information available, there is no objection to the proposed PV development as per the Final Layout provided on heritage grounds as all known significant heritage resources are avoided by the proposed development and the recommended buffers are respected. On condition that the recommended buffer areas are implemented and that the PV development is limited to the appropriate development areas, no impacts to heritage resources are anticipated and as such, no further heritage assessment is recommended.

### *2.5. Visual Impacts*

The findings of the Visual Impact Assessment undertaken for the proposed Transalloys PV Solar Facility is that the visual environment surrounding the site, especially within a 1km radius (and potentially up to a radius of 3km) of the proposed facility, may be visually impacted during the anticipated operational lifespan of the facility (i.e. a minimum of 25 years with maintenance).

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 **high**, temporary visual impact, that may be mitigated to **moderate**.
- The PV facility is expected to have a **high** visual impact pre-mitigation and a **moderate** visual impact post mitigation on residents of the northern section of the Clewer agricultural holdings, as well as, observers travelling along the N4, R104 and Bailey Avenue, within a 1km radius of the proposed PV facility.
- The operational PV facility could have a **moderate** visual impact on sensitive receptors within a 1 – 3km radius of the PV facility structures. This impact may be mitigated to **low**.
- 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 a road travel hazard is expected to be of **moderate** significance before and after mitigation.
- The only residences within a 1km radius of the proposed PV facility are the residents of the northern section of the Clewer agricultural holdings. Since these residents are located to south of the site and it is assumed that the PV panels will be oriented to the north for maximum sun exposure it is unlikely that these receptors will be impacted upon by solar glint and glare. Therefore, the potential visual impact related to solar glint and glare on static ground-based receptors (residents of homesteads) is therefore expected to be of **low** significance, both before and after mitigation.
- 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 (i.e. beyond 6km of the proposed infrastructure), and by implication, on the sense of place, is difficult to quantify, but is generally 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 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.

### *2.6. Socio-Economic Impacts*

Impacts are expected to occur with the development of the Transalloys Solar PV Energy 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 that the project is supported, but that mitigation 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 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 Transalloys Solar PV Energy 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.

### *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.

Based on the specialist cumulative assessment and findings (**Appendix D** to **Appendix J** and Chapter 8 of the BA) the development of the Transalloys Solar PV Energy Facility and its contribution to the overall impact of all existing and proposed renewable energy facilities and other industrial-type developments within a 30km radius, will be of a low to medium significance. There are no impacts or risks identified to be considered as unacceptable with the development of Transalloys Solar PV Energy Facility and other similar developments within the surrounding area. In addition, no impacts which will result in whole-scale change are expected.

**3. Environmental Costs of the Solar PV Facility versus Benefits of the Solar PV Facility**

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 biodiversity, flora, fauna and avifauna due to the clearing of land for the construction and utilisation of land for the solar PV facility. The loss of biodiversity has been minimised/avoided through the limited placement of project components and infrastructure within the ecological features, and sensitive areas considered to be of high sensitivity.
- Loss of aquatic resources such as wetlands. The loss of aquatic resources has been avoided through the avoidance of such features by the development footprint.
- The area is currently used by the illegal farmers for agriculture (non-irrigated) which would have to cease to accommodate the proposed development. However, Transalloys is the landowner and has no formal agreement with any farmers. Although the affected area has a high agricultural potential there will not be any loss of land for commercial agricultural purposes as a result of the project as the area is designated for industrial purposes by the landowner.
- There will be visual impacts associated with the PV facility as the Transalloys Solar PV Energy Facility will be visible and mainly of a very high and high significance within a 1km radius and a 1-3km radius of the PV facility, respectively. As the PV site and associated grid infrastructure are located within the Transalloys-owned land and industrial affected area, and due to the transformed nature of the surrounding areas, the potential impact on the area's sense of place will be negligible.

Benefits of the Transalloys Solar PV Energy 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 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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 sensitivity, the benefits of the project are expected to partially offset the localised environmental costs of the PV facility.

**4. Overall Conclusion (Impact Statement)**

The preferred activity was determined by the developer to be the development of a renewable energy facility on site using solar as the preferred technology, due to the availability of a strong solar resource, available grid capacity, benign topography, and good access. A technically viable development area for the project was proposed by Transalloys (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. Transalloys (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.

From a review of the relevant policy and planning framework, it was concluded that the project is well aligned with the policy framework, and a clear need for the Project is seen from a policy perspective at a local, provincial and National level.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the implementation of the project. The developer has designed a project development footprint in response to the identified sensitive environmental features and areas present within the project site. This approach is in line with the application of the mitigation hierarchy, where all the sensitive areas which could be impacted by the development have been avoided (i.e., tier 1 of the mitigation hierarchy). The layout for the PV facility and associated infrastructure assessed within this EIA Report is located outside of ecologically sensitive areas and features regarded to be no-go for development. Although the proposed layout for the PV facility and associated infrastructure overlaps with areas of sensitivity from a soils perspective, the specialist has concluded that the project as proposed can be authorised on condition that the recommended mitigation measures are implemented. No sensitive visual or social receptors or sites of high heritage significance were identified to be impacted by the proposed development. It was concluded by all specialists that impacts can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures. The layout assessed within this EIA Report is therefore considered to be acceptable for implementation.

**5. 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 Transalloys Solar PV Energy Facility is acceptable within the landscape and can reasonably be authorised. The

proposed optimised layout as provided by the developer (**Figure 1.3**) is considered to be the most appropriate from an environmental perspective as it avoids identified sensitivities and recommended buffer areas.

The following infrastructure would be included within an authorisation issued for the project:

- Solar PV array comprising PV modules and mounting structures (monofacial or bifacial and a single axis tracking system)
- Inverters and transformers
- Cabling between the project components
- On-site facility substation and a power line to connect the solar PV facility to the existing Transalloys Substation
- Security office, operations and control, and maintenance and storage laydown areas

Access roads and internal distribution roads

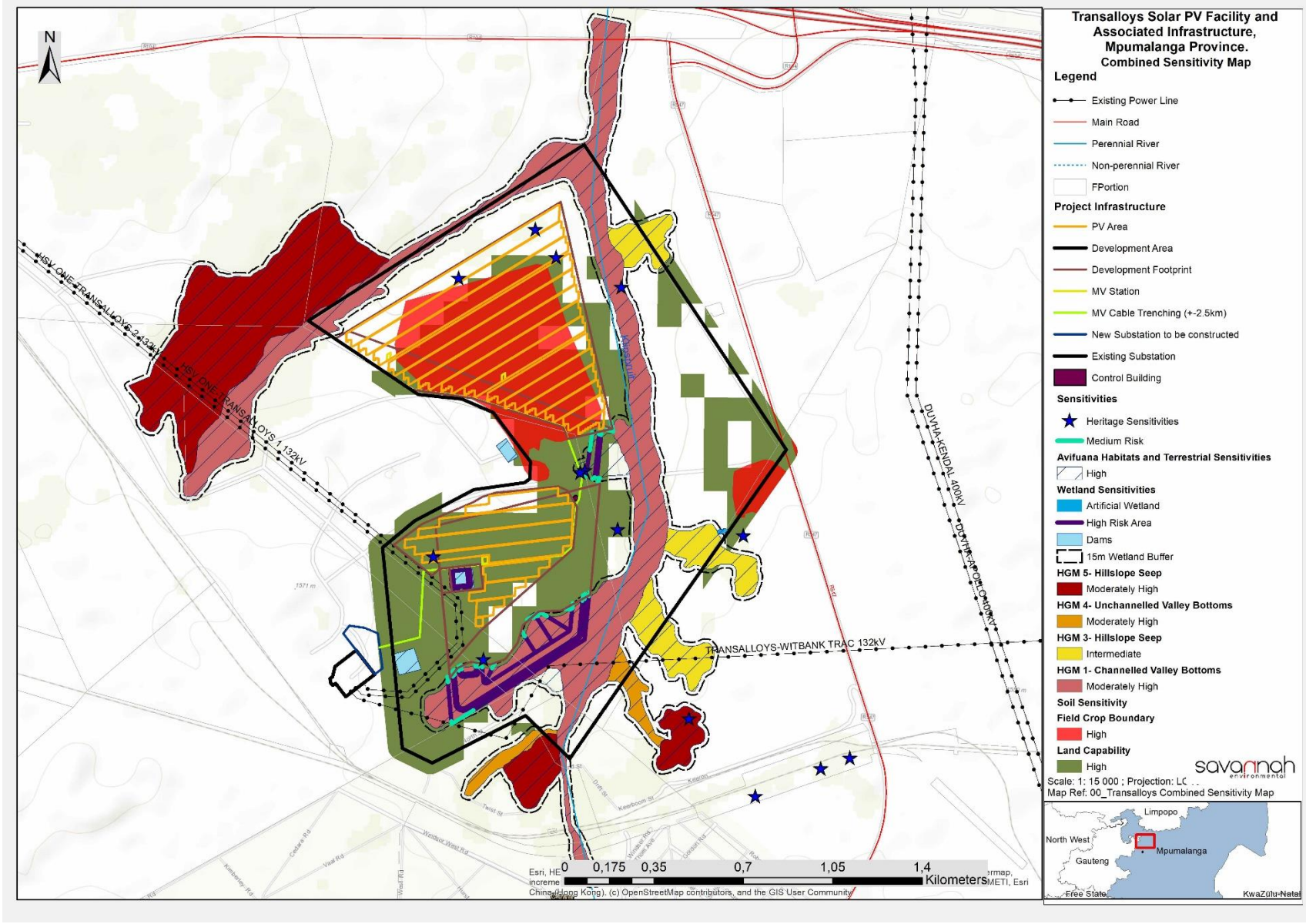


**Figure 1.3**: Environmental sensitivity map from the results of the Basic Assessment for the Transalloys Solar PV Energy Facility

# DEFINITIONS AND TERMINOLOGY

**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.

**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.

**Commercial Operation date**: The date after which all testing and commissioning has been completed and is the initiation date to which the seller can start producing electricity for sale (i.e. when the project has been substantially completed).

**Commissioning:** Commissioning commences once construction is completed.

**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. Construction begins with any activity which requires Environmental Authorisation.

**Cumulative impacts:** Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

**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 Transallys Solar PV Energy Facility is planned to be located. The development area is still to be determined.

**Development footprint:** The development footprint is the defined area (located within the development area) where the PV array and other associated infrastructure for the Transalloys Solar PV Facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

**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.

**Disturbing noise:** A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

**'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.

**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.

**Emergency:** An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

**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 are 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 impact:** An action or series of actions that have an effect on the environment.

**Environmental impact assessment:** Environmental Impact Assessment, as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

**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:** An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

**Heritage:** That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

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

**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:** 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 to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

**Mitigation hierarchy:** The mitigation hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services. The mitigation hierarchy is used when planning and implementing development projects, to provide a logical and effective approach to protecting and conserving biodiversity and maintaining important ecosystem services. It is a tool to aid in the sustainable management of living, natural resources, which provides a mechanism for making explicit decisions that balance conservation needs with development priorities.

**No-go areas:** Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

**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.

**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, this may include activities which do not require Environmental Authorisation (e.g., geotechnical surveys).

**Project site:** The project site is the area with an extent of 235.5ha, within which the Transalloys Solar PV Facility development footprint will be located.

**Rare species:** Taxa with small world populations that are not at present Endangered or Vulnerable but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

**Red data species:** Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

**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.

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# CHAPTER 1 : INTRODUCTION

Transalloys (Pty) Ltd propose to develop a commercial Solar Photovoltaic (PV) Energy Facility and associated electrical infrastructure on Portions 34 and 35 of the farm Elandsfontein 309JS and Portions 20 and 24 of the farm Schoongezicht 308JS, adjacent to their smelter complex on Clewer Road 1034, eMalahleni, in the Emalahleni Local Municipality. The project is located in the greater Nkangala District Municipality of Mpumalanga Province, approximately 34km west of Middelburg and 37km east of Bronkhorstspruit. The entire extent of the site falls within the Emalahleni Renewable Energy Development Zone (REDZ9)[3] and the International Corridor of the Strategic Transmission Corridors[4] (**Figure 1.1**). The facility will have a contracted capacity of up to 55MV and will be known as the Transalloys Solar PV Energy Facility.

The PV facility is proposed in order to partially meet Transalloys' current electricity needs and future expansion requirements. The plant will be a captive generating plant whereby generated electricity will be fed directly into the smelter complex for direct consumption. The development of the power plant project would effectively mean that Transalloys would become less dependent on the Eskom electricity grid, thereby creating additional capacity within the Eskom grid for use by other electricity users.

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 (DARDL&EA), as prescribed in the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), as amended. As the project falls within the Emalahleni REDZ, a Basic Assessment (BA) process is applicable as per GNR144 of February 2021.

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

- **Chapter 1** provides background to the Transalloys Solar PV Energy Facility and the Basic Assessment process.
- **Chapter 2** provides a description of the Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility as well as the need and desirability of the facility within the project site.
- **Chapter 6** outlines the approach to undertaking the BA process.
- **Chapter 7** describes the existing biophysical and socio-economic environment within and surrounding the project site.

[3] The REDZ are zones identified by the Department of Forestry Fisheries and the Environment (DFFE) as geographical areas of strategic importance for the development of large-scale solar PV and wind energy development activities and which have been earmarked for the development of renewable energy facilities within South Africa as per GNR144 of 26 February 2021.

[4] The Strategic Transmission Corridors are identified by the Department of Forestry Fisheries and the Environment (DFFE) as geographical areas of strategic importance for the development the supporting large scale electricity transmission and distribution infrastructure in terms of Strategic Integrated Project 10: Electricity Transmission and distribution. This is as per GNR113 of February 2018.

- **Chapter 8** provides an assessment of the potential issues and impacts (direct, indirect and cumulative impacts) associated with the Transalloys Solar PV Energy 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 specialist studies undertaken.
- **Chapter 10** provides references used in the compilation of the BA Report.

## 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 Transalloys Solar PV Energy 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. |

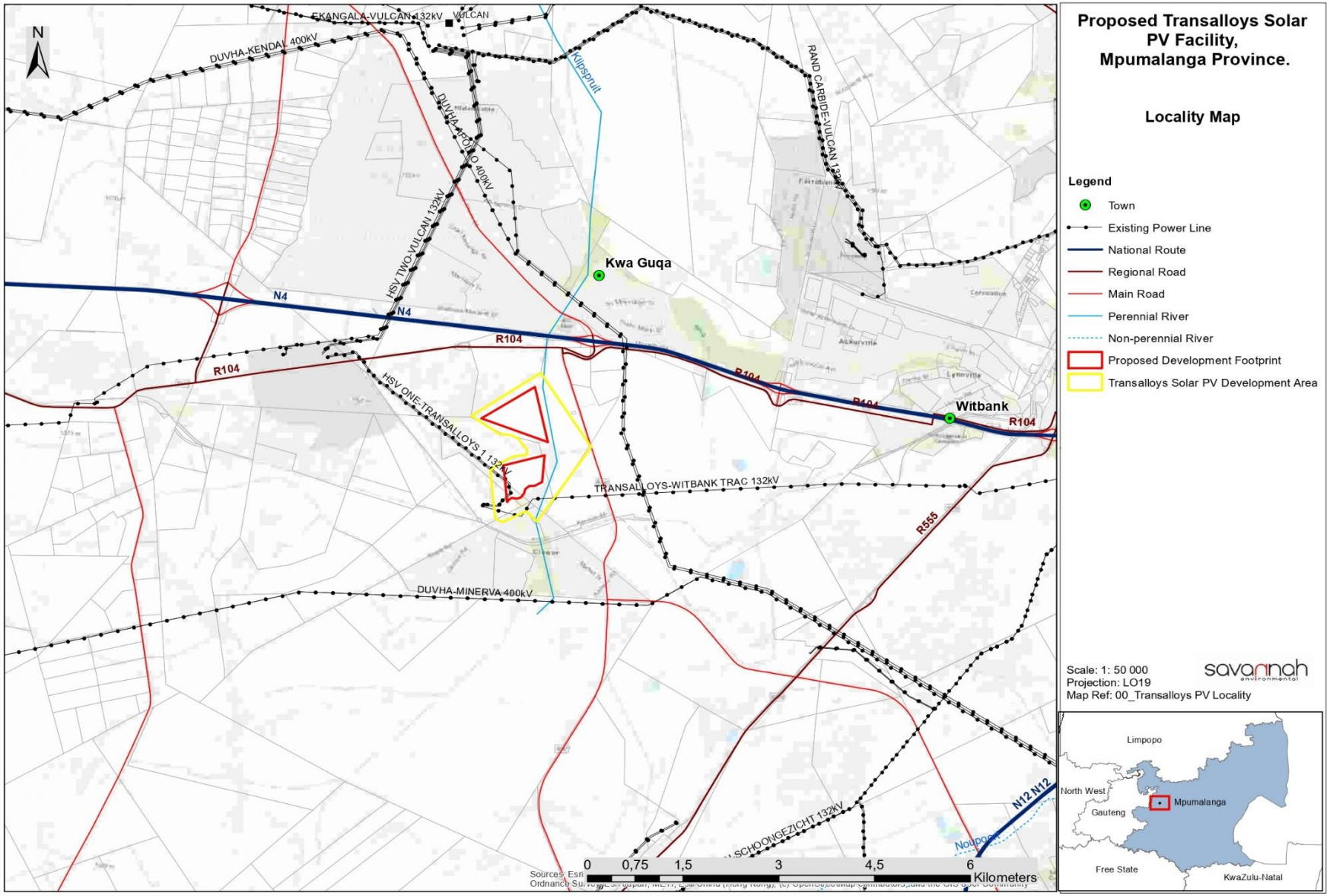



**Figure 1.1:** Locality map showing the location of the site in relation to the closest towns in the area

## 1.2 Project Overview

A development area of up to ~100ha and with a development footprint of up to ~67.9has been identified by Transalloys (Pty) Ltd for the establishment of the PV facility. The proposed facility will have a contracted capacity of up to 55MW and will include the following infrastructure:

- Solar PV array comprising PV modules and mounting structures (Bi-facial panels with single axis tracking are preferred over fixed-axis or double axis tracking systems, and mono-facial panels. However, the preferred panel technology will be confirmed during the final design phase.)
- Inverters and on-site transformers with total capacity up to 53MVA.
- Cabling between the project components.
- Underground 33kV power line to connect the solar PV facility to the existing Transalloys Substation
- Site control building and Site Security office, operations and control, and maintenance and storage laydown areas.
- Access roads and internal distribution roads.

To evacuate the generated power to Transalloys Smelter, a 33kV underground power line will be established to connect the on-site facility transformers to the existing Transalloys Substation. This proposed power line will run within the Transalloys property, parallel to the existing internal distribution roads.

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

**Table 1.1:** Detailed description of the Transalloys Solar PV Energy project site

| | |
|---|---|
| **Province** | Mpumalanga Province |
| **District Municipality** | Nkangala District Municipality |
| **Local Municipality** | Emalahleni Local Municipality |
| **Ward number(s)** | 29 |
| **Nearest town(s) (measured from the centre of the Development Area)** | eMalahleni previously known as Witbank (~8km east) Bronkhorstspruit (36 km west) |
| **Affected Properties: Farm name(s), number(s) and portion numbers** | Portions 20 and 24 of the farm Schoongezicht 308JS<br>Portions 34 and 35 of the farm Elandsfontein 309JS |
| **SG 21 Digit Code (s)** | Portion 20 of farm Schoongezicht 308JS - T0JS00000000030800020<br>Portion 24 of farm Schoongezicht 308JS - T0JS00000000030800024<br>Portion 34 farm Elandsfontein 309JS - T0JS00000000030900034<br>Portion 35 farm Elandsfontein 309JS - T0JS00000000030900035 |
| **Current zoning and Land Use** | Zoning: Mining/Industrial<br>Land Use: Agriculture (non-irrigated) |
| **Site co-ordinates (centre of development area)** | North Portion<br>Corner A: 25°52'52.53"S; 29°7'34.62"E<br>Corner B: 25°53'10.08"S; 29°7'5.80"E<br>Corner C: 25°53'20.73"S; 29°7'43.29"E<br><br>South Portion<br>Corner A: 25°53'34.25"S; 29°7'19.40"E<br>Corner B: 25°53'28.09"S; 29°7'41.88"E<br>Corner C: 25°53'42.04"S; 29°7'41.31"E<br>Corner D: 25°53'43.99"S; 29°7'37.54"E |

| | |
|---|---|
| | Corner E: 25°53'44.47"S; 29°7'34.21"E<br>Corner F: 25°53'46.32"S; 29°7'32.05"E<br>Corner G: 25°53'50.48"S; 29°7'30.01"E<br>Corner H: 25°53'51.34"S; 29°7'28.01"E<br>Corner I: 25°53'53.25"S; 29°7'22.31"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 PV 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, Transalloys (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 Transalloys Solar PV Energy Facility. Neither Savannah Environmental nor any of its specialists are subsidiaries of, or are affiliated with Transalloys (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.

- **Candy Mahlangu** is the principal author of this EIA Report and holds a BA Degree in Environmental Management. She has 6 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, environmental permitting and authorisations, compliance auditing, water use licensing, public participation, environmental education, and environmental management programmes.
- 
- **Jo-Anne Thomas** is the registered Environmental Assessment Practitioner for this project. She holds a Master of Science Degree in Botany (M.S.c Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP) and a registered Environmental Assessment Practitioner (EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/726). She has over 20 years of experience in the field of environmental assessment and management, and the management of large environmental assessment and management projects. During this time, she has managed and coordinated a multitude of large-scale infrastructure EIAs and is also well versed in the management and leadership of teams of specialist consultants, and dynamic stakeholders. She has

been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPrs, environmental policy, strategy and guideline formulation, and integrated environmental management (IEM). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.

» 

» **Bregardia Rabbie** is a Public Participation Consultant at Savannah Environmental. Bregardia has 6 years working experience in project management and coordinating public participation processes in the Telecommunication industry. She has good communication skills and utilizes this skill to manage interaction between National, Provincial and local authorities and the community. She is skilled at organising, managing and coordinating public participation and engagement projects effectively and timeously.

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:

| Specialist | Field of Study |
|---|---|
| Matthew Mamera, Michael Shrenk, Andrew Husted, Lindi Steyn and Ivan Baker of The Biodiversity Company | Avifauna<br>Ecology (including flora, fauna and avifauna)<br>Wetlands<br>Pedology (soils) |
| Jenna Lavin and Nicholas Wiltshire of CTS Heritage | Heritage (including archaeology and palaeontology) |
| Lourens du Plessis of LOGIS | Visual |
| Tony Barbour of Tony Barbour Environmental Consulting | Social |

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

# CHAPTER 2 : PROJECT DESCRIPTION

This chapter provides an overview of the Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility

The development of the Transalloys Solar PV Energy Facility and associated infrastructure will have a maximum capacity of up to 55MW to partially meet Transalloys' current electricity demands and future expansion requirements. The plant will be a captive generating plant from which generated electricity will be fed directly into the existing Transalloys' smelter complex for direct consumption. The development of the power plant project would effectively mean that Transalloys would become less dependent on the Eskom electricity grid, thereby creating additional capacity within the Eskom grid for use by other electricity users.

The project will make use of monofacial or bifacial panels with single-axis tracking 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 preferred panel technology will be confirmed during the final design phase.

### *2.2.1. Overview of the Project Site*

The project site is located in Emalahleni Local Municipality within the Nkangala District Municipality in the Mpumalanga Province. The preferred project site interlinks with four properties, namely, Portions 20 and 24 of the farm Schoongezicht 308JS and Portions 34 and 35 of the farm Elandsfontein 309JS. The development area within the project site is ~100ha in extent and the project will have a development footprint[5] of ~67.9ha.

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 and 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 route as indicated in **Figure 2.2** will be utilised for accessing the project site, development area and development footprint.

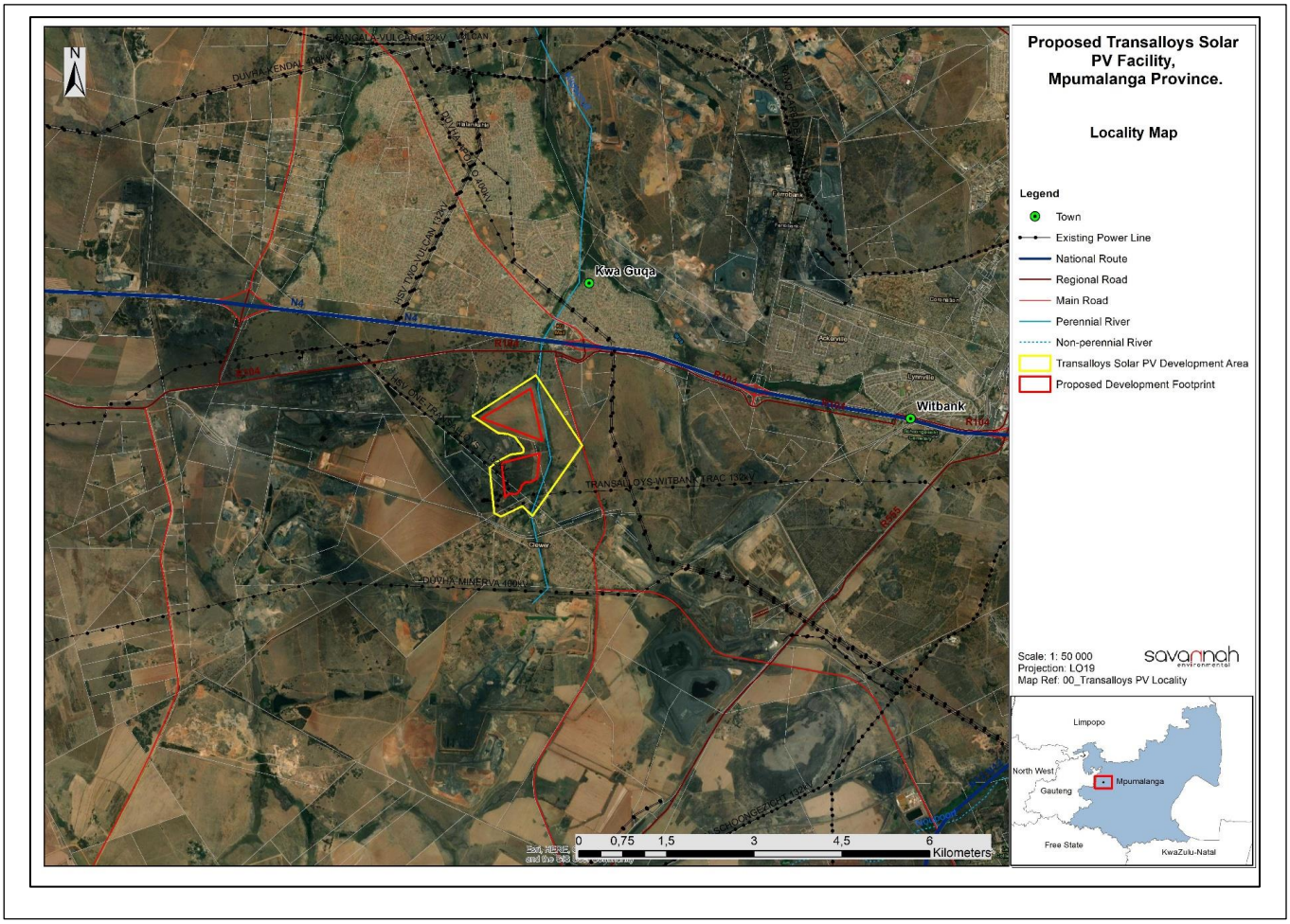



**Figure 2.1:** Location of the N17 national road, R546 and R580 regional roads in relation to the Transalloys Solar PV Energy Facility development area (shown in red).

5 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 solar facility.

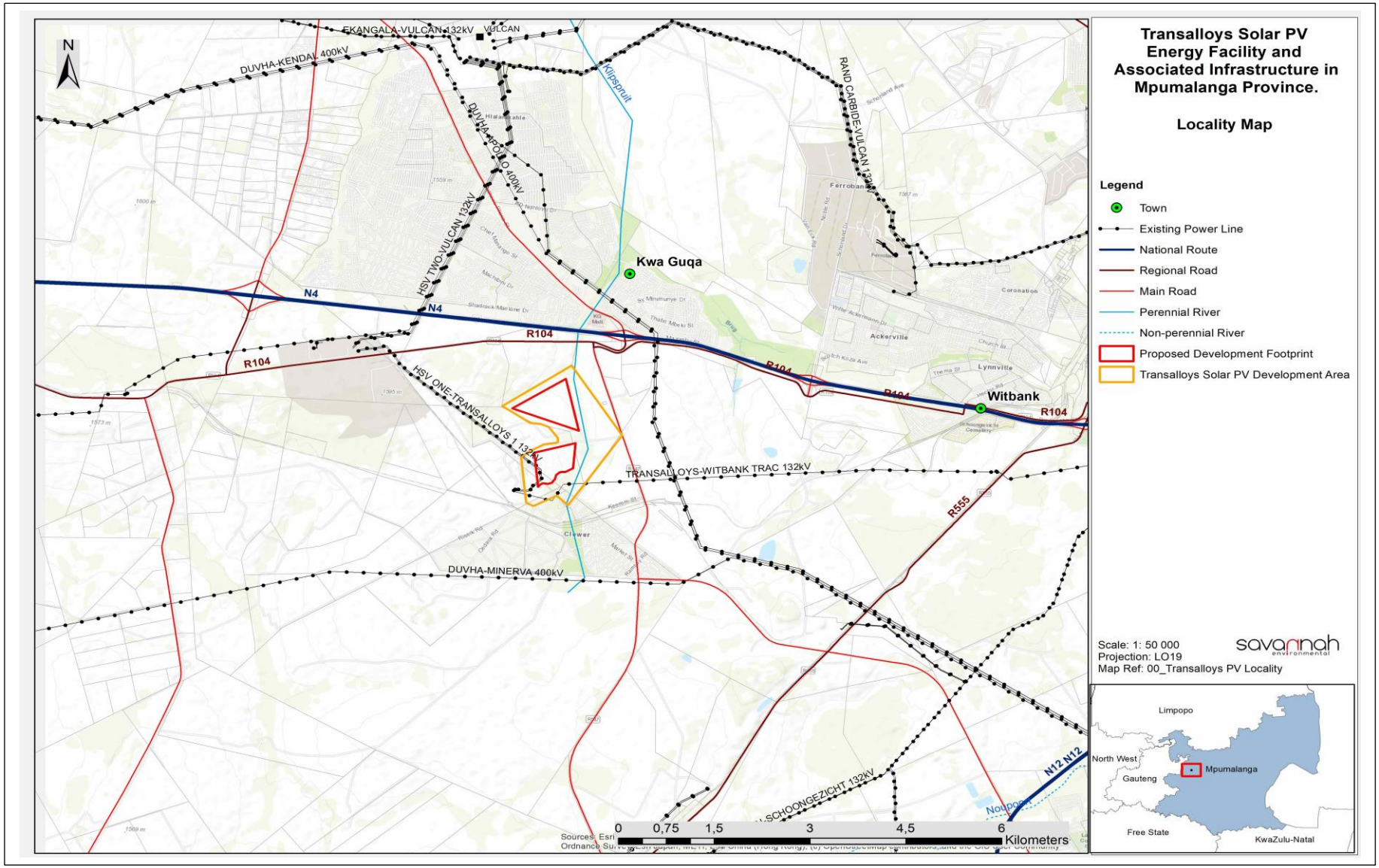



**Figure 2.2:** Proposed access route to the Transalloys Solar PV Energy Facility

### *2.2.2. Components of the Transalloys Solar PV Energy Facility*

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

- Solar PV array comprising PV modules and mounting structures (monofacial or bifacial and a single axis tracking system)
- Inverters and transformers
- Cabling between the project components
- On-site facility substation and a power line to connect the solar PV facility to the existing Transalloys Substation
- Security office, operations and control, and maintenance and storage laydown areas
- Access roads and internal distribution roads

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 Basic Assessment process. **Figure 2.3** illustrates the proposed development footprint of the Transalloys Solar PV Energy Facility assessed as part of this BA Report.

**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 Transalloys Solar PV Energy 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 | 49.280 MVA (AC)<br>52.807 MWp (DC) |
| Development area | ~ 100 |
| Development footprint (permanent infrastructure area) | ~ 67.9ha (48ha North, 19.9ha South) (including all associated infrastructure) |
| PV panels | » Bi-facial panels with single axis tracking are preferred over fixed-axis. The preferred panel technology will be confirmed during the final design phase.<br>» Height: ~2,8m from ground level (installed) |
| Number of Panels | » 96 013 x 550W Longi |
| Number of inverters and Height | » 154 x Sungrow SG350HX (Mounted at 1500mm) |
| Distribution transformer and height | » 5 x Sungrow MVS8960 (2896mm high)<br>» 1 x Sungrow MVS4480 (2806mm high) |
| Main transformer capacity | » Tie-In to existing substation |
| Capacity of on-site collector substation | Sungrow distribution transformers (MV stations complete with step-up transformers and RMUs) will be connected to Transalloys main substation at 33kV via a Ground Mounted Kiosk comprising of an auto recloser. |
| Grid connection | No grid connection. Facility will be connected directly to Transalloys |
| Length of the power line | c. 2500 m underground power line |
| Operating voltage of the power line | 33kV |
| Security booth, O&M building, workshop, storage area | 200m$^2$ |
| 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 length. |
| Underground cabling | Underground low-voltage cabling will be installed to connect the string inverters to the on-site transformers (MV stations) and the central inverters underground medium-voltage cables will connect these transformers directly to the smelter's substation. The MV cabling will be rated for the maximum current of the solar PV Facility including a safety factor and will operate 33kV. |


**Figure 2.3:** Development footprint (~67.9ha shown in blue) assessed within this BA Report for the Transalloys Solar PV Energy Facility

### *2.2.3 Project Development Phases associated with the Transalloys Solar PV Energy 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.<br>» Preparation of the site (e.g., laydown area).<br>» 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 DARDL&EA.<br>» Duration expected to be between 12 - 18 months for the Transalloys Solar PV Energy Facility.<br>» Create direct construction employment opportunities: Up to 40 jobs (at peak of construction) created and maintained for approximately 12 - 18 months.<br>» No on-site labour camps will be established. Employees to be accommodated in the nearby towns such as Emalahleni and transported to and from site on a daily basis.<br>» Overnight on-site worker presence would be limited to security staff.<br>» Security staff will also be present during the night-time of the construction phase.<br>» *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.<br>» *Sanitation* – during the construction phase, employees may be requested to utilise existing ablution facilities in close proximity to the PV Facility. Alternatively, mobile chemical toilets may be placed within the development area for use by contractors.<br>» *Electricity supply* - electricity required for construction activities will be generated by a generator or will be sourced from the existing Transalloys smelter complex.<br>» *Water supply* – Water will be sourced directly from the existing Transalloys smelter complex or from a registered water services provider such as the municipality. |
| **Activities to be undertaken** | |
| Establishment of access roads to the site | » An existing access road up to 8m in width and 50m in length will be utilised.<br>» Internal access roads up 6m wide will be established within the site at the commencement of construction. |

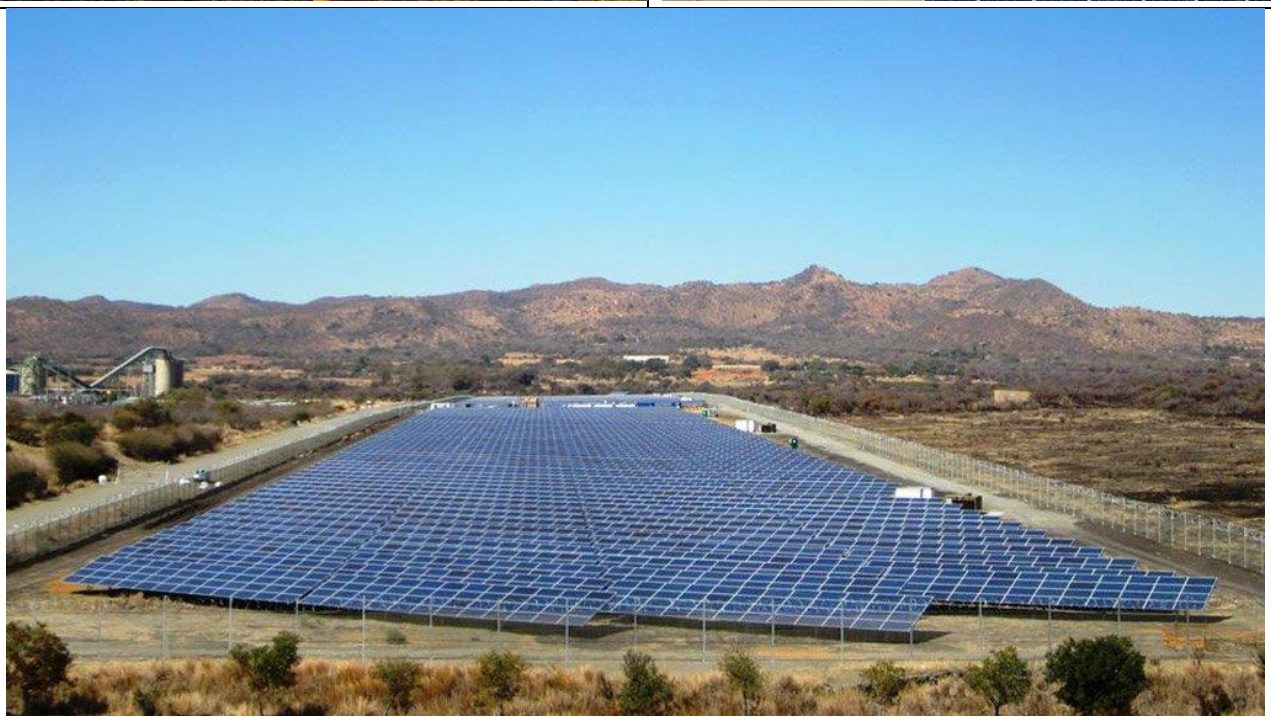
| | |
|---|---|
| Undertake site preparation | » Including the clearance of vegetation at the footprint of each support structure, establishment of a laydown area, the establishment of internal access roads and excavations for foundations.<br>» Stripping of topsoil to be stockpiled, backfilled, removed 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.<br>» 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. |
| Establishment of laydown areas | » A laydown area for the storage of project components, including the PV panels and civil engineering construction equipment.<br>» The laydown area will also accommodate building materials and equipment associated with the construction of buildings.<br>» No 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.<br>» 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.<br>» 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.<br>» 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.<br>» Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared.<br>» Wire harnesses connect the PV modules to the electrical collection systems. |
| Establishment of concrete platform and placement of the Ground Mounted Kiosk | » The Ground Mounted Kiosk will be assembled off-site and thereafter transported to site where it will be mounted on a concrete platform.<br>  |
| Establishment of ancillary infrastructure | » Operation and Maintenance buildings, including a security booth, workshop, storage area and site office.<br>» Establishment will require levelling and the excavation of foundations prior to construction. |

| | |
|---|---|
| Connection of PV facility to the Ground Mounted Kiosk | » Underground cables and overhead circuits connect the string inverters to the on-site AC electrical infrastructure (central inverter) and ultimately the project's Ground Mounted Kiosk.<br>» Excavation of trenches are required for the installation of the cables. Trenches will be approximately 1.2m deep.<br>» Underground cables are planned to follow the internal access roads, as far as possible. |
| Undertake site rehabilitation | » Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed.<br>» 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 20 years, or longer depending on the need for the project.<br>» Requirements for security and maintenance of the facility.<br>» Employment opportunities relating mainly to operation activities and maintenance. Up to 20 (full-time and temporary) employment opportunities will be available.<br>» *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.<br>» *Sanitation* – during the operation phase, employees may be requested to utilise existing ablution facilities at the existing Transalloys smelter complex. Alternatively, mobile chemical toilets may be utilised. The sewage generated over this period will be collected and treated as per normal standards using a septic or conservancy tanks. 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.<br>» *Water supply* – water will be required for the operation phase, for cleaning, fire control and general usage. Water will be sourced directly from the existing Transalloys smelter complex.<br>» 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.<br>» Transalloys Solar PV Energy Facility will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities.<br>» Transalloys Solar PV Energy Facility to be subject to periodic maintenance and inspection.<br>» Disposal of waste products (e.g., oil, broken panels, etc.) in accordance with relevant waste management legislation.<br>» Areas which were disturbed during the construction phase to be utilised should a laydown area be required during operation.<br>» 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 Transalloys Solar PV Energy Facility infrastructure at the end of its economic life.<br>» Expected lifespan of up to 20 years (with maintenance) before decommissioning is required.<br>» 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.<br>» Preparation of the site (e.g., laydown area and construction platform).<br>» Mobilisation of equipment required for decommissioning. |
| Disconnect, disassemble, and remove solar facility components | » Disconnect the facility from the grid.<br>» Dismantle all panels, mounting structures and foundations in line with all relevant legislation.<br>» Recycle, repurpose and re-use as much of the decommissioned project components as possible in accordance with regulatory requirements.<br>» Concrete foundations will be removed to a depth as defined by an agricultural specialist.<br>» Backfill the mounting structure holes and rehabilitate the area appropriately.<br>» Visible cables will be removed.<br>» A final site walkthrough will be conducted to remove debris and/or waste generated within the site during the decommissioning process.<br>» 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 be rehabilitated once the Transalloys Solar PV Energy Facility has reached the end of its economic life and all infrastructure has been decommissioned, and the site used for the same purposes as the remainder of the Transalloys site.

**Table 2.3:** Photographs of the construction phase of a solar facility similar to the Transalloys Solar PV Facility



# CHAPTER 3 : ALTERNATIVES

This chapter describes the preferred site location, activity, and technology alternatives as well as the 'do nothing' option for the Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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 investigation, 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 Guideline 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 Transalloys Solar PV Energy Facility, with maximum capacity of up to 55MW, and associated infrastructure. The Solar PV facility is proposed in order to meet Transalloys' current electricity demands and future expansion requirements. The plant will be a captive generating plant whereby generated electricity will be fed directly into the smelter complex for direct consumption. The development of the power plant project would effectively mean that Transalloys would become less

dependent on the Eskom electricity grid, thereby creating additional capacity within the Eskom grid for use by other electricity users.

### *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)[6], 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 Integrated Resource Plan (IRP) includes provision for distributed generation capacity for own use. Project developers for distributed generation plants are exempted from applying for a license regardless of the capacity of the facility but are required to register with the National Energy Regulator of South Africa (NERSA) and comply with the relevant grid code(s).

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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility

### *3.3.1 Property or Location Alternatives*

The proposed Transalloys Solar PV Energy Facility site is located on Portions 34 and 35 of the Farm Elandsfontein 309 JS and Portions 20 and 24 of the Farm Schoongezicht 308JS, in the Emalahleni Local

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

Municipality, which forms part of Nkangala District Municipality in the Mpumalanga Province. The preferred project site has been identified for the development of the project as it is adjacent to the existing Transalloys' smelter complex and meets the required site-specific characteristics such as the solar resource, land availability, topographical considerations, and environmental features. The project site is ~235ha in extent, which is considered to be sufficient for the development of a solar facility with a maximum capacity of up to 55MW. A development area of ~100ha has been identified by the proponent within the project site for the development. A development footprint of up to ~67.9ha within this development area has been assessed as part of the BA process.

Transalloys (Pty) Ltd considers the preferred property and site location as being highly favourable and suitable from a technical perspective to establish a solar PV Energy 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) in Mpumalanga ranges between a daily long-term average of 4.8kWh/$m^2$ and 5.6kWh/$m^2$. Approximately 2 576 hours of sunshine are counted in Mpumalanga throughout the year (refer to **Figure 3.1**). This is considered feasible for the development of a solar PV facility. Based on the solar resource available, the site is considered feasible for the establishment of the proposed project.

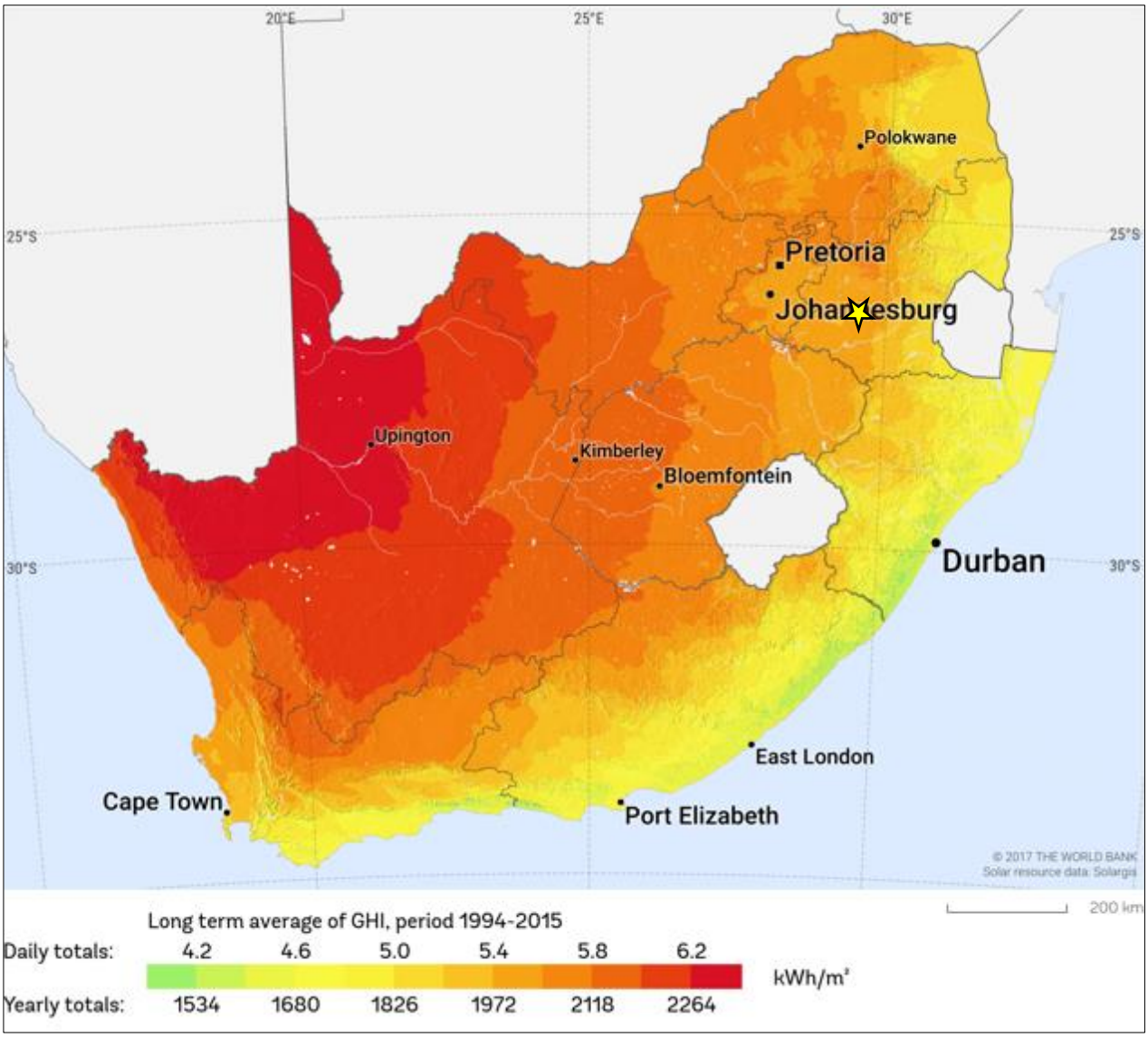



**Figure 3.1:** Solar irradiation map for South Africa; the position of the proposed Transalloys Solar PV Energy Facility is shown by the yellow star on the map (©2020 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis)

» **Geographical Location** – The development area is located on land owned by Transalloys, directly adjacent to the existing Transalloys smelter complex, which will be the exclusive user of the generated power. The site is therefore preferred for development of the proposed PV facility. No other location alternatives are considered for the development.

» **Topography:** The topographical profile of most the development area is characterised by a slope percentage between 0 and 10%, with some smaller patches characterised by a slope percentage ranging from 10 to 28%. The development area has a non-uniform topography in scattered areas and the majority of the area is characterised by a gentle slope. 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.

» **Land Availability and Suitability** – In order to develop the Transalloys Solar PV Energy Facility with a maximum capacity of up to 55MW and a development footprint of ~67.9ha, sufficient space is required. The preferred project site was identified within the Mpumalanga Province and in the Emalahleni area following confirmation of a feasible solar resource. The affected property is owned by the applicant and is deemed to be technically feasible for such development to take place.

» **Renewable Energy Development Zone (REDZ)**- The proposed development is located in the Emalahleni REDZ, one of 11 zones designated by the DFFE through a Strategic Environmental Assessment (SEA) process as being focus areas for the development of commercial-scale wind and solar PV facilities. The proposed PV facility therefore falls within the identified geographical areas / focus area most suitable for the rollout of the development of solar energy projects within the Mpumalanga Province.

» **Environmental Screening and consideration of sensitive environmental features** – The site was previously subjected to an EIA process for the development of a coal-fired power plant[7]. Through this assessment process, specialist investigations were undertaken, and sensitive features identified. This sensitivity spatial data was considered by Transalloys (Pty) Ltd in optimising the facility layout to avoid areas and features of high environmental sensitivity.

Based on the above site-specific attributes and considerations, the development area was identified by Transalloys (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 Environmental Authorisation. As a result, no feasible alternative properties or locations were identified for assessment as part of this BA process.

### *3.3.2 Layout Alternatives*

The layout optimisation process applied by the developer as detailed in Section 3.3.1 above demonstrates due consideration of the suitability of the project site for the Transalloys Solar PV Energy 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 layout development process, 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).

[7] The EA (DFFE Reference number 14/12/16/3/3/3/97) for the coal-fired power station was issued on 02/03/2016

### *3.3.3 Activity Alternatives*

Transalloys (Pty) Ltd has identified the need to become less dependent on the Eskom electricity grid. Reliable and cost-effective energy, sourced and generated through private or internal arrangements eliminates the possibility of unexpected power outages and unreliable energy supply. The additional energy supply helps reduce the burden on the national grid and reduces the need for energy management alternatives such as Load shedding. Power generation is therefore the only activity considered for implementation on the identified site.

### *3.2.3 Technology Alternatives*

As mentioned above, the site has previously been assessed for a coal-fired power station, for which an EA was issued in 2016. Due to various considerations, including economic and environmental factors, Transalloys (Pty) Ltd is now investigating the development of a renewable energy facility as the preferred power supply technology solution.

As the applicant is investigating the development of a renewable energy facility as the preferred power supply technology solution, no other technology alternatives are proposed. The project site lacks sufficient wind resource suitable for the development of a wind farm. The Integrated Resource Plan (IRP) 2019, excludes the procurement of power from CSP facilities until 2030. 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. 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.

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 during the final design phase of the project. 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.

### *3.2.4 The 'do-nothing' Alternative*

The 'do-nothing' alternative is the option of by Transalloys (Pty) Ltd not constructing the Transalloys Solar PV Energy 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 preferred project site. The opportunities associated with the development of the solar facility for supply of energy to Transalloys will not be realised. This alternative is assessed 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.

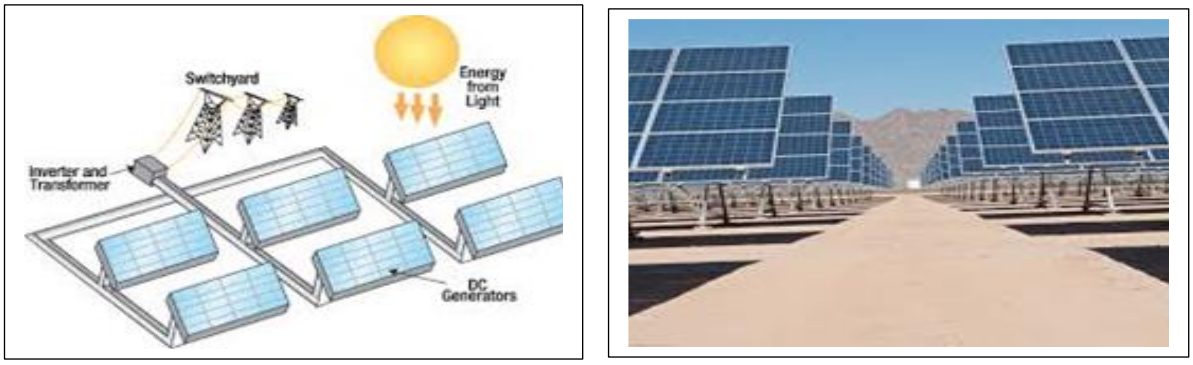



**Figure 4.1:** Overview of a PV cell, module, and array / panel (Source: pveducation.com)

**Inverters**

Inverters are used to convert electricity produced by the PV panels from DC into AC, to enable the facility to be connected to the national electricity grid. In order to connect a large solar facility such as the one being proposed to the national electricity grid, 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.

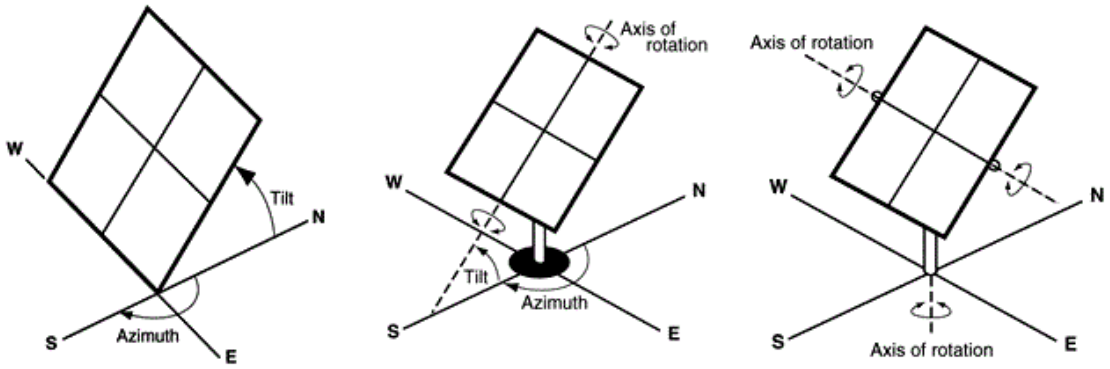



**Figure 4.2:** Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and double-axis tracking (Source: pveducation.com))

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

### *4.1.1. Bifacial Solar Panel Technology*

Transalloys (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.

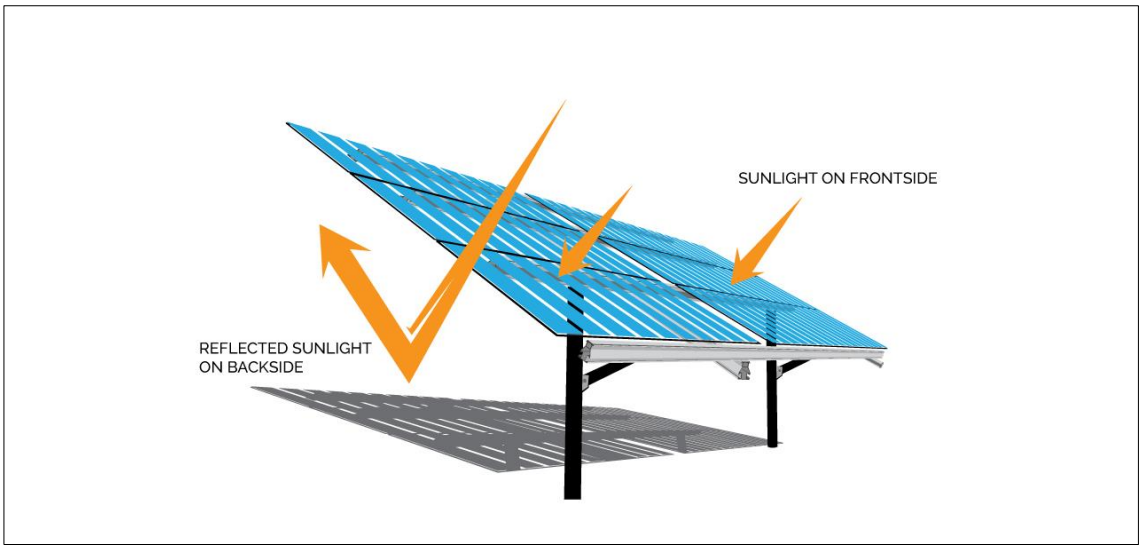



**Figure 4.3:** Diagram showing how bifacial Solar PV panels work (Source: https://sinovoltaics.com/learning-center/solar-cells/bifacial-solar-modules/)

# 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 Transalloys Solar PV Energy 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 5.7** and provides a description of the need and desirability of the Transalloys Solar PV Energy 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(1)(e) a description of the policy and legislative context within which the development is proposed including-<br><br>(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.<br>(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 Transalloys Solar PV Energy Facility is proposed is included and considered within Sections 5.2 to 5.6. |
| 3(1)(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 Transalloys Solar PV Energy Facility is included and discussed in Section 5.7. The need and desirability for the development of the facility has been considered from an international, national, regional, and site-specific perspective. |

## 5.2 Strategic Electricity Planning in South Africa

The need to expand electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the Department of Mineral Resources and Energy (DMRE). The policies or plans that have relevance to the development of the project are discussed in more detail in the following sections. Although the Solar PV Energy Facility is proposed for use by Transalloys, it is still important to demonstrate how this proposed project fits within this policy framework.

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project of this nature consists of three tiers of

authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels.

At **National Level**, the main regulatory agencies are:

- **National Energy Regulator of South Africa (NERSA):** NERSA is responsible for regulating all aspects of the electricity sector and will ultimately issue licenses for projects to generate electricity. Schedule 2 of the Electricity Regulation Act provides for exemptions from the obligation in the Act to apply for (and hold) a licence from the National Energy Regulator (NERSA). Project developers for distributed generation plants are exempted from applying for a license but are required to register with NERSA and comply with the relevant grid code(s).
- **Department of Forestry, Fisheries and the Environment (DFFE):** This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations, 2014 (GN R326) as amended. The DFFE is also responsible for issuing permits for impacts on protected trees and protected species under the National Environmental Management: Biodiversity Act (NEM: BA).
- **The South African Heritage Resources Agency (SAHRA):** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- **South African National Roads Agency Limited (SANRAL):** This Agency is responsible for the regulation and maintenance of all national road routes.
- **Department of Water and Sanitation (DWS):** This Department is responsible for effective and efficient water resources management to ensure sustainable economic and social development. This Department is also responsible for evaluating and issuing licenses pertaining to water use (i.e., Water Use Licenses (WUL) and General Authorisation).
- **The Department of Agriculture, Rural Development and Land Reform (DARDLR):** This Department is the custodian of South Africa's agricultural resources and is primarily responsible for the formulation and implementation of policies governing the agriculture sector. Furthermore, the Department is also responsible for issuing permits for the disturbance or destruction of protected tree species listed under Section 15 (1) of the National Forest Act (No. 84 of 1998) (NFA).

At **Provincial Level**, the main regulatory agencies are:

- **Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDL&EA)** is the CA for the project and is also responsible for issuing any biodiversity and conservation-related permits. According to the Explanatory Document for Government Notice No. 779 published in Government Gazette No. 40110 dated 01 July 2016, if the project developer will not, or does not, intend to participate in any of the Integrated Resource Plan programmes (IRP), the CA will be the Member of the Executive Council (MEC) responsible for environmental affairs in the respective province, unless another sub-section of section 24C of NEMA specifies the Minister to be the CA. Since the purpose of the Project is to generate power for use by Transalloys, DARDL&EA has been determined as the CA.
- **Mpumalanga Department of Public Works and Roads (MDPWR)** is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
- **Mpumalanga Provincial Heritage Resources Agency (MPHRA)** is responsible for the identification, conservation, and management of heritage resources, as well as commenting on heritage related issues within the province.

» **Mpumalanga Department of Community Safety and Transport Management (MDCSTM)** provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.

At the **Local Level,** the local and district municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. Both the local and district municipalities play a role. The local municipality includes the **Emalahleni Local Municipality** which forms part of the **Nkangala District Municipality**. In terms of the Municipal Systems Act (No. 32 of 2000), it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

### 5.3 International Policy and Planning Context

A brief review of international policies relevant to the establishment of the Transalloys Solar PV Energy Facility is provided below in **Table 5.1**. The Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility

| Relevant policy | Relevance to the Transalloys Solar PV Energy Facility |
|---|---|
| United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP) | 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 implementation of the Convention and any related legal instruments and takes decisions to promote the effective implementation of the Convention.<br><br>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.<br><br>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.<br><br>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.<br><br>The policy provides support for the Transalloys Solar PV Energy Facility which will contribute to managing climate change impacts and assist in reducing GHG emissions in a sustainable manner. |
| The Equator Principles IV (October 2020) | The Equator Principles (EPs) IV 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 |

| Relevant policy | Relevance to the Transalloys Solar PV Energy Facility |
|---|---|
| | practices. The EPs are applicable to infrastructure projects (such as the Transalloys Solar PV Energy Facility) and apply globally to all industry sectors.<br><br>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 Transalloys Solar PV Energy 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.<br><br>The Transalloys Solar PV Energy 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 Social Sustainability (January 2012) | 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.<br><br>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.<br><br>Given the nature of the Transalloys Solar PV Energy 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).<br><br>• Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts<br>• Performance Standard 2: Labour and Working Conditions<br>• Performance Standard 3: Resource Efficiency and Pollution Prevention<br>• Performance Standard 4: Community Health, Safety and Security<br>• ~~Performance Standard 5: Land Acquisition and Involuntary Resettlement~~ - N/A<br>• Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources<br>• ~~Performance Standard 7: Indigenous Peoples~~ - N/A<br>• Performance Standard 8: Cultural Heritage |

## 5.4 5.4 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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| Constitution of the Republic of South Africa, 1996 | Section 24 of the Constitution pertains specifically to the environment. It 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.<br><br>The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health, or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts. The undertaking of an EIA process for the proposed project in terms of the requirements of the EIA Regulations, 2014 (as amended) aims to minimise any impacts on the natural and social environment. |
| National Environmental Management Act (No. 107 of 1998) (NEMA) | This piece of legislation is South Africa's key piece of environmental legislation and sets the framework for environmental management in South Africa. NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights.<br><br>The national environmental management principles state that the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.<br><br>The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA. The Project 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). Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed. |
| 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.<br><br>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 unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future. |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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| 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.<br><br>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. |
| The Electricity Regulation Act (No. of 2006) | The Electricity Regulation Act of 2006, replaced the Electricity Act (No. 41 of 1987), as amended, except for Section 5B, which provides funds for the energy regulator for the purpose of regulating the electricity industry. The Act establishes a national regulatory framework for the electricity supply industry and introduces the National Energy Regulator (NERSA) as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which the generation, transmission, distribution, trading, and import and export of electricity are regulated. Schedule 2 of the Electricity Regulation Act provides for exemptions from the obligation in the Act to apply for (and hold) a licence from National Energy Regulator (NERSA). In terms of this schedule, the threshold for distributed generation was removed in December 2022. Project developers proposing distributed generation projects are exempted from applying for a license but are required to register with NERSA and comply with the relevant grid code(s). |
| 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.<br><br>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:<br><br>» 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.<br>» Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.<br>» Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change.<br><br>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. |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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| | The NDP aims to provide a supportive environment for growth and development, while promoting a more labour-absorbing economy. The development of Transalloys Solar PV Energy 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:<br><br>» To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector.<br>» 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).<br>» To guide investment in and the development of energy infrastructure in South Africa.<br>» 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.<br><br>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.<br><br>The 8 key objectives of the integrated energy planning process are as follows:<br><br>» Objective 1: Ensure security of supply.<br>» Objective 2: Minimise the cost of energy.<br>» Objective 3: Promote the creation of jobs and localisation.<br>» Objective 4: Minimise negative environmental impacts from the energy sector.<br>» Objective 5: Promote the conservation of water.<br>» Objective 6: Diversify supply sources and primary sources of energy.<br>» Objective 7: Promote energy efficiency in the economy.<br>» Objective 8: Increase access to modern energy. |
| Integrated Resource Plan for Electricity (IRP) 2010-2030 | The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 is a subset of the IEP and constitutes South Africa's National electricity plan. The primary objective of the IRP is to determine the long-term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing, and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation.<br><br>The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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| | development. The need for a Just Transition to a sustainable, low carbon and equitable energy system is also recognised.<br><br>Following the promulgation of the IRP 2010–2030, implementation followed in line with Ministerial Determinations issued under Section 34 of the Electricity Regulation (Act No. 4) of 2006. The Ministerial Determinations give effect to planned infrastructure by facilitating the procurement of the required electricity capacity.<br><br>Provision has been made for the following new capacity by 2030 in the current IRP:<br>» 1 500MW of coal<br>» 2 500MW of hydro<br>» 6 000MW of solar PV<br>» 14 400MW of wind<br>» 1 860MW of nuclear<br>» 2 088MW of storage<br>» 3 000MW of gas/diesel<br>» 4 000MW from other distributed generation, co-generation, biomass and landfill technologies<br><br>Of relevance to the proposed project is the provision for distributed generation capacity for own use. Therefore, the development of the project is supported by the IRP 2019. |
| 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.<br><br>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.<br><br>The Transalloys Solar PV Energy Facility is a renewable energy facility and would not result in the generation or release of emissions during its operation. |
| 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.<br><br>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 |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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| | 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.<br><br>The development of the Transalloys Solar PV Energy 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.<br><br>A number of principles and factors guided the conception of the strategy and are required to be implemented. These are:<br><br>» 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.<br>» Ensuring alignment with the need to consistently use locally available resources.<br>» Ensuring compliance with international obligations.<br>» 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.<br>» Focussing on those areas that promote sustainable development.<br>» Promoting programmes that will build capacity, raise awareness, and improve education in climate change issues.<br>» Encouraging programmes that will harness existing national technological competencies.<br>» Reviewing the strategy constantly in the light of national priorities and international trends.<br>» Recognizing that South Africa's emissions will continue to increase as development is realised.<br><br>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 |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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| | developing country. This will ensure that the principles of sustainable development are adequately served and do not conflict with existing development policies. |
| Strategic Environmental Assessment (SEA) for Wind and Solar PV energy in South Africa | The Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa (CSIR, 2015) identified eight (8) Renewable Energy Development Zones (REDZs) (Phase 1 REDZs). The REDZs identified areas where large scale wind energy facilities can be developed in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country. On 17 February 2016, the Cabinet of the Republic of South Africa (Cabinet) approved the gazetting of Renewable Energy Development Zones (REDZs). 8 REDZs and 5 Power Corridors have been identified. On 26 February 2021, Minister Barbara Dallas Creecy, published Government Notice No. 142, 144 and 145 in Government Gazette No. 44191 which identified 3 additional REDZs (Phase 2 REDZs) for implementation as well as the procedures to be followed when applying for environmental authorisation for electricity transmission or distribution infrastructure or large-scale wind and solar photovoltaic energy facilities in these REDZs. The total number of REDZ is therefore 11. The proposed Transalloys PV Solar Energy Facility is located within the Emalahleni REDZ. |
| National Biodiversity Economy Strategy (NBES) (March 2016) | The biodiversity economy of South Africa encompasses the businesses and economic activities that either directly depend on biodiversity for their core business or that contribute to conservation of biodiversity through their activities. The commercial wildlife and the bioprospecting industries of South Africa provide cornerstones for the biodiversity economy and are the focus of this strategy.<br><br>Both the wildlife and bioprospecting sub-sectors of the biodiversity economy have already demonstrated the potential for significant future development and growth. In the study commissioned on the situational analysis of the biodiversity economy, the contribution of the biodiversity economy to the national economy can be measured in terms of Gross Domestic Product (GDP), with the wildlife and bioprospecting industries contributing approximately R3 billion to GDP in 2013. Growth in the wildlife and bioprospecting industries can make a significant impact on the national economy, while contributing to national imperatives such as job creation, rural development and conservation of our natural resources.<br><br>The Wildlife Industry value chain is centred on game and wildlife farming/ranching activities that relate to the stocking, trading, breeding, and hunting of game, and all the services and goods required to support this value chain. The key drivers of this value chain include domestic hunters, international hunters and a growing retail market demand for wildlife products such as game meat and taxidermy products. This sector is therefore characterised by an interesting combination of agriculture, eco-tourism and conservation characteristics.<br><br>Over the period 2008-2013, the total Wildlife Industry market grew by more than 14% per year. This growth comprised an average annual growth exceeding 6% in domestic hunting, a decrease in international hunting, and an exponential growth in live auction sales. It is considered likely that the consolidated Wildlife Industry has the potential to experience a weighted average annual growth rate of between 4 %-14 % per year up to 2030.<br><br>In order for the wildlife and bioprospecting sub-sectors of the biodiversity economy to achieve its full potential, a strategic partnership between the state, private sector and communities is required. To this end, a National Biodiversity Economy Strategy (NBES) is required to guide the sustainable growth of the wildlife and bioprospecting industries and to provide a basis for addressing constraints to growth, ensuring sustainability, identifying clear stakeholder's responsibilities and monitoring progress of the Enabling Actions. |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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| | The Vision of NBES is to optimise the total economic benefits of the wildlife and bioprospecting industries through its sustainable use, in line with the Vision of the Department of Environmental Affairs. The purpose of NBES is to provide a 14-year national coordination, leadership and guidance to the development and growth of the biodiversity economy.<br><br>NBES has set an industry growth goal stating that by 2030, the South African biodiversity economy will achieve an average annualised GDP growth rate of 10% per annum. This envisioned growth curve extends into the year 2030 and is aligned to the efforts of the country's National Development Plan, Vision 2030. The NBES seeks to contribute to the transformation of the biodiversity economy in South Africa through inclusive economic opportunities, reflected by a sector which is equitable - equitable access to resources, equitable and fair processes and procedures and equitable in distribution of resources (i.e., business, human, financial, indigenous species, land, water) in the market.<br><br>To address these transformation NBES imperatives, NBES has the principles of:<br><br>» Conservation of biodiversity and ecological infrastructure<br>» Sustainable use of indigenous resources<br>» Fair and equitable beneficiation<br>» Socio-economic sustainability<br>» Incentive driven compliance to regulation<br>» Ethical practices<br>» Improving quality and standards of products.<br><br>The NBES provides the opportunity to redistribute South Africa's indigenous biological/ genetic resources in an equitable manner, across various income categories and settlement areas of the country. The NBES has prioritised nodes in the country for biodiversity economy transformation (BET), referred to as BET nodes. NBES prioritises 18 BET nodes, 13 rural and 5 urban districts across the nine provinces of the country, with communities having been prioritised for development of small and medium size enterprises and community-based initiatives which sustainably use of indigenous biological and/or genetic resources. The municipalities within which the project is proposed is not identified as a priority area. |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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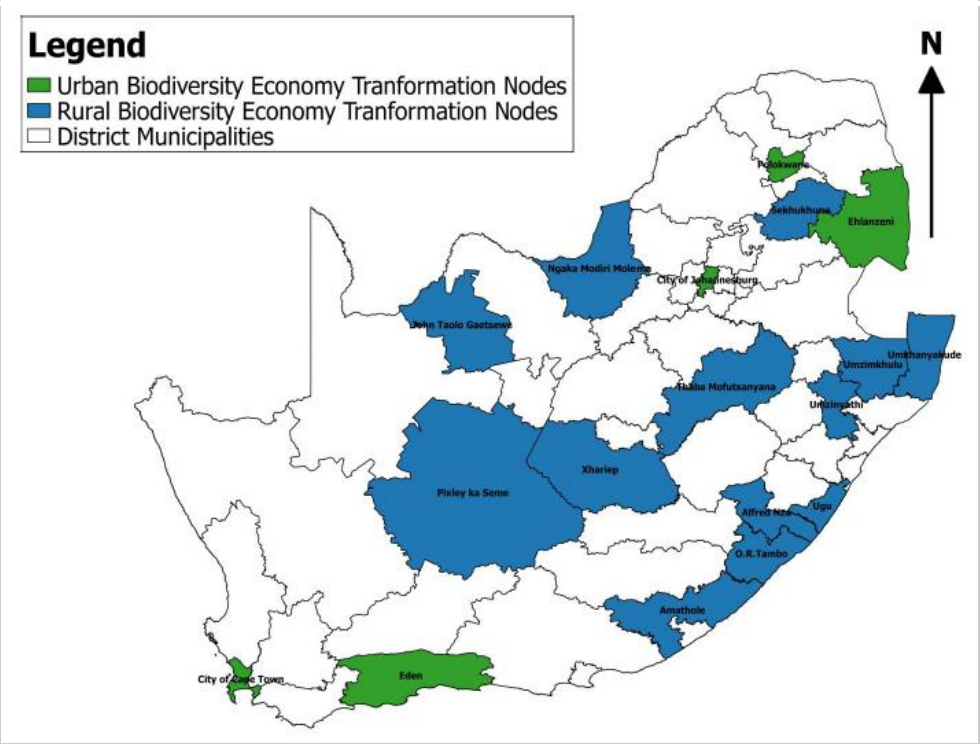
| |  |

### 5.5 5.5 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.

**Table 5.3:** Provincial policies relevant to the Transalloys Solar PV Energy Facility

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy 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. |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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| | 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 Transalloys Solar PV Energy Facility are key drivers 1 to 6 as the development of the facility will promote economic development and job creation. |
| 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.<br><br>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.<br><br>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.<br><br>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*.<br><br>Strategic requirements which need to be addressed include the following:<br><br>» Harnessing the opportunities provided by urbanisation forces to achieve effective rural development.<br>» Adopting a flexible approach which suits the province and enables sustainable development rather than inhibits growth and development.<br>» Creating world class infrastructure, services and amenities to attract investment. |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
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| | » Integrated infrastructure development planning responding to long term forecasted requirements.<br>» Pro-active planning which integrates aspiring economic activities into the mainstream economies and urban fabric.<br>» Safeguarding existing resources and creating opportunities for renewable energy development.<br>» Consensus on where to develop and not develop the province.<br>» Connecting the spatial frameworks to catalytic programmes of the Mpumalanga Implementation Framework and Plan.<br>» Creating opportunities for increased international, national, provincial and municipal connectivity, linked by strategic transportation routes in the province.<br>» Achieving improved quality of life in our settlements through formalisation, provision of planned amenities and consolidation of land uses.<br>» Gearing up of spatial planning capacity, skills, systems, and procedures to achieve the vision.<br><br>The development of Transalloys Solar PV Energy 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.<br><br>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.<br><br>According to the Mpumalanga Biodiversity Sector Plan, the project area overlaps with a heavily modified area. |

### 5.6 5.6 Local Policy and Planning Context

The local tiers of government within which the Transalloys Solar PV Energy Facility is located is the Emalahleni Local Municipality which falls within the jurisdiction of the Nkangala 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 Transalloys Solar PV Energy Facility. These include, economic growth, job creation, community upliftment and poverty alleviation.

**Table 5.4:** Local policies relevant to the Transalloys Solar PV Energy Facility

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
|---|---|
| Emalahleni Municipality Integrated Development Plan (IDP) (2017 – 202) | The vision of the Emalahleni Local Municipality (ELM) is "To be a centre of excellence and innovation" Emalahleni "The energy heartbeat of Southern Africa and economic hub of Mpumalanga". Linked to the vision is the mission statement, which is "Empowerment of our communities and providing innovative and excellent service that is conducive for sustainable economic development and social transformation".<br><br>The IDP lists the top five goals of the ELM, of which socio-economic growth and a safe environment is the most relevant to the proposed development. The IDP also identifies 6 KPAs, of which the KPA 3, Local Economic Development, and KPA 6, Spatial and Cross Cutting Issues, are the most relevant for the proposed Transalloys Solar PV Energy Facility.<br>**Local economic development**<br><br>In terms promoting economic development the ELM adopted a 5-year Local Economic Development (LED) strategic framework in 2011/12. The purpose of the LED strategy is to develop the economic capacity of the local area to improve its economic future for the benefit of all residents. Of relevance to the project the LED strategy seeks to:<br><br>» Assess the local economy in the context of sectoral growth and challenges.<br>» Identify LED opportunities and development initiatives to be implemented by key stakeholders and role players.<br>» Identify LED programmes and projects to uplift local communities.<br>» Promote SMMEs.<br><br>The municipality has a comparative advantage in the following sectors:<br><br>» Mining.<br>» Manufacturing.<br>» Utilities.<br><br>In terms of challenges, the IDP notes that shortage of energy due to Eskom electricity creates challenges for local businesses and economic development. The lack of manufacturing incubation hubs, training as well as coaching and mentoring programmes are also identified as a challenge. The proposed Transalloys Solar PV Energy Facility can assist to address these two challenges.<br><br>**Spatial and cross cutting issues**<br><br>The IDP notes that the ELM strategically located within the Mpumalanga provincial context as it serves the function of a gateway municipality and town into the province for eight of the nine provinces of South Africa. Its proximity to the Johannesburg, Ekurhuleni and the Tshwane Metropolitan Municipalities, which jointly constituted the largest economy in the country serve the municipality favourably. |
| Emalahleni Municipality Spatial Development Framework (SDF) (2014) | In terms of spatial or cross cutting issues the Emalahleni Spatial Development Framework lists four strategic objectives, namely: |

| Relevant legislation or policy | Relevance to the Transalloys Solar PV Energy Facility |
|---|---|
| | » Strategic Objective 1: To enhance the sustainability of the area by way of protection, management, and enhancement of the natural environmental resources of the Municipality.<br>» Strategic Objective 2: To improve spatial efficiency, justice, and sustainability by consolidating urbanisation around existing nodes and corridors and within an urban development boundary.<br>» Strategic Objective 3: To maintain/enhance connectivity between the identified activity nodes, and with surrounding regional towns and activity areas.<br>» Strategic Objective 4: To build a diverse, efficient, and resilient local economy and to optimise the spatial distribution of conflicting economic sectors.<br><br>Strategic objective 4 is the most relevant to the proposed development. In this regard the SDF notes that area to the south of the N12 freeway hosts a combination of mining activity, power stations and extensive agricultural use (mostly crop farming). The mining areas host South Africa's key coal reserves and important power stations, including Kendal, Matla, Duvha and Kriel. The mining belt also extends northward towards Emalahleni City. This area is thus characterised by conflicting demand between mining, electricity generation and agriculture. The SDF notes that the primary objective should be to prevent mining activity from encroaching onto high potential agricultural land and areas of high biodiversity; and to ensure that the areas of mining activity are properly rehabilitated and that the agricultural value of the land be restored once the mineral resources are depleted.<br><br>Strategic Objective 4 also notes that the industrial and manufacturing activities within the ELM should be strongly supported. Spatially, the SDF recommends that the bulk of new industrial development be consolidated along the N4 and N12 Development Corridors. Similar to the recommendations for mining activity in the ELM, industrial development should not be allowed to negatively affect high potential agricultural land or identified environmentally sensitive and/or tourism precincts. |

## 5.7 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.

### *5.7.1 Need and Desirability of the Transalloys Solar PV Energy Facility*

South Africa has experienced 15 years of intermittent black-outs and in the recent months, the country has yet again faced a considerable shortage in the availability and stability of electricity supply. This has impacted significantly on industries such as Transalloys that are electricity intensive and has prompted these industries to consider not only the diversification of their energy mix, but also to change their reliance on State-provided electricity.

In addition, the need for alternative renewable sources of energy has become very apparent in the local and international context. South Africa is fast becoming an integral part of this global transition towards using renewable sources for electricity generation. This evolution has been largely prompted by South Africa's carbon footprint, considering that South Africa is the largest emitter of greenhouse gases in Africa, accounting for as much as 42 % of the continent's total emissions. South Africa is furthermore estimated to rank amongst the top 20 largest emitters of greenhouse gases in the world. The South African economy is a very energy-intensive economy with a high dependence on coal-based electricity generation. Considering this and the impact the country has, the South African government committed to supplementing the existing generation capacity of thermal and nuclear power plants with renewable energy power generation. This has created a framework and a more conducive environment for industry to steadily incorporate alternative renewable energy sources as part of their energy mix. This in turn contributes to their sustainability targets and reducing their carbon footprint.

In 2021, the South African government acknowledged that aging state-owned electricity infrastructure and a demand far surpassing supply, is hampering the country and economy's growth. On 10 June 2021, President Ramaphosa announced the government's approval of an increase in the generation license exemption threshold for embedded generation facilities from 1MW to 100MW. This allows industry to not only generate electricity for self-consumption but allows them to develop facilities with a more realistic capacity response to their demand requirements without the need to obtain a Generation License from NERSA. In December 2022, this threshold was completely removed. This aims to reduce generation demands on the national grid and to alleviate residential, commercial, and industrial electricity supply constraints. It is within this context that Transalloys is proposing the solar PV facility. The project is considered to be highly desirable from a commercial and technical perspective.

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 (refer to section 5.6 above). 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 Transalloys Solar PV Energy 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.

Considering the South African policy at a national, provincial and regional level, it can be concluded that the proposed project does align with the national energy planning efforts, with renewable energy having links to climate change, environmental impact and electricity supply security, stability and flexibility considerations. In addition to this, the concept of a solar energy project is broadly supported in local economic planning documents. Considering the development planning initiatives, goals and objectives of the Mpumalanga Province, the district and the Emalahleni Local Municipality, it can be concluded that the concept of the proposed project is broadly supported.

### *5.7.2 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 Transalloys Solar PV Energy Facility has the potential to create much needed employment for unskilled locals during the construction phase. 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.

Transalloys Solar PV Energy Facility also has the potential to make a positive contribution towards the identified community needs.

***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 9$^{th}$ worldwide in terms of per capita carbon dioxide emissions. The development of Transalloys Solar PV Energy 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.

### *5.7.3 Receptiveness of and desirability of the project site to develop the Transalloys Solar PV Energy 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 and the extent of the site. 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, as detailed in Section 3.1.1 of this report.

The development area (~100ha) within which the facility footprint is proposed is sufficient in extent for the installation of a solar PV facility with a development footprint of ~67.9ha, while allowing for the avoidance of environmental site sensitivities. This consideration is in line with the mitigation strategy and enables the achievement of the objectives of the mitigation hierarchy (i.e., avoid, minimise, mitigate). This application of the mitigation heirarchy allows for the identification of the optimised placement of the PV facility within the development area. This approach will ensure that the final location of the PV facility and associated infrastructure is desirable from an environmental and social perspective.

### *5.7.4. Conclusion*

From the detail presented in this section of the report, it is clear that the need and desirability for the project is supported from a planning and policy perspective on a national, provincial, district, and local level, as well as from a technical perspective when considering solar resource. It is however important to also consider the potential impacts and benefits that the proposed solar facility may have for the affected site and surrounding area from both a biodiversity sustainability perspective and a socio-economic perspective. Therefore, it is imperative for the assessment being undertaken for the project to consider this project not only from a policy (national, provincial, and local level) perspective, but also from a biodiversity and socio-economic perspective. The aim of the EIA process is to ensure a balance between these three spheres and to ensure that conclusions made regarding the proposed project draw on both the positive and negative

consequences of the proposed development, as well as the potential for impacts to be compounded through the development of the solar facility and its associated infrastructure in proximity to other similar developments (i.e. cumulative impact). The potential impacts associated with the project are identified and described within this BA Report.

# 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 Transalloys Solar PV Energy 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. 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(1)(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 Transalloys Solar PV Energy 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(1)(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(1)(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 throughout the BA process to date have been included and responded to in the Comments and Responses (C&R) Report (**Appendix C**). 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 C**) to be submitted as part of the Final BA Report to Mpumalanga DARDLEA for decision-making. |
| 3(1)(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 Transalloys Solar PV Energy Facility has been included in **section 6.4**. |
| 3(1)(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 Transalloys Solar PV Energy Facility is included in **section 6.6**. |

## 6.2 6.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to the Transalloys Solar PV Energy Facility, as identified at this stage in the process and considered in the BA process, are described in more detail under the respective sub-headings. Additional permitting requirements applicable to the project are detailed within **Section 6.7**.

### *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 Transalloys, 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. As the project falls within the Emalahleni REDZ, a BA process is applicable as per GNR144 of February 2021.

The BA process being conducted for the Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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)<br><br>**Listing Notice 1** | 12(ii)(a)(c) | The development of –<br>(i) infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs –<br><br>(a) within a watercourse; or<br>(c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse.<br><br>***The development footprint considered for the establishment of the Transalloys Solar PV Energy Facility is associated with the presence of wetlands. The development of the Transalloys Solar PV Energy Facility will therefore 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 ~67.9ha in extent.*** |
| GN R327, 08 December 2014 (as amended on 07 April 2017)<br><br>**Listing Notice 1** | 19 | The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.<br><br>***The development footprint considered for the establishment of the Transalloys Solar PV Energy Facility is associated with the presence of wetlands. Therefore, during the construction phase, 10 cubic metres or more of rock will be removed from the watercourses for the development of the Transalloys Solar PV Energy Facility and associated infrastructure.*** |
| GN R327, 08 December 2014 (as amended on 07 April 2017)<br><br>**Listing Notice 1** | 24(ii) | The development of a road –<br><br>(ii) a road with a reserve wider than 13.5m, or where no reserve exists where the road is wider than 8m.<br><br>***The development of the Transalloys Solar PV Energy Facility will require the construction of new access roads in areas where no road reserve exists to provide access to the facility. These will exceed 8 metres in width.*** |
| GN R327, 08 December 2014 (as amended on 07 April 2017)<br><br>**Listing Notice 1** | 56(ii) | The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre –<br><br>(ii) where no reserve exists, where the existing road is wider than 8 metres<br><br>***The development of the Transalloys Solar PV Energy Facility will require widening of the roads where no road reserve exists to provide access to the 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 R325, 08 December 2014 (as amended on 07 April 2017)<br><br>**Listing Notice 2** | 1 | The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more<br><br>***The development comprises of a renewable energy generation facility, which will utilise Solar power technology and will have a generation capacity of up to 55MW.*** |
| GN R325, 08 December 2014 (as amended on 07 April 2017)<br><br>**Listing Notice 2** | 15 | The clearance of an area of 20 hectares or more indigenous vegetation.<br><br>***The development of the Transalloys Solar PV Energy Facility and associated infrastructure will require clearance of vegetation where such vegetation cover constitutes indigenous vegetation. The combined vegetation clearance for Transalloys Solar PV Energy Facility will be more than 20 hectares as the development footprint is approximately 67.9 hectares.*** |
| GN R324, 08 December 2014 (as amended on 07 April 2017)<br><br>**Listing Notice 3** | 4(f)(i)(aa)(bb) | The development of a road wider than 4 metres with a reserve less than 13.5 metres.<br><br>f. Mpumalanga<br>i. Outside urban areas:<br>(aa) A protected Area Expansion Strategy Focus areas, excluding conservancies.<br>(bb) National Protected Area Expansion Strategy Focus areas.<br><br>***Internal roads between projects components that are 4m wide are proposed. The site is located in the Mpumalanga Province, outside urban areas and is within a Protected Area Expansion Strategy Area and National Protected Area Expansion Strategy focus Area.*** |
| GN R324, 08 December 2014 (as amended on 07 April 2017)<br><br>**Listing Notice 3** | 14(ii)(a)(c)(f)(i)(ff) | The development of –<br><br>(ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs –<br>(a) within a watercourse; or<br>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse<br><br>f. in Mpumalanga<br>(i) Outside urban areas<br>(aa) A protected Area Expansion Strategy Focus areas, excluding conservancies.<br>(bb) National Protected Area Expansion Strategy Focus areas.<br><br>***The development of the Transalloys Solar PV Energy 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*** |

| 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 |
|---|---|---|
| | | ***be ~67.9ha in extent. The project site is located within Mpumalanga, outside of an urban area and protected Area Expansion Strategy Focus areas.*** |

### *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.<br><br>***The development footprint considered for the establishment of the Transalloys Solar PV Energy Facility is associated with the presence of wetlands. Activities pertaining to the establishment of the PV facility might encroach on the wetlands which may lead to an impediment and diversion of the flow of water in the watercourses.*** |
| Section 21 (i) | Altering the bed, banks, course or characteristics of a watercourse.<br><br>***The development footprint considered for the establishment of the Transalloys Solar PV Energy 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 for the above-mentioned identified water uses will be made by the applicant once a positive EA has been received. This will need to be in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GN R267), or a GA registered in accordance with the requirements of Revision of General Authorisation. The process of applying for a WUL or GA registration will only be completed once a positive EA has been received. This is in line with the requirements of the Department of Water and Sanitation (DWS).

### *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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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)*

As previously indicated, since the purpose of the proposed Transalloys PV Energy facility is to meet the current electricity demands and future expansion requirements, 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:

» Communication with the Mpumalanga DARDLEA has been ongoing since commencing with the project 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 in hard copy via courier. A record of all authority correspondence undertaken during the BA process is included in **Appendix B** and **Appendix C**.

## 6.4 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 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.

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 Transalloys Solar PV Energy 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) |
| 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** |
| Nkangala District Municipality |
| Emalahleni 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** |
| 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 C** 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[8] 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.

[8] 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).

» 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 –<br>(i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and<br>(ii) Any alternative site. |
| 40.(2)(b) | Giving written notice, in any of the manners provided for in section 47Dof the Act, to –<br>(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;<br>(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;<br>(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;<br>(iv) The municipality which has jurisdiction in the area;<br>(v) Any organ of state having jurisdiction in respect of any aspect of the activity; and<br>(vi) Any other party as required by the competent authority. |
| 40.(2)(c) | Placing an advertisement in –<br>(i) One local newspaper; or<br>(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 |
| 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 –<br>(i) Illiteracy;<br>(ii) Disability; or<br>(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 C**) 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 **18 November 2022**. Evidence of distribution is contained in **Appendix C** 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 **21 September 2022**. Photographs of the site notices are included in **Appendix C** of the BA Report.
- Placement of an advertisement in one local newspaper (The Witbank News (in English)) on **30 September 2022** (**Appendix C**). This advert:
  - provided details of the project and the EIA process being undertaken for the project;
  - announced the availability of the BA Report and details of the review period; and
  - provided all relevant details to access the Savannah Environmental website.
- The BA Report has been made available for review and comment by I&APs from **10 February 2023 to 13 March 2023.** The BA Report has been made available on the Savannah Environmental website and all registered I&APs have been notified of the availability on **10 February 2023** 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 Transalloys Solar PV Energy 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.<br><br>The BID and electronic reply form was also made available on the online stakeholder engagement platform. | 18 November 2022 |
| Placement of site notices along the boundary of the project site, including placement of further notices in Emalahleni. | 21 September 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:<br>» Witbank News (English advertisement) | 10 February 2023 |
| 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. | 10 February 2023 |
| 30-day review and comment period of the BA Report. | Friday, 10 February 2023 to Friday, 13 March 2023 |
| Meetings through the use of virtual platforms as determined through discussions with the relevant stakeholder group: | To be held during the 30-day review and comment period. |

| Activity | Date |
|---|---|
| » Landowners.<br>» Authorities and key stakeholders (including Organs of State, local municipality and official representatives of community-based organisations).<br>» 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. | |
| 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 sub regulation (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 BA Report has been made available on the Savannah Environmental website (https://savannahsa.com/public-documents/energy-generation/transalloys-solar-pv-energy-facility/). The notification was distributed at the commencement of the 30-day review and comment period, on **10 February 2023**. 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 be recorded and included in **Appendix C** of the BA Report.

v. Identification and Recording of Comments

All written comments raised by I&APs will be collated into a C&R Report and will be included as **Appendix C** of the final BA Report that will be submitted to the Mpumalanga DARDLEA for decision-making. The C&R Report will include detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised.

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

### 6.5 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 N** of the BA Report) for the Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility and is included in this BA Report as **Appendix G**. |
| Landscape/Visual Impact Assessment | Very high | A Visual Impact Assessment has been undertaken for the Transalloys Solar PV Energy Facility and is included in this BA Report as **Appendix I.** |
| Archaeological and Cultural Heritage Impact Assessment | Very high | A Heritage Impact Assessment (which covers both archaeological and cultural aspects of the development area and development footprint) has been undertaken for the Transalloys Solar PV Energy Facility and is included in this BA Report as **Appendix H**. |
| Palaeontology Impact Assessment | Very high | The Heritage Impact Assessment (included as **Appendix H** of the BA Report) includes an assessment of palaeontological resources within the development area and development footprint. |
| Terrestrial Biodiversity Impact Assessment | Very high | A Terrestrial Ecological Impact Assessment (including flora and fauna) has been undertaken for the Transalloys Solar PV Energy Facility and is included as **Appendix D** of the BA Report. |
| Aquatic Biodiversity Impact Assessment | Very high | An Aquatic Impact Assessment has been undertaken for the Transalloys Solar PV Energy Facility and is included as **Appendix F** of the BA Report. |

| Specialist Assessment | Sensitivity Rating as per the Screening Tool (relating to the need for the study) | Project Team Response |
|---|---|---|
| Avian Impact Assessment | Low | An Avifauna Assessment has been undertaken for the Transalloys Solar PV Energy Facility and is included as **Appendix E** of the BA Report. |
| Civil Aviation Assessment | Low | The project site is not located within close proximity of any airfield. The Civil Aviation Authority will however be consulted throughout the BA process to obtain input regarding any specific requirements. Refer to **Appendix M**. |
| Defence Assessment | Low | The project site is not located within close proximity of any military base. |
| RFI Assessment | Medium | The project site under consideration for the development of the Transalloys Solar PV Energy Facility is located within 1km of a telecommunication facility. Telecommunications stakeholders such as Telkom and Sentech will be consulted throughout the BA process to obtain input regarding any specific requirements. |
| Social Impact Assessment | The screening report does not indicate a rating for this theme. | A Social Impact Assessment has been undertaken for the Transalloys Solar PV Energy Facility and is included in the BA Report as **Appendix J**. |
| Plant Species Assessment | Medium | An Ecological Impact Assessment (including flora and fauna) has been undertaken for the Transalloys Solar PV Energy Facility and is included as **Appendix D** of the BA Report. |
| Animal Species Assessment | High | |

### 6.6 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 Transalloys Solar PV Energy Facility

| Specialist | Field of Study | Appendix |
|---|---|---|
| Ivan Baker, Andrew Husted, Lindi Steyn and Martinus Erasmus of The Biodiversity Company | Ecology (including flora and fauna) | Appendix D |
| | Avifauna | Appendix E |
| | Wetlands | Appendix F |
| | Soils and Agricultural (Pedology) | Appendix G |
| Jenna Lavin and Nicholas Wiltshire of CTS Heritage | Heritage (including archaeology and palaeontology) | Appendix H |
| Lourens du Plessis of LOGIS | Visual | Appendix I |
| Tony Barbour of Tony Barbour Environmental Consulting | Social | Appendix J |

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the Transalloys Solar PV Energy 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 K**.

### 6.7 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 Transalloys 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 – J** for specialist study specific limitations.

### *6.8* 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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:<br><br>"*Everyone has the right –*<br>» *To an environment that is not harmful to their health or well-being, and*<br>» *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*<br>* *Prevent pollution and ecological degradation,*<br>* *Promote conservation, and*<br>* *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).<br><br>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 | 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 |
|---|---|---|---|
| | authority charged by NEMA with granting of the relevant environmental authorisation.<br><br>Considering the capacity of the proposed solar PV facility (i.e., contracted capacity of up 55MW) and the 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.<br><br>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. | Mpumalanga DARDLEA<br><br>Emalahleni Local Municipality | 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 |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | 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.<br><br>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 person, machine, device or apparatus or any combination thereof (Regulation 04).<br><br>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. | | a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of the legislation. |
| 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. | Regional DWS | A small portion of the proposed Transalloys Solar PV Energy Facility is within the presence of a channelled Valley Bottom, and Hillslope Seep as identified in the Aquatic Impact Assessment (**Appendix F**). |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | 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.<br><br>Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)).<br><br>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)). | | 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, or where activities are proposed within 500m of a wetland, 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 from the DWS. |
| 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 | | 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 |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | Minister for approval in the prescribed manner. | | 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.<br><br>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.<br><br>Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval. | Mpumalanga DARDLEA<br><br>Nkangala 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 Transalloys Solar PV Energy Facility is not anticipated to result in significant dust generation and at this stage, a dust fall monitoring programme is not deemed required. |
| 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.<br><br>Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites.<br><br>Section 36 of the NHRA provides for the conservation and care of cemeteries and | South African Heritage Resources Agency (SAHRA)<br><br>Mpumalanga Provincial Heritage Resource Authority | A Heritage Screener has been undertaken as part of the BA process (refer to **Appendix H** of this BA Report). Heritage and palaeontological resources of significance were identified within the development area.<br><br>Should a heritage resource be impacted upon, a permit may be required from SAHRA or the |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
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| | graves by SAHRA where this is not the responsibility of any other authority.<br><br>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.<br><br>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. | | 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.<br><br>Three government notices have been published in terms of Section 56(1) of NEM:BA as follows:<br><br>» Commencement of TOPS Regulations, 2007 (GNR 150).<br>» Lists of critically endangered, vulnerable, and protected species (GNR 151), as amended in 2020 (GNR 627).<br>» TOPS Regulations (GNR 152).<br><br>NEM:BA provides for listing threatened or protected ecosystems, in one of four | DFFE<br><br>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.<br><br>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 NEM:BA were identified within the development area. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
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| | 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). | | |
| 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.<br><br>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 Alien and Invasive Species list was gazetted on 18 September 2020 (in force 1 March 2021). | DFFE<br><br>Mpumalanga DARDLEA | The Ecological Impact Assessment (**Appendix D**) identified fifteen (15) invasive alien plant species within the development area. Four of these species are Category 1b species which must be controlled through the implementation of an IAP Management Programme.<br><br>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 |
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| Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)<br><br>Regulations (GN R1048) (CARA Regulations) | Section 05 of CARA provides for the prohibition of the spreading of weeds.<br><br>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.<br><br>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.<br><br>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.<br><br>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:<br><br>» Uprooting, felling, cutting, or burning.<br>» 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.<br>» 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.<br>» 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.<br>» A combination of one or more of the methods prescribed, save that |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
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| | | | 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).<br><br>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 | Should protected trees be found on site and be impacted by the project, a licence is required for the removal. 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.<br><br>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 | DFFE | While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Transalloys Solar PV Energy 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 |
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| | does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it.<br><br>Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to 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.<br><br>» Group I and II: Any substance or mixture of a substance that might by reason of its | 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 |
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| | 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<br>» Group IV: any electronic product, and<br>» Group V: any radioactive material.<br><br>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force. | | |
| 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.<br><br>The Minister may amend the list by –<br><br>» Adding other waste management activities to the list.<br>» Removing waste management activities from the list.<br>» Making other changes to the particulars on the list.<br><br>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. | DFFE – Hazardous Waste<br><br>Mpumalanga DARDLEA – General Waste | No waste listed activities are triggered by the Transalloys Solar PV Energy 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. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
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| | Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:<br><br>» The containers in which any waste is stored, are intact and not corroded or in<br>» Any other way rendered unlit for the safe storage of waste.<br>» Adequate measures are taken to prevent accidental spillage or leaking.<br>» The waste cannot be blown away.<br>» Nuisances such as odour, visual impacts and breeding of vectors do not arise, and<br>» Pollution of the environment and harm to health are prevented. | | |
| 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 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.<br><br>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.<br><br>The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and | South African National Roads Agency (SANRAL) – national roads<br><br>Mpumalanga Department of Public Works, Roads and Transport | An abnormal load/vehicle permit will be required to transport the various components to site for construction. These include:<br>» Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads.<br>» Depending on the trailer configuration and height when loaded, some of the project components may not meet specified dimensional limitations (height and width). |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | 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. | | |
| 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.<br><br>Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified.<br><br>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)<br><br>Air Traffic and Navigation Services SOC Limited (ATNS) | Not Applicable to the Transalloys Solar PV Energy Facility as no structure will exceed 45m above ground and the power line will be underground. |
| ***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 | Mpumalanga DARDLEA | An Ecological Impact Assessment (including flora and fauna) has been undertaken as part of the BA process (refer to **Appendix D**). Several individuals of the species *Zantedeschia aethiopica* and *Crinum macowanii* were observed along the wetland habitat within the project boundary. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance Requirements |
|---|---|---|---|
| | and Flora, the control of harmful animals, freshwater pollution, and enforcement. | | These species are provincially protected according to Schedule 11 of the Mpumalanga Nature Conservation Act (Act 10 of 1998), and no individual may be disturbed without the appropriate permit. |

### *6.7.1 Best Practice Guidelines Birds & Solar Energy (2017)*

The Best Practice Guidelines Birds & Solar Energy (2017) proposed by the Birds and Renewable Energy Specialist Group (BARESG) (convened by BirdLife South Africa and the Endangered Wildlife Trust) contain guidelines for assessing and monitoring the impact of solar generation facilities on birds in Southern Africa. The guidelines recognise the impact that solar energy may have on birds, through for example the alteration of habitat, the displacement of populations from preferred habitat, and collision and burn mortality associated with elements of solar hardware and ancillary infrastructure; and the fact that the nature and implications of these effects are poorly understood.

The guidelines are aimed at Environmental Assessment Practitioners (EAPs), avifaunal specialists, developers and regulators and propose a tiered assessment process, including:

(i) Preliminary avifaunal assessment – an initial assessment of the likely avifauna in the area and possible impacts, preferably informed by a brief site visit and by collation of available data; also including the design of a site-specific survey and monitoring project should this be deemed necessary.
(ii) Data collection – further accumulation and consolidation of the relevant avian data, possibly including the execution of baseline data collection work (as specified by the preliminary assessment), intended to inform the avian impact study.
(iii) Impact assessment – a full assessment of the likely impacts and available mitigation options, based on the results of systematic and quantified monitoring if this was deemed a requisite at preliminary assessment.
(iv) Monitoring – repetition of baseline data collection, plus the collection of mortality data. This helps to develop a complete before and after picture of impacts, and to determine if proposed mitigation measures are implemented and are effective, or require further refinement. Monitoring may only be necessary for projects with the potential for significant negative impacts on birds (i.e. large area affected and / or vulnerable species present).

In terms of the guidelines, the quantity and quality of baseline data required to inform the assessment process at each site should be set in terms of the size of the site and the predicted impacts of the solar technology in question, the anticipated sensitivity of the local avifauna (for example, the diversity and relative abundance of priority species present, proximity to important flyways, wetlands or other focal sites) and the amount of existing data available for the area.

Data collection could vary from a single, short field visit (Regime 1, for e.g. at a small or medium sized site with low avifaunal sensitivity), to a series of multi-day survey periods, including the collection of various forms of data describing avian abundance, distribution and movement and spread over 12 months (Regime 3, for e.g. at a large developments located in a sensitive habitat, or which otherwise may have significant impacts on avifauna). **Table 6.8** is taken from the best practise guidelines and provides a summary of the recommended assessment regimes in relation to proposed solar energy technology, project size, and likely risk).

**Table 6.8:** Recommended avian assessment regimes in relation to proposed solar energy technology, project size, and known impact risks.

| Type of technology* | Size** | Avifaunal Sensitivity*** | | |
|---|---|---|---|---|
| | | Low | Medium | High |
| All except CSP power tower | Small (< 30ha) | Regime 1 | Regime 1 | Regime 2 |
| | Medium (30 – 150ha) | Regime 1 | Regime 2 | Regime 2 |
| | Large (> 150ha) | Regime 2**** | Regime 2 | Regime 3 |
| CSP power tower | All | Regime 3 | | |

Regime 1: One site visit (peak season); minimum 1 – 5 days.
Regime 2: Pre- and post-construction; minimum 2 – 3 x 3 – 5 days over 6 months (including peak season); carcass searches.
Regime 3: Pre- and post-construction; minimum 4 – 5 x 4 – 8 days over 12 months, carcass searches.

* Different technologies may carry different intrinsic levels of risk, which should be taken into account in impact significance ratings

** For multi-phased projects, the aggregate footprint of all the phases should be used. At 3ha per MW, Small = < 10MW, Medium = 10 – 50MW, Large = > 50MW.

*** The avifaunal sensitivity is based on the number of priority species present, or potentially present, the regional, national or global importance of the affected area for these species (both individually and collectively), and the perceived susceptibility of these species (both individually and collectively) to the anticipated impacts of development. For example, an area would be considered to be of high avifaunal sensitivity if one or more of the following is found (or suspected to occur) within the broader impact zone:

1) Avifaunal habitat (e.g. a wetlands, nesting or roost sites) of regional or national significance.
2) A population of a priority species that is of regional or national significance.
3) A bird movement corridor that is of regional or national significance.
4) A protected area and / or Important Bird and Biodiversity Area.

An area would be considered to be of medium avifaunal sensitivity if it does not qualify as high avifaunal sensitivity, but one or more of the following is found (or suspected to occur) within the broader impact zone

1) Avifaunal habitat (e.g. a wetland, nesting or roost sites) of local significance.
2) A locally significant population of a priority species.
3) A locally significant bird movement corridor.

An area would be considered to be of low avifaunal sensitivity if it is does not meet any of the above criteria.

**** Regime 1 may be applied to some large sites, but only in instances where there is abundant existing data to support the assessment of low sensitivity.

Based on the avifauna survey undertaken for the project site, the development footprint was determined to be of low to medium significance for avifauna. Therefore, a single season survey (Regime 1) was considered by the specialist to be adequate.

### *6.7.2 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 Transalloys Solar PV Energy 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

### *6.7.3 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 Transalloys Solar PV Energy Facility and attached as **Appendix K** 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 2000m$^3$/day for cleaning, fire control and general usage. Water will be sourced directly from the existing Transalloys complex.

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:*
Transalloys (Pty) Ltd is the applicant and the landowner of the property where the proposed.

Transalloys Solar PV Energy Facility and its associated infrastructure is proposed on a property owned by Transalloys (Pty) Ltd. 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 Transalloys (Pty) (Ltd).

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 Transalloys Solar PV Energy 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 K** 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 Transalloys Solar PV Energy 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 K** 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 Transalloys Solar PV Energy Facility have been assessed as part of the Heritage Impact Assessment conducted as part of the BA process (refer to **Appendix H**), 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 K** 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 for the project and included within the project EMPr attached as **Appendix K** 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 K** 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 Transalloys Solar PV Energy 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 - Appendix 1: Content of Basic Assessment Reports:

| Requirement | Relevant Section |
|---|---|
| 3(1)(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 - J**.

## 7.2 Regional Setting

The Transalloys Solar PV Energy Facility and associated infrastructure is proposed on Portions 34 and 35 of the farm Elandsfontein 309JS and Portions 20 and 24 of the farm Schoongezicht 308JS, adjacent to the Transalloys smelter complex on Clewer Road 1034, in Emalahleni within the Emalahleni Local Municipality which forms part of the Nkangala District Municipality of Mpumalanga Province, approximately 34km west of Middelburg and 37km east of Bronkhorstspruit. The property is owned by Transalloys (Pty) Ltd.

### *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 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 Nkangala District Municipality.

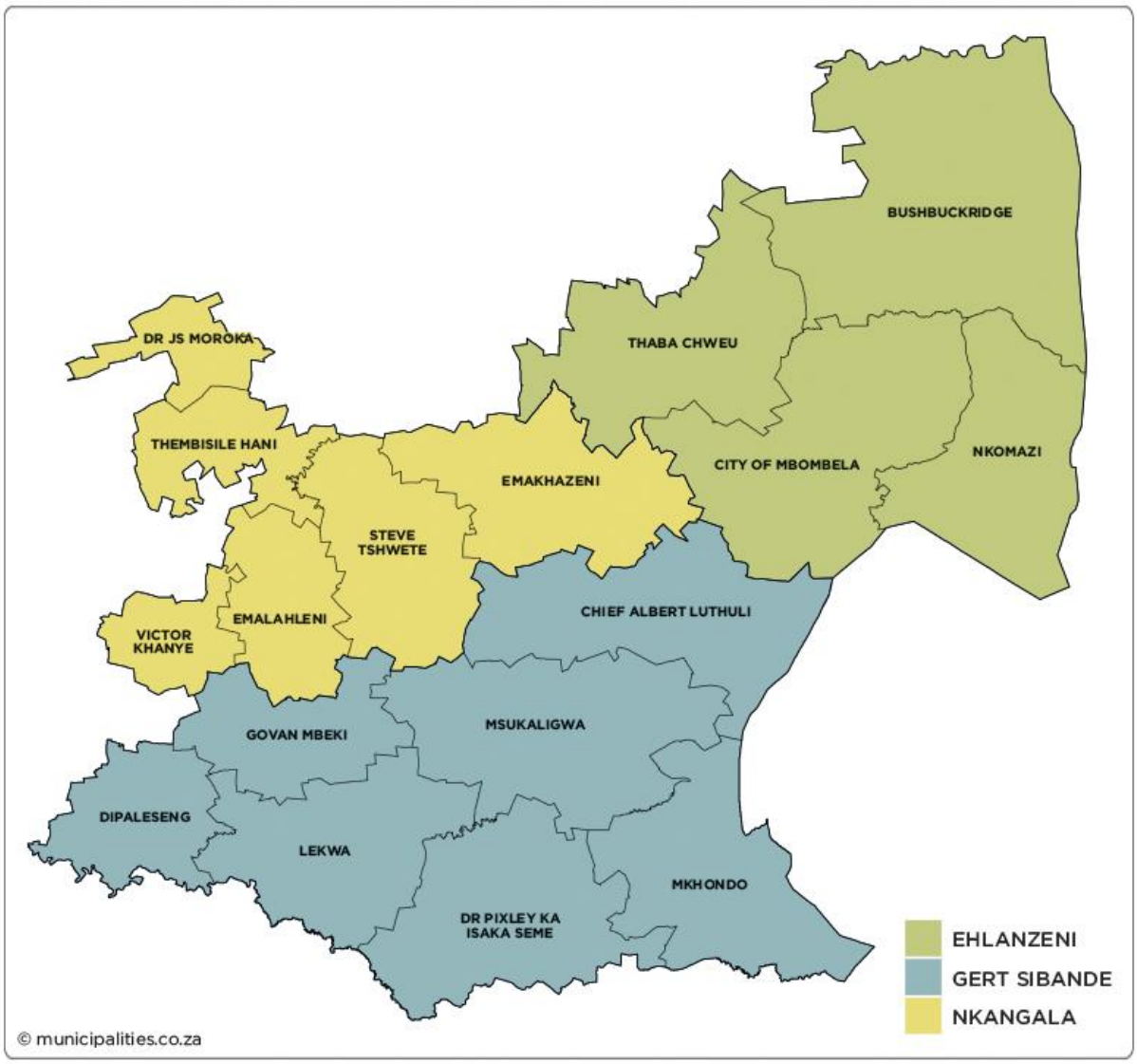


**Figure 7.1**: District municipalities of the Mpumalanga Province (Source: Municipalities of South Africa)

### *7.2.2 Nkangala District Municipality*

The Nkangala District Municipality is a Category C municipality in the Mpumalanga Province. It is one of the three districts in the province, making up 22% of its geographical area. It is comprised of six local municipalities: Victor Khanye, Emalahleni, Steve Tshwete, Emakhazeni, Thembisile Hani, and Dr JS Moroka (refer to **Figure 7.2**). The district's headquarters are in Middelburg. Nkangala is at the economic hub of Mpumalanga and is rich in minerals and natural resources. The district is host to the Maputo corridor which brings increased potential for economic growth and tourism development.

Nkangala district neighbours provinces of Limpopo, Gauteng and North West. The proximity to Gauteng opens opportunities to a larger market, which is of benefit to the district's agricultural and manufacturing sectors. There is further potential in exporting goods that provides opportunities within the district.

The districts economy is dominated by electricity, manufacturing and mining. These sectors are followed by community services, trade, finance, transport, agriculture and construction. Nkangala prides itself on having

a high credit rating and a low credit risk. Good governance ensures that Annual Financial Statements and Unqualified Audit Reports are prepared on time. Through responsible financial management (the municipality is rated as an A1 in terms of national ratings), Nkangala has been successful in allocating a significant investment in municipal infrastructure in the district, with particular emphasis on water related projects. However, Nkangala is not exempt from the difficulties facing all municipalities in South Africa. Poverty and unemployment in the rural areas are a major threat to socioeconomic growth.

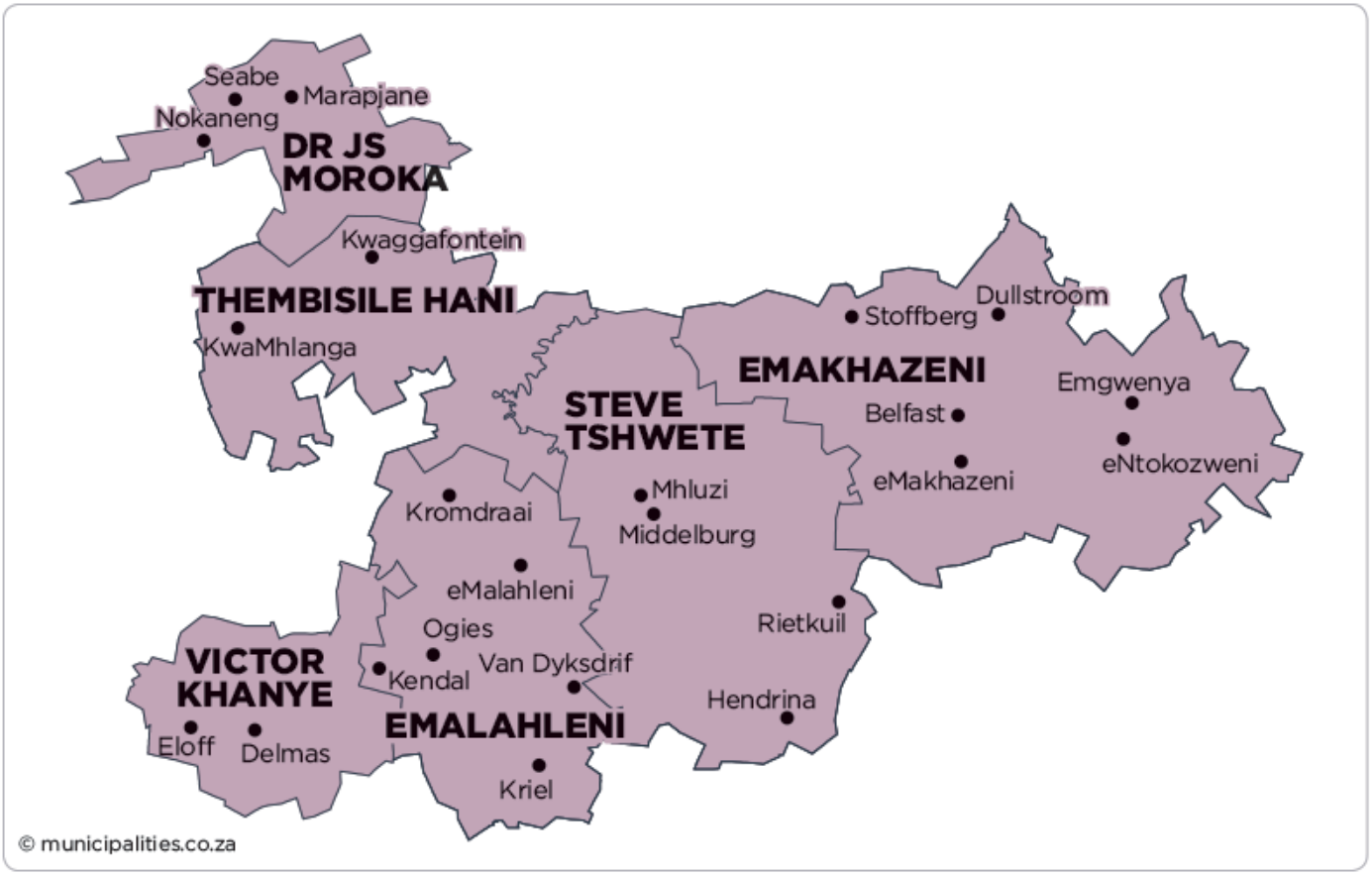


**Figure 7.2**: Local municipalities in the Nkangala District Municipality (Source: Municipalities of South Africa)

### *7.2.3 Emalahleni Local Municipality*

Emalahleni Local Municipality is located within the Mpumalanga Province and is situated in the jurisdictional area of the Nkangala District Municipality. The district is located to the North-West of the province and is the smallest district in land mass (21%) and has the second largest population concentration (35%) in the province. It covers an area of about 2677.67 km$^2$ in extent. The Nkangala District Municipality is made up of six local municipalities, namely Emalahleni Local Municipality, Emakhazeni Local Municipality, Steve Tshwete Local Municipality, Thembisile Hani Local Municipality, Dr JS Moroka Local Municipality, and Victor Khanye Local Municipality.

Emalahleni Local Municipality is strategically located within the Mpumalanga provincial context, and it serves the function of a gateway municipality and town into the province for eight of the nine provinces of South Africa. Its proximity to the Johannesburg, Ekurhuleni, and the Tshwane Metropolitan Municipalities, which jointly constituted the largest economy in the country serve the municipality favourably.

The road infrastructure connecting Emalahleni to the rest of the country is also very well maintained and serviced by logistics freight activities to such that the significance of the municipality in the Industrial Development and Transportation strategies of the country are recognised. Connecting the municipality to the rest of the country as mentioned above is the significant road infrastructure consisting of the N4 and N12 freeways. The N4 and the N12 converge at Emalahleni town, N12 starts at Emalahleni and then the N4 proceeds to Nelspruit and Maputo.

The southern areas of the Emalahleni Municipality form part of the region referred to as the Energy Mecca of South Africa, due to its rich deposits of coal reserves and power stations such as Kendal, Matla, Duvha and Ga-Nala, while the new Kusile power station is located a few kilometres to the east of Phola. The Southward Road and rail network connect the Emalahleni area to the Richards Bay and Maputo harbours, offering export opportunities for the coal reserves.

Emalahleni Local Municipality (ELM) as with all other municipalities in the country continues to be with the deep spatial challenges of the past where communities continue to live separately from each other, although strides have been made to bring the poor communities closer to the centres of economic activities, land availability continues to hamstring the programme.

## 7.3 Climatic Conditions

The climate of the broader project area is characterised by a strongly seasonal rainfall, dry winters and a mean annual precipitation of approximately 726mm and relatively uniform across the distribution of the Gm 12 vegetation type. Incidence of frost ranges between 13 to 42 days a year and occurs more at higher elevations (refer to **Figure 7.3**)

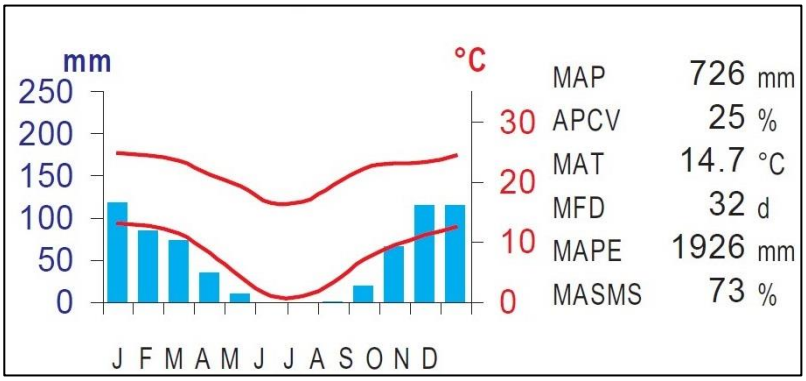


**Figure 7.3**: Climate diagram for the region

## 7.4 Biophysical Characteristics of the Study Area

### *7.4.1. Topography and Terrain*

The topographical inland and river line data for "2529" quarter degree was used. This data set indicates two perennial rivers as well as two non-perennial rivers running through the 500 m regulated area. These areas indicate potential wetland areas. The terrain of the 500 m regulated area has been analysed to determine potential areas where wetlands are more likely to accumulate (due to convex topographical features, preferential pathways, or more gentle slopes).

The slope percentage of the project area has been calculated and is illustrated in **Figure 7.4.** Most of the project area is characterised by a slope percentage between 0 and 10%, with some smaller patches within the project area characterised by a slope percentage ranging from 10 to 28%.

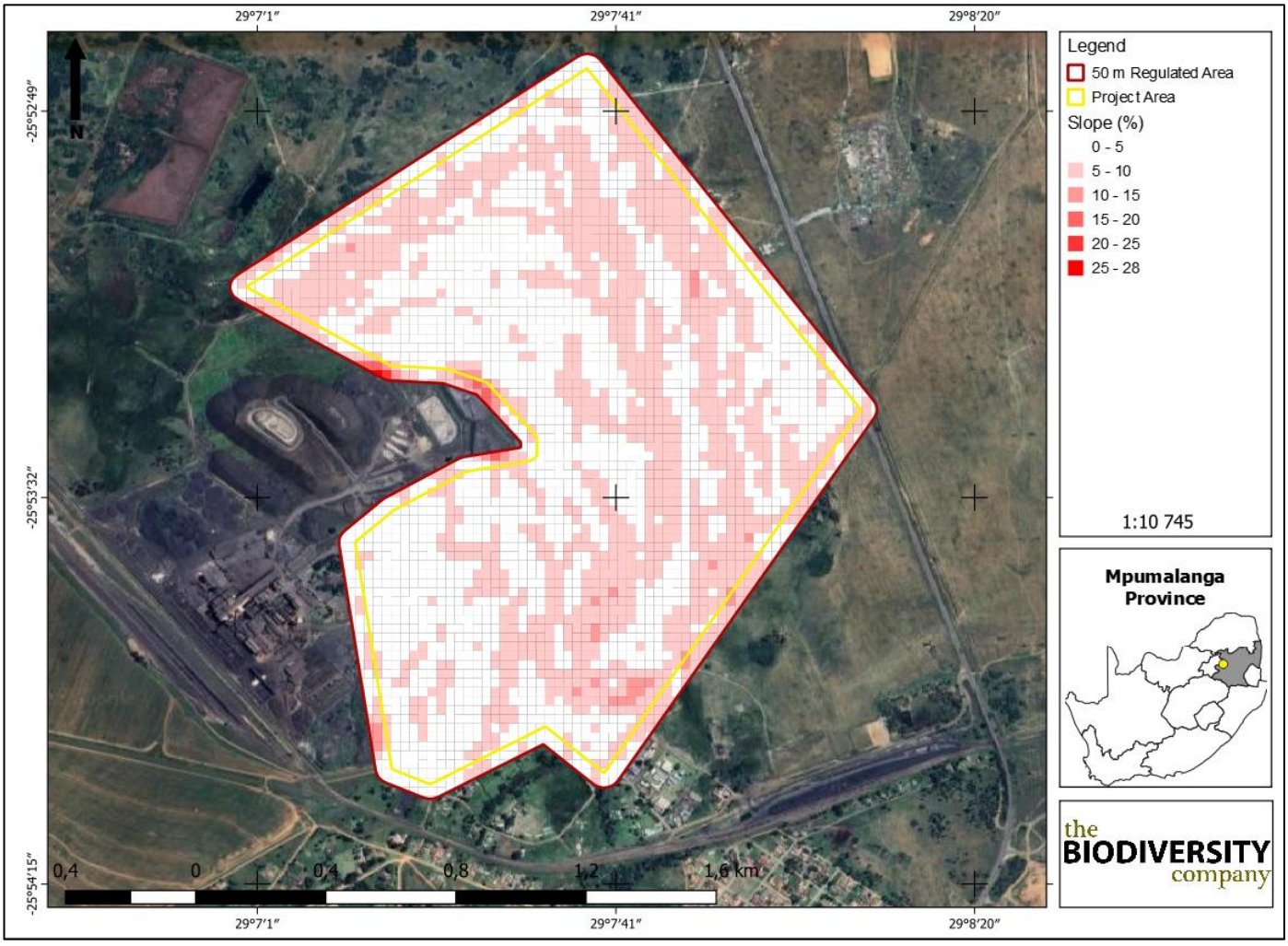


**Figure 7.4**: Slope percentage of project area

### *7.4.2. Geology, Soils and Agricultural Potential*

#### *Geological Setting of the Project Site*

The geology and soils aspect of this region is characterised by red to yellow sandy soils of the Ba and Bb land type. The geology of this region includes sandstone and shale of the Madzaringwe Formations (Karoo Supergroup (refer to **Figure 7.5**). The project area is characterised by the Bb 13 land type. The Bb land type consists of plinthic catena. Upland duplex and margalitic soils are rare and dystrophic and/or mesotrophic red soils are not widespread

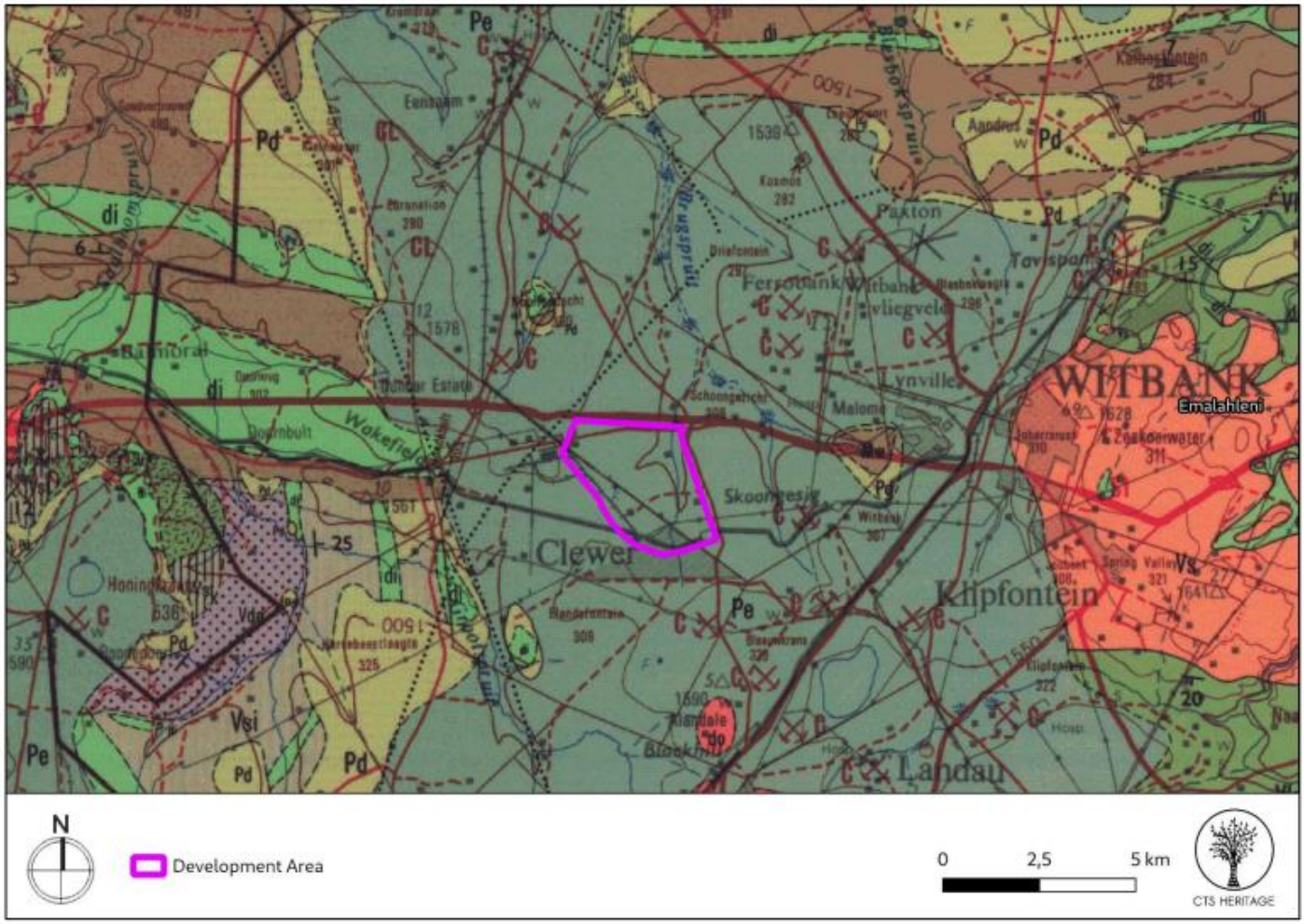


**Figure 7.5**: 1:50 0000 Geology Map 2528 Pretoria from the Council of Geoscience. The development area is underlain by sediments of the Ecca Formation (Pe).

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

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Bb 13 land type. The Bb land type is characterised with Clovelly, Avalon and Katspruit soil forms according to the Soil classification working group, (1991), with other associated soil forms also occur in the terrains. The Bb land type is characterised by plinthic catena with upland duplex and margalitic soils being rare within the terrain. The terrains are characterised by dystrophic and/or mesotrophic base status. Red soils are not widespread in the terrain.

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

- Orthic topsoil;
- Lithic horizon;
- Hard rock horizon;
- Neocutanic horizon,

- Red apedal apedal
- Albic horizon; and
- Alluvial horizon.

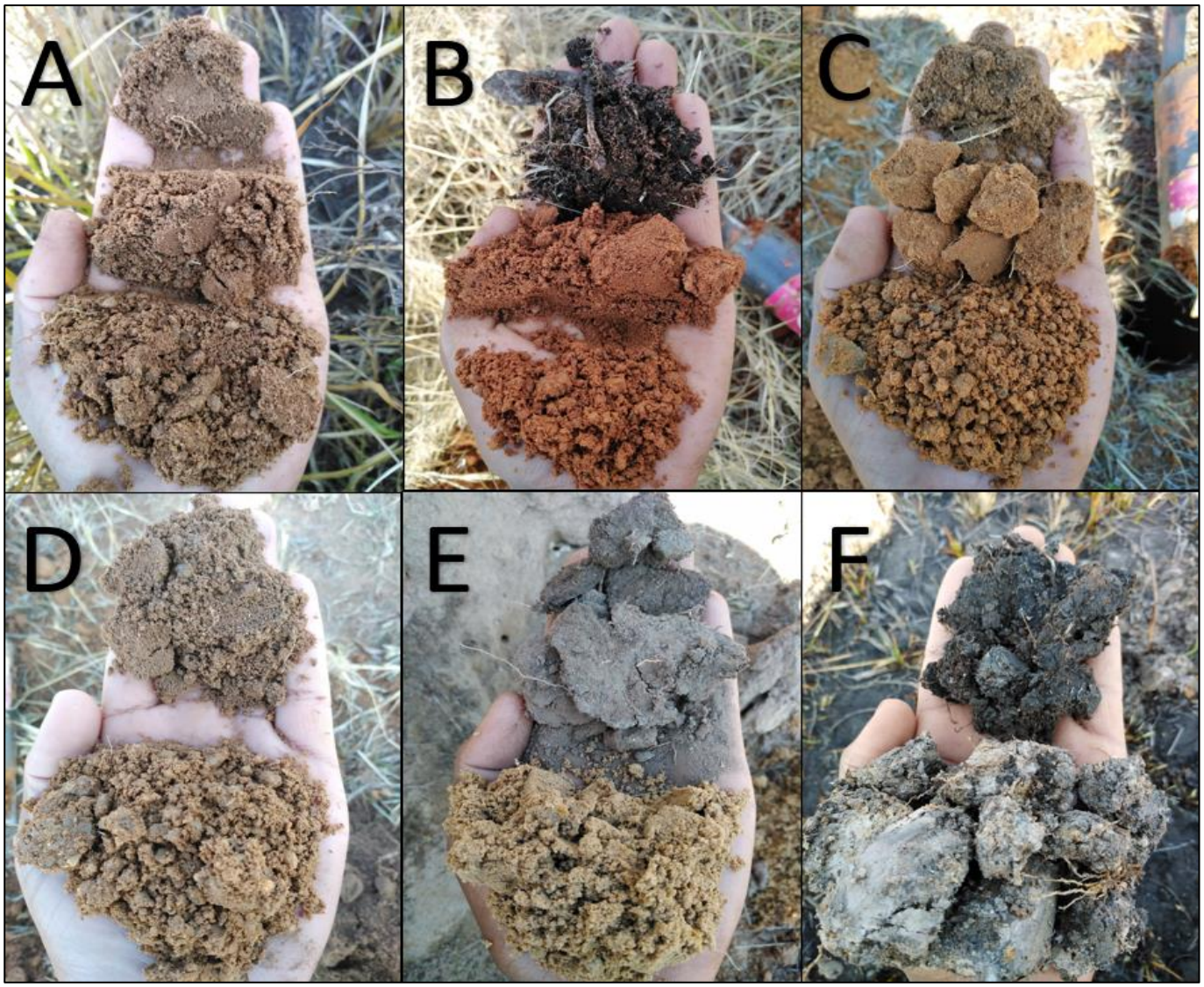


**Figure 7.6**: Diagnostic soil horizons identified during the site assessment. A) Neoutanic horizon. B) Red apedal horizon. C) Orthic on top of yellow-brown apedal, underlined by lithic). D) Lithic subsurface horizon. E) Alluvial subsurface horizon. F) Albic subsurface horizon.

During the pedology site assessment, various soil forms were identified. These soil forms are described in **Table 7.1** according to depth, clay percentage, indications of surface crusting, signs of wetness and percentage rock. The soil forms are followed by the soil family and in brackets the maximum clay percentage of the topsoil. Soil family characteristics are described in **Table 7.2**.

**Table 7.1**: Summary of soils identified within the project area.

| | Topsoil | | | | | Subsoil A | | | | Subsoil B | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Depth (mm)** | **Clay (%)** | **Signs of wetness** | **Rock %** | **Surface crusting** | **Depth (mm)** | **Clay (%)** | **Signs of wetness** | **Rock %** | **Depth (mm)** | **Clay (%)** | **Signs of wetness** | **Rock %** |
| Clovelly 1221(15) | 0-50 | 0-15 | None | 0 | None | 50-250 | 15-30 | None | 10 | 250-500 | 15-30 | | 40 |
| Tubatse 1121(15) | 0-150 | 0-15 | None | 0 | None | 150-300 | 15-35 | None | 3 | 300-450 | 15-30 | N/A | 30 |
| Nkonkoni 1221(15) | 0-50 | 0-15 | None | 0 | None | 50- 400 | 0-15 | None | 0 | 400- 500 | 15-30 | N/A | 30 |
| Dundee 1112 (15) | 0-300 | 0-15 | None | 0 | None | 300-900 | 0-15 | Present | 0 | | | | |
| Glenrosa 1110 (15) | 0-100 | 0-15 | None | 5 | None | 100-400 | 0-15 | None | 30 | 400+ | - | - | 60+ |
| Iswepe 1120 (15) | 0-100 | 0-15 | Present | 0 | None | 100-350 | 0-15 | Present/Bleached | 5 | 350+ | - | - | 60+ |

**Table 7.2**: Description of soil family characteristics

| Soil Form/Family | Topsoil Colour | Base Status | Textural Contrast |
|---|---|---|---|
| Clovelly 1221 (15) | Dark Topsoil | Mesotrophic | Luvic |
| Tubatse 1121 (15) | Dark Topsoil | Mesotrophic | Luvic |
| Nkonkoni 1221 (15) | Dark Topsoil | Mesotrophic | Luvic |
| Dundee 1112 (15) | Dark Topsoil | Mesotrophic | Luvic |
| Glenrosa 1110 (15) | Dark Topsoil | Mesotrophic | Luvic |
| Iswepe 1120 (15) | Dark Topsoil | Dystrophic | Luvic |

The land capability was determined by using the guidelines described in "The farming handbook" (Smith, 2006). The delineated soil forms were clipped into the four different slope classes (0-3%, 3-7%, 7-12% and >12%) to determine the land capability of each soil form. Accordingly, the most sensitive soil forms associated with the project area are restricted to land capability 3, 4 and 5 classes.

The land capabilities for the development area, are described in **Table 7.3** and illustrated in **Figure 7.7**.

**Table 7.3**: Land capability for the soils within the development area.

| Land Capability Class | Definition of Class | Conservation Need | Use-Suitability | Land Capability Group | Sensitivity |
|---|---|---|---|---|---|
| 3 | Moderate limitations. Some erosion hazard | Special conservation practice and tillage methods | Rotation crops and ley (50%) | Arable | Very High |
| 4 | Severe limitations. Low arable potential. | Intensive conservation practice | Long term leys (75%) | Arable | Moderate |
| 5 | Water course and land with wetness limitations | Protection and control of water table | Improved pastures, suitable for wildlife | Grazing | Low |

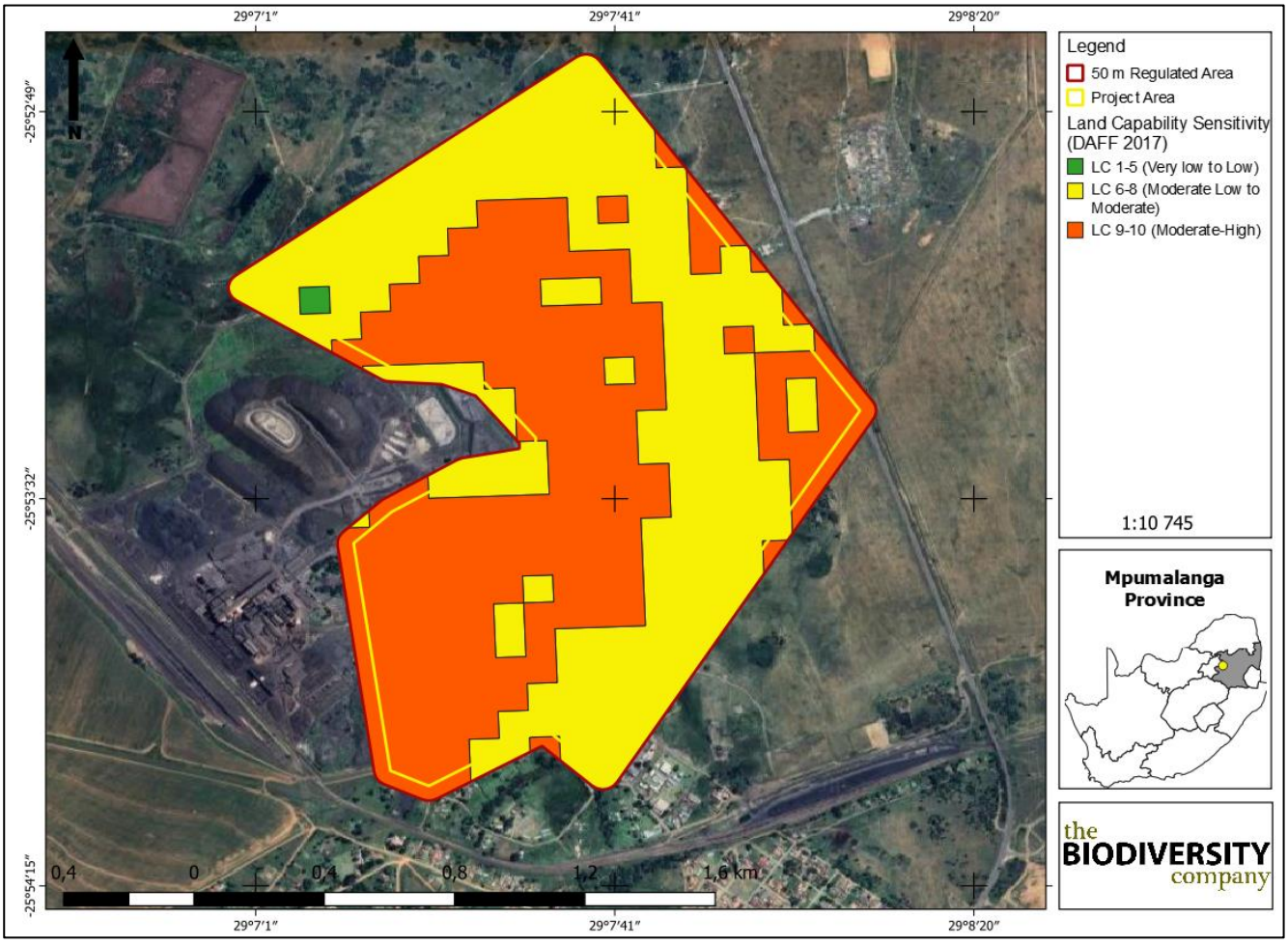


**Figure 7.7**: Land capability sensitivity (DAFF, 2017)

The three land capability classes, two land potential levels have been determined by means of the Guy and Smith (1998) methodology. Land capability III and IV have been reduced to a land potential level L5 due to climatic limitations. The land capability V has been allocated a land potential "Vlei" considering its hydromorphic characteristics.

**Table 7.4**: Land potential for soils within the development area.

| Land Potential | Description of Land Potential Class | Sensitivity |
|---|---|---|
| **5** | **Restricted potential.** Regular and/or severe to limitations due to soil, slope, temperatures, or rainfall. Not arable. | Low |
| **Vlei** | Wetland (grazing and wildlife) | Low |
| **Disturbed** | N/A | None |

### *7.4.3 Land Use*

Four different land uses have been identified within the proposed development area, namely "secondary grasslands", "degraded grasslands", "transformed", and "Wetlands" (refer to **Figure 7.9**).

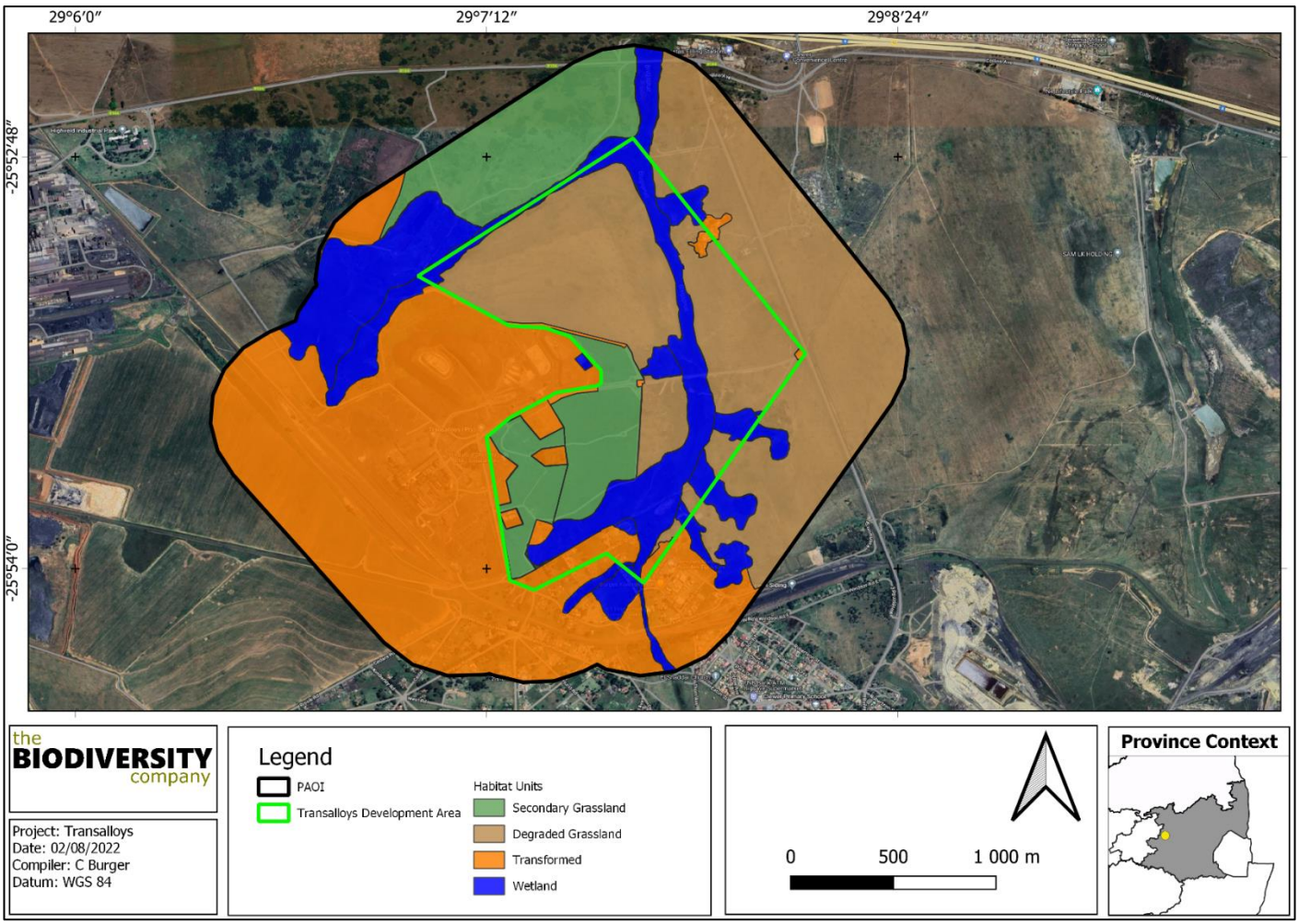


**Figure 7.8**: Different land uses within the proposed development area

Land use activities within the broader region are described as residential areas, (predominantly) agricultural activities and mining activities. Transalloys smelter complex within which the project is proposed is located ~

10km to the south-west of the CBD of Emalahleni. The urban land uses in the vicinity of the site include the town of Clewer located immediately to the south of the site and residential township areas, including Vosman, associated with Emalahleni, located ~ 1km to the north of the site. The N4 and R104 are located to the north of the site and separate the site from the residential areas. The R547 runs along the eastern boundary of the site. The area to the east of the R547 is open farmland. This area has been identified as potential future area for coal mining.

### *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 Eastern Highveld Grassland vegetation type (refer to **Figure 7.9**).

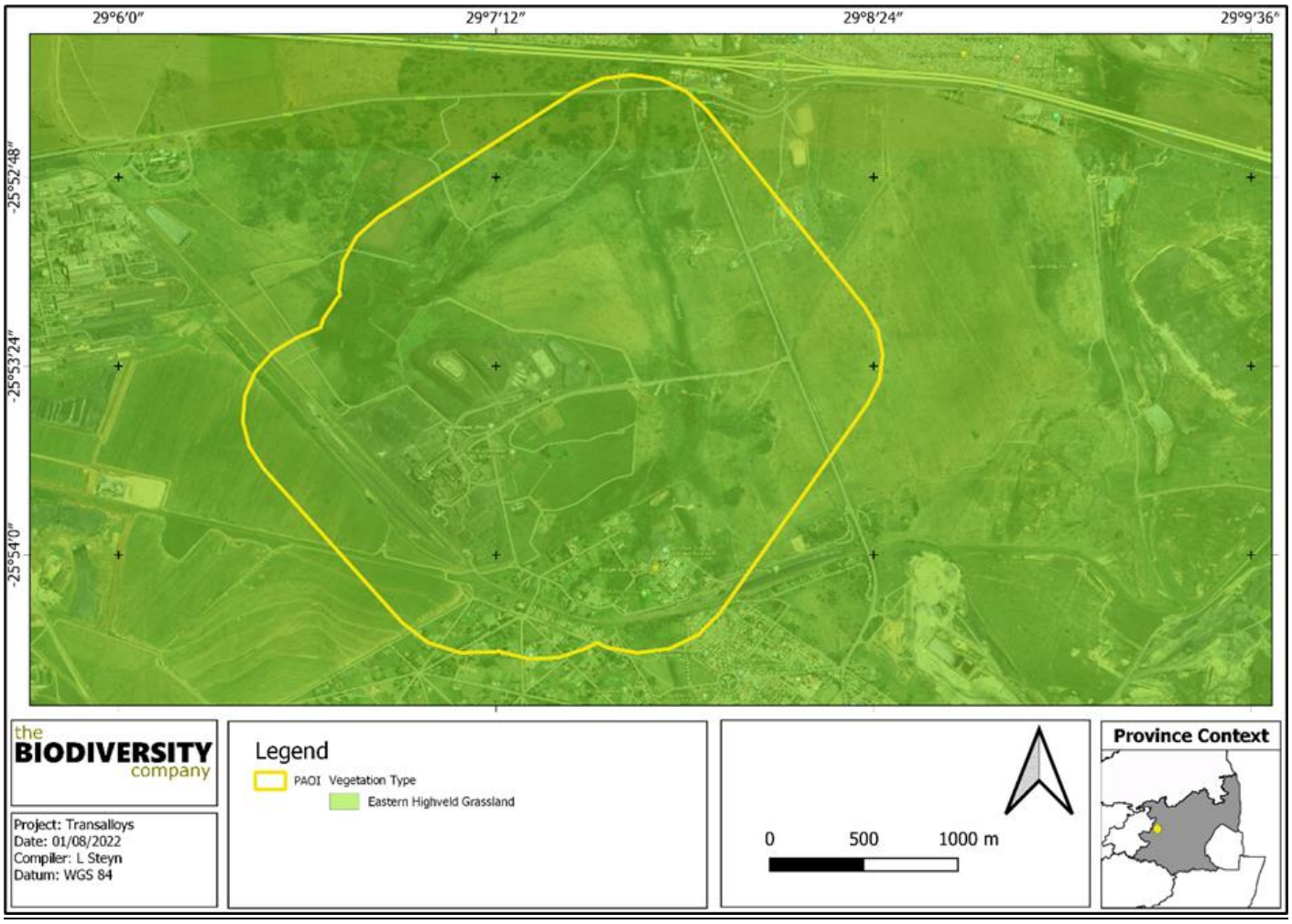


**Figure 7.9**: Map illustrating the vegetation type associated with the project site

Eastern Highveld Grassland

This vegetation type occurs on slightly to moderately undulating planes, including some low hills and pan depressions. The vegetation is a short dense grassland dominated by the usual highveld grass composition (*Aristida, Digitaria, Eragrostis, Themeda, Tristachya* etc.) with small scattered rocky outcrops with, wiry sour grasses and some woody species. Some 44% transformed primarily by cultivation, plantations, mines, urbanisation and by building of dams. No serious alien invasions are reported (Mucina & Rutherford, 2006).

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

**Graminoids:** *Aristida aequiglumis (d), A. congesta (d), A. junciformis subsp. galpinii (d), Brachiaria serrata (d), Cynodon dactylon (d), Digitaria monodactyla (d), D. tricholaenoides (d), Elionurus muticus (d), Eragrostis chloromelas (d), E. curvula (d), E. plana (d), E. racemosa (d), E. sclerantha (d), Heteropogon contortus (d), Loudetia simplex (d), Microchloa caffra (d), Monocymbium ceresiiforme (d), Setaria sphacelata (d), Sporobolus africanus (d), S. pectinatus (d), Themeda triandra (d), Trachypogon spicatus (d), Tristachya leucothrix (d), T. rehmannii (d), Alloteropsis semialata subsp. eckloniana, Andropogon appendiculatus, A. schirensis, Bewsia biflora, Ctenium concinnum, Diheteropogon amplectens, Eragrostis capensis, E. gummiflua, E. patentissima, Harpochloa falx, Panicum natalense, Rendlia altera, Schizachyrium sanguineum, Setaria nigrirostris, Urelytrum agropyroides.*

**Herbs:** *Berkheya setifera (d), Haplocarpha scaposa (d), Justicia anagalloides (d), Pelargonium luridum (d), Acalypha angustata, Chamaecrista mimosoides, Dicoma anomala, Euryops gilfillanii, E. transvaalensis subsp. setilobus, Helichrysum aureonitens, H. caespititium, H. callicomum, H. oreophilum, H. rugulosum, Ipomoea crassipes, Pentanisia prunelloides subsp. latifolia, Selago densiflora, Senecio coronatus, Vernonia oligocephala, Wahlenbergia undulata.*

**Geophytic Herbs:** *Gladiolus crassifolius, Haemanthus humilis subsp. hirsutus, Hypoxis rigidula var. pilosissima, Ledebouria ovatifolia.*

**Succulent Herb:** *Aloe ecoklonis.*

**Low Shrubs**: *Anthospermum rigidum subsp. pumilum, Stoebe plumosa.*

According to Mucina and Rutherford (2006) this vegetation type is classified as 'Endangered, with the national target for conservation protection for Eastern Highveld Grassland being 24%. Only a very small fraction is conserved in statutory reserves (Nooitgedacht Dam and Jericho Dam Nature Reserves) and private reserves (Holkranse, Kransbank, Morgenstond). Some 44% has been transformed primarily by cultivation, plantations, mines, urbanisation and by building of dams. Cultivation may have had a more extensive impact, indicated by land-cover data. No serious alien invasions are reported, but Acacia mearnsii can become dominant in disturbed sites (Mucina and Rutherford, 2006).

**ii. Listed Plant Species**

The Plants of Southern Africa (POSA) database indicates that 391 species of indigenous plants are expected to occur within the project area. Six (6) species of conservation concern (SCC), based on their conservation status, could be expected to occur within the project area and are provided in **Table 7.5** below.

**Table 7.5**: Threatened flora species that may occur within the project area

| 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 7.5** were confirmed within the project site during the field survey. A total of twenty-six (26) tree, shrub, herbaceous and graminoid plant species were however recorded in the project area during the field assessment. Several individuals of the species Zantedeschia aethiopica and Crinum macowanii were observed along the wetland habitat within the development area. Zantedeschia aethiopica and Crinum macowanii are provincially protected according to Schedule 11 of the Mpumalanga Nature Conservation Act (Act 10 of 1998), and no individual may be disturbed without the appropriate permit. No plant species protected in terms of the National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA) were recorded during the field survey of the project area.

**iii. Protected Tree Species**

During the field survey undertaken, 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.

The Mpumalanga Biodiversity Spatial Plan (MBSP) CBA map delineates Critical Biodiversity Areas, Ecological Support Areas, Other Natural Areas, Protected Areas, and areas that have been irreversibly modified from their natural state (MTPA, 2014). The MBSP uses the following terms to categorise the various land used types according to their biodiversity and environmental importance:

- Critical Biodiversity Area (CBA);
- Ecological Support Area (ESA);
- Other Natural Area (ONA);
- Protected Area (PA); an
- Moderately or Heavily Modified Areas (MMAs or HMAs).

- Heavily modified;
- Moderately modified -old lands area;
- CBA: optimal; and
- CBA: Irreplaceable Area.

**Figure 7.10** shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with a heavily modified area.

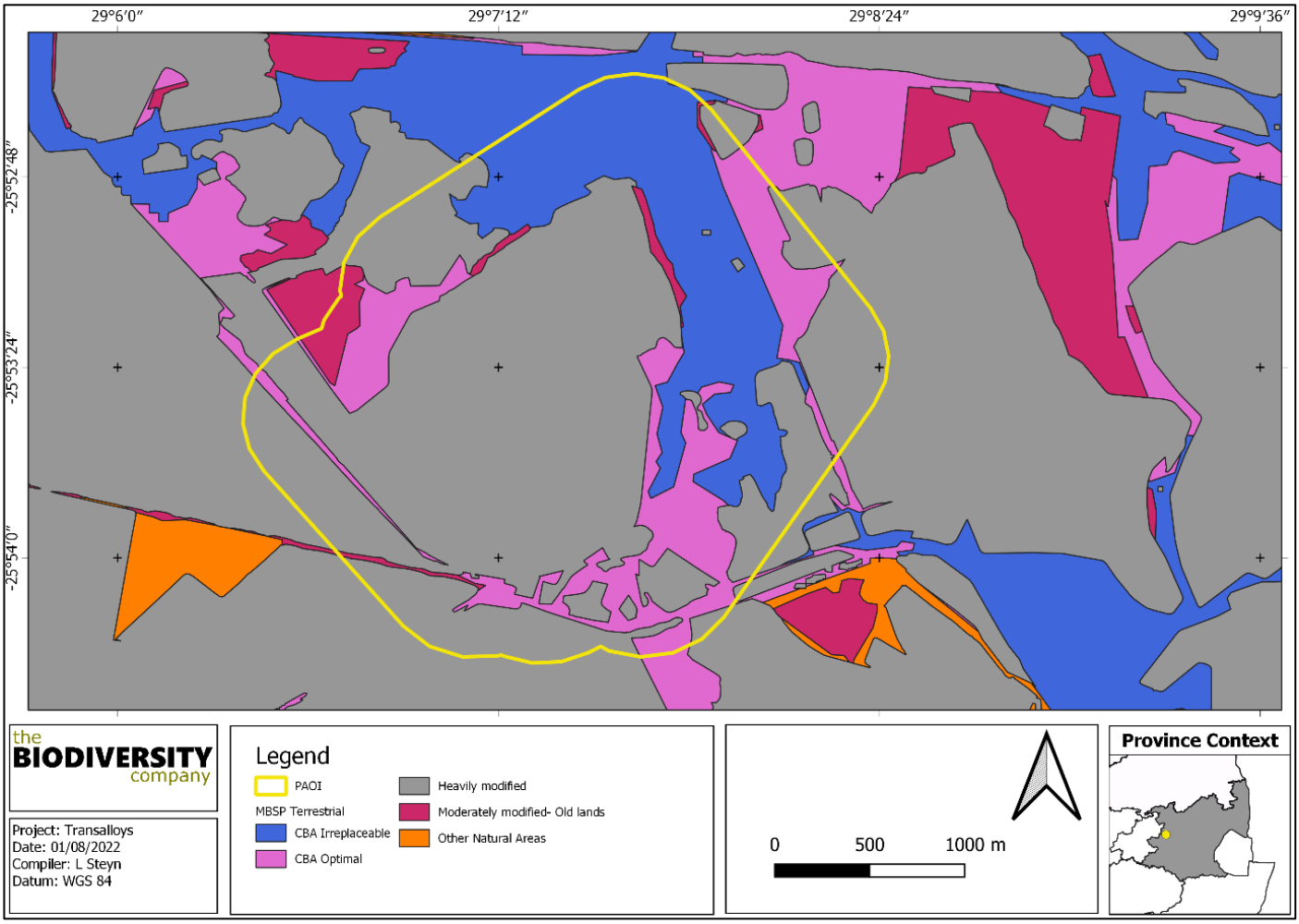


**Figure 7.10** Extract of the Mpumalanga Biodiversity Sector Plan for the project showing that the development area falls within a site classified as heavily modified.

## 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 7.11**).

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 area overlaps with a PP ecosystem (refer to **Figure 7.11**).

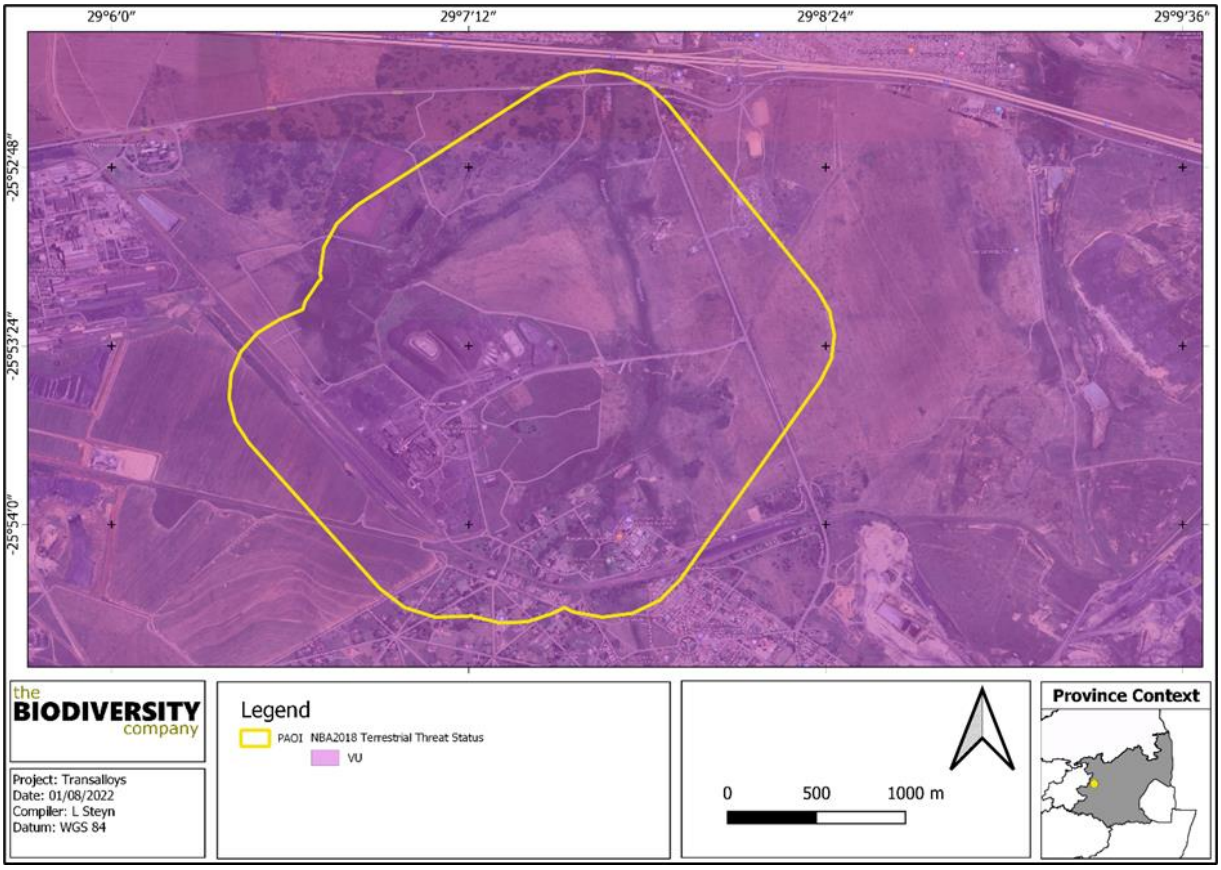


**Figure 7.11** Map illustrating that the project site falls within a Vulnerable ecosystem

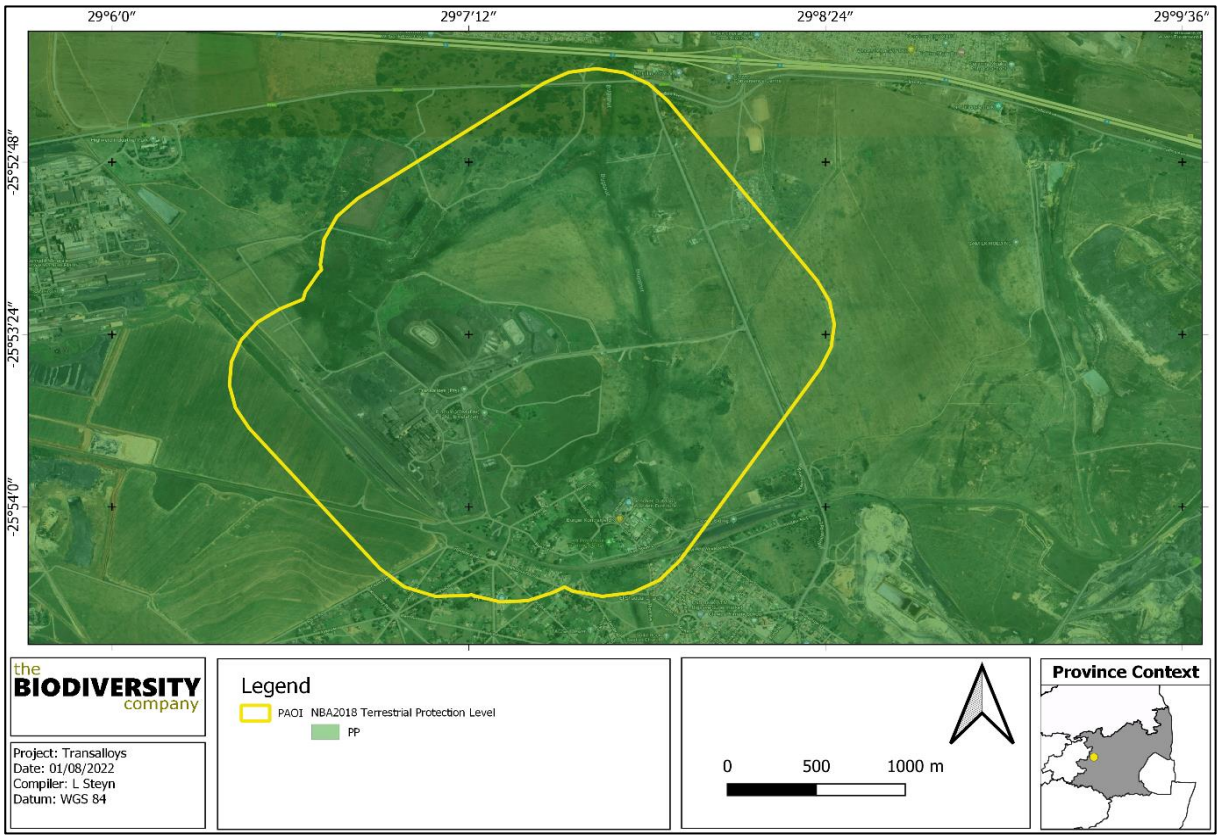


**Figure 7.12** Map illustrating that the project site falls within an ecosystem that is Poorly Protected (PP)

## vi. Mpumalanga Protected Areas Expansion Strategy (MPAES)

The project area in relation to the Mpumalanga Protected Areas Expansion Strategy (MPAES) focus areas can be seen in **Figure 7.14**. The project area does overlap on MPAES areas. The project area impacts on an area identified as part of the protected area expansion strategy. This however falls within the Transalloys smelter site, which is considered to be heavily modified (as shown in the figure above).

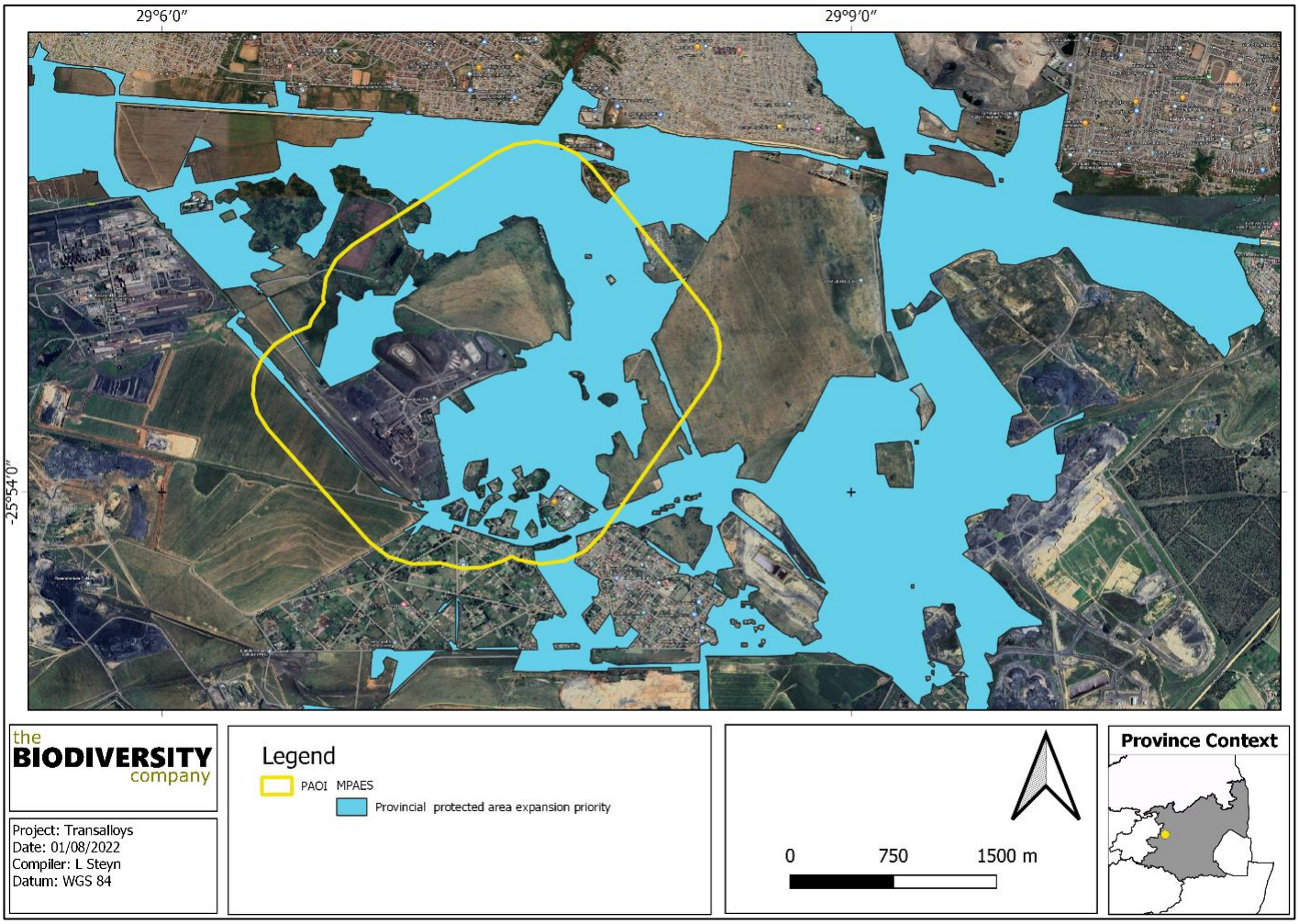


**Figure 7.13**: The project area in relation to the Mpumalanga Protected Areas Expansion Strategy focus areas

## vii. Ecological sensitivity of the site

Four main habitats were identified and delineated within the development area, namely water resources, degraded grassland, secondary grassland and transformed areas. 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 7.6**). The sensitivity ratings of the habitat types delineated are illustrated in **Figure 7.15**. According to **Figure 7.15**, the water resources are regarded as being of high ecological sensitivity; the degraded grasslands, secondary grasslands 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 7.6**: 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. |
| **Medium** | Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities. |
| **Low** | Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities. |
| **Very Low** | Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required. |

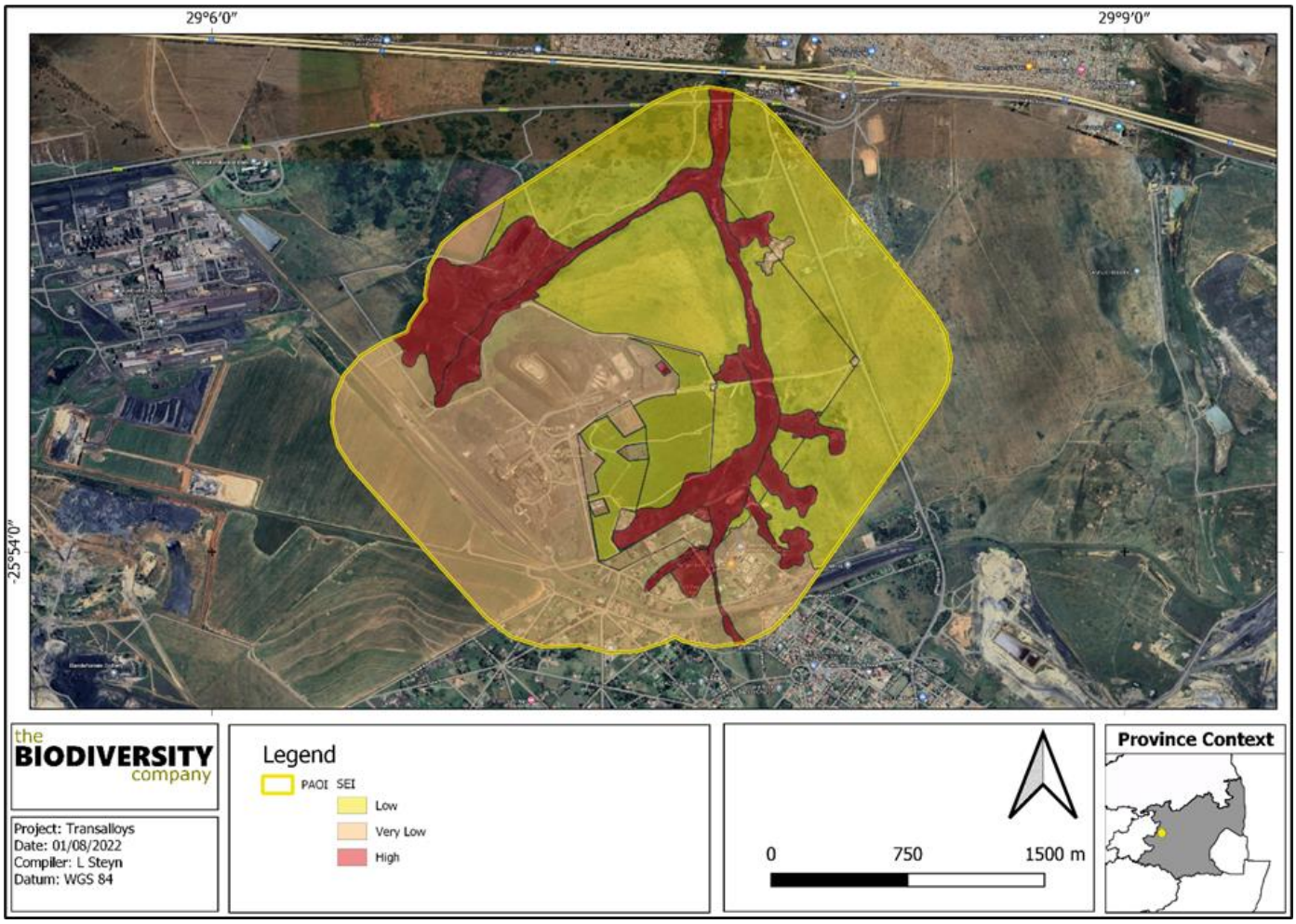


**Figure 7.14** Sensitivity of the development area

## viii. Terrestrial Fauna Communities

### Mammals

The IUCN Red List Spatial Data lists eighty (80) mammal species that could be expected to occur within the area. This list excludes large mammal species that are limited to protected areas. Fifteen (15) of these expected species are regarded as threatened, five (5) of these have a moderate to high likelihood of occurrence based on the presence pf suitable habitat and food sources in the project area. Threatened mammal species expected to occur within the project area are detailed below in **Table 7.7**.

**Table 7.7**: Threatened mammal species that are expected to occur within the project area

| Species | Common Name | Conservation Status | | Likelihood Of Occurrence |
|---|---|---|---|---|
| | | SANBI (2022) | IUCN (2021) | |
| *Aonyx Capensis* | Cape Clawless Otter | NT | NT | High |
| *Atelerix Frontalis* | South Africa Hedgehog | NT | LC | Moderate |
| *Cloeotis Percivali* | Short-Eared Trident Bat | EN | LC | Low |
| *Crocidura Maquassiensis* | Makwassie Musk Shrew | VU | LC | Low |
| *Dasymys Incomtus* | African Marsh Rat | NT | LC | Moderate |
| *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 | High |
| *Leptailurus Serval* | Serval | NT | LC | High |
| *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 | Low |

- ***Aonyx capensis* (Cape Clawless Otter)** is the most widely distributed otter species in Africa (IUCN, 2017). This species is predominantly aquatic, and it is seldom found far from water. Based on the presence of a perennial river and wetland habitat present across the project area, the likelihood of occurrence of this species occurring in the project area is considered to be high.
- ***Atelerix frontalis* (South African Hedgehog)** has a tolerance of a degree of habitat modification and occurs in a wide variety of semi-arid and sub-temperate habitats (IUCN, 2017). Based on the Red List of Mammals of South Africa, Lesotho and Swaziland (2016*), A. frontalis* populations are decreasing due to the threats of electrocution, veld fires, road collisions, predation from domestic pets and illegal harvesting. Although the species is cryptic and therefore not often seen, there is suitable habitat in the project area and therefore the likelihood of occurrence is rated as moderate.
- ***Dasymys incomtus* (African Marsh Rat)** is listed as NT on a regional scale and LC on a global scale. This species has a wide distributional range that includes Central Africa, East Africa and parts of Southern Africa. This species has been recorded from a wide variety of habitats, including forest and savanna habitats, wetlands and grasslands (IUCN, 2017). Based on the presence of a river as well as wetlands in the project area the likelihood of occurrence of this species in the project area is rated as moderate, the proximity of the urban area may cause the species to be absent.

- ***Hydrictis maculicollis* (Spotted-necked Otter)** inhabits freshwater habitats where water is un-silted, unpolluted, and rich in small to medium sized fishes (IUCN, 2017). Suitable habitat may be available along the river and wetland areas associated with the project area and therefore the likelihood of occurrence is high.
- ***Leptailurus serval* (Serval)** occurs widely through sub-Saharan Africa and is commonly recorded from most major national parks and reserves (IUCN, 2017). The Serval's status outside reserves is not certain, but they are inconspicuous and may be common in suitable habitat as they are tolerant of farming practices provided there is cover and food available. In sub-Saharan Africa, they are found in habitat with well-watered savanna long-grass environments and are particularly associated with reedbeds and other riparian vegetation types. Due to the presence of suitable habitat along portions of the project area, the likelihood of occurrence is rated as high.

During the March 2019 Fauna and Flora Pre-Construction Walkthrough Report compiled by Nkurenkuru one protected species was found within the relevant provincial conservation act (Aardvark), whilst none are listed Red Data species.

**Reptiles**

Based on the IUCN Red List spatial database and the ReptileMap database, over 90 reptile species may be expected to occur within and near the project area. Six (6) of these expected species are regarded as SCC and of these SCC three (3) have a moderate likelihood of occurrence based on the presence of suitable habitat and food sources in the area.

- ***Chamaesaura macrolepis*** (Large-scaled Grass Lizard) is categorised as NT on both a regional and an international scale. Endemic to South Africa (KwaZulu-Natal, Mpumalanga and Limpopo), Swaziland and Zimbabwe. They occur in the Savanna, Indian Ocean Coastal Belt and Grassland biomes where they are found in the grassland, especially on rocky, grassy hillsides. Threatened by transformation of land for crop farming and plantations, overgrazing by livestock, infrastructural development, frequent anthropogenic fires and use of pesticides. The likelihood of occurrence in the project area is rated as moderate.
- ***Homoroselaps dorsalis*** (Striped Harlequin Snake) is partially fossorial and known to inhabit old termitaria in grassland habitat (IUCN, 2017). Most of its range is at moderately high altitudes, reaching 1,800 m in Mpumalanga and Swaziland, but it is also found at elevations as low as about 100 m in KwaZulu-Natal. The likelihood of occurrence was rated as moderate.
- ***Tetradactylus breyeri*** (Breyers's Long-tailed Seps) is categorised as VU regionally and NT internationally. Found in montane and Highveld grasslands of the Grassland Biome at altitudes of 1,400-2,000m. Threatened by transformation of land for crops, timber plantations, overgrazing by livestock causing depletion of sheltering sites and insect prey, infrastructure development in some areas, frequent fires and the use of pesticides. Due to the availability of suitable habitat the likelihood of the species occurring in the project area is rated as moderate.

**Amphibians**

Based on the IUCN Red List Spatial Data and the AmphibianMap, twenty (20) 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 area.

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

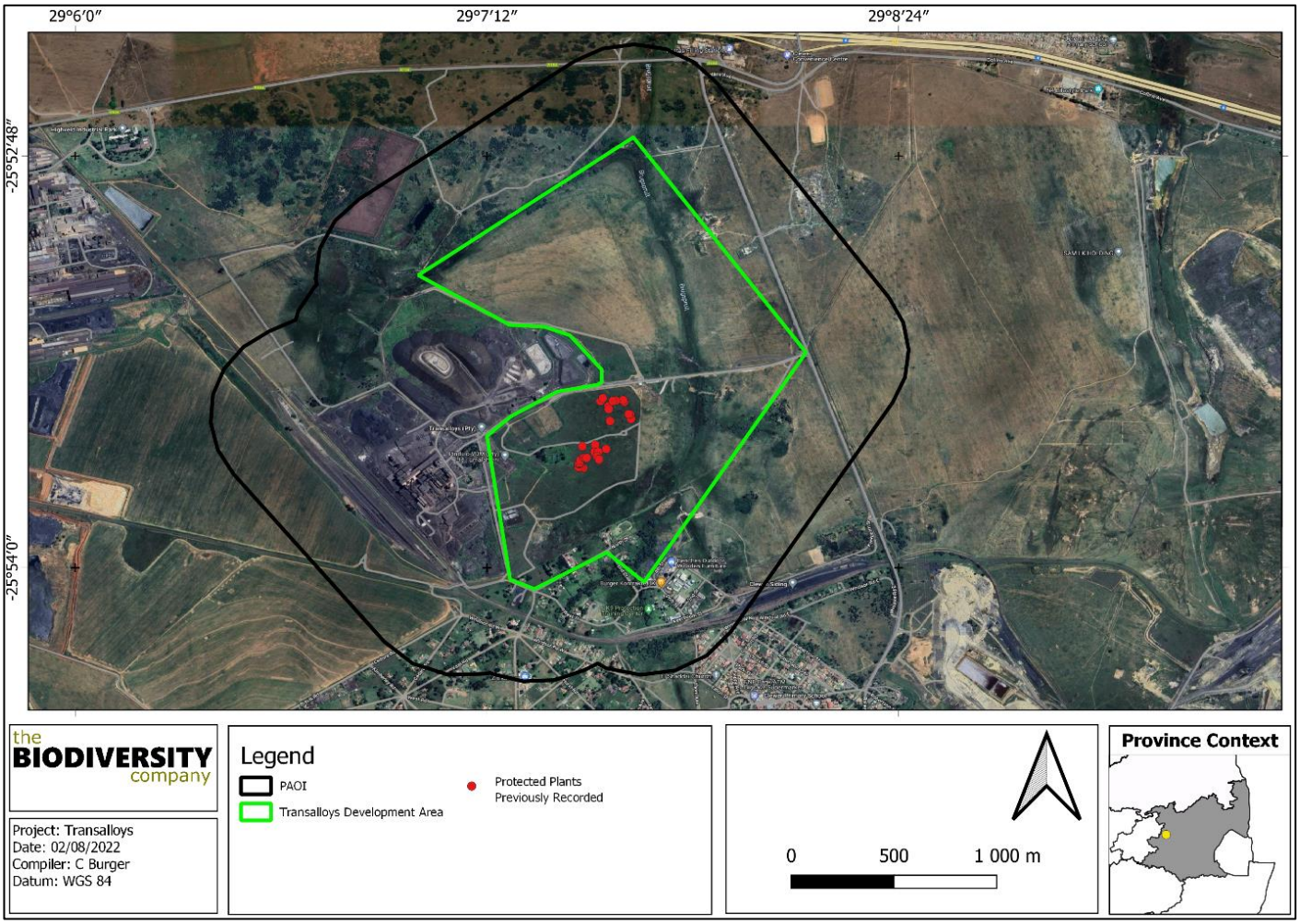


**Figure 15:** Protected plant, *Crinum macowanii*, recorded during the 2019 Walkthrough (Nkurenkuru Ecology & Biodiversity, 2019)

## ix. Avifauna

The Lanner Falcon (*Falco biarmicus*) was observed in the project area. A nest of Hamerkop (*Scopus umbrette*) was found in the project area, this species is protected under schedule 5 of the Mpumalanga Nature Conservation Act no 10 of 1988. As this schedule is more relevant to the trade and imprisonment of the species as appose to full protection only a 50 m buffer was placed around the nest to ensure the species does not get exposed to any nest disturbance

The SABAP2 Data lists two hundred and forty-six (246) avifauna species that could be expected to occur within the area. Ten (10) of these expected species are regarded as threatened. Four (4) species have a low likelihood of occurrence due to lack of suitable habitat and food sources in the project area.

Twenty-one 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 (refer to **Table 7.8**). None of the species recorded in the project area are considered as species of conservation concern.

**Table 7.8**: Threatened avifauna species that are expected to occur within the project area

| Species | Common Name | Conservation Status | | Likelihood of occurrence |
|---|---|---|---|---|
| | | Regional (SANBI, 2016) | IUCN (2021) | |
| *Calidris ferruginea* | Sandpiper, Curlew | LC | NT | Moderate |
| *Circus ranivorus* | Marsh-harrier, African | EN | LC | High |
| *Geronticus calvus* | Ibis, Southern Bald | VU | VU | Moderate |
| *Grus paradisea* | Crane, Blue | NT | VU | Low |
| *Mirafra cheniana* | Lark, Melodious | LC | NT | Low |
| *Oxyura maccoa* | Duck, Maccoa | NT | VU | Moderate |
| *Phoeniconaias minor* | Flamingo, Lesser | NT | NT | Low |
| *Phoenicopterus roseus* | Flamingo, Greater | NT | LC | Low |
| *Sagittarius serpentarius* | Secretarybird | VU | EN | High |
| *Tyto capensis* | Grass-owl, African | VU | LC | Moderate |

**Table 7.9**: List of avifauna species recorded in the project area

| Species | Common Name | Conservation Status | |
|---|---|---|---|
| | | Regional (SANBI, 2016) | IUCN (2021) |
| *Falco Biarmicus* | Lanner Falcon | VU | LC |

**x. Aquatic Features**

The wetland areas within the project site were delineated in accordance with the DWAF (2005) guidelines. Five (5) hydrogeomorphic (HGM) units were identified within the 500m regulated area, namely, hillslope seep wetlands, channelled valley bottom wetland, unchanneled valley bottom wetland (refer to **Figure 7.18**). Along wetlands a leaking pipe as well as a few dams were also delineated. Of these wetland systems, only HGM1 and 2 are expected to be at an appreciable level of risk due to the locality of these systems being within the proposed Transalloys Solar PV Energy facility development area.

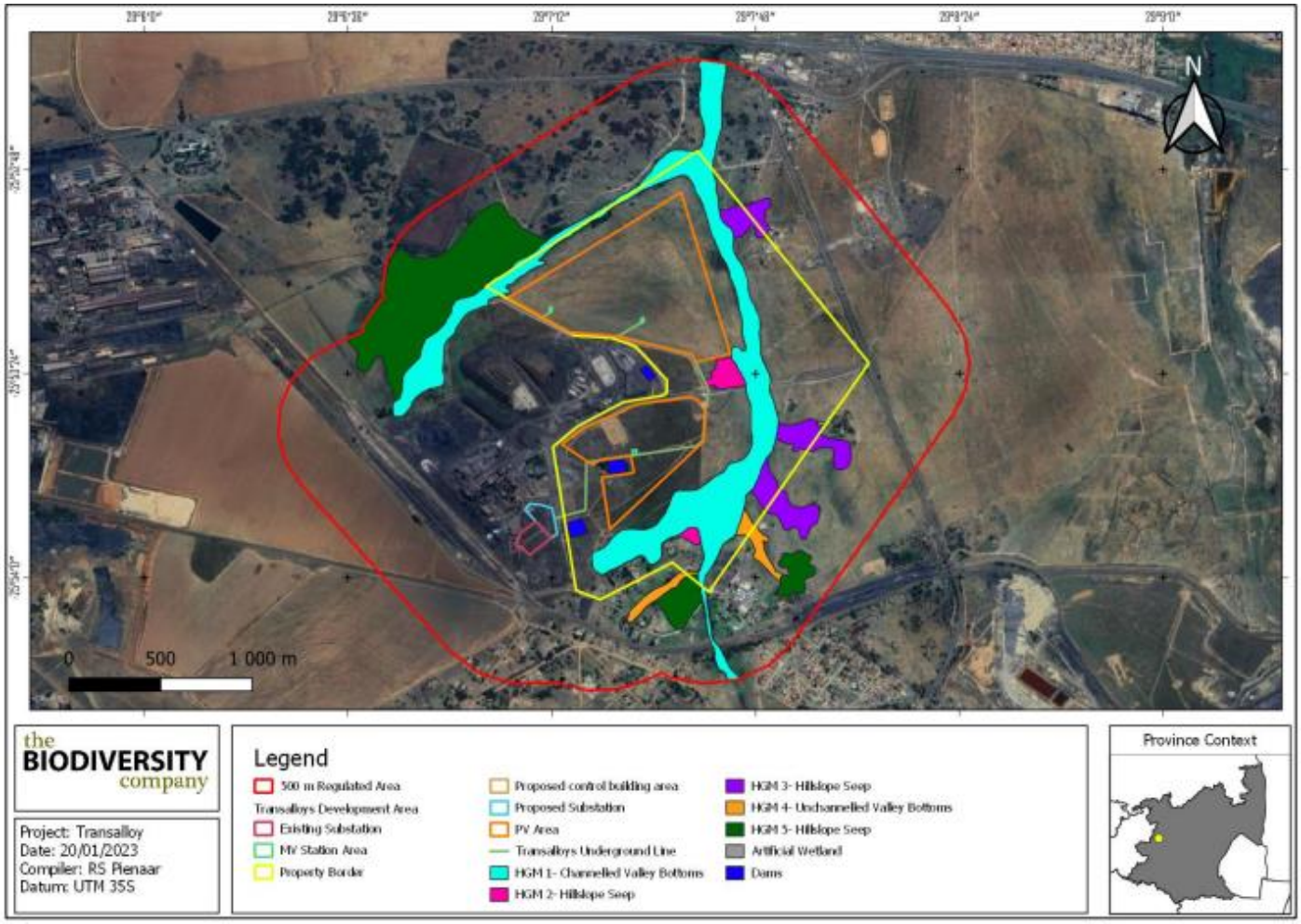


**Figure 7.16** Delineated wetlands within the 500m regulated area, including their associated buffer zones

An ecological importance and sensitivity assessment was undertaken for the two wetlands systems located within the Solar PV development area (i.e., HGM 1 and 2). 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 for HGM 1 and HGM 2 has been calculated as moderate.

A pre-mitigation buffer zone of 15m is recommended for the wetland systems delineated within the 500m regulated area.

## 7.5 Heritage Resources

### *7.5.1 Archaeological Resources*

The area proposed for development has been previously surveyed for impacts to heritage resources by both Pelser (2014, SAHRIS NID 160495) and Van der Walt (2019, SAHRIS NID 524807) and as such, we have a good idea of the heritage sensitivity of the area proposed for development. According to Van der Walt (2019), the development area is very flat and has been extensively altered by large-scale industrial and mining

activities. A more detailed history of the area proposed for development has been compiled by Van der Walt (2019) and is not repeated here.

Pelser's (2014) assessment identified a number of heritage resources within and in proximity to the area proposed for development including "the remains of a very large graveyard containing at least 90 graves. Different types of grave dressing and headstones are found, being cement borders with headstones, heaps of soil, stone packed with or without headstones, granite borders and headstones and heaps of brick. A few are even fenced in. Surnames identified include Gasibone, Mdlalose, Masilela, Blom and Mokoena. Only eight of the graves have dates of death indicated, with the oldest being 1947 and the youngest 1960." According to Van der Walt (2019), it is noted that the graveyard is separately fenced off. This site is marked as SAHRIS Site 44057 and 45183. Pelser (2014) recommended no impact to this site and this recommendation is reiterated in this assessment. Furthermore, it is recommended that due to the ongoing social significance of this site, that visitation access is ensured in the proposed development. Pelser (2014) further recommended that a management plan be developed for this site's ongoing management. This recommendation is also reiterated in this report.

In his assessment of the site (2019), Van der Walt determined that the overall area has limited heritage sensitivity. Van der Walt (2019) noted that the development area has been impacted by agricultural activities and recent mining operations. Van der walt (2019) identified the demolished remains of three structures within the development area. These structures were determined to be Not Conservation-Worthy in Van der walts report (2019), described simply as cement and bricks, and are marked as Sites 45186, 45188, 45189 in Figure 3A. No recommendations are made in this regard as these sites have no heritage value.

Two sites that have social significance as initiation sites were identified in Van der Walt (2019). The sites marked as 45192 and 45185 in **Figure 7.17** below as the general locations of these initiation sites. Initiation site 1 (Site 45192) is located on the western bank of the "Brugspruit" within a cluster of wattle trees. No features occur in this area but according to Mr Knoetze the site is visited approximately every 3 years by Ndebele and Sotho participants. Initiation site 2 (Site 45183) is located at a low water bridge over the "Brugspruit". According to Mr. Knoetze the site is visited yearly by Pedi participants. At the time of the survey no one was attending an initiation school at any of the two sites. However, it is important that the ongoing cultural practices that take place at these sites are retained and provided for in the proposed development. These sites are included within the wetland buffer areas provided.

### *7.5.2 Palaeontology*

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of very high palaeontological sensitivity. According to the CGS Map for Pretoria, the underlying geology of the development area consists of sediments of the Ecca Formation. In 2014, a desktop palaeontology assessment of the area was completed by Durand (2014). Durand (2014) notes that "The region is known for its fossiliferous mudstones and sandstones and it is highly probable that fossils will be encountered during construction if the excavations expose the bedrock. The potentially fossiliferous unit in the study area which may be impacted during construction consists of weathered sandstone." Durand (2014) also notes that Glossopteris leaves are abundant in Ecca Group sediments in Gauteng, Free State, Mpumalanga and KwaZulu-Natal and could be considered to be amongst the most common fossils in South Africa. Most of the geology in the study site is presently covered by alluvium and the bedrock will only be exposed during excavations. There are large and well described collections of fossil material from this region at the Council for Geoscience and at the Bernard Price Institute for Palaeontology at the University of the

Witwatersrand. SAHRIS Site 44024 is marked on **Figure 7.17** and **Figure 7.18** represents a Glossopteris leaf imprint in fine sandstone found ex situ. Despite the grainy nature of the sandstone, the venation pattern of the leaf is visible." This site falls within the wetland buffer area provided. As such, no further recommendations are made in terms of impacts to palaeontological heritage resources. All of the known heritage resources identified through previous assessments and their recommended buffer areas as well as the wetland buffer areas have been mapped in order to identify areas that are appropriate for the PV development from a heritage perspective (**Figure 7.17**).

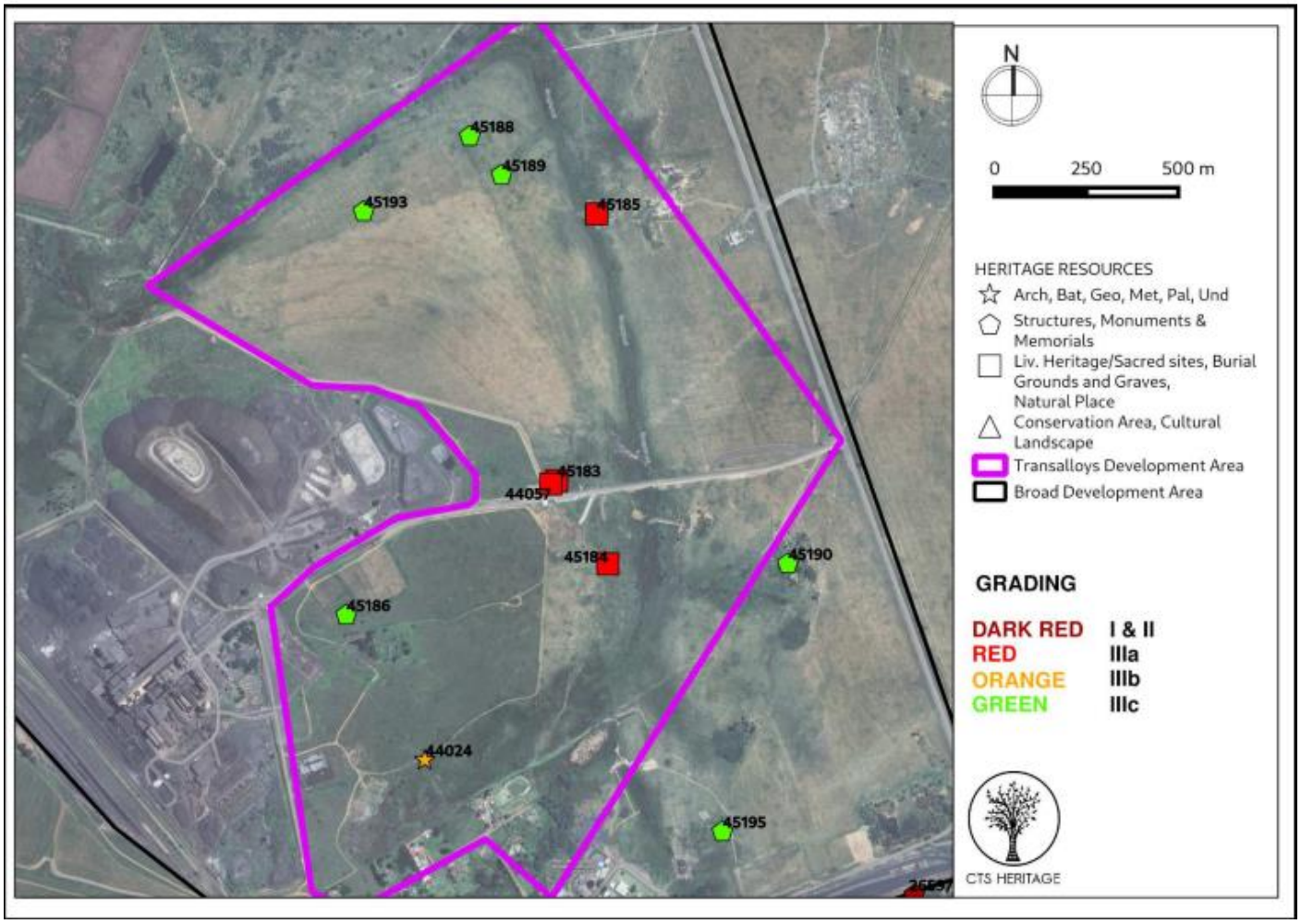


**Figure 7.17**: Heritage resources identified during the field assessment, relative to the proposed development

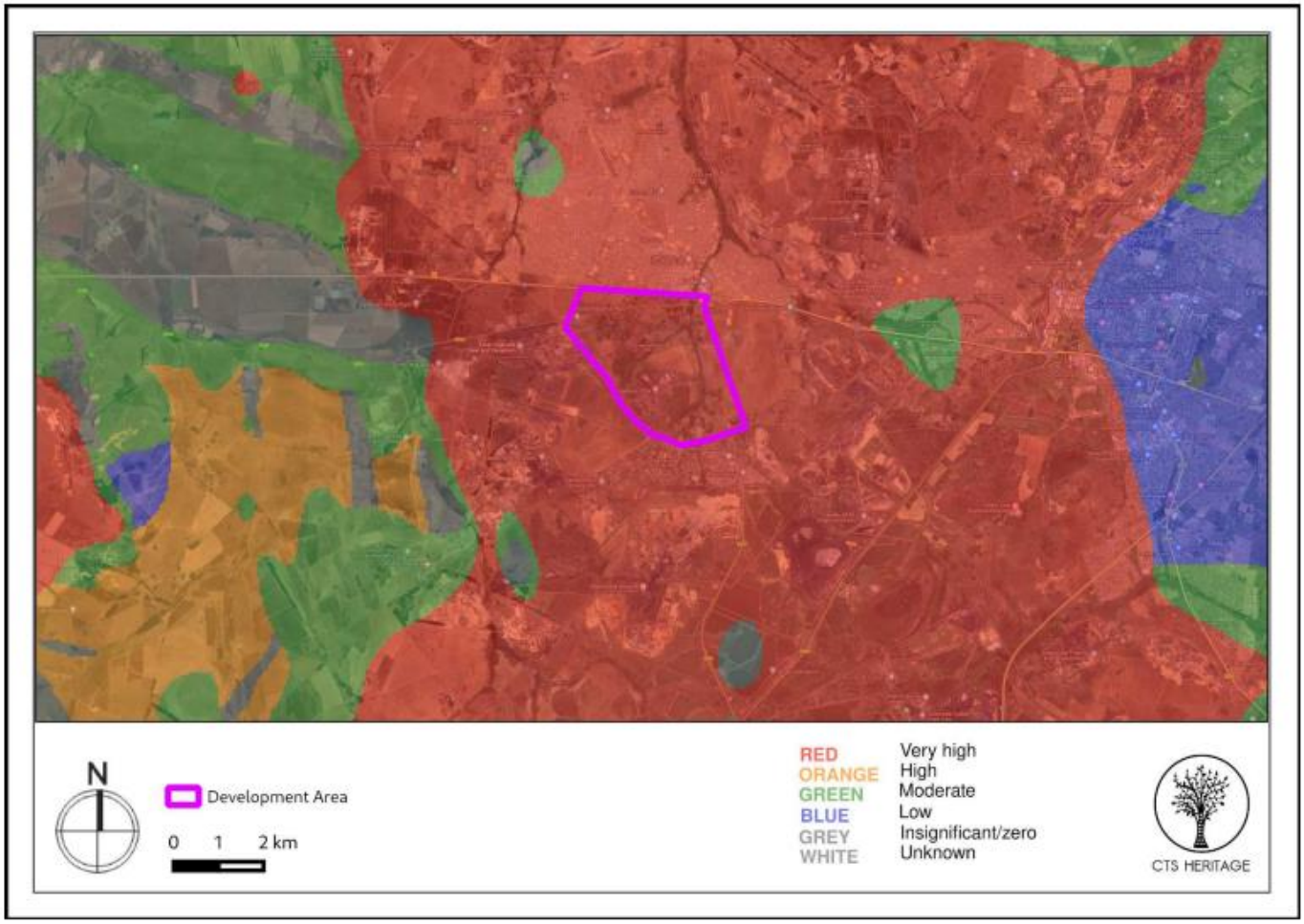


**Figure 7.18:** Palaeontological sensitivity of the development area and the broader study area

### 7.6 7.6. Visual Quality

The identified site for the proposed PV facility is situated south of the N4 national road approximately 10km west of Emalahleni (previously Witbank). The region has a strong mining and industrial character, interspersed with agricultural activities (maize crop production) and human settlements. The central and south-eastern parts of the study area are home to a number of coal mines and industrial plants. These activities, especially the expansive mining and quarrying are rapidly changing the once rural and agricultural character to that of a predominantly industrial nature. Industrial and mining activities in close proximity to the proposed Transalloys PV Solar Energy Facility include the Evraz Highveld Steelworks to the north-west and the Landau colliery to the southeast.

A great number of power lines criss-cross the study area, many of them originating at the power stations within the region or congregating at the Vulcan substation north of KwaGuqa. Electricity for the Highveld steelworks and Transalloys plant are supplied by some of these power lines.

Additional linear infrastructure includes the railway line and railway sidings traversing west of the Transalloys Power Plant, transporting iron ore to the Evras Highveld Steelworks.

The southern part of the study area still has a largely agricultural and rural character where predominantly dryland agriculture (maize) and limited irrigated agriculture are practised. North of the N4 national road the

land use activities are dominated by the KwaGuqa town. This town and expanded townlands primarily include formalised high-density settlements with some informal township developments along the outskirts. Other than the above town, Ackerville to the north-east, smaller residential areas to the south are generally associated with the mining activities, where employees of these mines are housed. The Clewer town and small holdings, situated south of the Transalloys PV Solar Facility are believed to be a case in point.

### *7.6.1. The Affected Environment*

The region has a strong mining and industrial character, interspersed with agricultural activities (maize crop production) and human settlements. The central and south-eastern parts of the study area are home to a number of coal mines and industrial plants. These activities, especially the expansive mining and quarrying are rapidly changing the once rural and agricultural character to that of a predominantly industrial nature. Industrial and mining activities in close proximity to the proposed Transalloys PV Solar Facility include the Evraz Highveld Steelworks to the north-west and the Landau colliery to the south-east.

The highest point above sea level within the region is located near the farm Allandale (1 606.8m), south-west of the Landau Colliery, with the lowest point located along the Brugspruit where it exits the study area to the north.

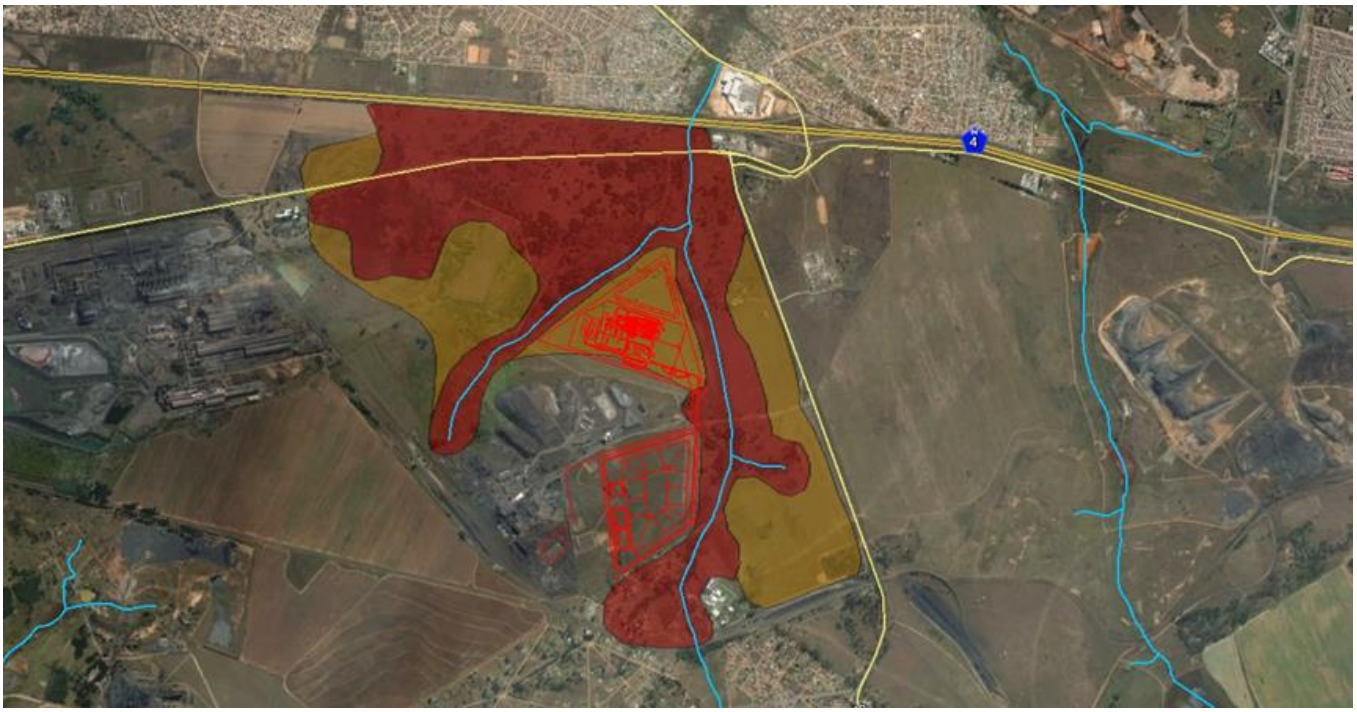

**Figure 7.19**: Visual resource sensitivity (Red = very high, orange = high)

Prominent rivers or streams include the Grootspruit, to the south-west, and the Brugspruit traversing east of the Transalloys Power Plant. This water course (wetland) and grassland account for the remaining scenic natural resources in an area largely dominated by industrial and surface mining activities. This area is considered sensitive from a visual resource perspective and may be considered as a visual buffer zone between the proposed Transalloys PV Solar Energy Facility and the N4, R104, R547 (Bailey Avenue) and Clewer. **Refer to Figure 7.19**.

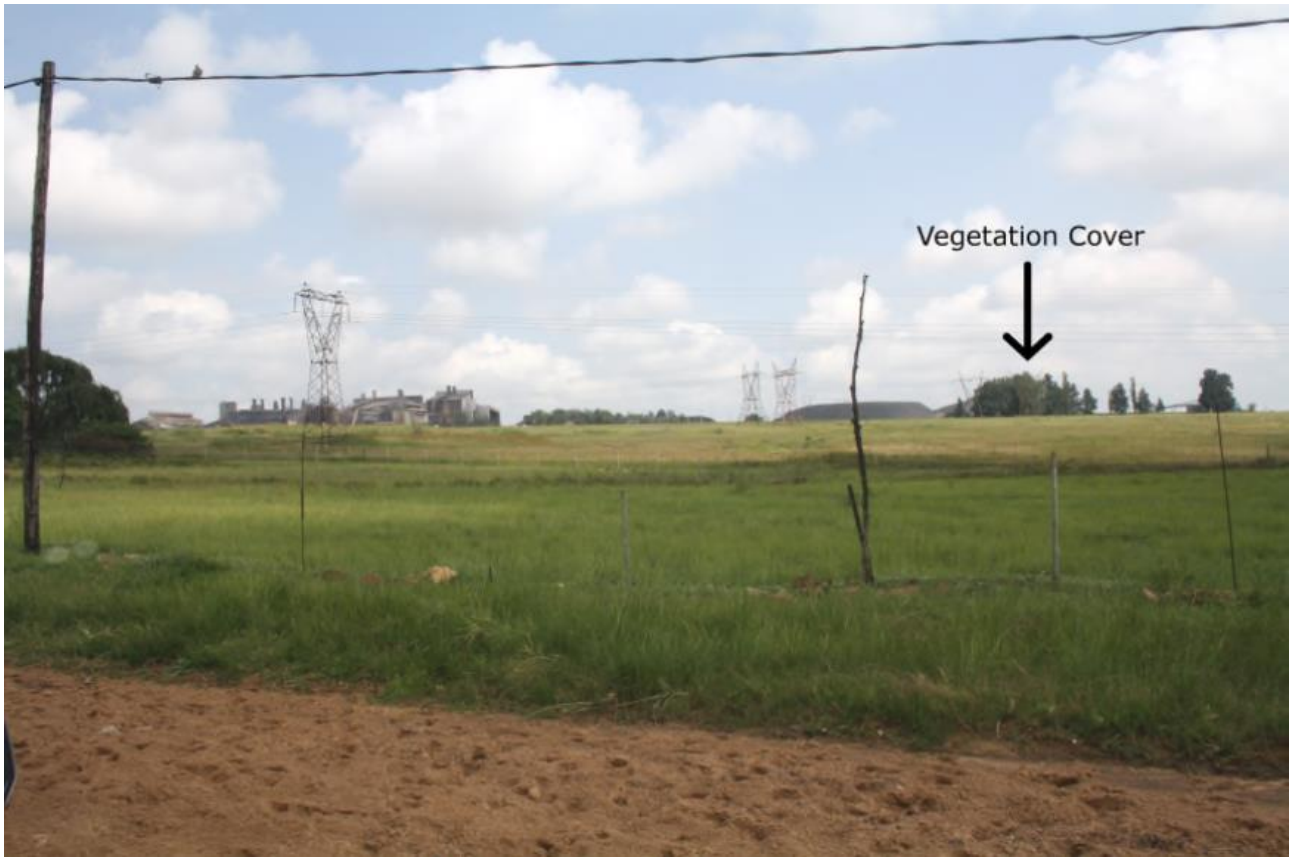


**Figure 7.20:** View from Clewer Agricultural Holdings (north) to the Transalloys Smelter Plant. Note the potential effectiveness of planted vegetation cover in shielding the power plant structures.

A host of power lines criss-cross the study area, many of them originating at the power stations within the region, or congregating at the Vulcan substation north of KwaGuqa. Electricity for the Highveld steelworks and Transalloys plant are supplied by some of these power lines. Some of these include, but are not limited to:

- Minerva-Vulcan 1 400kV
- Arnot-Vulcan 400kV
- Hendrina-Vulcan 1 400kV
- Minerva-Vulcan 1 400kV
- Hendrina -Vulcan 2 400kV
- Ekangala-Kromdraai 132kV
- Duvha-Vulcan 400kV
- Kromdraai-Vulcan 132kV
- Ekangala-Vulcan 132kV
- Kwaguqa-Vulcan 132kV
- Churchill-Vulcan 132kV
- Churchill-Kwaguqa 132kV
- Rand Carbide-Vulcan 132kV
- Hsv One No 2-Vulcan 132kV
- Transalloys-Witbank Trac 132kV
- Schoongezicht T/Witbank Trac-Greenside One 132kV
- Grootpan-Schoongezicht 132kV

» Blackhill Trac-Grootpan 88kV
» Greenside One-Kleinkopje 132kV

Additional linear infrastructure includes the railway line and railway sidings traversing west of the Transalloys Power Plant, transporting iron ore to the Evras Highveld Steelworks.

The southern part of the study area still has a largely agricultural and rural character where predominantly dryland agriculture (maize) and limited irrigated agriculture are practised. North of the N4 national road the land use activities are dominated by the KwaGuqa town. This town and expanded townlands primarily include formalised high-density settlements with some informal township developments along the outskirts. Other than the above town, Ackerville to the north east, smaller residential areas to the south are generally associated with the mining activities, where employees of these mines are housed. The Clewer town and small holdings, situated south of the Transalloys PV Solar Facility are believed to be a case in point.

The natural vegetation or land cover types of the region (where intact) are described as Grassland, Wetlands and Pans. These vegetation cover types are under increased pressure from both mining and township development and are often subject to varying levels degradation. They may also include old agricultural fields that are regenerating. The majority of the remaining natural vegetation within the study area is indicated as Eastern Highveld Grassland with Rand Highveld Grassland to the west refer to **Figure 7.21**.

Farm settlements or residences are (still) found to the south of the study area. Some of these include:
» Allandale
» Weltevrede
» Elandsfontein

No formally protected or conservation areas or major tourist attractions/resorts were identified within the study area.

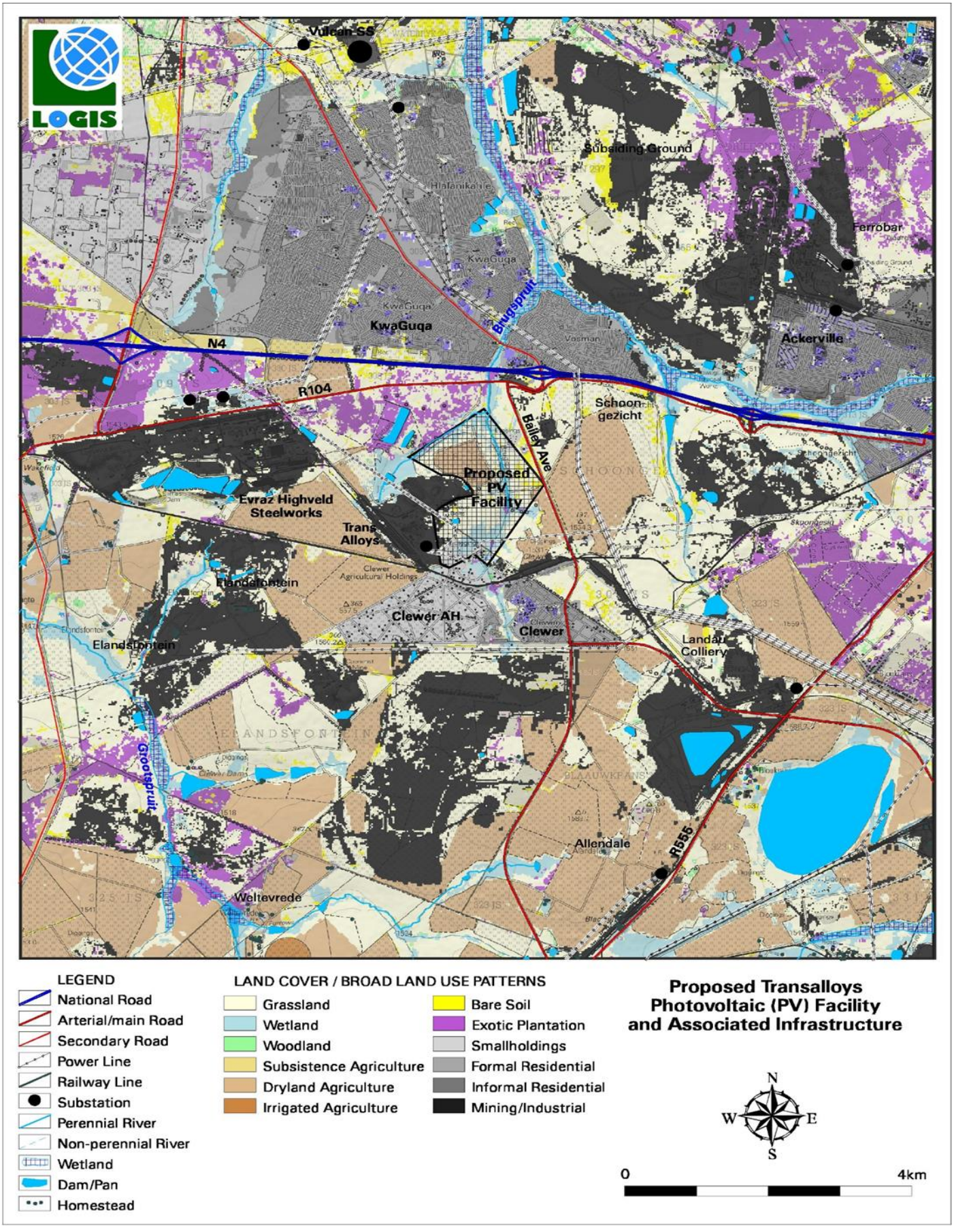


**Figure 7.21:** Land cover and broad land use pattern

# 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 Transalloys Solar PV Energy Facility and associated infrastructure. This assessment has considered the construction of a solar PV facility with a contracted capacity of up to 55MW, within a development footprint of approximately 67.9ha. Infrastructure associated with the facility will include the following:

- Solar PV array comprising PV modules and mounting structures (Bi-facial panels with single axis tracking are preferred over fixed-axis or double axis tracking systems, and mono-facial panels. However, the preferred panel technology will be confirmed during the final design phase.)
- Inverters and on-site transformers with total capacity up to 53MVA.
- Cabling between the project components.
- Underground 33kV power line to connect the solar PV facility to the existing Transalloys Substation.
- Site control building and Site Security office, operations and control, and maintenance and storage laydown areas.
- Access roads and internal distribution roads.

The development of the Transalloys Solar PV Energy 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 33kV power line; and commissioning of new equipment and site rehabilitation. The construction phase for the facility is estimated at 12 - 18 months.

- *Operation* – will include the operation of the Transalloys solar PV energy facility and generation of electricity fed directly into the existing Transalloys smelter complex for direct consumption. The operation phase of the facility is expected to be approximately 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 (with maintenance). 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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 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,. | A description of all environmental impacts identified for the Transalloys Solar PV Energy Facility during the BA process, and the extent to which the impact significance can be reduced through the implementation of the recommended 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility are included and assessed within **section 8.10**. |

## 8.2 Approach to the Assessment of Impacts

The full extent of the project site (~235.5ha), including the development area (~100ha) within the project site, as well as the proposed development footprint (~67.9ha), 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, and the appropriate mitigation measures recommended for the reduction of the significance of negative impacts as well as enhancement measures recommended for the increase of the significance of positive impacts. 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.

Impacts associated with the project have the potential to become more significant when considered in combination with the other developments within the area. The role of the cumulative assessment is to confirm if such impacts are relevant to the Transalloys Solar PV Energy Facility within the project site being considered for the development. This assessment considers whether the cumulative impact will result in:

- Unacceptable loss of threatened or protected vegetation types, habitat, or species through clearing, resulting in an impact on the conservation status of such flora, fauna, or ecological functioning.
- Unacceptable risk to freshwater features through disturbance associated with construction activities and increased runoff and erosion during the operation phase.
- Unacceptable risk to avifauna through habitat loss, displacement, and collision with project infrastructure.
- Unacceptable loss of high agricultural potential areas presenting a risk to food security and increased soil erosion.
- Unacceptable loss of heritage resources (including palaeontological and archaeological resources and the cultural landscape).
- Complete or whole-scale change in the sense of place and character of an area and unacceptable visual intrusion.
- Unacceptable negative impact to socio-economic factors and components.

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. Similar projects proposed within this study area are reflected in **Figure 8.2**. In addition to renewable energy developments, there are a number of industrial-type developments in the immediate vicinity of the site, including the adjacent Transalloys smelter and the Highveld Industrial Park located to the north of the site. Coal-fired power stations, coal mines and numerous power lines also occur within the region.

This section of the report presents a summary of the findings of the detailed specialist studies contained in **Appendix D** to **J**.

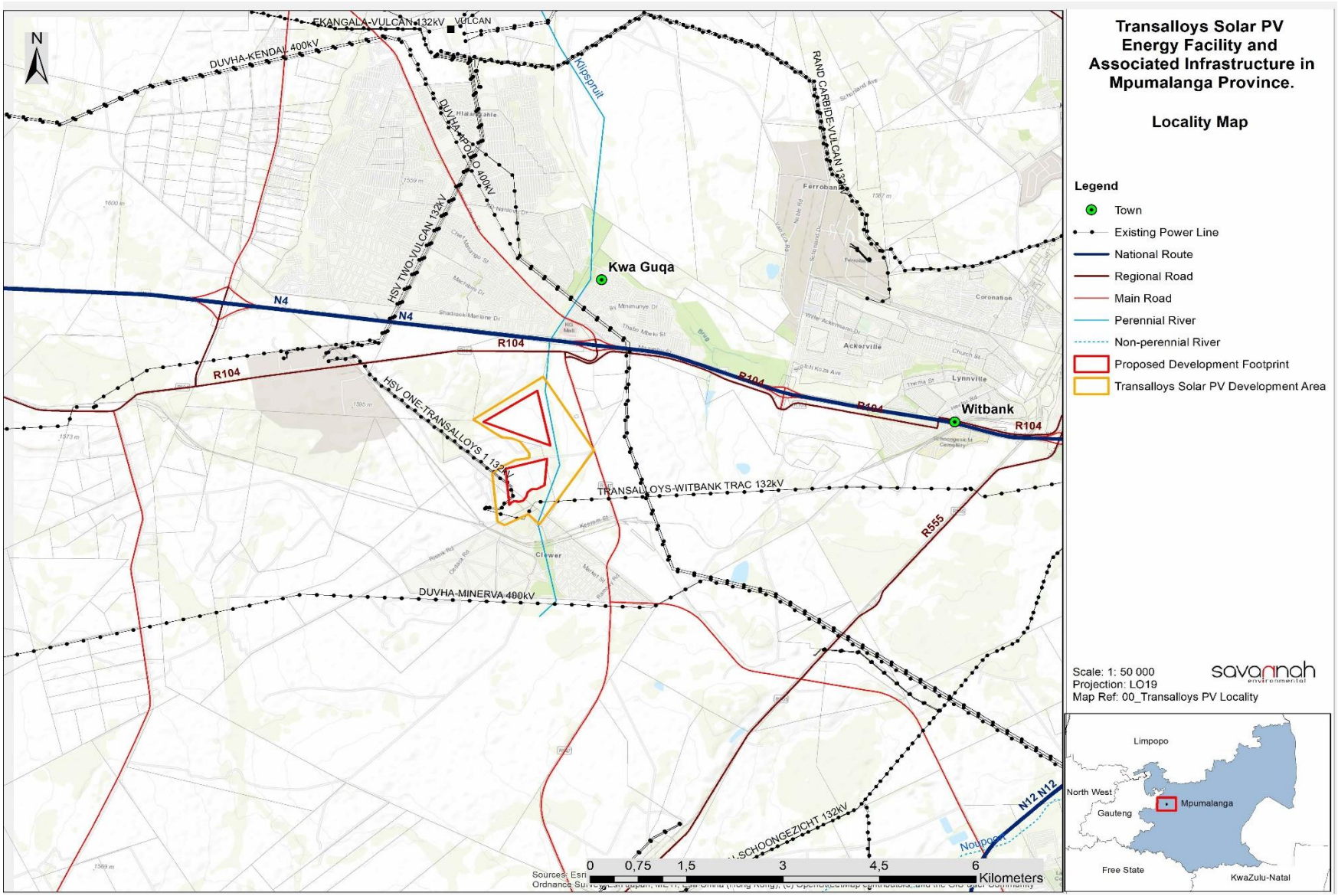


**Figure 8.1:** Map showing the project site and development area for the Transalloys Solar PV Energy Facility and associated infrastructure considered as part of this BA process (refer to **Appendix O** for A3 maps).

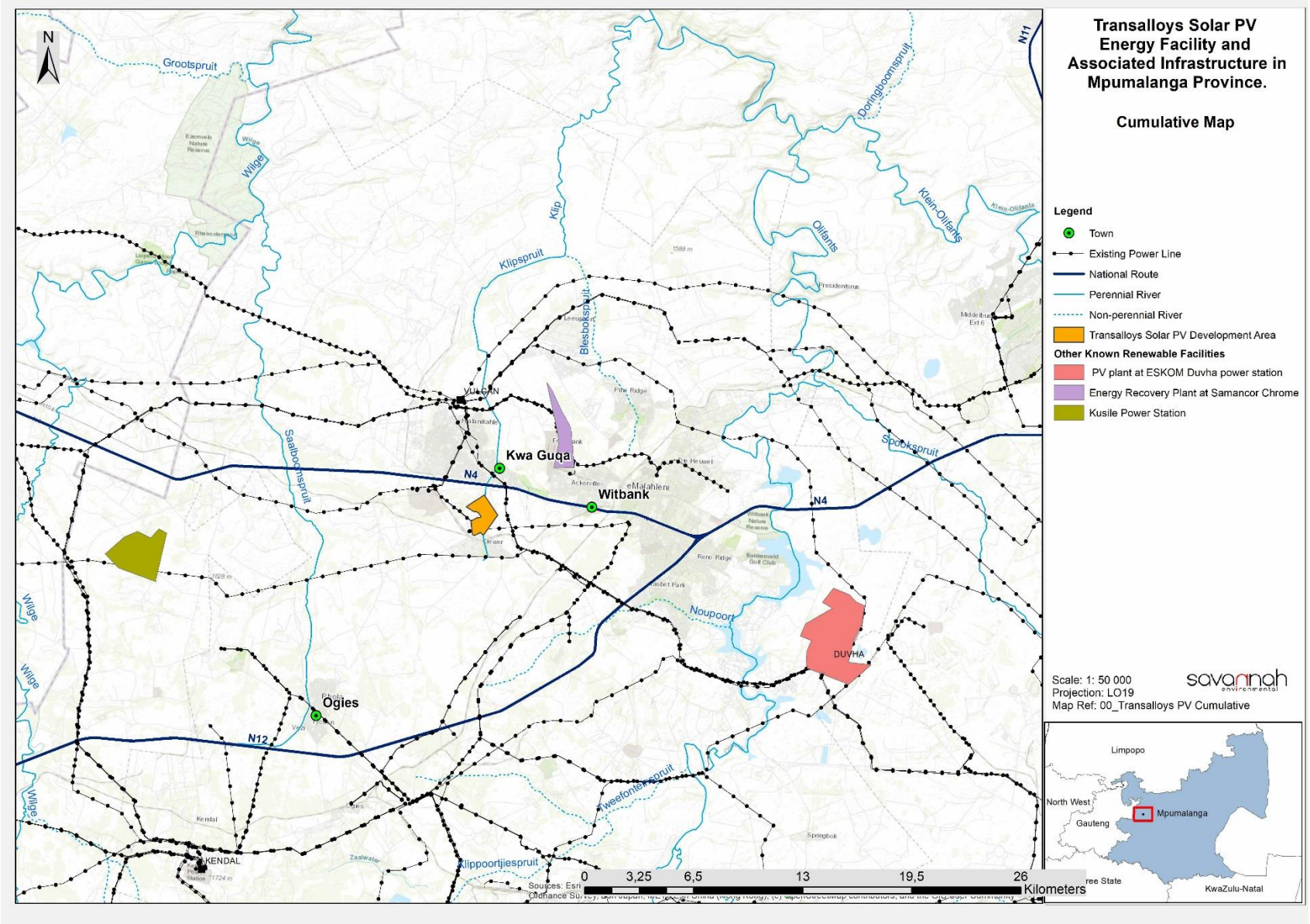


**Figure 8.2** Cumulative map indicating other Solar PV Energy Facility within 30km radius from the project site

## 8.3 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 67.9ha, some of which will be temporary and will be rehabilitated following construction. To evacuate the generated power to Transalloys Smelter, a 33kV underground power line will be established to connect the on-site facility transformers to the existing Transalloys Substation. This proposed power line will run within the Transalloys property, parallel to the internal distribution roads. A 1.5 m wide and ~2500 m long corridor has been identified for the assessment and placement of the underground 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.

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

## 8.4. Potential Impacts on Terrestrial Ecology (Flora and Fauna)

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

### *8.4.1 Results of the Ecological Impact Assessment*

**Habitat Assessment**

The main habitat types identified across the project area were initially delineated largely based on aerial imagery, and these main habitat types were then refined based on the field coverage and data collected during the survey. Four habitats were delineated in total, and. Emphasis was placed on limiting timed meander searches to within the most functional habitats, and therefore habitats with a higher potential of hosting SCC. The four habitats are briefly discussed in the sub-sections that follow, and a summary of the habitat types delineated within the project area **Table 8.1**.

**Table 8.1**: Summary of habitat types delineated within the Project Area of Influence

| Habitat Type | Description | Dominant Flora | Habitat Sensitivity |
|---|---|---|---|
| Transformed | The transformed areas comprised of agricultural fields, residential areas and active operational areas associated with the Transalloys Smelter. | Little to no remaining natural vegetation due to land transformation by various anthropogenic activities. | Very Low |
| Degraded Grassland | Open grassland on gently sloping landscapes, which has previously been transformed to accommodate agricultural practices and has a low species diversity. | *Aristida congesta subsp. Congesta, Cynodon dactylon, and Hyparrhenia hirta,* all species which are considered to be increaser 1 and 2 species which are commonly associated with disturbance. | Low |

| Habitat Type | Description | Dominant Flora | Habitat Sensitivity |
|---|---|---|---|
| Secondary Grass | Gently sloping grassland habitat with a low – moderate functionality, impacted by grazing and alien and invasive species in many areas. The area has a higher diversity of flora species than the degraded grassland areas | *Hyperthelia dissolute* and *Pogonarthria squarrosa* grasses with alien and invasive species *BidensPilosa,Tagetes minuta andSeriphium plumosum*. | Medium |
| Wetland | Perennial river and seasonally wet portions of land as delineated by the wetland specialist. Important movement corridor and foraging resource for local fauna. | *Typha capensis, Imperata* cylindrica and *Phragmites australis* as well as alien and invasive *speciessuch* as Eucalyptus grandis and *Acaciadealbata*. | High |

**Site Ecological Importance (SEI)**

The four delineated habitat types have each been allocated a sensitivity category, or SEI, and this breakdown is presented in **Table 8.2** below. In order to identify and spatially present sensitive features in terms of the relevant specialist discipline. It is important to note that this map does not replace any local, provincial, or national government legislation relating to these areas or the land use capabilities or sensitivities of these environments.

It is important to note that Figure 8.3 does not replace any local, provincial, or national government legislation relating to these areas or the land use capabilities or sensitivities of these of these environments.

The following guidelines should be considered when interpreting SEI in the context of any proposed development or disturbance activities (noted in conjunction with provincial guidelines pertaining to CBA and ESA areas):

- Very Low: Minimisation mitigation- Development activities of medium to high impact acceptable and restoration activities may not be required.
- Low: Minimisation and restoration mitigation-Development activities of medium to high impact acceptable followed by appropriate restoration activities.
- Medium: Minimisation and restoration mitigation-Development activities of medium impact acceptable followed by appropriate restoration activities.
- High:
  - Avoidance mitigation wherever possible;
  - Minimisation mitigation –changes must be made to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable; and
  - Offset mitigation may be required for high impact activities.

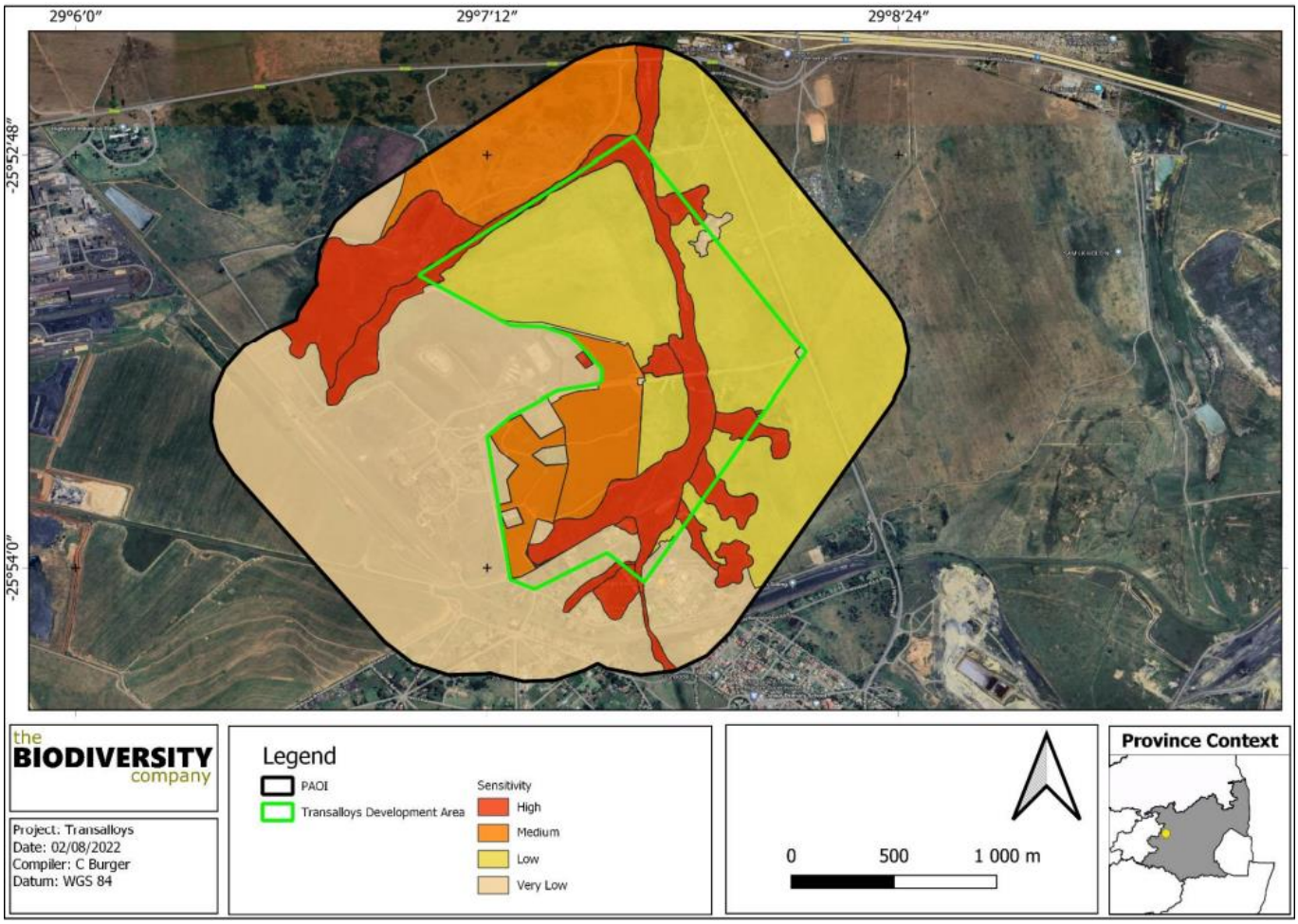


**Figure 8.3**: Map illustrating the sensitivities of the habitats delineated within the overall project area

**Table 8.2:** Sensitivity summary of the habitat types delineated within the project area.

| Habitat | Conservation Importance | Functional Integrity | Biodiversity Importance | Receptor Resilience | Site Ecological Importance |
|---|---|---|---|---|---|
| Transformed | Very Low | Low | Very Low | High | Very Low |
| Degraded Grassland | Low | Low | Low | Medium | Low |
| Secondary Grassland | Medium | Medium | Medium | Medium | Medium |
| Watercourse | High | High | High | Medium | High |

### *8.4.2 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 Transalloys Solar PV Energy Facility. The following impacts are identified and assessed for the project:

» Destruction, further loss and fragmentation of habitats (including watercourses), ecosystem and vegetation community 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, vehicles potentially spreading seed, 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 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.
»

### *8.4.3 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. Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community including protected species. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Regional (4) | Local Area (3) |
| ***Duration*** | Permanent (5) | Long term (4) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | Definite (5) | Highly probable (4) |
| ***Significance*** | **High (85)** | **Medium (52)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | Yes |
| ***Can impacts be mitigated?*** | Yes, although this impact cannot be well mitigated as the loss of vegetation is unavoidable. | |
| ***Mitigation:***<br>» Limiting the impact area and construction activities to the proposed footprint area and the associated infrastructure servitude only.<br>» Existing roads/servitudes should be considered first option over the construction of new roads/servitudes and must only be made where necessary.<br>» Minimise the extent of vegetation clearing for the infrastructure. Areas to be cleared must be clearly/visibly demarcated to avoid unnecessary clearing.<br>» Fire management plan must be in place for the areas surrounding the project area and the road to restrict the impact from fire on the natural flora and fauna communities. | | |
| ***Residual Impacts:*** | | |

| |
|---|
| The loss of currently intact vegetation and destruction of protected flora species is an unavoidable consequence of the project and cannot be entirely mitigated. The disturbance may also cause some erosion and invasive alien plant encroachment. Faunal movement corridors will be disrupted in the area. |

| ***Nature:*** Introduction of alien species, especially plants.<br>Degradation and loss of surrounding natural vegetation arising from construction activities and dust precipitation. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Regional (4) | Local Area (3) |
| ***Duration*** | Long term (4) | Moderate (3) |
| ***Magnitude*** | High (8) | Low (4) |
| ***Probability*** | Highly probable (4) | Improbable (2) |
| ***Significance*** | **High (64)** | **Low (20)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Moderate | High |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» Compilation of and implementation of an alien vegetation management plan. The plan must identify areas for action (if any) and prescribe the necessary removal methods and frequencies to be applied. This plan must also prescribe a monitoring plan and be updated as/when new data is collated.<br>» 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.<br>» Remove organic waste from site weekly to prevent pest species from becoming a problem. A waste management plan must be compiled and implemented from the onset of the construction phase. The plan must designate collection areas, define the separation of waste and also prescribe removal measures and frequencies from the areas. This plan must be also prescribing a monitoring plan and be updated as/when new data is collated. | | |
| ***Residual Impacts:***<br>Long-term broad scale invasive alien species infestation if not mitigated. | | |

| ***Nature:*** Destruction of protected plant species<br>Loss of protected plant species, these are mainly provincially protected species. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Regional (4) | Local Area (3) |
| ***Duration*** | Permanent (5) | Permanent (5) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | Highly probable (4) | Probable (3) |
| ***Significance*** | **High (68)** | **Medium (42)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | Yes |
| ***Can impacts be mitigated?*** | The plant SCCs require a permit for destruction and/ or relocation. | |
| ***Mitigation:***<br>» Any individual of the protected plants that is present needs a relocation or destruction permit in order for any individual to be removed or destroyed due to the development.<br>» High visibility flags must be placed near any protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program.<br>» All protected plants should be relocated where possible. | | |

***Residual Impacts:***
The loss of some of the protected species are unavoidable.

***Nature:*** Displacement of faunal community due to habitat loss, direct mortalities and disturbance (including possible SCC).

Construction activity 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*** | Regional (4) | Local Area (3) |
| ***Duration*** | Long term (4) | Moderate (3) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | Definite (5) | Highly probable (4) |
| ***Significance*** | **High (80)** | **Medium (48)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Moderate |
| ***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:***

» Signs must be put up stating that should any person be found poaching any species they will be fined.
» Construction must take place in the winter months as much is feasible.
» The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, access to these areas must be controlled. Signs must be put up to enforce this.
» Areas should be cleared and disturbed on a need's basis only, as opposed to clearing and disturbing a number of sites simultaneously.
» Any holes/deep excavations must be done in a progressive manner on a need's basis only. No holes/excavations may be left open overnight. In the event holes/excavations are required to remain open overnight, these areas must be covered to prevent fauna falling into these areas.
» Where possible, work should be restricted to one area at a time and be systematic. This is to reduce the number and extent of on-site activities, allowing fauna to move off as the project progresses. This will give the smaller mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories.
» 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 SCC, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr.
» Prior to vegetation clearing activities, the area to be cleared should be walked on foot by 1-2 individuals to create a disturbance in order for fauna to move off. Sites should be disturbed only prior to the area having to be cleared, not more than 1 day in advance.
» The timing between clearing of an area and subsequent development must be minimized to avoid fauna from re-entering the site to be disturbed.

***Residual Impacts:***
It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.

### 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*** | Local Area (3) | Footprint & surrounding areas (2) |
| ***Duration*** | Permanent (5) | Moderate term (3) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Highly probable (4) | Probable (3) |
| ***Significance*** | **Medium (56)** | **Low (27)** |
| ***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. | |

***Mitigation:***

» 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.
» Implementation of an alien vegetation management plan

***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.<br>Degradation and loss of surrounding natural vegetation | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Regional (4) | Footprint & surrounding area (2) |
| ***Duration*** | Long term (4) | Short term (2) |
| ***Magnitude*** | Moderate (6) | Minor (2) |
| ***Probability*** | Highly probable (4) | Probable (3) |
| ***Significance*** | **Medium (56)** | **Low (18)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Moderate | High |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | |

***Mitigation:***

» Implementation of an alien vegetation management plan.
» Implementation of a waste management plan. Waste management must be a priority and all waste must be collected, stored and disposed of adequately. It is recommended that all waste be removed from site on a weekly basis (as a minimum) to prevent rodents and pests entering the site.
» Refuse bins must be emptied and secured.
» Temporary storage of domestic waste must be in covered waste skips.
» Maximum domestic waste storage period will be 7 days.
» A pest control plan must be put in place and implemented; it is imperative that poisons not be used.

***Residual Impacts:***

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

***Nature:*** Ongoing displacement and direct mortalities of faunal community (including SCC) 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*** | Local Area (3) | Footprint & surrounding areas (2) |
| ***Duration*** | Long term (4) | Moderate term (3) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | Highly Probable (4) | Improbable (2) |
| ***Significance*** | **Medium (60)** | **Low (22)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Moderate | High |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | |

***Mitigation:***

- Lighting should be kept to a minimum to avoid disturbing crepuscular and nocturnal species. Lighting fixtures should be fitted with baffles, hoods or louvres and directed downward, to minimize light pollution which could attract night migrating species.
- Lighting should be directed towards to footprint area and avoid unnecessary illumination of the adjacent undeveloped areas.
- Where feasible, motion detection lighting must be used to minimise the unnecessary illumination of areas.
- Avoid using any road during the night.
- In the security fence surrounding the project areas, small areas of 30cm x30cm must be left open to allow fauna species to move through the area and to avoid a barrier effect created by the development.

***Residual Impacts:***

Disturbance from maintenance activities will occur albeit at a low and infrequent level.
Less migratory species will be found in the area.
Road killings are still a possibility.
Migratory routes of fauna will change, fauna and flora species composition will change.

**Decommissioning Phase Impacts**

| ***Nature:*** Continued fragmentation and degradation of habitats. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Local area (3) | Footprint and surrounding (2) |
| ***Duration*** | Long term (4) | Very short term (1) |
| ***Magnitude*** | High (8) | Minor (2) |
| ***Probability*** | Highly probable (4) | Improbable (2) |
| ***Significance*** | **High (60)** | **Low (10)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» Implementation of a rehabilitation plan.<br>» Implementation of an alien invasive management plan and monitoring on an annual basis for 3 years post construction.<br>» There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous flora. | | |
| ***Residual Impacts:***<br>No significant residual risks are expected, although IAP encroachment and erosion might still occur but would have a negligible impact if effectively managed. | | |

| ***Nature:*** Displacement of Faunal community due disturbance (road collisions, noise, dust, vibration). | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Regional (4) | Local Area (3) |
| ***Duration*** | Long term (4) | Moderate Term (3) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | Highly probable (4) | Probable (3) |
| ***Significance*** | **High (64)** | **Medium (36)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» Dust management needs to be undertaken in the areas where the infrastructure will be removed. This includes wetting of the soil. This area must be rehabilitated as soon as possible.<br>» All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the decommissioning area.<br>» All vehicles (construction or other) accessing the site should adhere to a low-speed limit on site (40 km/h max) to avoid collisions with susceptible fauna, such as nocturnal species which sometimes forage or rest on roads, especially at night.<br>» The area must be walked through prior to decommissioning to ensure fauna species are not affected by the removal of the infrastructure. | | |
| ***Residual Impacts:***<br>If this is mitigated and monitored correction no residual impact should be present. | | |

## Cumulative Impacts

**Nature**: Cumulative impact to biodiversity associated with the proposed project.
The development of the proposed infrastructure will contribute to cumulative habitat loss, especially in the ecological corridors like the wetlands and thereby impact the water resource and ecological processes in the region.

The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or region, it is appropriate to consider the cumulative effects of development. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system. This section describes the potential impacts of the project that are cumulative for avifauna.

Localised cumulative impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers (such as the nearby existing solar facility and the existing powerlines). These include dust deposition, noise and vibration, disruption of corridors or habitat, groundwater drawdown, groundwater and surface water quality, and transport.

Long-term cumulative impacts due to the large number of developments close by can lead to the loss of endemic and threatened species, loss of habitat and even degradation of well conserved areas. An area of 30 km surrounding the project area was considered to determine the percentage of habitat loss that has already taken place in the three vegetation types (Loskop Mountain Bushveld, Rand Highveld Grassland and Eastern Highveld Grassland) in this area. This was achieved by using the Landcover (2019) dataset from which all natural areas were excluded. In addition to the areas disturbed the planned and approved solar development in the area (within the 30 km area) were also included in the calculation (refer to **Figure 8.4**). Based on the aforementioned it can be said that 51.43% of the habitat has already been transformed by amongst others agriculture and mining activities. Considering the project in isolation, after the mitigations have been implemented, it can be said that the impact would be Low, however when considering the total natural habitat lost in the 30 km area the cumulative impact is High.

| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects within the area** |
|---|---|---|
| ***Extent*** | Local Area (3) | Regional (4) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | Moderate (6) | High (8) |
| ***Probability*** | Probable (3) | Highly probable (4) |
| ***Significance*** | **Medium (39)** | **High (64)** |
| ***Status*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources*** | Yes | Yes |
| ***Can impacts be mitigated?*** | Yes | |

***Mitigation***
Should the vegetation be removed, the impact cannot be mitigated. Project-specific mitigations recommended through individual EIA processes must be implemented to minimise impacts.

***Residual Impacts:***
Will result in the loss of:
» Watercourses;
» CBA;
» Protected plants; and
» SCC fauna species (the species listed in the Nkurenkuru Ecology & Biodiversity (2019) report).

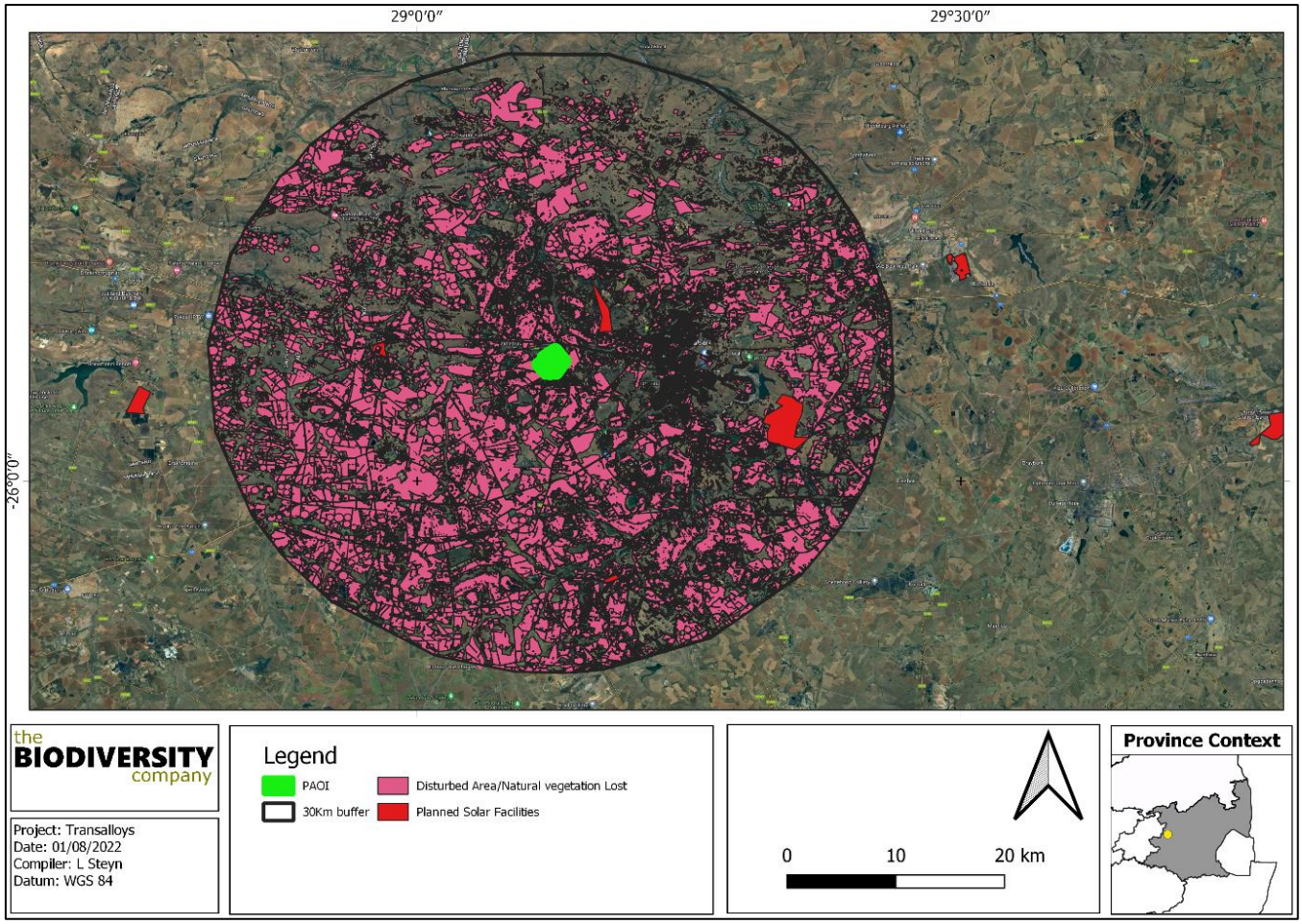


**Figure 8.4:** The Natural Area that has been disturbed or lost in the 30 km buffer area.

### *8.4.4 Overall Result*

The project area overlaps with CBA irreplaceable and CBA optimal areas according to the provincial conservation plan, however, following the findings of this assessment most of the local habitat is considered to exist in a degraded state. It is noted that certain sections of the project area represent more intact areas of habitat (the wetland areas), and these are considered to be more functional with regards to the CBA status of the development area, whereby they should be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems, and land uses should maximise the retention of biodiversity pattern and ecological process. To ensure this it is important that the management outcomes presented above be adhered to, in order to properly mitigate the negative environmental impacts that will stem from the project activities.

Fauna and flora SCC have a moderate expectancy of occurrence across the project area. While two species, *Zantedeschia aethiopica* and *Crinum macowanii*, listed as protected under Schedule 11 of the Mpumalanga Nature Conservation Act (Act 10 of 1998) were recorded within the wetland habitat. The previous Pre-Construction Walk-Through Report compiled by Nkurenkuru Ecology & Biodiversity in 2019 found additional *Crinum macowanii* individuals along the secondary grassland habitat. As such it is recommended that a wet season walkthrough of the project area be conducted prior to the commencement of the project construction phase.

Completion of the terrestrial biodiversity assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The development area is instead assigned an overall sensitivity that ranges from 'Very Low' to 'Medium', with the exception of the wetland areas that have been assigned a 'High' sensitivity.

Considering that the area proposed for the facility has been identified as being of low significance for biodiversity maintenance and ecological processes, it is the specialist's opinion that the development may proceed. All mitigations measures prescribed herein must be considered by the issuing authority for authorisation. No fatal flaws are evident for the proposed project.

## 8.5. Potential Impacts on Avifauna

The development of Transalloys Solar PV Energy Facility and associated infrastructure is likely to result in a variety of impacts on avifauna. Potential impacts and the relative significance of the impacts are summarised below (refer to chapter 6 and **Appendix E** for more details).

### *8.5.1 Results of the Avifauna Impact Assessment*

**Avifauna species**

One species of conservation concern, the Lanner Falcon (*Falco biarmicus*) was observed in the project area. A number of species were found that would be considered as high risk species (**Table 8.3**). Risk species are species that would be regarded as collision prone species and species that would have a high electrocution risk. Even though the panels does not pose an extensive collision risk for larger birds, power lines (if above ground) associated with the infrastructure, guidelines (anchor lines) and connection lines does pose a risk. The fence could also pose a collision risk for various species.

**Table 8.3:** At risk species found in the survey

| Common Name | Scientific Name | Collisions | Electrocution | Habitat Loss |
|---|---|---|---|---|
| Black Sparrowhawk | *Accipiter melanoleucus* | X | X | |
| Egyptian Goose | *Alopochen aegyptiaca* | X | X | |
| African Black Duck | *Anas sparsa* | X | | |
| Yellow-billed Duck | *Anas undulata* | X | | |
| Black-headed Heron | *Ardea melanocephala* | X | X | |
| Purple Heron | *Ardea purpurea* | X | X | |
| Hadada Ibis | *Bostrychia hagedash* | | X | |
| Grey-headed Gull | *Chroicocephalus cirrocephalus* | | X | |
| Pied Crow | *Corvus albus* | | X | |
| Lanner Falcon | *Falco biarmicus* | | | X |
| Helmeted Guineafowl | *Numida meleagris* | | X | |
| Hamerkop | *Scopus umbretta* | | X | |
| South African Shelduck | *Tadorna cana* | X | | |
| African Sacred Ibis | *Threskiornis aethiopicus* | | X | |

A nest of a Hamerkop (*Scopus umbretta*) was found in the project area, this species is protected under Schedule 5 of the Mpumalanga Nature Conservation Act no 10 of 1998. As this schedule is more relevant to the trade and imprisonment of the species as appose to full protection only a 50 m buffer was placed

around the nest to ensure the species does not get exposed to any nest disturbance. No nest of species of conservation concern were observed.

**Habitats in the study area**

Fine-scale habitats within the landscape are important in supporting a diverse avifauna community as they provide differing nesting, foraging and reproductive opportunities. The assessment area overlapped with four habitat types namely, Degraded Grassland, Secondary Grassland, Transformed as well as Water Resources (Wetlands and river). These habitats were based on the species compositions in the various areas (**Figure 8.5**).

The sensitivities were compiled for the avifauna study based on the one survey. Based on the criteria provided in Section 2.3 of this report, all habitats within the assessment area of the proposed project were allocated a sensitivity category (**Table 8.4**). The sensitivities of the habitat types delineated are illustrated in **Figure 8.6**.

**Table 8.4**: SEI Summary of habitat types delineated within field assessment area of project area

| Habitat | Conservation Importance | | Functional Integrity | | Biodiversity Importance | Receptor Resilience | | Site Ecological Importance |
|---|---|---|---|---|---|---|---|---|
| Water Resources | High | The water resources (i.e., river and wetland) are rated as CR based on the SAIIAE dataset. | High | The CR wetland found on site is approximately 60Ha. The size combined with the somewhat disturbed nature this habitat it was given a High functional integrity. | High | Medium | Taking into account the current vegetation growth and state, the area will recover slowly, and it will take more than 10 years to reach the same state. If the vegetation growth in the area is altered, it will disturb the avifauna diversity as well which will take long to return to its pre-disturbance state. | High |
| Degraded Grassland | Medium | The VU listed Lanner Falcon were observed in this area | Medium | The area does still function as an ecological corridor especially between the water resource areas. | Medium | High | The area has been altered from its original state mainly by over grazing, therefore the flora species composition is low. As the area does not provide a large number of food sources especially for | Low |

| Habitat | Conservation Importance | | Functional Integrity | | Biodiversity Importance | Receptor Resilience | | Site Ecological Importance |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | granivorous species the receptor resilience is rated as high. | |
| Secondary Grassland | Medium | The VU listed Lanner Falcon were observed in this area | Medium | The area does still function as an ecological corridor especially between the water resource areas. | Medium | High | This habitat has also been altered by overgrazing, however the flora species composition in this area is more diverse. As the habitat is mainly supporting graminoid species and therefore granivorous species if the area recovers the granivores will return. | Low |
| Transformed | Very Low | Unlikely to support any SCCs and no natural habitat remains in these areas anymore. | Very Low | Several major current negative ecological impacts found in the area and no ecological connectivity offered. | Very Low | Very High | The flora species composition surrounding the buildings for example is mainly garden species and therefore will support mainly generalist more adaptable species. | Very Low |

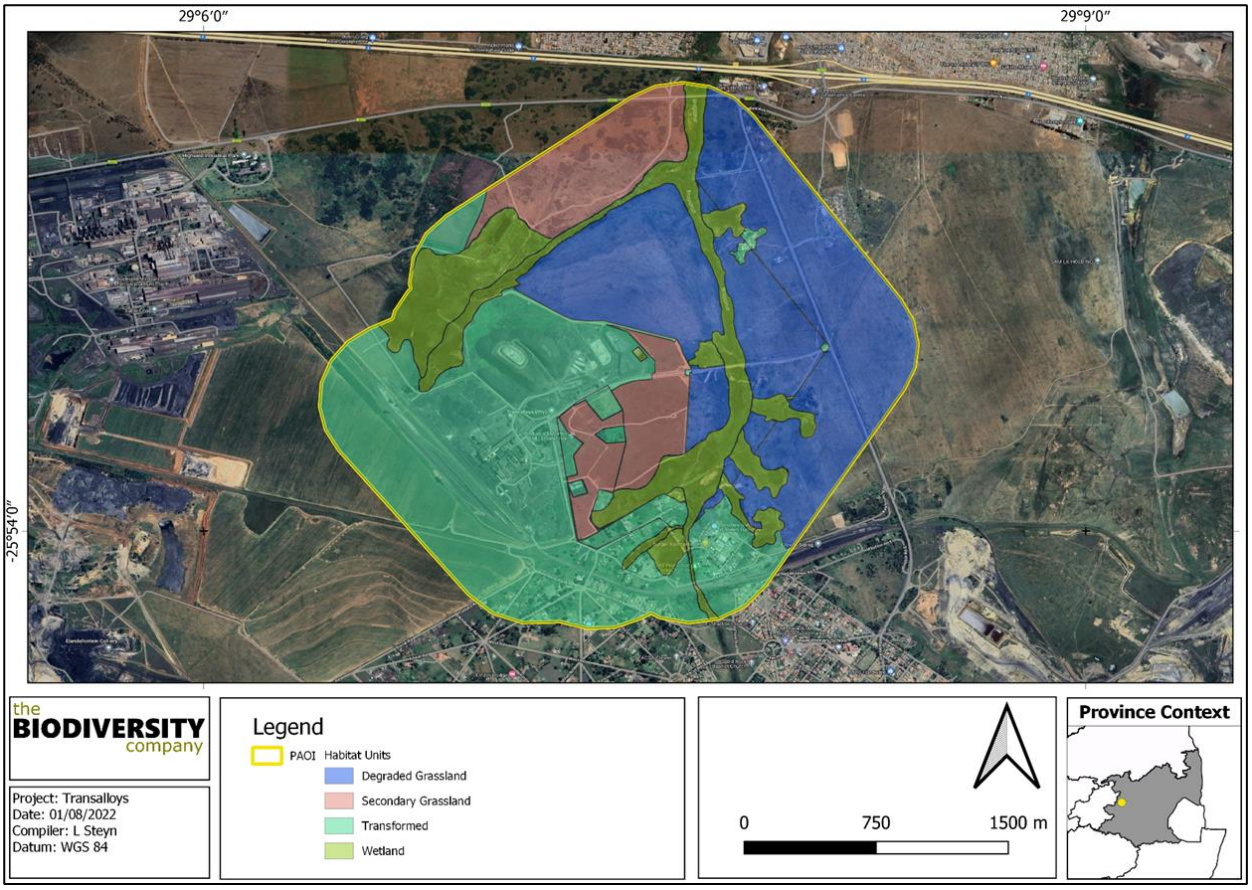


**Figure 8.5:** The avifauna habitats found in the project area.

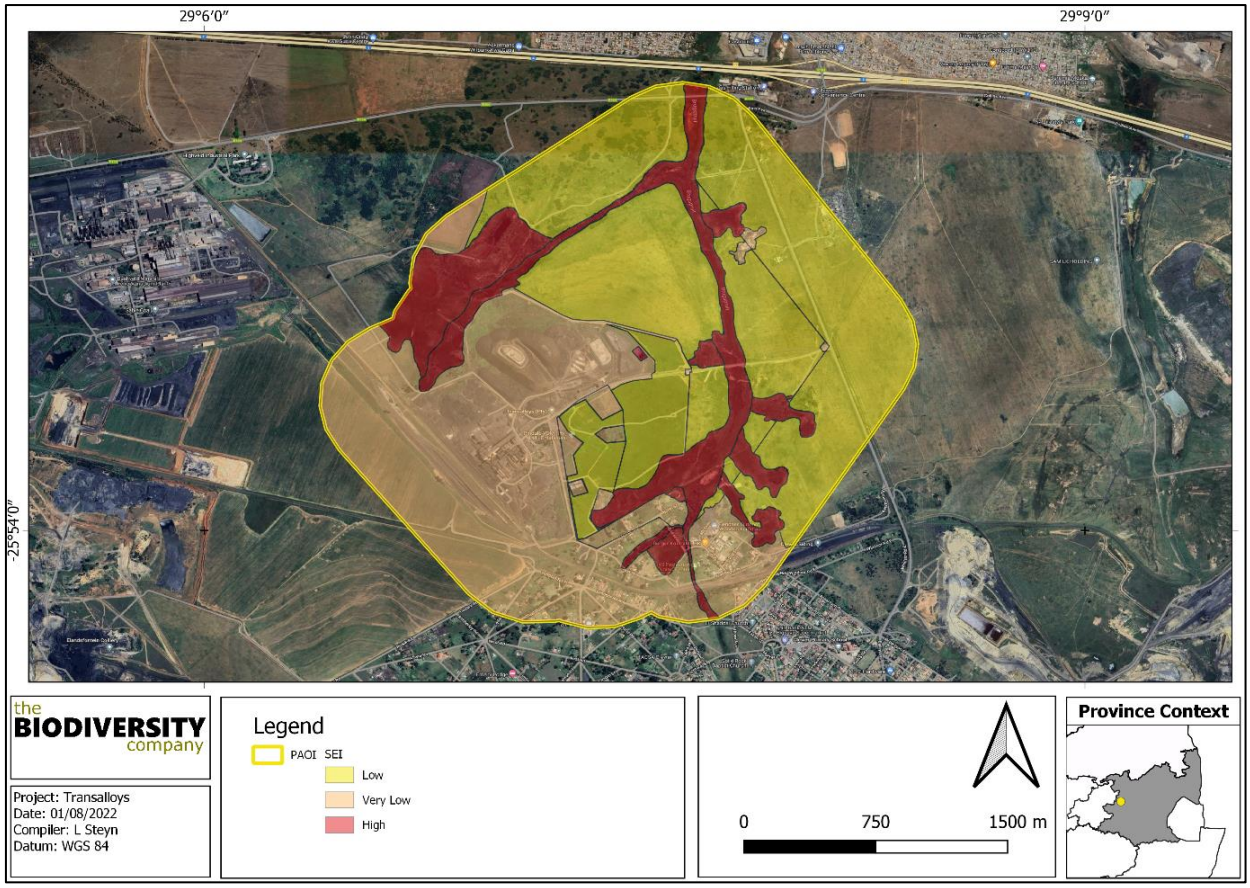


**Figure 8.6:** Sensitivities based on the avifauna assessment.

### *8.5.2 Description on the Impacts on Avifauna*

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

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

» Displacement of avifaunal community (including several SCC) due to disturbance such as noise, light, dust, and vibration due to vegetation removal, vehicles potentially spreading seed, 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.

» Collection of eggs and poaching 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.

» Roadkill resulting from loss of landscape used as a corridor, compacted roads and the removal of vegetation (if present).

»

» Large passerines are particularly susceptible to electrocution because owing to their relatively large bodies, they are able to touch conductors and ground/earth wires or earthed devices simultaneously. The chances of electrocution are increased when feathers are wet, during periods of high humidity or during defecation. Prevailing wind direction also influences the rate of electrocution casualties.

»

» Fencing of the PV site can influence birds in six ways (Birdlife SA, 2015);

- Snagging: Occurs when a body part is impaled on one or more barbs or razor points of a fence.
- Snaring: When a bird's foot/leg becomes trapped between two overlapping wires.
- Impact injuries: birds flying into a fence, the impact may kill or injure the bird
- Snarling: When birds try and push through a mesh or wire stands, ultimately becoming trapped (uncommon).
- Electrocution: Electrified fence can kill or severely injure birds.
- Barrier effect: Fences may limit flightless birds (e.g. Moulting waterfowl) from resources.

### *8.5.3 Impact tables summarising the significance of impacts on avifauna during construction and operation (with and without mitigation)*

**Construction Phase Impacts**

| ***Nature:*** Destruction, fragmentation and degradation of habitats. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Regional (4) | Local area (3) |
| ***Duration*** | Short term (4) | Short term (2) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | Highly probable (4) | Highly probable (4) |
| ***Significance*** | **Medium (56)** | **Medium (44)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | Yes |
| ***Can impacts be mitigated?*** | To some extent, habitat will still be lost | |

***Mitigation:***

» The loss of habitat in the project footprint cannot be negated but can be restricted to some extent. The loss of habitat will result in the loss of territory, feeding area, nesting sites and prey availability for numerous species.

» The habitat outside the footprint can be protected by implementing the following mitigations:

- No construction is to take place in the wetland or wetland buffer area. These areas must be treated as "No-Go" areas;
- The 50 m Buffer surrounding the Hamerkop nest must be treated as a "No-Go" area;
- Construction activity to only be within the project footprint and the area is to be well demarcated;
- Areas where vegetation has been cleared must be re-vegetated within local indigenous plant species;
- The affected area must be monitored for invasive plant encroachment and erosion and must be controlled;
- The use of laydown areas within the development footprint must be used, to avoid habitat loss and disturbance to adjoining areas;
- All areas to be developed must be walked through prior to any activity to ensure no nests or avifauna species are found in the area; and
- Should any Species of Conservation Concern not move out of the area, or their nest be found in the area, a suitably qualified specialist must be consulted to advise on the correct actions to be taken.

***Residual Impacts:***

| |
|---|
| The loss of habitat is a residual impact that is unavoidable. The disturbance may also cause some erosion and invasive alien plant encroachment. Movement corridors will be disrupted in the area. |

| ***Nature:*** Displacement of avifaunal community (Including a SCC) due to disturbance such as noise, light, dust, vibration. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Local area (3) | Footprint and surrounding (2) |
| ***Duration*** | Moderate term (3) | Short term (2) |
| ***Magnitude*** | Moderate (6) | Minor (2) |
| ***Probability*** | Probable (3) | Improbable (2) |
| ***Significance*** | **High (36)** | **Low (12)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | Yes |
| ***Can impacts be mitigated?*** | Yes, but only to a limited extent. The mitigation of noise pollution during construction is difficult to mitigate against. | |
| ***Mitigation:***<br>» Minimize disturbance impact by abbreviating construction time, schedule the activities to avoid breeding and movement time.<br>» Ensure lights are kept to a minimum, lights must be red or green and not white to reduce confusion for nocturnal migrants.<br>» Dust management need to be done in the areas where the vegetation will be removed, this includes wetting of the soil. | | |
| ***Residual Impacts:***<br>Displacement of endemic and SCC avifauna species. | | |

| ***Nature:*** Collection of eggs and poaching. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Footprint and surrounding (2) | Footprint and surrounding (2) |
| ***Duration*** | Long term (4) | Very short term (2) |
| ***Magnitude*** | High (8) | Minor (2) |
| ***Probability*** | Highly probable (4) | Improbable (2) |
| ***Significance*** | **Medium (40)** | **Low (12)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | High |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition; and<br>» Signs must be put up stating that should any person be found poaching any species they will be fined. | | |
| ***Residual Impacts:***<br>There is a possibility that the eggs to be poached could be that of an SCC with decreasing numbers. | | |

| ***Nature:*** *Roadkill*. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Local area (3) | Footprint and surrounding (2) |
| ***Duration*** | Long term (2) | Very short term (1) |
| ***Magnitude*** | Moderate (6) | Minor (2) |
| ***Probability*** | Highly probable (4) | Improbable (2) |
| ***Significance*** | **Medium (44)** | **Low (12)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.<br>» All vehicles (construction or other) accessing the site should adhere to a low speed limit on site (40 km/h max) to avoid collisions with susceptible avifauna, such as nocturnal and crepuscular species (e.g., nightjars and owls) which sometimes forage or rest on roads, especially at night. | | |
| ***Residual Impacts:***<br>Roadkill could still occur | | |

## Operational Phase Impacts

| ***Nature:*** Collisions with PV panels, associated power lines and connection lines and fences. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Regional (4) | Local area (3) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | High (8) | High (8) |
| ***Probability*** | Highly probable (4) | Probable (3) |
| ***Significance*** | **High (64)** | **Medium (45)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used. This would involve using existing/approved pylons and associated infrastructure for different lines.<br>» Any overhead power lines must have bird diverters on at every 10 m due to the high collision risk as a result of the water resources in the project area. If it is a multiple line installation the diverters must be placed on interchangeable lines at every 5 m.<br>» White strips should be placed along the edges of the panels, to reduce similarity to water and deter birds and insects (Horvath *et al,* 2010). Consider the use of bird deterrent devices to limit collision risk.<br>» Fencing mitigations:<br>∗ Top 2 strands must be smooth wire<br>∗ Routinely retention loose wires<br>∗ Minimum 30 cm between wires<br>∗ Place markers on fences | | |
| ***Residual Impacts:***<br>Some collisions of SCCs and risk species might still occur regardless of mitigations. | | |

| ***Nature:*** Electrocution with solar plant connections and power line. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Regional (4) | Regional (4) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | Highly probable (4) | Improbable (2) |
| ***Significance*** | **High (64)** | **Low (28)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» The design of the proposed solar plant and any overhead grid lines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa.<br>» Infrastructure should be consolidated where possible/practical in order to minimise the amount of ground and air space used. This would involve using the existing/approved pylons and associated infrastructure for different lines.<br>» Ensure that monitoring is sufficiently frequent to detect electrocutions reliably and that any areas where electrocutions occurred are repaired as soon as possible. | | |
| ***Residual Impacts:***<br>Electrocutions might still occur regardless of mitigations. | | |

| ***Nature:*** Roadkill during maintenance procedures. | | |
|---|---|---|
| | **Without mitigation** | **With mitigation** |
| ***Extent*** | Local area (3) | Local area (2) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Probable (3) | Improbable (2) |
| ***Significance*** | **Medium (39)** | **Low (18)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» All personnel should undergo environmental induction with regards to avifauna and their behaviour on roads.<br>» All vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed.<br>» All vehicles accessing the site should adhere to a low speed limit on site (40 km/h max) to avoid collisions with susceptible avifauna, such as nocturnal and crepuscular species (e.g., nightjars and owls) which sometimes forage or rest on roads, especially at night. | | |
| ***Residual Impacts:***<br>Road collisions can still occur regardless of mitigations. | | |

| ***Nature:*** Habitat degradation and displacement of resident, visiting and breeding species (as well as SCCs). |
|---|

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Regional (4) | Local area (3) |
| ***Duration*** | Long term (4) | Short term (2) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | High Probable (4) | Probable (3) |
| ***Significance*** | **High (64)** | **Medium (33)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | No, the footprint has already been disturbed. The area surrounding the development can be mitigated to some extent. | |

***Mitigation:***

» Minimising habitat destruction caused by the maintenance by demarcating the footprint so that it does not increase yearly.
» All areas where maintenance (for example grass cutting) must be walked through by the maintenance team prior to any activity to ensure no nests or avifauna species are found in the area.
» Should any Species of Conservation Concern not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.

***Residual Impacts:***

Migratory routes of avifauna species could change, and the species composition could also change regardless of mitigations.

## Decommissioning Phase Impacts

***Nature:*** Continued fragmentation and degradation of habitats.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Local area (3) | Local area (3) |
| ***Duration*** | Long term (4) | Very short term (2) |
| ***Magnitude*** | High (8) | Minor (6) |
| ***Probability*** | Highly Probable (4) | Very improbable (3) |
| ***Significance*** | **Medium (60)** | **Low (5)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | |

***Mitigation:***

» Implementation of a rehabilitation plan.
» Implementation of an alien invasive management plan and monitoring on an annual basis for 3 years post construction.
» There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous flora.

***Residual Impacts:***

No significant residual risks are expected, although IAP encroachment and erosion might still occur but would have a negligible impact if effectively managed.

***Nature:*** Displacement of faunal community (including SCC) due disturbance (road collisions, noise, dust, vibration).

| | **Without mitigation** | **With mitigation** |
|---|---|---|

| | | |
|---|---|---|
| ***Extent*** | Regional (4) | Local area (3) |
| ***Duration*** | Long term (4) | Moderate term (3) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | Highly Probable (4) | Probable (3) |
| ***Significance*** | **High (64)** | **Medium (36)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Low | Low |
| ***Irreplaceable loss of resources?*** | Yes | No |
| ***Can impacts be mitigated?*** | Yes | |

***Mitigation:***

» Minimize disturbance impact by abbreviating decommissioning time.
» Schedule the activities to avoid breeding and movement times report.
» Dust management need to be done in the areas where the vegetation will be removed, this includes wetting of the soil. This area must be rehabilitated as soon as possible.
» All decommissioning vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the decommissioning area.
» All vehicles accessing the site should adhere to a low speed limit on site (40 km/h max) to avoid collisions with susceptible avifauna, such as nocturnal and crepuscular species (e.g., nightjars and owls) which sometimes forage or rest on roads, especially at night.

***Residual Impacts:***

If this is mitigated and monitored correctly no residual impacts should be present.

***Nature:*** Collisions with any overhead power lines if not removed during decommissioning.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Regional (4) | Site Spec (1) |
| ***Duration*** | Long term (4) | Very short term (1) |
| ***Magnitude*** | High (8) | None (0) |
| ***Probability*** | Highly Probable (4) | Very improbable (1) |
| ***Significance*** | **High (64)** | **Low (2)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Moderate | High |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | |

***Mitigation:***

» If overhead lines are removed after/if the plant is decommissioned, the risk of collisions will be absent.

***Residual Impacts:***

No residual impact will remain if the line is removed as part of the decommissioning.

**Cumulative Impacts**

| ***Nature:*** Loss of habitat and increase in bird collisions. | | |
|---|---|---|
| | **Project in isolation** | **Project with adjacent PV projects with associated infrastructure** |
| ***Extent*** | Footprint & surrounding area (2) | Regional (4) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | Low (4)) | High (4) |
| ***Probability*** | Improbable (2) | Highly probable (4) |
| ***Significance*** | **Low (20)** | **High (64)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | None | None |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | No | |
| ***Mitigation:***<br>» The overall combined habitat loss is extensive and cannot be replaced. Even through collisions can be mitigated to some extent for individual lines / solar plants their combined densities will increase the of collisions. | | |
| ***Residual Impacts:***<br>Loss of habitat for endemic and SCC. Loss of SCCs due to collisions. | | |

### *8.5.4 Overall Results*

On the project area sixty-six (66) bird species were recorded during the survey, while twenty-two (22) species were recorded during incidental observations. One of the species recorded was a SCC, the Lanner Falcon (*Falco biarmicus*), it was observed flying over the project area, no nest of this species was observed in the project area. A nest of a provincially protected Hamerkop (*Scopus umbretta*) was observed, based on its lower schedule 5 protection level only a 50m buffer was placed around the nest, and this must be treated as a "No-Go" area. The feeding groups recorded in the project area were dominated by insectivores, followed by granivores and omnivores. It is believed a summer survey in the migratory season of avifauna would yield higher numbers of bird species, especially those of water birds due to the high numbers of water resources in the project area. The water resources and their buffers (as per the wetland report as detailed in Appendix F) in the project area must be treated as "No-Go' areas. As a result of the high amount of water resources in the project area the collision risk is regarded as higher. This risk can be mitigated by the installation of white-strips on the edge of the PV panels and bird diverters along the whole length of the power line (should this be overhead).

Based on the current types of bird species recorded in the project area the development will not have a high residual impact should all the mitigations and recommendations be implemented. Based on the desktop and field findings it is the opinion of the specialist that the project, may be favourably considered, on condition that all prescribed mitigation measures and supporting monitoring are implemented.

## 8.6. Potential Impacts on Aquatic Ecology

The development of the Transalloys Solar PV Energy 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 F** for more details).

### *8.6.1 Results of the Aquatic Ecology Impact Assessment*

A total five HGM units were identified within the 500 m regulated area. The wetland areas were delineated in accordance with the DWAF (2005) guidelines. Three HGM units have been identified as hillslope seep wetlands, one as a channelled valley bottom wetland and one as an unchannelled valley bottom wetland. Along with the wetlands a leaking pipe as well as a few dams were also delineated. Although these systems do not classify as a wetland system it is important to note where they are and to preserve them.

**Ecological Functional Assessment**
HGM units 1,4 & 5 scored "Moderately High" ecosystem service scores with HGM 3 scoring "Intermediate" and HGM 2 scoring "Moderately Low". The average ecosystem service scores for the delineated systems are illustrated in **Table 8.6** and **Figure 8.7** Ecosystem services contributing to these scores include flood attenuation, streamflow regulation, sediment trapping, phosphate assimilation, nitrate assimilation, toxicant assimilation, erosion control, biodiversity maintenance and tourism and recreation.

**Table 8.6:** Average ecosystem service scores for delineated wetlands

| Moderately High | Intermediate | Moderately Low |
|---|---|---|
| HGM 1 | HGM 3 | HGM 2 |
| HGM 4 | | |
| HGM 5 | | |

**Buffer Requirements**
The scientific buffer calculation (Macfarlane *et al*., 2014) was used to determine the size of the buffer zones relevant to the proposed development of the PV facility The buffer size for the development was determined to be 15 m post mitigation (see **Table 8.6** and **Figure 8.7**).

**Table 8.7:** Pre- and post-mitigation buffer requirements

| Aspect | Pre-Mitigation Buffer Size (m) | Post Mitigation Buffer Size (m) |
|---|---|---|
| PV facility | 36 | 15 |

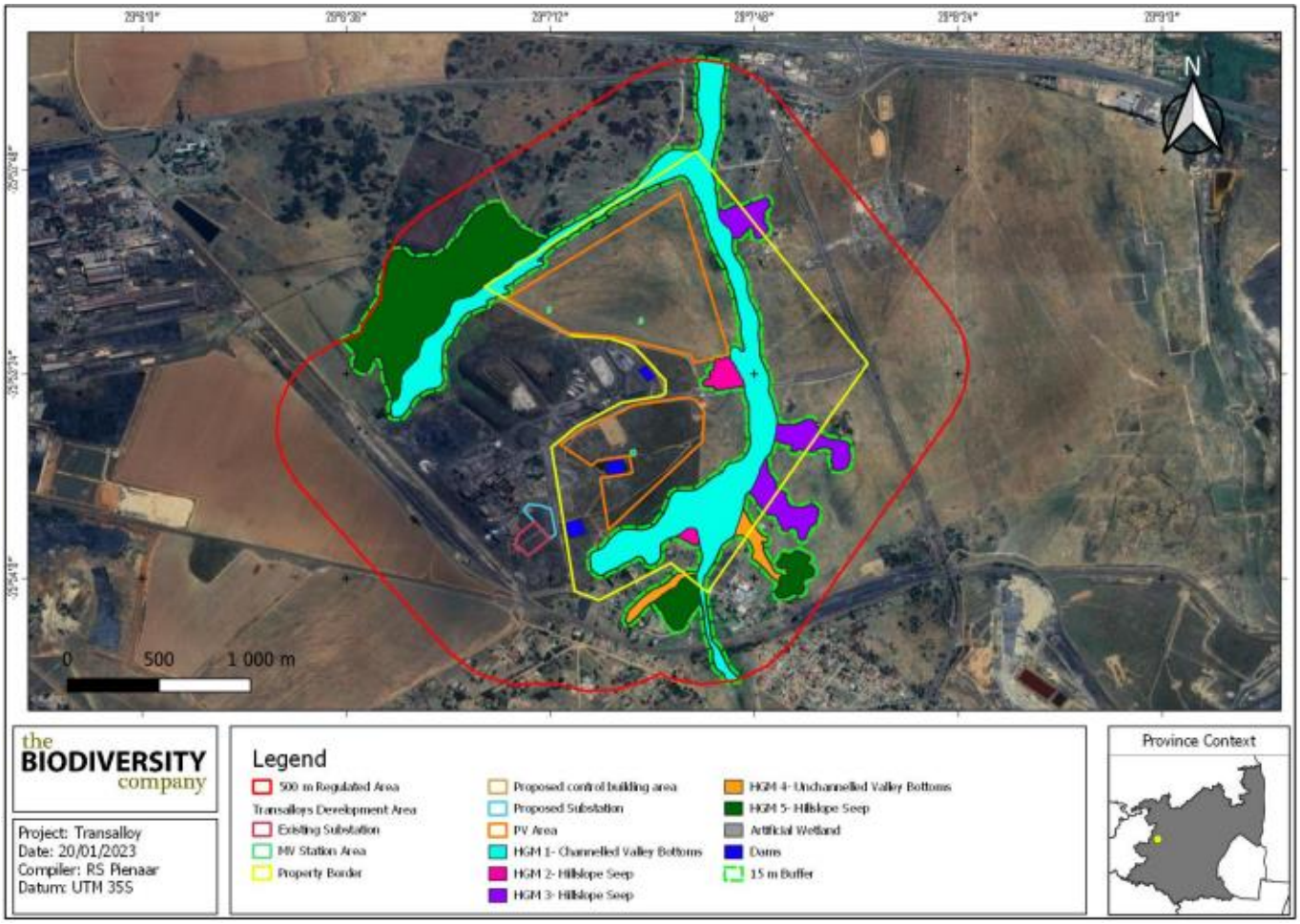


**Figure 8.7**: Delineated wetlands within the 500m regulated area, including their associated buffer zones

### *8.6.2 Description of Impacts on Aquatic Ecology*

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

### *8.6.3 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 Hillslope Seep (HGM 2) wetland which are likely to be impacted upon (either directly or indirectly) by the proposed activities (refer to **Figure 8.4**). 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.

Impacts in construction, Operation, and Decommissioning phases in aquatic assessments are as soon as in Terrestrial ecology.

**Cumulative Impacts**

**Nature**: Loss of wetland functionality

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 in regard to 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).

| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects within the area** |
|---|---|---|
| ***Extent*** | Local (3) | Regional (4) |
| ***Duration*** | Long term (4) | Long Term (5) |
| ***Magnitude*** | Moderate (6) | High (8) |
| ***Probability*** | Probable (3) | Highly probable (4) |
| ***Significance*** | **Medium (39)** | **High (64)** |
| ***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.
- 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.

### *8.6.4 Overall Result*

A total of five (5) HGM units were identified and assessed within the 500 m regulated area namely three hillslope seep wetland a channelled valley bottom wetland as well as a unchannelled valley bottom wetland. One of the HGM unit scored overall PES scores of C – "Moderately Modified" due to the modification to the hydrology and vegetation of the wetland through anthropogenic activities. Most of the HGM units scored overall PES scores of D – "Largely Modified" with the remaining HGM unit scoring an overall PES scores of E – "Seriously Modified". All the HGM units scored "High" importance and sensitivity scores due to the high protection level of both the wet veg and wetland units. The average ecosystem service score ranges between "Moderately Low" and "Moderately High".

A 15 m post mitigation buffer was assigned to the wetland systems.

It is the opinion of the specialist that no fatal flaws were identified for the project. Due to the moderate risks associated with the project, a Water Use Licence is required for the project. The proposed layout will result in the partial loss of wetland areas, and this loss should be compensated for by means of onsite rehabilitation of remaining wetland areas.

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

Based on the sensitivity of the Transalloys Solar PV Energy Facility development area (see Chapter 6 and **Appendix G**), 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 G** for more details).

### *8.7.1 Results of the Land Use, Soil and Agricultural Potential Impact Assessment*

**Description of Soil Profiles and Diagnostic Horizons**

Soil profiles were studied up to a depth of 1.2 m to identify specific diagnostic horizons which are vital in the soil classification process as well as determining the agricultural potential and land capability. The most sensitive soil forms have been considered. The following diagnostic horizons were identified during the site assessment):

» Orthic topsoil are mineral horizons that have been exposed to biological activities and varying intensities of mineral weathering. The climatic conditions and parent material ensure a wide range of properties differing from one Orthic A topsoil to another (i.e., colouration, structure etc) (Soil Classification Working Group, 2018).

» The horizon is a young weakly-structed subsurface layer with variations in the soil matrix. The horizon is commonly associated to the processes of transportation of materials usually colluvial or alluvial origins in the valley bottoms or flats terrains and river terraces that have been subjected to an intermediate stage of pedogenic changes. The color differences in the neocutanic horizon are usually caused by illuvial material that coats weak structural units.

» The horizon is a young weakly-structed subsurface layer with variations in the soil matrix. The horizon is commonly associated to the processes of transportation of materials usually colluvial or alluvial origins in the valley bottoms or flats terrains and river terraces that have been subjected to an intermediate stage of pedogenic changes. The color differences in the neocutanic horizon are usually caused by illuvial material that coats weak structural units.

» The yellow-brown apedal horizon is similar to that of the Red Apedal horizon in all aspects except for the colour and the iron-oxide processes involved with the colouration thereof. This diagnostic soil horizon rarely occurs in parent rock high in iron-oxides and will rather be associated with Quartzite, Sandstone, Shale and Granites.

» The red apedal diagnostic soil horizon has no well-formed peds, but rather small porous aggregates. The poor structure associated with this diagnostic profile is a result of weathering processes under well drained oxidising conditions. Iron-oxide precipitations form on the outside of soil particles (hence the red colour) and non-swelling clays dominate the clay particles. This diagnostic soil horizon is widely spread across South Africa and can be associated with any parent material expected (Soil Classification Working Group, 1991).

» Albic horizons are characterised with unform colours due to the dominance of grey to whitish colouration of clay particles. These colours form because of the exposed quartz particles that usually range from a whitish to pale yellow colouration. Albic horizons mostly have a sand to sandy loam texture. Some can also have the occurrence of sandy clay loam and finer textures. The prominent characteristic of an albic horizon is the soil matrix bleaching. This feature occurs due to the redox and ferrolysis chemical reactions, due to eluviation and in instance from podzolization. This horizon has been traditionally identified by a loss of colloidal material, silicate clay, sesquioxide and humus with low clay contents. Most albic horizons have more clay contents than the overlying topsoil horizons. Albi horizons can also occur at deeper layers and receive lateral flows of water from hillslope water accumulations expected (Soil Classification Working Group, 1991).

» A lithic horizon is subsurface horizon with morphological expression of pedogenic alteration that range from strong weathering of the underlying country rock, with friable soil-like structure. The soil material is intimately mixed with partially weathered to hard rock fragments. Evidence of gleying in the form of reduction of iron minerals in the soil matrix or in the partially weathered fragments may be present in the wetter variants. However, redo-morphological properties are absent in drier conditions.

» Hard rock horizon comprises of hard rock characterised with primarily physical weathering ranging from fractured and solid rock lacking soil development between the fractures. The underlain parent material includes igneous, sedimentary and metamorphic rocks. The horizon restricts most root penetrations of plants except for some selected annual trees and shrubs which can grow through the fractured sections in specialized ecological niche environments.

**Agricultural Potential**

Agricultural potential is determined by a combination of soil, terrain and climate features. Land capability classes reflect the most intensive long-term use of land under rain-fed conditions. The land capability is determined by the physical features of the landscape including the soils present. The land potential or agricultural potential is determined by combining the land capability results and the climate capability for the region.

**Sensitivity Verification**

The following land potential level has been determined:

» Land potential level 3 (this land potential level is characterised by a good potential. Infrequent and/or moderate limitations due to soil, slope temperatures or rainfall. Appropriate contour protection must be implemented and inspected; and
» Land potential level 4 (this land potential level is characterised by a moderate potential. Moderate regular and/or severe to moderate limitations occur due to soil, slope, temperatures or rainfall).

Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which nine potential land capability classes are located within the proposed footprint area's assessment corridor, including;

» Land Capability 1 to 5 (Very Low to Low Sensitivity);
» Land Capability 6 to 8 (Low/Moderate to Moderate Sensitivity) and;
» Land Capability 9 to 10 (Moderate High Sensitivity).

The land capability sensitivity (DAFF, 2017) indicates a range of sensitivities expected throughout the project focus area, which is predominantly covers "Moderately Low" to "Moderate" sensitivities. Smaller patches are characterised by sensitivities up to "Moderately High. Furthermore, various crop field boundaries were identified by means of the DEA Screening Tool (2022), which are predominantly characterised by "High" sensitivities with one area being classified as "Very High" sensitivity (refer to **Figure 8.8**). It is the specialist`s recommendation that such high potential crop fields be avoided for the project. In a case relocating of the project is not feasible, intensive mitigation measures should be applied.

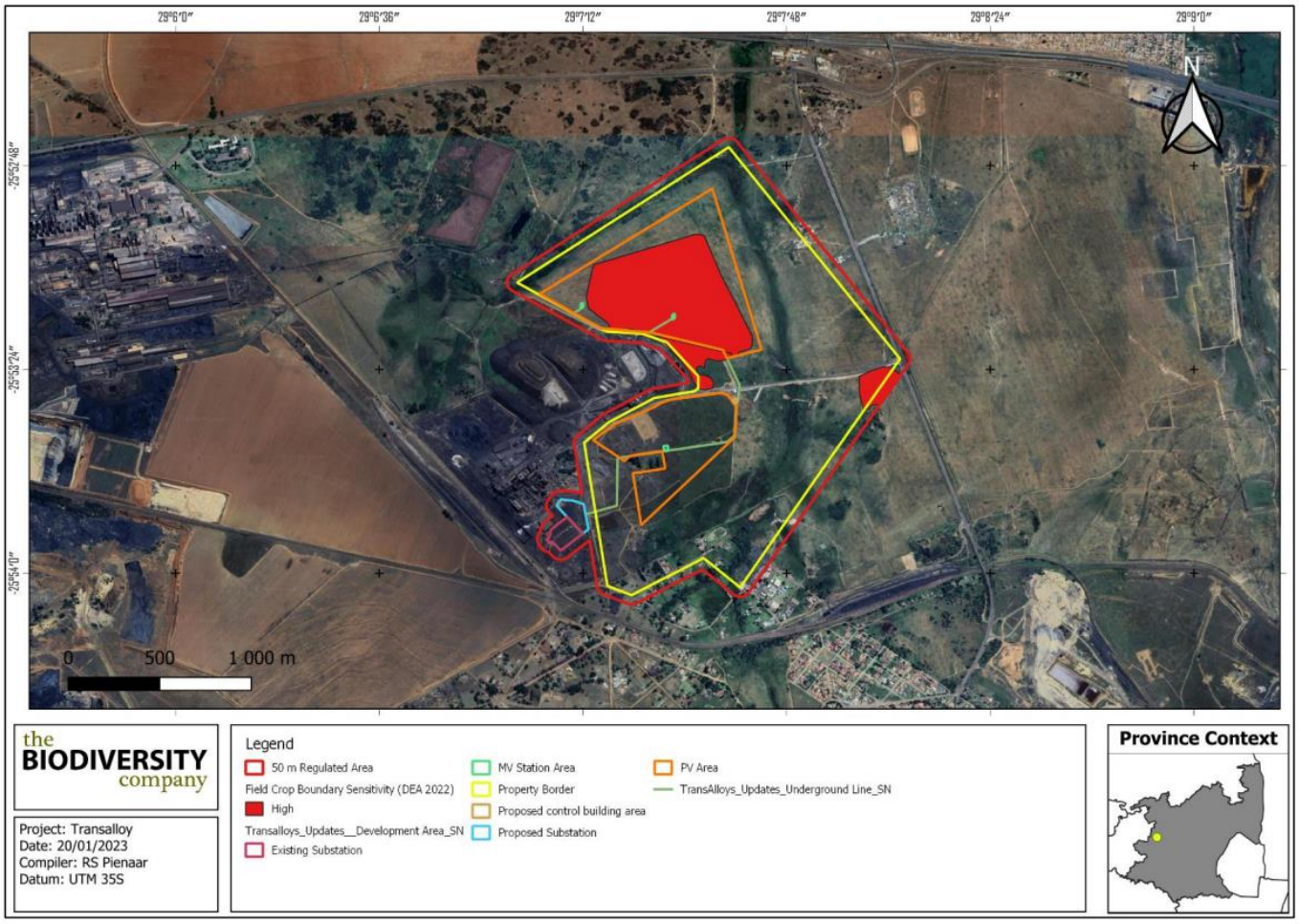


**Figure 8.8:** Infrastructure within proximity to sensitive crop fields

### *8.7.2 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 Transalloys Solar PV Energy Facility relates to the loss of land capability.

### *8.7.3 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 powerline 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).

### Construction Phase Impacts

***Nature:*** Loss of land capability

During the construction phase, foundations will be cleared with topsoil often being stripped and stockpiled. Access roads will be created with trenches being dug for the installation of relevant cables/pipelines. Construction of substation sites will take place together with the erection of transmission lines where relevant. Contractor and laydown yards will also be cleared with construction material being transported to laydown yards. Potential erosion is expected during the construction phase due to some erodable soils within the footprint assessment area, such as the Vaalboos and Tukulu soil forms. The removal vegetation and changes to the local topography could result in an alteration to surface run-off dynamics. Erosion of the area could result in further loss of topsoil, and soil forms suitable for agriculture.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Local area (3) | Footprint & surrounding areas (2) |
| ***Duration*** | Moderate Term (3) | Moderate Team (3) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Probable (3) | Low (2) |
| ***Significance*** | **Medium (36)** | **Low (18)** |
| ***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.
» Vegetate all stockpiles after stripping/removing soils.
» 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

***Nature:*** Loss of land capability

During the operational phase, limited impacts are foreseen. Concrete areas will be equipped with drains to reduce soil erosion on exposed areas. Only the footprint area will be disturbed to minimise soil and vegetation disturbance of the surrounding area. Revegetation will be carried out on exposed surrounding areas to avoid surface erosion. Maintenance of vegetation, wind and solar PV infrastructure structure 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.

The operational phase of the renewable project (Constructed Infrastructure) includes anthropogenic movement and activities. The relevant infrastructure will be occupied by professionals throughout the lifetime of the operation. Besides compaction and erosion caused by increased traffic and surface water run-off for the area, few aspects are expected to be associated with this phase. The spread of alien invasive species will be a risk, predominantly adjacent to developed aeras (edge effect).

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Footprint & surrounding areas (2) | Site specific (1) |
| ***Duration*** | Long Term (4) | Moderate Term (3) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Probable (3) | Low (2) |
| ***Significance*** | **Medium (36)** | **Medium (16)** |
| ***Status (positive or negative)*** | Negative | Negative |

| | | |
|---|---|---|
| ***Reversibility*** | High | High |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» Monitor compaction on site during the timeframe assigned for the life of the PV plant. | | |
| ***Residual Impacts:***<br>Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to. | | |

**Cumulative Impacts**

The proposed project area measures approximately 67.9 ha (48 ha North, 19.9 ha South) and falls within a development area of 100 ha, which is situated on a 235ha property. It is proposed that ~55MW WTG (49.280 MVA (AC) and 52.807 MWp (DC) layout with solar PV will be developed. The cumulative impacts have been scored "Medium," indicating that the potential incremental, interactive, sequential, and synergistic cumulative impacts will result in spatial and temporal cumulative change.

| **Nature**: Impact assessment related to the loss of land capability due to cumulative impacts of the proposed Transalloys solar photovoltaic facility project | | |
|---|---|---|
| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects within the area** |
| ***Extent*** | Local (3) | Footprint and surrounding area (2) |
| ***Duration*** | Long term (4) | Moderate term (5) |
| ***Magnitude*** | Moderate (6) | Minor (2) |
| ***Probability*** | Probable (3) | Probable (2) |
| ***Significance*** | **Medium (39)** | **Low (18)** |
| ***Status*** | Negative | Negative |
| ***Reversibility*** | High | High |
| ***Irreplaceable loss of resources*** | No | No |
| ***Can impacts be mitigated?*** | Yes | |
| ***Mitigation:***<br>» Investigate the possibility of avoiding large concrete areas.<br>» Develop and implement a rehabilitation management and monitoring plan.<br>» Demarcate all access routes.<br>» Vegetate all stockpiles after stripping/removing soils.<br>» Store potential contaminants in bunded areas.<br>» All contractors must have spill kits available and be trained in the correct use thereof.<br>» 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".<br>» No cleaning or servicing of vehicles, machines and equipment in water resources.<br>» Have action plans on site, and training for contractors and employees in the event of spills, leaks and other impacts to the aquatic systems.<br>» Continuously monitor erosion on site.<br>» Monitor compaction on site. | | |
| **Residual Impacts:**<br>Limited residual impacts will be associated with these activities, assuming that all prescribed mitigation measures be strictly adhered to. | | |

### *8.7.4 Overall Result*

Three main sensitive soil forms were identified within the project area, namely the Nkonkoni, Clovelly and Tubatse soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with "Low" and "Moderate high" sensitivities, which correlates with the "Moderate" sensitivities finding from the baseline assessment associated with land potential 3 and 4.

The project area is associated with arable soils. However, the available climatic conditions of low annual rainfall and high evapotranspiration potential severely limits crop production significantly resulting in land capabilities with "Low" and "Moderate high" sensitivities. Moreover, most soil profiles in the assessment area are shallow, which also limit field crop root penetrations. Depth limitations can also expose most of the soils to the effect of erosion. The land capabilities associated with the assessment area are suitable for livestock grazing, however limitations in the profile depth can restrict some of the cropping practices.

It is the specialist's opinion that the proposed Transalloys Solar PV Energy Facility project will have limited impact on the agricultural production ability of the land. The proposed Solar PV project can be developed on the crop fields identified as high sensitivity by the DFFE screening tool, (2022) with measures in place. Transalloys Pty Ltd is the landowner of the high crop field land use. The proposed Transalloys Solar PV Energy Facility may be favourably considered but all prescribed mitigation measures and recommendations must be considered by the issuing authority.

## 8.8. Assessment of Impacts on Heritage Resources

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

### *8.8.1 Results of the Heritage Assessment*

The area proposed for development has been previously surveyed for impacts to heritage resources by both Pelser (2014, SAHRIS NID 160495) and Van der Walt (2019, SAHRIS NID 524807) and as such, the specialist has a good idea of the heritage sensitivity of the area proposed for development. According to Van der Walt (2019), the development area is very flat and has been extensively altered by large-scale industrial and mining activities.

Pelser's (2014) assessment identified a number of heritage resources within and in proximity to the area proposed for development including "the remains of a very large graveyard containing at least 90 graves. Different types of grave dressing and headstones are found, being cement borders with headstones, heaps of soil, stone packed with or without headstones, granite borders and headstones and heaps of brick. A few are even fenced in. Surnames identified include Gasibone, Mdlalose, Masilela, Blom and Mokoena. Only eight of the graves have dates of death indicated, with the oldest being 1947 and the youngest 1960." According to Van der Walt (2019), it is noted that the graveyard is separately fenced off. Pelser (2014) recommended no impact to this site and this recommendation is reiterated in this assessment. Furthermore, it is recommended that due to the ongoing social significance of this site, that visitation access is ensured in the proposed development. Pelser (2014) further recommended that a management plan be developed for this site's ongoing management. This recommendation is also reiterated in this report.

In his assessment of the site (2019), Van der Walt determined that the overall area has limited heritage sensitivity. Van der Walt (2019) noted that the development area has been impacted by agricultural activities and recent mining operations. Van der walt (2019) identified the demolished remains of three structures within the development area. These structures were determined to be Not Conservation-Worthy in Van der Walt's report (2019), described simply as cement and bricks. No recommendations are made in this regard as these sites have no heritage value. All represent piles of cement slabs and concrete. Van der Walt (2019) notes that sites such as these may contain graves however this is unlikely in this instance.

Two sites that have social significance as initiation sites were identified in the area in Van der Walt (2019). Initiation site 1 is located on the western bank of the "Brugspruit" within a cluster of wattle trees. No features occur in this area but according to Mr Knoetze the site is visited approximately every 3 years by Ndebele and Sotho participants. Initiation site 2 is located at a low water bridge over the "Brugspruit". According to Mr. Knoetze the site is visited yearly by Pedi participants. At the time of the survey no one was attending an initiation school at any of the two sites. However, it is important that the ongoing cultural practices that take place at these sites are retained and provided for in the proposed development. These sites are included within the wetland buffer areas provided.

According to the SAHRIS Palaeosensitivity Map, the area proposed for development is underlain by sediments of very high palaeontological sensitivity. According to the CGS Map for Pretoria, the underlying geology of the development area consists of sediments of the Ecca Formation. In 2014, a desktop palaeontology assessment of the area was completed by Durand (2014). Durand (2014) notes that "The region is known for its fossiliferous mudstones and sandstones and it is highly probable that fossils will be encountered during construction if the excavations expose the bedrock. The potentially fossiliferous unit in the study area which may be impacted during construction consists of weathered sandstone."

Durand (2014) also notes that Glossopteris leaves are abundant in Ecca Group sediments in Gauteng, Free State, Mpumalanga and KwaZulu-Natal and could be considered to be amongst the most common fossils in South Africa. Most of the geology in the study site is presently covered by alluvium and the bedrock will only be exposed during excavations. There are large and well described collections of fossil material from this region at the Council for Geoscience and at the Bernard Price Institute for Palaeontology at the University of the Witwatersrand. Despite the grainy nature of the sandstone, the venation pattern of the leaf is visible." This site falls within the wetland buffer area provided. As such, no further recommendations are made in terms of impacts to palaeontological heritage resources.

All of the known heritage resources identified through previous assessments and their recommended buffer areas as well as the wetland buffer areas have been mapped in order to identify areas that are appropriate for the PV development from a heritage perspective. The final layout of the proposed PV area has been mapped relative to these known heritage resources (**Figure 8.9**). Sites 45186, 45188, 45189 and 45193 fall within the PV areas. All of these "sites" represent piles of modern debris, likely mining related, that are not conservation-worthy. Van der Walt (2019) notes that sites such as these may contain graves however this is unlikely in this instance.

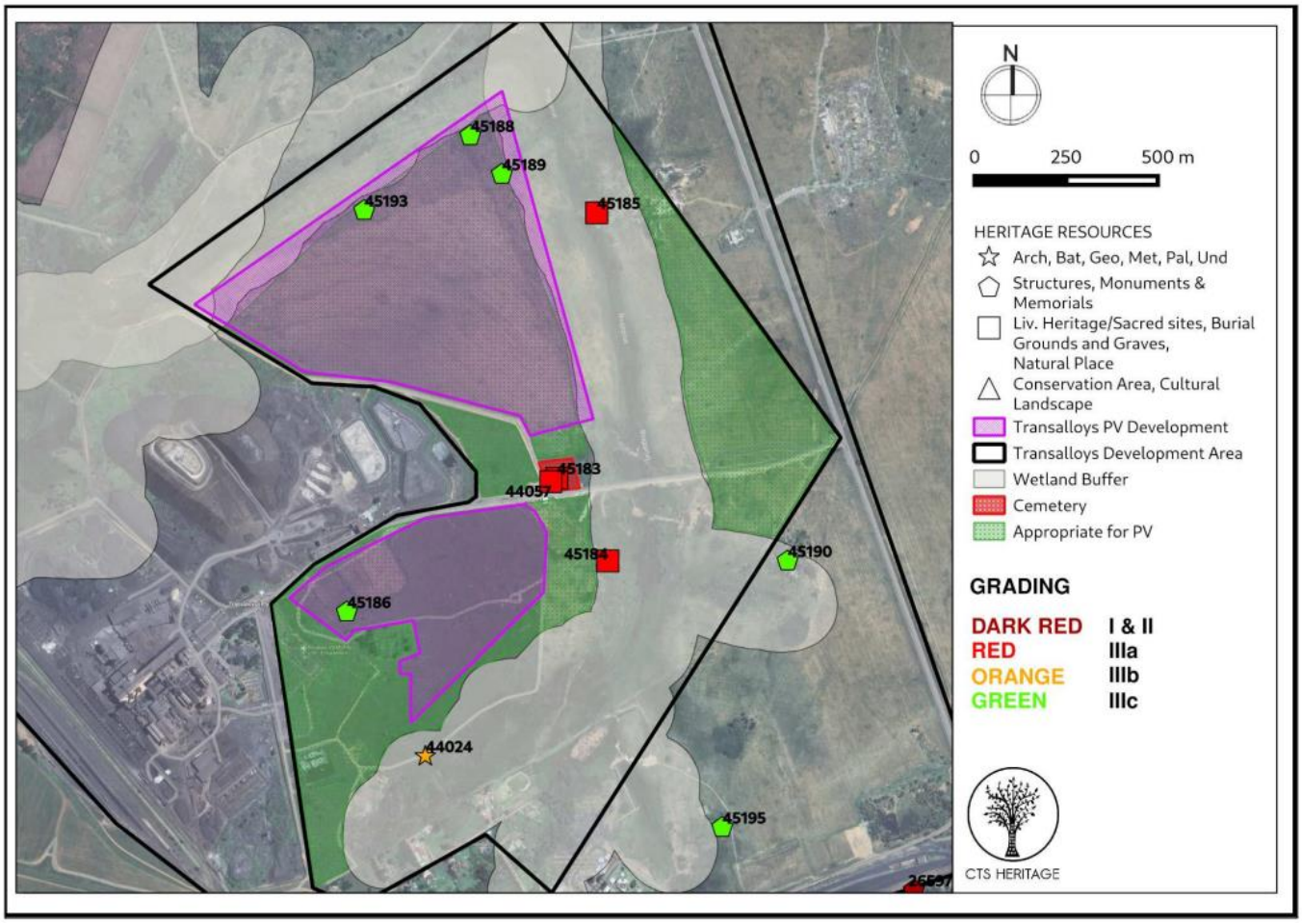


**Figure 8.9:** Site sensitivities Map and Final Layout

### *8.8.2 Description of the Heritage Impacts*

All of the archaeological "sites" recorded within the proposed development footprint represent piles of modern debris, likely mining related, that are not conservation-worthy. Van der Walt (2019) notes that sites such as these may contain graves however this is unlikely in this instance. Impacts on heritage resources are therefore unlikely to occur.

Only one site of palaeontological sensitivity was recorded on the site. This site falls within the wetland buffer area provided. As such, no further recommendations are made in terms of impacts to palaeontological heritage resources.

### *8.8.2 Overall Result*

Based on the heritage information available, there is no objection to the proposed PV development as per the Final Layout provided on heritage grounds as all known significant heritage resources are avoided by the proposed development and the recommended buffers are respected. On condition that the recommended buffer areas are implemented and that the PV development is limited to the appropriate development areas marked in green in **Figure 8.9**, no impacts to heritage resources are anticipated and

as such, no further heritage assessment is recommended.

## 8.9. Assessment of Visual Impacts

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

### *8.9.1 Results of the Visual Impact Assessment*

The Transalloys PV Solar Facility is located south of the N4 national road approximately 10km west of eMalahleni (previously Witbank). The region has a strong mining and industrial character, interspersed with agricultural activities (maize crop production) and human settlements. The central and south-eastern parts of the study area are home to a number of coal mines and industrial plants. These activities, especially the expansive mining and quarrying are rapidly changing the once rural and agricultural character to that of a predominantly industrial nature. Industrial and mining activities in close proximity to the proposed Transalloys PV Solar Facility include the Evraz Highveld Steelworks to the north-west and the Landau colliery to the south-east.

Prominent rivers or streams include the Grootspruit, to the south-west, and the Brugspruit traversing east of the Transalloys Power Plant. This water course (wetland) and grassland account for the remaining scenic natural resources in an area largely dominated by industrial and surface mining activities. This area is considered sensitive from a visual resource perspective and may be considered as a visual buffer zone between the proposed Transalloys PV Solar Facility and the N4, R104, R547 (Bailey Avenue) and Clewer.

A host of power lines criss-cross the study area, many of them originating at the power stations within the region, or congregating at the Vulcan substation north of KwaGuqa. Electricity for the Highveld steelworks and Transalloys plant are supplied by some of these power lines. Additional linear infrastructure includes the railway line and railway sidings traversing west of the Transalloys Power Plant, transporting iron ore to the Evras Highveld Steelworks.

The southern part of the study area still has a largely agricultural and rural character where predominantly dryland agriculture (maize) and limited irrigated agriculture are practised. North of the N4 national road the land use activities are dominated by the KwaGuqa town. Other than the above town, Ackerville to the north east, smaller residential areas to the south are generally associated with the mining activities, where employees of these mines are housed. The Clewer town and small holdings, situated south of the Transalloys PV Solar Facility are believed to be a case in point. Farm settlements or residences are (still) found to the south of the study area. Some of these include:

- Allandale
- Weltevrede
- Elandsfontein

No formally protected or conservation areas or major tourist attractions/resorts were identified within the study area.

### *8.9.2 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 8.10**. 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.

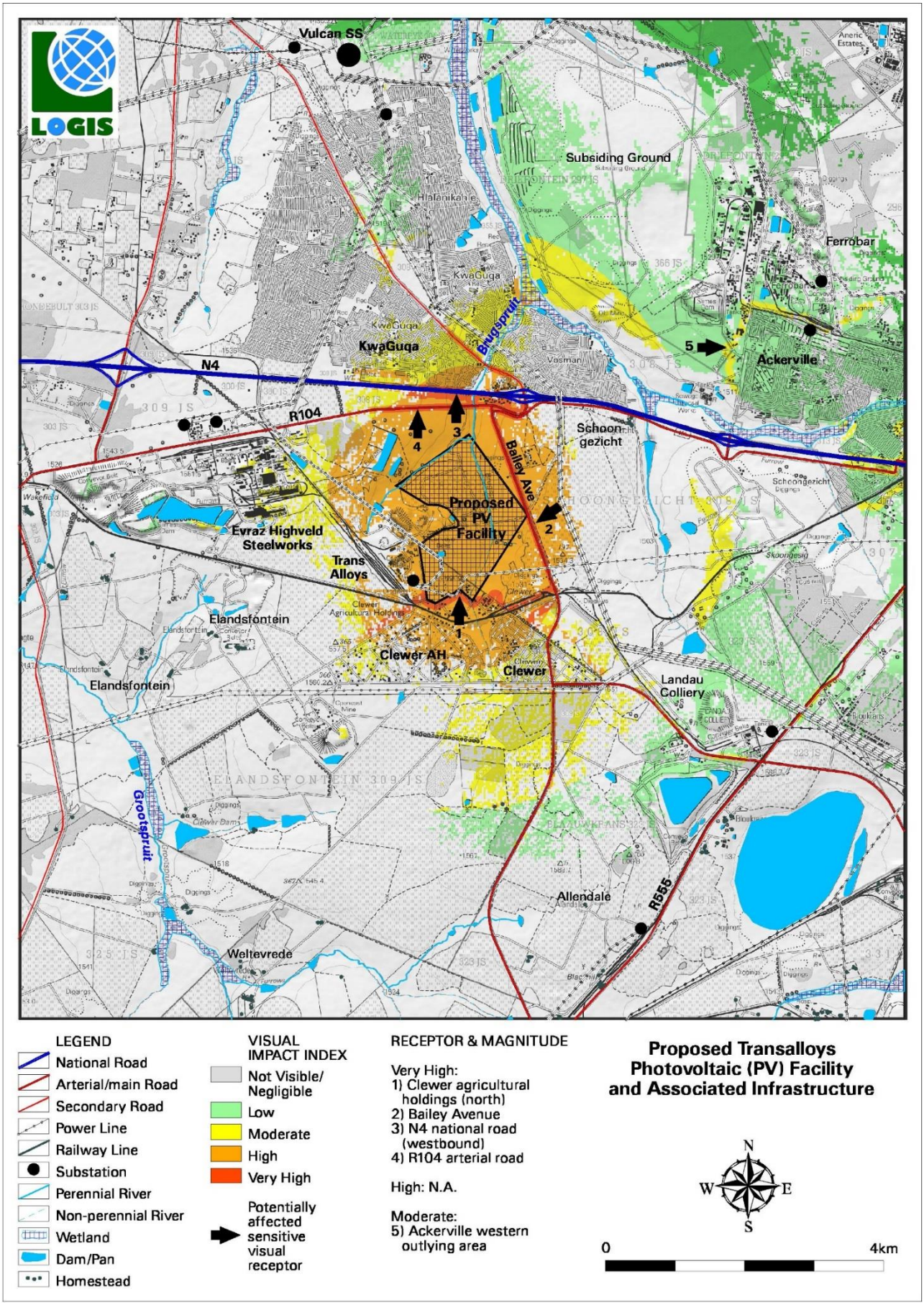


**Figure 8.10:** Visual impact index and potentially affected sensitive visual receptors

Magnitude of the potential visual impact

The Transalloys Solar PV energy facility is expected to have a visual impact of **very high** magnitude on residents of the northern section of Clewer agricultural holdings, a sector of the N4 national road, R104 and Bailey Avenue main road.

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

Residents of/or visitors to:
» Ackerville Western outlying area

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

### *8.9.2 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 close proximity (< 1 km) to the construction activities.

Construction activities may potentially result in a high (significance rating = 80), temporary visual impact, that may be mitigated to moderate (significance rating = 56

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Very short distance (4) | Very short distance (4) |
| ***Duration*** | Short term (2) | Short term (2) |
| ***Magnitude*** | Very High (10) | High (4) |
| ***Probability*** | Definite (5) | Highly Probable (3) |
| ***Significance*** | **High (80)** | **Low (56)** |
| ***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 **high** visual impact (significance rating = 72) pre-mitigation and a **moderate** visual impact (significance rating = 48) post mitigation on residents of the northern section of the Clewer agricultural holdings, as well as, observers travelling along the N4 national road and R104 and Bailey Avenue main roads. Observers traveling along these roads will only be exposed to the visual intrusion for a short period of time. This reduces the probability of this impact occurring.

Residents of the northern section of the Clewer agricultural holdings are expected to visually impacted upon the most.

**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*** | Very short distance (4) | Very short distance (4) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | Very High (10) | High (8) |
| ***Probability*** | Highly Probable (4) | Probable (3) |
| ***Significance*** | **Moderate (72)** | **Moderate (48)** |
| ***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/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 = 45) on sensitive receptors within 1 – 3km radius of the PV facility structures. This impact may be mitigated to **low** (significance rating = 26).

**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*** | Short distance (3) | Short distance (3) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | High (8) | Moderate (6) |
| ***Probability*** | Probable (3) | Improbable (2) |
| ***Significance*** | **Moderate (45)** | **Moderate (26)** |
| ***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*** | Very short distance (4) | Very short distance (4) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | Very High (10) | Moderate (6) |
| ***Probability*** | Probable (3) | Improbable (2) |
| ***Significance*** | **Moderate (54)** | **Low (28)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Reversible (1) | Reversible (1) |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | |

***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 off 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 relatively close proximity to the source (e.g. users of the N4, R104 and Bailey Avenue roads), 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 Transalloys PV Solar 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.[9]

There are three major roads within a 1km radius of the proposed PV facility, namely the N4, R104 and Bailey Avenue. This approximate distance is recommended as a threshold within which the visual impact of glint and glare (if there

[9] Sources: Blue Oak Energy, FAA and Meister Consultants Group.

is visual line of sight from the road) may influence road users.[10] However, since the alignment of the N4 national road is further slightly depressed with high embankments on either side of the road, potentially obstructing views of the proposed PV Facility, and section of the N4 east and west is further separated along the median by a brick wall intended to discourage pedestrians from crossing the highway, potentially shielding eastbound travellers from the proposed PV Facility, it is expected that glint and glare impacts experience by users of the N4 will be minimal.

The potential visual impact related to solar glint and glare as a road travel hazard is therefore expected to be of **moderate** significance both before and after mitigation for users of the R104 and Bailey Avenue.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Very short distance (4) | Very short distance (4) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | Very High (10) | Moderate (6) |
| ***Probability*** | Probable (3) | Improbable (3) |
| ***Significance*** | **Moderate (54)** | Moderate (42) |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Reversible (1) | Reversible (1) |
| ***Irreplaceable loss of resources?*** | No | Very short distance (4) |
| ***Can impacts be mitigated?*** | No, however best practice measures are recommended. | |

***Mitigation:***

Planning & operation:

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

The only residences within a 1km radius of the proposed PV facility are the residents of the northern section of the Clewer agricultural holdings. Since these residents are located to south of the site and it is assumed that the PV panels will be oriented to the north for maximum sun exposure it is unlikely that these receptors will be impacted upon by solar glint and glare.

The potential visual impact related to solar glint and glare on static ground-based receptors (residents of homesteads) is therefore expected to be of low significance, both before and after mitigation.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Very short distance (4) | Very short distance (4) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | Low (4) | Low (4) |
| ***Probability*** | Improbable (2) | Improbable (2) |
| ***Significance*** | **Low (24)** | **Low (24)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Reversible (1) | Reversible (1) |
| ***Irreplaceable loss of resources?*** | No | No |

[10] December 2020, Solar Photovoltaic Glint and Glare Guidance Third Edition.

| | |
|---|---|
| ***Can impacts be mitigated?*** | Yes |
| ***Mitigation:***<br>Planning and Operation:<br>» Use anti-reflective panels and dull polishing on structures, where possible and industry standard.<br>» Adjust tilt angles of the panels if glint and glare issues become evident, where possible.<br>» If specific sensitive visual receptors are identified during operation, investigate screening at the receptor site, where possible. | |
| ***Residual Impacts:***<br>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 inverters, low voltage cabling between the PV arrays, 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*** | Very short distance (4) | Very short distance (4) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | Low (4) | Low (4) |
| ***Probability*** | Probable (2) | Improbable (2) |
| ***Significance*** | **Low (24)** | **Low (24)** |
| ***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. | |

***Mitigation:***

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.

### Secondary Impacts

**Nature:** The potential visual impact of the proposed PV facility on the sense of place of the region.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.), plays a significant role.

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

Since the greater environment has a strong mining and industrial character, interspersed with agricultural activities (maize crop production) and human settlements this highly developed landscape is not considered to have a high visual quality.

The anticipated visual impact of the proposed PV facility on the regional visual quality (i.e. beyond 6km of the proposed infrastructure), and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of low significance.

| | **Without mitigation** | **With mitigation** |
|---|---|---|
| ***Extent*** | Medium to longer distance (2) | Medium to longer distance (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/servitude, 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 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.

### Cumulative Impacts

| **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 (1) | Local and Regional (2) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | Moderate (6) | Minor (4) |
| ***Probability*** | Probable (3) | Probable (3) |

| | | |
|---|---|---|
| ***Significance*** | **Moderate (36)** | **Low (24)** |
| ***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:***<br>Planning:<br>» Retain/re-establish and maintain natural vegetation (if present) immediately adjacent to the development footprint, where possible.<br><br>Operations:<br>» Maintain the general appearance of the facility as a whole.<br><br>Decommissioning:<br>» Remove infrastructure not required for the post-decommissioning use.<br>» Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications. | | |

### *8.9.3 Overall Result*

The findings of the Visual Impact Assessment undertaken for the proposed Transalloys Solar PV Energy Facility with a capacity of up to 55 MW 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 and 25 years with maintenance).

This impact is primarily applicable to the individual Transalloys Solar PV energy 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 **high**, temporary visual impact, that may be mitigated to **moderate**.
» The PV facility is expected to have a **high** visual impact pre-mitigation and a **moderate** visual impact post mitigation on residents of the northern section of the Clewer agricultural holdings, as well as, observers travelling along the N4, R104 and Bailey Avenue, within a 1km radius of the proposed PV facility.
» The operational PV facility could have a moderate visual impact on sensitive receptors within a 1 – 3km radius of the PV facility structures. This impact may be mitigated to **low**.
» 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 a road travel hazard is expected to be of **moderate** significance before and after mitigation.

» The only residences within a 1km radius of the proposed PV facility are the residents of the northern section of the Clewer agricultural holdings. Since these residents are located to south of the site and it is assumed that the PV panels will be oriented to the north for maximum sun exposure it is unlikely that these receptors will be impacted upon by solar glint and glare. Therefore, the potential visual impact

related to solar glint and glare on static ground-based receptors (residents of homesteads) is therefore expected to be of **low** significance, both before and after mitigation.
» 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 (i.e. beyond 6km of the proposed infrastructure), and by implication, on the sense of place, is difficult to quantify, but is generally 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 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.

## 8.10. Assessment of Social Impacts

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

### *8.10.1 Results of the Social Impact Assessment*

The proposed Transalloys Solar PV SEF facility and its associated electrical infrastructure is located to the east of the Transalloys smelter complex ~ 10kmto the south-west of the CBD of Emalahleni (Witbank). The urban land uses in the vicinity of the site include the town of Clewer located immediately to the south of the site and residential township areas, including Vosman, associated with Emalahleni located ~ 1km to the north of the site. The N4 and R 104 are located to the north of the site and separate the site from the residential areas. The R 547 runs along the eastern boundary of the site. The area to the east of the R547 is open farmland. This area has been identified as potential future area for coal mining.

The area to the south of the N4 is dominated by industrial and mining activities. The dominant heavy industrial activities include the Transalloys smelter complex and the Evraz Highveld Steel and Vanadium complex located ~2 km north-west of the Transalloys smelter complex and the PV site. The mining activities are dominated by coal mines, including the Elandsfontein Colliery located ~ 2.7km to the south-west of the PV site and Landau Colliery located ~ 3km to the south-east of the site. The area has therefore been substantially altered by industrial and mining activities. As such there are no sensitive social receptors that would be impacted by the proposed PV facility.

### *8.10.2 Description of Social Impacts*

Impacts are expected to occur with the development of the Transalloys Solar PV Energy 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
» Increased risk of grass firs associated with construction related activities and vehicles.
» 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

### *8.10.3 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 (~12 - 18 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 mismanagement of the construction phase activities.

**Nature:** The potential social impact of the proposed PV facility on the creation of employment and business opportunities during the construction phase.
The construction phase of the PV SEF will extend over a period of approximately 18 months and create in the region of 150 employment opportunities. Members from the local communities in the area, specifically Emalahleni, would be in a position to qualify for most of the low skilled and semi-skilled employment opportunities. Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members of the community. Based on information from similar projects the total wage bill will be in the region of R 20 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the local towns in the area.

Given relatively high local unemployment levels in the area, this will represent a significant, if localised, social benefit. The capital expenditure associated with the construction phase will be approximately R 1 billion (2022 Rand value). Given the well-developed local economy the potential for local construction and engineering companies to benefit

from aspects of the construction phase is likely to be high. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

In terms of training and skills development, the relatively short duration of the construction phase will make it difficult to implement an effective training and skills development programme. In addition, the majority of benefits are likely to accrue to personnel employed by the relevant contractors

| | **Without mitigation** | **With Enhancement** |
|---|---|---|
| ***Extent*** | Local - Regional (2) | Local (3) |
| ***Duration*** | Short term (2) | Short term (2) |
| ***Magnitude*** | Moderate (6) | Moderate (6) |
| ***Probability*** | Highly Probable (4) | Highly probable (4) |
| ***Significance*** | **Medium (40)** | **Medium (44)** |
| ***Status (positive or negative)*** | Positive | Positive |
| ***Reversibility*** | N/A | N/A |
| ***Irreplaceable loss of resources?*** | N/A | N/A |
| ***Can impacts be enhance?*** | Yes | |

***Enhancement:***

In order to enhance local employment and business opportunities associated with the construction phase the following measures should be implemented:

**Employment**

» Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
» Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
» Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.
» Before the construction phase commences the proponent should meet with representatives from the EM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.
» The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.
» Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
» The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

**Business**

» The proponent should liaise with the EM with regards the establishment of a database of local companies, specifically BBBEE 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 service providers. These companies should be notified of the tender process and invited to bid for project-related work.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

***Residual Impacts:***

Improved pool of skills and experience in the local area.

**Nature:** The potential social impact of the proposed PV facility on family structures and social networks associated with the presence of construction workers during the construction phase.

The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

The objective will be to source as many of the low and semi-skilled workers locally. These workers will be from the local community and form part of the local family and social networks. This will reduce the risk and mitigate the potential impacts on the local community. The potential impact on the local community will therefore be negligible. The balance of semi-skilled and skilled workers will be accommodated in Emalahleni.

| | **Without mitigation** | **With Enhancement** |
|---|---|---|
| ***Extent*** | Local (2) | Local (1) |
| ***Duration*** | Short term (2) | Short term (2) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Probable (3) | Probable (3) |
| ***Significance*** | **Medium (30)** | **Low (21)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | No in case of HIV and AIDS | No in case of HIV and AIDS |
| ***Irreplaceable loss of resources?*** | Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods. | Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods. |
| ***Can impacts be enhance?*** | Yes, to some degree. However, the risk cannot be eliminated. | |

***Enhancement:***

- Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
- Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
- The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report resolve incidents.
- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.
- The proponent and contractor(s) should develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation.
- The proponent and the contractor should implement an HIV/AIDS and COVID-19 awareness programme for all construction workers at the outset of the construction phase.
- The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area.
- The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.

» Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks.
» The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.
» It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

***Residual Impacts:***
Impacts on family and community relations that may, in some cases, persist for a long period of time. Also, in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.

**Nature:** The potential social impact of the proposed PV facility on family structures, social networks and community services associated with the influx of job seekers during the construction phase.

Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become "economically stranded" in the area or decide to stay on irrespective of finding a job or not. As in the case of construction workers employed on the project, the actual presence of job seekers in the area does not in itself constitute a social impact. However, the manner in which they conduct themselves can impact on the local community. The main areas of concern associated with the influx of job seekers include:

» Impacts on existing social networks and community structures.
» Competition for housing, specifically low-cost housing.
» Competition for scarce jobs.
» Increase in incidences of crime. The concern is that these job seekers may not leave town immediately and, in some cases, may stay indefinitely.

The impacts associated with the influx of job seekers are typically associated with large construction projects located in smaller towns that extend over a number of years. The proposed project in not located in or near a small town and does not represent a large construction project. The potential for the influx of job seekers is therefore likely to be low. The potential impacts associated with the influx of job seekers are therefore likely to be negligible.

| | **Without mitigation** | **With Mitigation** |
|---|---|---|
| ***Extent*** | Local 2) | Local (3) |
| ***Duration*** | Permanent (5) | Permanent (5) |
| ***Magnitude*** | Minor (2) | Minor (2) |
| ***Probability*** | Probable (3) | Probable (3) |
| ***Significance*** | **Low (27)** | **Low (24)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | No, in case of HIV and AIDS | No, in case of HIV and AIDS |
| ***Irreplaceable loss of resources?*** | Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods | Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods. |
| ***Can impacts be mitigated?*** | Yes, to some degree. However, the risk cannot be eliminated. | |

***Mitigation:***
» It is impossible to stop people from coming to the area in search of a job. However, as indicated above, the proponent should ensure that the employment criteria favour local residents in the area. In addition:

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| » Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.<br>» Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.<br>» The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities. |
| ***Residual Impacts:*** See cumulative impacts. |

**Nature:** The potential social impact of the proposed PV facility on the loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires during the construction phase.

The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could in turn pose a threat to livestock, crops, wildlife, and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed, and human lives threatened.

The potential fire risk of grass fires is highest during the dry winter months (April-October). This period also coincides with dry, windy conditions in the area.

| | **Without mitigation** | **With Mitigation** |
|---|---|---|
| ***Extent*** | Local (4) | Local (2) |
| ***Duration*** | Short term (2) | Short term (2) |
| ***Magnitude*** | Moderate (6) | Low (4) |
| ***Probability*** | Probable (3) | Probable (3) |
| ***Significance*** | **Medium (36)** | **Medium (24)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Yes, compensation paid for stock and crop losses etc | Yes, compensation paid for stock and crop losses etc |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | |

***Mitigation:***

The mitigation measures include:

» The proponent should prepare a Community Health, Safety and Security Plan (CHSSP) prior to commencement of the construction phase.
» The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.
» The option of establishing a fire-break around the perimeter of the site prior to the commencement of the construction phase should be investigated.
» Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.
» Smoking on site should be confined to designated areas.
» Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are effectively managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months.
» Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.
» Contractor to provide fire-fighting training to selected construction staff. No construction staff, with the exception of security staff, to be accommodated on site overnight.

| |
|---|
| » As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities. |
| ***Residual Impacts:*** No, provided losses are compensated for. |

**Nature:** The potential social impact of the proposed PV facility on noise, dust and safety impacts associated with construction related activities during the construction phase.

Construction related activities, including the movement of heavy construction vehicles of and on the site, has the potential to create dust, noise and safety impacts and damage roads. The access to the site will via the N4 and R 547. Care should be taken to ensure that construction vehicles accessing and leaving the site do not pose a safety threat to motorist using the R 547. The preparation of the site and associated levelling and clearing of vegetation will expose the soil to wind and result in dust. The dust impacts will be exacerbated during windy periods. The impacts will be largely local and can be effectively mitigated.

| | **Without mitigation** | **With Mitigation** |
|---|---|---|
| ***Extent*** | Local (2) | Local (1) |
| ***Duration*** | Short term (2) | Short term (2) |
| ***Magnitude*** | Low (4) | Minor (2) |
| ***Probability*** | Probable (3) | Probable (3) |
| ***Significance*** | **Low (24)** | **Medium (15)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Yes | Yes |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | |

***Mitigation:***

» Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.
» Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.
» Time transport of heavy equipment and materials to avoid peak am and pm periods on the R547.
» Dust suppression measures to be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.
» All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.

***Residual Impacts:*** Potential damage to local road, specifically the R547.

## Operation Phase Impacts

**Nature:** The potential social impact of the proposed PV facility on development infrastructure to generate clean, renewable energy during the operation phase.

needs. As a result, South Africa is the nineteenth largest per capita producer of carbon emissions in the world, and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions.

The proposed PV SEF will generate sufficient energy to meet Transalloys' current electricity demands and future expansion requirements. In this regard the facility will be a captive generating plant whereby generated electricity will be fed directly into the smelter complex for direct consumption. The development of the power plant project would enable Transalloys to become independent of the Eskom electricity grid, thereby creating additional capacity within the Eskom grid for use by other electricity users.

The energy will also be from a renewable source and therefore reduce Transalloy's carbon footprint and in so doing also assist to reduce South Africa's carbon footprint. The proposed development should therefore be viewed within the context of the South Africa's current power supply constraints and the reliance on coal powered energy to meet most of its energy needs. South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. Load shedding in the first six months of 2015 was estimated to have cost South African businesses R13.72 billion in lost revenue with an additional R716 million was spent by businesses on backup generators. A survey of 3 984 small business owners found that 44% said that they had been severely affected by load shedding with 85% stating that it had reduced their revenue, with 40% of small businesses losing 20% or more or revenue during due to load shedding period.

| | **Without mitigation** | **With Mitigation** |
|---|---|---|
| ***Extent*** | Local, Regional and National (4) | Local, Regional and National (5) |
| ***Duration*** | Long term (4) | Long term (4) |
| ***Magnitude*** | High (8) | High (8) |
| ***Probability*** | Highly Probable (4) | Definite (5) |
| ***Significance*** | **High (64)** | **High (85)** |
| ***Status (positive or negative)*** | Positive | Positive |
| ***Reversibility*** | Yes | - |
| ***Irreplaceable loss of resources?*** | N/A | N/A |
| ***Can impacts be mitigated?*** | Yes | |

***Mitigation:***

Should the project be approved, the proponent should:

» Implement a skills development and training programme aimed at maximising the number of employment opportunities for local community members.
» Maximise opportunities for local content, procurement, and community shareholding.

***Residual Impacts:***

Overall reduction in CO2 emission, reduction in water consumption for energy generation, contribution to promoting use of renewable energy in South Africa.

**Nature:** The potential social impact of the proposed PV facility on the creation of employment and business opportunities during the operational phase.

The Transalloys Solar PV Energy Facility will create ~ 10-15 permanent employment opportunities. Additional temporary employment opportunities will also be created, linked to maintenance and cleaning of solar panels etc. Most of the employment opportunities associated with the operational phase is likely to benefit HD members of the community. It will also be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. Such a programme would support the strategic goals of promoting local employment and skills development contained in the Emalahleni Municipality IDP. As indicated above, the establishment of the proposed Transalloys Solar PV Energy Facility should also be viewed within South Africa's current reliance on coal powered energy to meet the majority of its energy needs and the on-going energy crisis facing the economy.

| | **Without mitigation** | **With Enhancement** |
|---|---|---|
| ***Extent*** | Local – Regional (2) | Local - Regional (3) |
| ***Duration*** | Long term (4) | long term (4) |
| ***Magnitude*** | Low (4) | Low (4) |
| ***Probability*** | Highly Probable (3) | Highly Probable (3) |
| ***Significance*** | **Medium (40)** | **Medium (44)** |

| | | |
|---|---|---|
| ***Status (positive or negative)*** | Positive | Positive |
| ***Reversibility*** | N/A | N/A |
| ***Irreplaceable loss of resources?*** | N/A | N/A |
| ***Can impacts be enhanced?*** | Yes | |
| ***Mitigation:***<br>Should the project be approved, the proponent should:<br><br>» Implement a skills development and training programme aimed at maximising the number of employment opportunities for local community members. | | |
| ***Residual Impacts:***<br>Improved pool of skills and experience in the local area. | | |

**Nature:** The potential social impact of the proposed PV facility on the loss of productive agricultural land associated with the Transalloys Solar PV Energy Facility footprint and associated potential impact on viability of operation during the operational phase.

The establishment of the PV SEF will result in the loss of agricultural land. However, the Emalahleni Municipality SDF indicates that the area has been identified for industrial and commercial development. The area is also surrounded by existing industrial and coal mining operations. The impact on current and future agricultural uses of the land is therefore regarded as low. The owner/s of the site will also be compensated for the loss of land. The impact of the proposed PV SEF on the economic potential of the farm will therefore be low.

| | **Without mitigation** | **With Enhancement** |
|---|---|---|
| ***Extent*** | Local – Regional (2) | Local - Regional (3) |
| ***Duration*** | Long term (4) | long term (4) |
| ***Magnitude*** | Low (4) | Low (4) |
| ***Probability*** | Highly Probable (3) | Highly Probable (3) |
| ***Significance*** | **Medium (40)** | **Medium (44)** |
| ***Status (positive or negative)*** | Positive | Positive |
| ***Reversibility*** | Yes, solar facility can be removed. | |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be enhanced?*** | Yes | |
| ***Mitigation:***<br>The recommendations contained in the Agricultural Assessment should be implemented. | | |
| ***Residual Impacts:***<br>Overall loss of farmland could affect the livelihoods of the affected farmers, their families, and the workers on the farms and their families. However, area has been identified for future industrial development and compensation for loss of land will be paid to affected landowners. | | |

**Nature:** The potential social impact of the proposed PV facility on the Visual impact associated with the proposed solar facility and the potential impact on the area's rural sense of place and adjacent land uses. during the operational phase.

The proposed PV SEF has the potential to impact on the areas existing rural sense of place. However, given the surrounding land uses which include the existing Transalloys and Evraz Highveld Steel and Vanadium facility, several coal mines and townships associated with Emalahleni the potential impact on the areas sense of place will be limited. The site is also located within the Emalahleni REDZ and has therefore been identified as being suitable for the establishment of renewable energy facilities.

| | **Without mitigation** | **With Mitigation** |
|---|---|---|
| ***Extent*** | Local (1) | Local (1) |
| ***Duration*** | Long term (4) | long term (4) |
| ***Magnitude*** | Minor (2) | Minor (2) |

| | | |
|---|---|---|
| ***Probability*** | Probable (3) | Probable (3) |
| ***Significance*** | **Low (21)** | **Low (21)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Yes, solar facility can be removed. | |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be Mitigation?*** | Yes | |
| ***Mitigation:***<br>The recommendations contained in the Final VIA should also be implemented. | | |
| ***Residual Impacts:***<br>Improved pool of skills and experience in the local area. | | |

**Decommissioning Phase Impacts**

Upon the expiry of the Transalloys Solar PV Energy Facility lifespan, the facility would need to be disbanded. Typically, the major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, the communities within which they live, and the relevant local authorities. Given the relatively small number of people employed during the operational phase (~ 15), the social impacts at a community level associated with decommissioning will be limited. In addition, potential impacts associated with the decommissioning phase can be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative).

| | | |
|---|---|---|
| **Nature:** <u>The potential social impact of the proposed PV facility on the social impacts associated with retrenchment including loss of jobs, and source of income during the decommissioning phase.</u><br>The Transalloys Solar PV Energy Facility will create ~ 10-15 permanent employment opportunities. Additional temporary employment opportunities will also be created, linked to maintenance and cleaning of solar panels etc. Most of the employment opportunities associated with the operational phase is likely to benefit HD members of the community. It will also be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase. Such a programme would support the strategic goals of promoting local employment and skills development contained in the Emalahleni Municipality IDP. As indicated above, the establishment of the proposed Transalloys Solar PV Energy Facility should also be viewed within South Africa's current reliance on coal powered energy to meet the majority of its energy needs and the on-going energy crisis facing the economy. | | |
| | **Without mitigation** | **With Mitigation** |
| ***Extent*** | Local – Regional (2) | Local - Regional (1) |
| ***Duration*** | Medium term (2) | Very short term (1) |
| ***Magnitude*** | Low (4) | Low (4) |
| ***Probability*** | Probable (3) | Probable (3) |
| ***Significance*** | **Low (24)** | **Low (18)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Yes, assumes retrenchment packages are paid to all affected employees. | N/A |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be enhanced?*** | Yes | |
| ***Mitigation:***<br>The following mitigation measures are recommended: | | |

| |
|---|
| • The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned.<br>• All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.<br>• Revenue generated from the sale of scrap metal during decommissioning should be allocated to funding closure and rehabilitation of disturbed areas. |
| ***Residual Impacts:***<br>Loss of jobs and associated loss of income etc. can impact on the local economy and other businesses. However, decommissioning can also create short term, temporary employment opportunities associated with dismantling etc. |

**Cumulative 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 vicinity of 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 incentivize operation and maintenance companies to centralize and expand their activities towards education and training.

***Nature:*** Cumulative impacts on the visual impacts associated with the establishment of more than one SEF and the potential impact on the area's rural sense of place and character of the landscape.

The potential for cumulative impacts associated with combined visibility (whether two or more solar facilities will be visible from one location) and sequential visibility (e.g., the effect of seeing two or more solar facilities along a single journey does exist. However, as indicated above, given the surrounding land uses which include the existing Transalloys and Evraz Highveld Steel and Vanadium facility, several coal mines and townships associated with Emalahleni the potential impact on the areas sense of place will be limited. In addition, the site is located within the Emalahleni REDZ. The area has therefore been identified as suitable for the establishing of large-scale renewable energy facilities. The potential cumulative impact on the areas sense of place is therefore likely to be low.

| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects in the area** |
|---|---|---|
| ***Extent*** | Local (1) | Local and Regional (2) |
| ***Duration*** | Long-term (4) | Long-term (4) |
| ***Magnitude*** | Minor (2) | Minor (2) |
| ***Probability*** | Probable (3) | Probable (3) |
| ***Significance*** | **Low (27)** | **Low (24)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Yes, Solar energy plant components and other infrastructure can be removed. | |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | Yes |
| ***Confidence in findings:*** High. | | |
| ***Mitigation:***<br>The recommendations of the VIA should be implemented. | | |

***Nature:*** Cumulative impacts on the establishment of a number of renewable energy facilities in the EM has the potential to place pressure on local services.

The establishment of the proposed SEF and the other renewable energy facilities in the EM has the potential to place pressure on local services in local towns in the area. Services affected include medical, education and accommodation. This pressure will be associated with the influx of workers to the area associated with the construction phases, and to a lesser extent, the operational phases. However, given the size of Emalahleni and the history of mining and industrial activity in the area the impact is likely to be limited. The potential impact should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of a renewable projects in the area. These benefits will create opportunities for investment in the EM, including the opportunity to up-grade and expand existing services. The proposed site is also located within the Emalahleni REDZ. The area has therefore been identified as suitable for the establishment of large-scale solar energy facilities and associated infrastructure.

| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects in the area** |
|---|---|---|
| ***Extent*** | Local (1) | Local and regional (2) |
| ***Duration*** | Long-term (4) | Long-term (4) |
| ***Magnitude*** | Minor (2) | Minor (2) |
| ***Probability*** | Probable (3) | Probable (3) |
| ***Significance*** | **Low (21)** | **Low (24)** |
| ***Status (positive or negative)*** | Negative | Negative |
| ***Reversibility*** | Yes. Solar energy plant components and other infrastructure can be removed | N/A |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | Yes |

***Confidence in findings:*** High.

***Mitigation:***

The EM should engage with proponents involved in the development of renewable energy projects in the EM to co-ordinate and manage the development and operation of renewable energy projects in the area with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the EM.

***Nature:*** Cumulative Impacts on the establishment of a number of REFs in the EM will create employment, skills development and training opportunities, creation of downstream business opportunities.

In addition to the potential negative impacts, the proposed Transalloys Solar PV Energy Facility also has the potential to create significant positive cumulative impacts. In this regard the establishment of a number of SEFs in the area will create socio-economic opportunities for the REM, which, in turn, will result in positive social benefits. The positive cumulative impacts include the creation of employment, skills development and training opportunities, and downstream business opportunities. The potential cumulative benefits for the local and regional economy would apply to both the construction and operational phase of the renewable energy projects in the EM.

| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects in the area** |
|---|---|---|
| ***Extent*** | Local (1) | Local to Regional (2) |
| ***Duration*** | Long-term (4) | Long-term (4) |
| ***Magnitude*** | Low (4) | Moderate (6) |
| ***Probability*** | Probable (3) | Definite (5) |

| | | |
|---|---|---|
| ***Significance*** | **Low (27)** | **High (60)** |
| ***Status (positive or negative)*** | Positive | Positive |
| ***Reversibility*** | Yes, Solar energy plant components and other infrastructure can be removed. | |
| ***Irreplaceable loss of resources?*** | No | No |
| ***Can impacts be mitigated?*** | Yes | Yes |
| ***Confidence in findings:*** High. | | |
| ***Enhancement:***<br>The proposed establishment of suitably sited renewable energy facilities within the EM should be supported. | | |

| | | |
|---|---|---|
| ***Nature:*** Cumulative impacts on the no-development option would result in the lost opportunity to meet energy needs with clean, renewable energy<br>As indicated above, South Africa currently relies on coal-powered energy to meet more than 90% of its energy needs. As a result, South Africa is one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer carbon emissions. The No-Development option would represent a lost opportunity for Transalloys to reduce its carbon footprint and meet it energy needs with clean, renewable energy. Given South Africa's position as one of the highest per capita producers of carbon emissions in the world, this would represent a negative social cost. The No-Development Option is therefore not supported. | | |
| | **Overall impact of the proposed project considered in isolation** | **Cumulative impact of the project and other projects in the area** |
| ***Extent*** | Local – International (4) | Local – International (4) |
| ***Duration*** | Long-term (4) | Long-term (4) |
| ***Magnitude*** | Moderate (6) | Moderate (6) |
| ***Probability*** | Highly Probable (4) | High Probable (4) |
| ***Significance*** | **Medium (56)** | **Medium (56)** |
| ***Status (positive or negative)*** | Negative | Positive |
| ***Reversibility*** | Yes | |
| ***Irreplaceable loss of resources?*** | N/A | N/A |
| ***Can impacts be Enhanced?*** | Yes | Yes |
| ***Confidence in findings:*** High. | | |
| ***Mitigation:***<br>The proposed facility should be developed, and the mitigation and enhancement measures identified in the SIA and other specialist studies should be implemented. However, the impact of large solar facilities on the sense of place and landscape are issues need to be addressed in the location, design, and layout of the proposed facility. | | |

### *8.10.4 Overall Result*

**Key Findings**

From a social perspective, it is concluded that the project is supported, but that mitigation 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 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. 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 Transalloys Solar PV Energy Facility and associated infrastructure is unlikely to result in permanent damaging social impacts. From a social perspective, is the specialist 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 J**).

## 8.11. Assessment of the 'Do Nothing' Alternative

Transalloys Pty Ltd is proposing the development of a Solar PV Energy Facility with associated infrastructure that will have a maximum capacity of up to 55MW to meet Transalloys' current electricity demands and future expansion requirements. The plant will be a captive generating plant whereby generated electricity will be fed directly into the existing Transalloys' smelter complex for direct consumption. The development of the power plant project would effectively mean that Transalloys would become less dependent on the Eskom electricity grid, thereby creating additional capacity within the Eskom grid for use by other electricity users.

Failure to establish an exclusive power supply source for Transalloys smelting complex current and future expansion would also result in a constant demand of power to be supplied from Eskom, adding pressure on the grid infrastructure in the region. 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. Transalloys previously considered the development of a coal-fired power station on the site, for which an EA was issued in 2016. Due to various considerations, including economic and environmental factors, Transalloys (Pty) Ltd is now investigating the development of a renewable energy facility as the preferred power supply technology solution.

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.

From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with the project subject to implementation of the recommended mitigation measures. All impacts associated

with the project can be mitigated to acceptable levels. Environmental costs identified for the project include:

- Destruction, fragmentation and degradation of habitats and ecosystems.
- Spread and/or establishment of alien and/or invasive species.
- Direct mortality of fauna.
- Reduced dispersal/migration of fauna.
- Environmental pollution.
- Disruption/alteration of ecological life cycles (breeding, migration, feeding).
- Loss of wetland functionality.
- 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.

The 'do-nothing' alternative (i.e. no-go alternative) is the option of not constructing the Transalloys Solar PV Energy 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. 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. The 'do nothing' alternative is therefore not recommended.

# CHAPTER 9 : CONCLUSIONS AND RECOMMENDATIONS

Transalloys (Pty) Ltd propose to develop a commercial Solar Photovoltaic (PV) Energy Facility and associated electrical infrastructure on Portions 34 and 35 of the farm Elandsfontein 309JS and Portions 20 and 24 of the farm Schoongezicht 308JS, adjacent to their smelter complex on Clewer Road 1034, Witbank in the Emalahleni Local Municipality. The project is located in the greater Nkangala District Municipality of Mpumalanga Province, approximately 34km west of Middelburg and 37km east of Bronkhorstspruit. The entire extent of the site falls within the Emalahleni Renewable Energy Development Zone (REDZ9) and the International Corridor of the Strategic Transmission Corridors (**Figure 1.1**). The facility will have a contracted capacity of up to 55MW and will be known as the Transalloys Solar PV Energy Facility.

The PV facility is proposed in order to meet Transalloys' current electricity demands and future expansion requirements. The plant will be a captive generating plant whereby generated electricity will be fed directly into the smelter complex for direct consumption. The development of the power plant project would effectively mean that Transalloys would become independent of the Eskom electricity grid, thereby creating additional capacity within the Eskom grid for use by other electricity users.

A project site with an extent of ~235.5ha has been identified by Transalloys (Pty) Ltd as a technically suitable area for the development of the Transalloys Solar PV Energy Facility. The site is owned by Transalloys (Pty) Ltd.

A development area has been identified within the project site and assessed as part of the BA process. The development area is up to ~100ha in extent and the much smaller development footprint of ~67.9ha will be placed and sited within the development area. Infrastructure associated will the Solar PV Facility to enable the facility to generate up to 55MW will include the following:

- Solar PV array comprising PV modules and mounting structures (monofacial or bifacial and a single axis tracking system)
- Inverters and transformers
- Cabling between the project components
- On-site facility substation and a power line to connect the solar PV facility to the existing Transalloys Substation
- Security office, operations and control, and maintenance and storage laydown areas
- Access roads and internal distribution roads

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(1)(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 Transalloys Solar PV Energy Facility has been included in **section 9.2**. |
| 3(1)(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 Energy Solar PV Energy Facility has been included as **section 9.5**. An environmental sensitivity and layout map of the Transalloys Solar PV Energy 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.<br><br>A summary of the positive and negative impacts associated with the Transalloys Solar PV Energy Facility has been included in **section 9.2**. |
| 3(1)(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 Transalloys Solar PV Energy Facility have been included in **section 9.7**. |
| 3(1)(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 Transalloys Solar PV Energy Facility should be authorised has been included in **section 9.6**. |

## 9.2 Evaluation of the Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility and associated infrastructure. This chapter concludes the environmental assessment of the project by providing a summary of the results and conclusions of the assessment of both the project site and development footprint for the Transalloys Solar PV Energy 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 Transalloys Solar PV Energy Facility identified and assessed through the BA process include:

» Impacts on ecology, flora and fauna.
» Impacts on 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 and fauna)*

The Transalloys Solar PV Energy Facility falls within the Eastern Highveld Grassland vegetation type. The vegetation of this vegetation type is characterised by short and dense grasslands that occur in moderately undulating plains which include low hills and pan depressions.

The project area overlaps with CBA irreplaceable and CBA optimal areas according to the provincial conservation plan, however, following the findings of this assessment most of the local habitat is considered to exist in a degraded state. It is noted that certain sections of the project area represent more intact areas of habitat (the wetland areas), and these are considered to be more functional with regards to the CBA status of the project area, whereby they should be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems, and land uses should maximise the retention of biodiversity pattern and ecological process. To ensure this it is important that the management outcomes presented above be adhered to, in order to properly mitigate the negative environmental impacts that will stem from the project activities.

Fauna and flora SCC have a moderate expectancy of occurrence across the project area. While two species, *Zantedeschia aethiopica* and *Crinum macowanii*, listed as protected under Schedule 11 of the Mpumalanga Nature Conservation Act (Act 10 of 1998) were recorded within the wetland habitat. The previous Pre-Construction Walk-Through Report compiled by *Nkurenkuru* Ecology & Biodiversity in 2019 found additional *Crinum macowanii* individuals along the secondary grassland habitat. As such it is recommended that a wet season walkthrough of the project be conducted prior to the commencement of the project construction phase.

The terrestrial biodiversity assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The project area is instead assigned an overall sensitivity that ranges from 'Very Low' to 'Medium', with the exception of the wetland areas that has been assigned a 'High' sensitivity.

Considering that the area proposed for the facility has been identified as being of low significance for biodiversity maintenance and ecological processes, it is the specialist's opinion that the development may proceed. All mitigations measures prescribed herein must be considered by the issuing authority for authorisation. No fatal flaws are evident for the proposed project.

### *9.2.2 Impacts on Avifauna*

Sixty-six (66) bird species were recorded in the point counts of the survey, while twenty-two (22) species were recorded during incidental observations. One of the species recorded was a SCC, the Lanner Falcon *(Falco biarmicus),* it was observed flying over the project area, no nest of this species was observed in the project area. A nest of a provincially protected Hamerkop *(Scopus umbretta)* was observed, based on its lower schedule 5 protection level only a 50 m buffer was placed around the nest, and this must be treated as a

"No-Go" area. The feeding groups recorded in the project area were dominated by insectivores, followed by granivores and omnivores. It is believed a summer survey in the migratory season of avifauna would yield higher numbers of bird species, especially those of water birds due to the high numbers of water resources in the project area. The water resources and their buffers (as per the wetland report TBC, 2022) in the project area must be treated as "No-Go' areas. As a result of the high amount of water resources in the project area the collision risk is regarded as higher. This risk can be mitigated by the installation of white strips on the edge of the PV panels and bird diverters along the whole length of the power line (should this be overhead).

Based on the current types of bird species recorded in the project area the development will not have a high residual impact should all the mitigations and recommendations be implemented. Based on the desktop and field findings it is the opinion of the specialist that the project, may be favourably considered, on condition that all prescribed mitigation measures and supporting monitoring are implemented.

### *9.2.3 Impacts on Aquatic Ecology*

A total of five (5) wetlands were identified and assessed within the 500 m regulated area namely three hillslope seep wetland a channelled valley bottom wetland as well as a unchanneled valley bottom wetland. HGM 4 scored overall PES scores of C – "Moderately Modified" due to the modification to the hydrology and vegetation of the wetland through anthropogenic activities. HGM 1, HGM 2 and HGM 5 units scored overall PES scores of D – "Largely Modified". HGM 2 unit scored PES score of E – "Seriously Modified". All the HGM units scored "High" importance and sensitivity scores due to the high protection level of both the wet veg and wetland units. The average ecosystem service score ranges between "Moderately Low" and "Moderately High".

The buffer size for the proposed development was determined to be 15m post mitigation buffer to the wetland systems.

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. A Water Use Licence is required for the development of the Transalloys Solar PV Energy Facility.

It is the opinion of the specialist that no fatal flaws were identified for the project. 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 HGM 2 and 4 to "Largely Modified" after construction).

### *9.2.4 Impacts on Land Use, Soil and Agricultural Potential*

Three main sensitive soil forms were identified within the project area, namely the Nkonkoni, Clovelly and Tubatse soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with "Low" and "Moderate high" sensitivities, which correlates with the "Moderate" sensitivities finding from the baseline assessment associated with land potential 3 and 4.

The project area is associated with arable soils. However, the available climatic conditions of low annual rainfall and high evapotranspiration potential severely limits crop production significantly resulting in land capabilities with "Low" and "Moderate high" sensitivities. Moreover, most soil profiles in the assessment area are shallow, which also limit field crop root penetrations. Depth limitations can also expose most of the soils to the effect of erosion. The land capabilities associated with the assessment area are suitable for livestock grazing, however limitations in the profile depth can restrict some of the cropping practices.

It is the specialist's opinion that the proposed Transalloys Solar PV Energy Facility project will have limited impact on the agricultural production ability of the land. The proposed Solar PV project can be developed on the crop fields identified as high sensitivity by the DFFE screening tool, (2022) with measures in place. Transalloys Pty Ltd. is the landowner of the high crop field land use. The proposed Transalloys Solar PV Energy Facility may be favourably considered but all prescribed mitigation measures and recommendations must be considered by the issuing authority.

### *9.2.5 Impacts on Heritage Resources (archaeology and palaeontology)*

Based on the heritage information available, there is no objection to the proposed PV development as per the Final Layout provided on heritage grounds as all known significant heritage resources are avoided by the proposed development and the recommended buffers are respected. On condition that the recommended buffer areas are implemented and that the PV development is limited to the appropriate development areas, no impacts to heritage resources are anticipated and as such, no further heritage assessment is recommended.

### *9.2.6 Visual Impacts*

The findings of the Visual Impact Assessment undertaken for the proposed Transalloys PV Solar Facility is that the visual environment surrounding the site, especially within a 1km radius (and potentially up to a radius of 3km) of the proposed facility, may be visually impacted during the anticipated operational lifespan of the facility (i.e. a minimum of 25 years with maintenance).

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 **high**, temporary visual impact, that may be mitigated to **moderate**.
- The PV facility is expected to have a **high** visual impact pre-mitigation and a **moderate** visual impact post mitigation on residents of the northern section of the Clewer agricultural holdings, as well as, observers travelling along the N4, R104 and Bailey Avenue, within a 1km radius of the proposed PV facility.

- The operational PV facility could have a **moderate** visual impact on sensitive receptors within a 1 – 3km radius of the PV facility structures. This impact may be mitigated to **low**.
- 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 a road travel hazard is expected to be of **moderate** significance before and after mitigation.
- The only residences within a 1km radius of the proposed PV facility are the residents of the northern section of the Clewer agricultural holdings. Since these residents are located to south of the site and it is assumed that the PV panels will be oriented to the north for maximum sun exposure it is unlikely that these receptors will be impacted upon by solar glint and glare. Therefore, the potential visual impact related to solar glint and glare on static ground-based receptors (residents of homesteads) is therefore expected to be of **low** significance, both before and after mitigation.
- 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 (i.e. beyond 6km of the proposed infrastructure), and by implication, on the sense of place, is difficult to quantify, but is generally 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 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.

### *9.2.7 Social Impacts*

Impacts are expected to occur with the development of the Transalloys Solar PV Energy 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 that the project is supported, but that mitigation 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 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 Transalloys Solar PV Energy Facility and associated infrastructure is unlikely to result in permanent damaging social impacts. From a social perspective, the specialist 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.

### *9.2.8 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.

Based on the specialist cumulative assessment and findings (**Appendix D** to **Appendix I** and Chapter 8 of the BA) the development of the Transalloys Solar PV Energy Facility and its contribution to the overall impact of all existing and proposed renewable energy facilities and other industrial-type developments within a 30km radius, will be of a low to medium significance. There are no impacts or risks identified to be considered as unacceptable with the development of Transalloys Solar PV Energy Facility and other similar developments within the surrounding area. In addition, no impacts which will result in whole-scale change are expected.

### 9.2.9 *Assessment of the "Do Nothing" Alternative*

The 'do-nothing' alternative (i.e. no-go alternative) is the option of not constructing the Transalloys Solar PV Energy 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. 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. From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with the project subject to implementation of the recommended mitigation measures. All impacts associated with the project can be mitigated to acceptable levels. The 'do nothing' alternative is therefore not recommended.

## 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:**
The project area overlaps with CBA irreplaceable and CBA optimal areas according to the provincial conservation plan, however, following the findings of this assessment most of the local habitat is considered to exist in a degraded state. It is noted that certain sections of the project area represent more intact areas of habitat (the wetland areas), and these are considered to be more functional with regards to the CBA status of the project area, whereby they should be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems, and land uses should maximise the retention of biodiversity pattern and ecological process. To ensure this it is important that the management outcomes presented above be adhered to, in order to properly mitigate the negative environmental impacts that will stem from the project activities.

Fauna and flora SCC have a moderate expectancy of occurrence across the project area. While two species, Zantedeschia aethiopica and *Crinum macowanii*, listed as protected under Schedule 11 of the Mpumalanga Nature Conservation Act (Act 10 of 1998) were recorded within the wetland habitat. The previous Pre-Construction Walk-Through Report compiled by *Nkurenkuru* Ecology & Biodiversity in 2019 found additional *Crinum macowanii* individuals along the secondary grassland habitat. As such it is recommended that a wet season walkthrough of the project be conducted prior to the commencement of the project construction phase.

The terrestrial biodiversity assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The project area is instead assigned an overall sensitivity that ranges from 'Very Low' to 'Medium', with the exception of the wetland areas that has been assigned a 'High' sensitivity.

» **Avifaunal features:**
Sixty-six (66) bird species were recorded in the point counts of the survey, while twenty-two (22) species were recorded during incidental observations. One of the species recorded was a SCC, the Lanner

Falcon *(Falco biarmicus),* it was observed flying over the project area, no nest of this species was observed in the project area. A nest of a provincially protected Hamerkop *(Scopus umbretta)* was observed, based on its lower schedule 5 protection level only a 50 m buffer was placed around the nest, and this must be treated as a "No-Go" area. The feeding groups recorded in the project area were dominated by insectivores, followed by granivores and omnivores. It is believed a summer survey in the migratory season of avifauna would yield higher numbers of bird species, especially those of water birds due to the high numbers of water resources in the project area. The water resources and their buffers (as per the wetland report TBC, 2022) in the project must be treated as "No-Go' areas. As a result of the high amount of water resources in the project area the collision risk is regarded as higher. This risk can be mitigated by the installation of white strips on the edge of the PV panels and bird diverters along the whole length of the powerline.

» **Aquatic ecology features:**
A total of five (5) HGM units were identified and assessed within the 500 m regulated area namely three hillslope seep wetland a channelled valley bottom wetland as well as a unchanneled valley bottom wetland. One of the HGM unit scored overall PES scores of C – "Moderately Modified" due to the modification to the hydrology and vegetation of the wetland through anthropogenic activities. Most of the HGM units scored overall PES scores of D – "Largely Modified" with the remaining HGM unit scoring an overall PES scores of E – "Seriously Modified". All the HGM units scored "High" importance and sensitivity scores due to the high protection level of both the wet veg and wetland units. The average ecosystem service score ranges between "Moderately Low" and "Moderately High". A 15 m post mitigation buffer was assigned to the wetland systems.

» **Soils:**
Three main sensitive soil forms were identified within the project area, namely the Nkonkoni, Clovelly and Tubatse soil forms. The land capability sensitivities indicate land capabilities with "Low" and "Moderate high" sensitivities. Various crop field boundaries were identified by means of the DEA Screening Tool (2022), which are predominantly characterised by "High" sensitivities with one area being classified as "Very High" sensitivity. It is recommended that the location of infrastructure avoid areas of high agricultural production. In a case relocating of the project is not feasible, intensive mitigation measures should be applied.

» **Heritage Resources:**
» All of the archaeological "sites" recorded within the proposed development footprint represent piles of modern debris, likely mining related, that are not conservation-worthy. Van der Walt (2019) notes that sites such as these may contain graves however this is unlikely in this instance. Impacts on heritage resources are therefore unlikely to occur.
»
» Only one site of palaeontological sensitivity was recorded on the site. This site falls within the wetland buffer area provided. As such, no further recommendations are made in terms of impacts to palaeontological heritage resources.

» **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 traveling Clewer Agricultural Holdings (northern section), a section of the N4 national road, R104 and Bailey

Avenue main roads. 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 Residents of the KwaGuqa town and located north of the N4 national road). 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 Ackerville (outlying). 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:**

» The area has been substantially altered by industrial and mining activities. As such there are no sensitive social receptors that would be impacted by the proposed PV facility. No no-go areas have been identified and no buffers have been recommended from a social perspective.

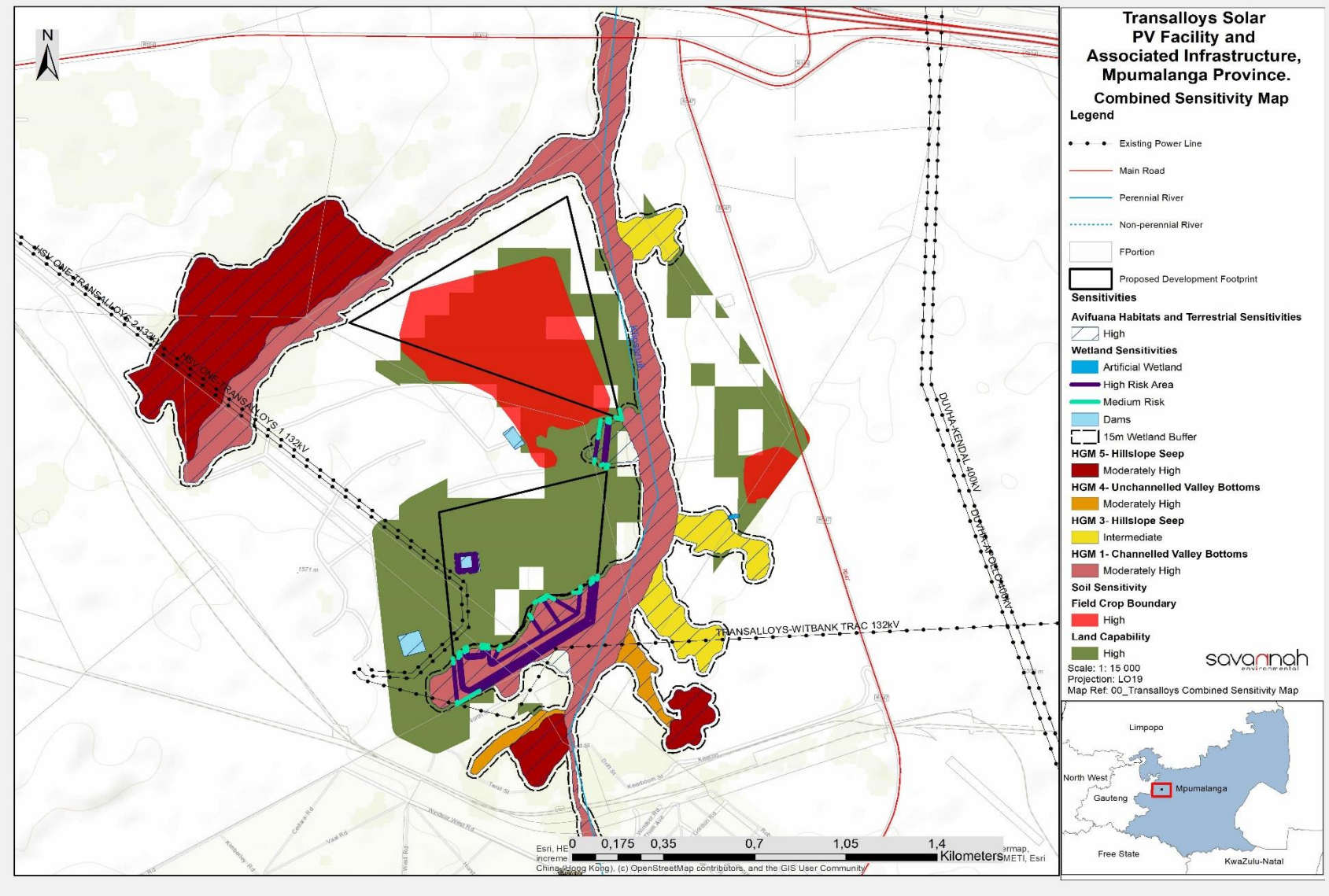


**Figure 9.1:** The development area (~67.9ha) of the Transalloys Solar PV Energy Facility, as assessed within this BA Report, overlain on the identified environmental sensitive features (**Appendix O**)

## 9.4. Assessment of Proposed Facility Layout

The development footprint, as assessed in this BA Report, has been overlain with the identified environmental sensitivities in **Figure 9.1**. The development footprint was designed by the project developer in order to respond to and avoid the sensitive environmental and social features located within the development footprint as far as possible. This approach ensured the application of the mitigation hierarchy (i.e., avoid, minimise, mitigate and offset) to the Transalloys Solar PV Energy Facility, which ultimately ensures that the development is appropriate from an environmental perspective and is suitable for development within the development area (located within the project site). The application of the mitigation hierarchy was undertaken by the developer based on specialist study findings, as concluded in this chapter.

The layout for the PV facility and associated infrastructure assessed within this EIA Report is located outside of ecologically sensitive areas and features regarded to be no-go for development. Although the proposed layout for the PV facility and associated infrastructure overlaps with areas of sensitivity from a soils perspective, the specialist has concluded that the project as proposed can be authorised on condition that the recommended mitigation measures are implemented. As such, the impact of this proposed facility layout is considered to be acceptable and the layout is recommended for approval (refer to **Figure 9.2**). Final micro-siting must however be undertaken prior to construction considering all mitigation measures recommended within this EIA Report and associated specialist studies.

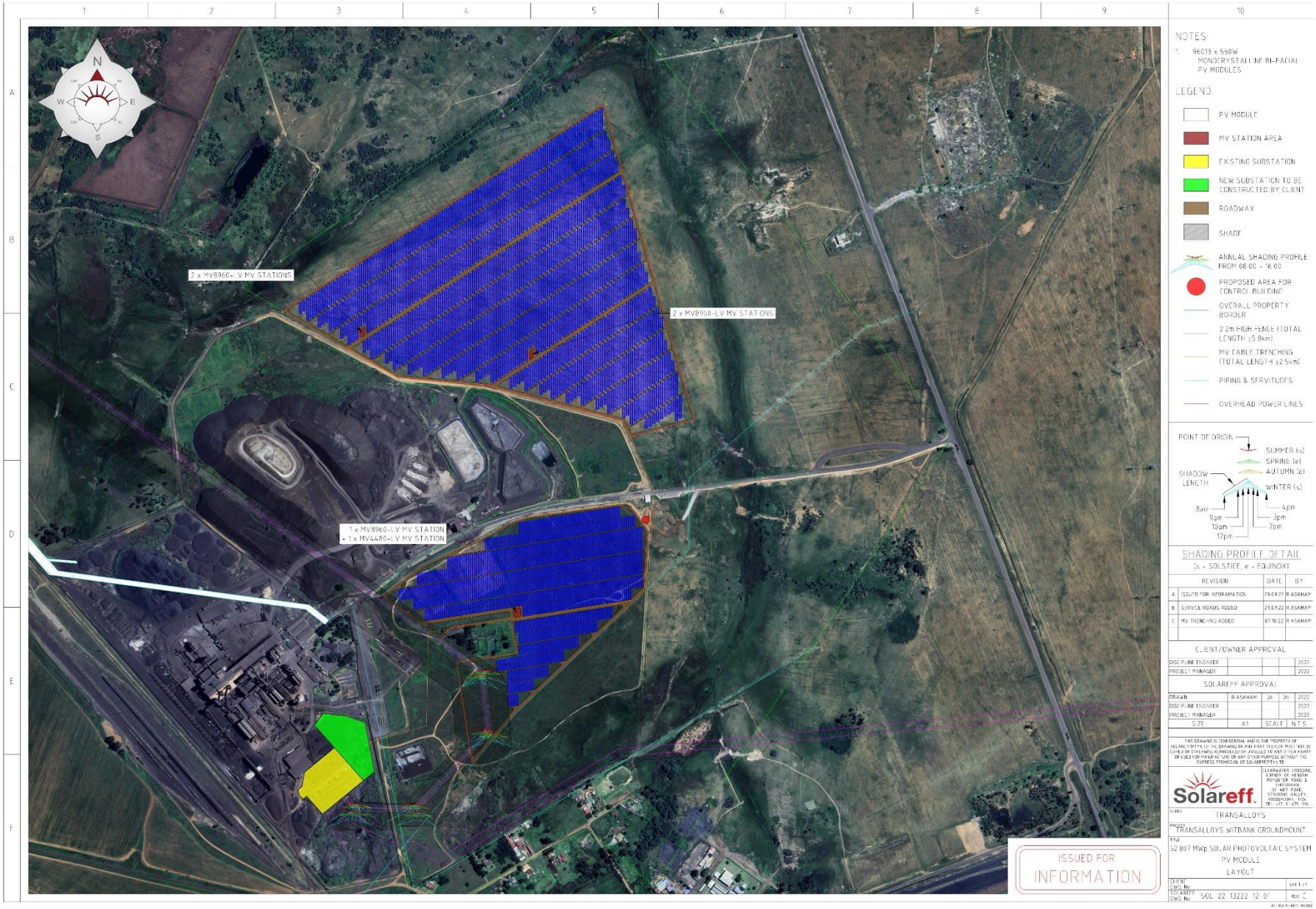


**Figure 9.2**: Layout proposed for authorisation for the Transalloys Solar PV Energy Facility **Appendix O**)

## 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 biodiversity, flora, fauna and avifauna due to the clearing of land for the construction and utilisation of land for the solar PV facility. The loss of biodiversity has been minimised/avoided through the limited placement of project components and infrastructure within the ecological features, and sensitive areas considered to be of high sensitivity.
- Loss of aquatic resources such as wetlands. The loss of aquatic resources has been avoided through the avoidance of such features by the development footprint.
- The area is currently used by the illegal farmers for agriculture (non-irrigated) which would have to cease to accommodate the proposed development. However, Transalloys is the landowner and has no formal agreement with any farmers. Although the affected area has a high agricultural potential there will not be any loss of land for commercial agricultural purposes as a result of the project as the area is designated for industrial purposes by the landowner.
- There will be visual impacts associated with the PV facility as the Transalloys Solar PV Energy Facility will be visible and mainly of a very high and high significance within a 1km radius and a 1-3km radius of the PV facility, respectively. As the PV site and associated grid infrastructure are located within the Transalloys-owned land and industrial affected area, and due to the transformed nature of the surrounding areas, the potential impact on the area's sense of place will be negligible.

Benefits of the Transalloys Solar PV Energy 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 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 Transalloys Solar PV Energy 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 Transalloys Solar PV Energy 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 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)

The preferred activity was determined by the developer to be the development of a renewable energy facility on site using solar as the preferred technology, due to the availability of a strong solar resource, available grid capacity, benign topography, and good access. A technically viable development area for the project was proposed by Transalloys (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. Transalloys (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.

From a review of the relevant policy and planning framework, it was concluded that the project is well aligned with the policy framework, and a clear need for the Project is seen from a policy perspective at a local, provincial and National level.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the implementation of the project. The developer has designed a project development footprint in response to the identified sensitive environmental features and areas present within the project site. This approach is in line with the application of the mitigation hierarchy, where all the sensitive areas which could be impacted by the development have been avoided (i.e., tier 1 of the mitigation hierarchy). The layout for the PV facility and associated infrastructure assessed within this EIA Report is located outside of ecologically sensitive areas and features regarded to be no-go for development. Although the proposed layout for the PV facility and associated infrastructure overlaps with areas of sensitivity from a soils perspective, the specialist has concluded that the project as proposed can be authorised on condition that the recommended mitigation measures are implemented. No sensitive visual or social receptors or sites of high heritage significance were identified to be impacted by the proposed development. It was concluded by all specialists that impacts can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures. The layout assessed within this EIA Report is therefore considered to be acceptable for implementation.

## 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 Transalloys Solar PV Facility is acceptable within the landscape and the proposed development site and can reasonably be authorised. The proposed layout as provided by the developer (**Figure 9.2**) is considered to be the most appropriate from an environmental perspective as it avoids identified ecological sensitivities and recommended buffer areas. The following infrastructure would be included within an authorisation issued for the project:

- Solar PV array comprising PV modules and mounting structures (monofacial or bifacial and a single axis tracking system)
- Inverters and transformers
- Cabling between the project components
- On-site facility substation and a power line to connect the solar PV facility to the existing Transalloys Substation

- Security office, operations and control, and maintenance and storage laydown areas
- Access roads and internal distribution roads

The following key conditions would be required to be included within an authorisation issued for the Transalloys Solar PV Energy Facility:

- All mitigation measures detailed within this BA report, as well as the specialist reports contained within **Appendices D to J** are to be implemented.
- The EMPr as contained within **Appendix K** 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 Transalloys Solar PV Energy Facility is considered key in achieving the appropriate environmental management standards as detailed for this project.
- A 15m post mitigation buffer must be assigned to the wetland systems.
- 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. No SCC flora may be disturbed without the appropriate permit.
- 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".
- 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.
- 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.

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.

# CHAPTER 10 : REFERENCES

**Terrestrial Ecology Impact Assessment**

ADU. 2020. MammalMap database of the Animal Demography Unit and the FitzPatrick Institute of African Ornithology. Available at: website. Accessed: Jul 2022.

ADU. 2020a. ReptileMap database of the Animal Demography Unit and the FitzPatrick Institute of African Ornithology. Available at: website. Accessed: Jul 2022.

ADU. 2020b. FrogMap database of the Animal Demography Unit and the FitzPatrick Institute of African Ornithology. Available at: website. Accessed: Jul 2022.

Alexander, G. & Marais, J. 2007. A guide to the Reptiles of Southern Africa. Struik, Cape Town.

Awuah, A. 2018. NBA 2018 Rivers and NBA 2018 National Wetland Map 5. South African National Biodiversity Institute (SANBI), Newlands, Cape Town.

Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J & de Villiers, M.S. (Eds). 2014. Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland. Suricata 1. South African Biodiversity Institute, Pretoria.

BGIS (Biodiversity GIS). 2017. http://bgis.sanbi.org/

Branch, W.R. 1998. Field Guide to Snakes and Other Reptiles of Southern Africa. Struik, Cape Town.

Branch, B. 2008. Tortoises, Terrapins, and Turtles of Africa. Struik, Cape Town.

Bromilow. C. 2018. Problem Plants and Alien Weeds of Southern Africa. Briza Publications, Pretoria.

Chittenden, H., Davies, G., and Weiersbye, I. 2016. Roberts Bird Guide. Second Edition. The John Voelcker Bird Book Fund, Cape Town.

CITES. UNEP-WCMC (Comps.) 2021. Checklist of CITES species. CITES Secretariat, Geneva, Switzerland and UNEP-WCMC, Cambridge, United Kingdom. Accessed: Mar 2022.

Department of Environmental Affairs (DEA). 2016. National Protected Areas Expansion Strategy for South Africa 2016. Department of Environmental Affairs, Pretoria, South Africa.

Department of Environment, Forestry and Fisheries (DEFF). 2022. Declaration of four tree species as protected and the publication of the annual list of all tree species which are protected under section 12 of the National Forests Act, 1998 (Act no. 84 of 1998). No. 1935, National Gazettes No. 46094 of 25 March 2022.

Department of Forestry, Fisheries and the Environment (DFFE). 2021. South Africa Protected Areas Database (SAPAD_OR_2021_Q4). Published 2022/04/04. Available at: http://egis.environment.gov.za.

Department of Forestry, Fisheries and the Environment (DFFE). 2021a. South Africa Conservation Areas Database (SACAD_OR_2021_Q4). Published 2022/04/04. Available at: http://egis.environment.gov.za.

Du Preez, L. & Carruthers, V. 2009. A Complete Guide to the Frogs of Southern Africa. Struik Nature, Cape Town.

EWT. 2016. Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The 2016 Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Fish, L., Mashau, A.C., Moeaha, M.J. & Nembudani, M.T. 2015. Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions. SANBI, Pretoria.

Goff, F., Dawson, G., & Rochow, J. 1982. Site examination for threatened and endangered plant species. Environmental Management, 6(4), 307-316.

IUCN Spatial Dataset. 2017. The IUCN Red List of Threatened Species. Version 2021-3. https://www.iucnredlist.org. Accessed: Mar 2022.

IUCN. 2012. IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. iv + 32pp.

IUCN. 2021. The IUCN Red List of Threatened Species. Version 2021-3. https://www.iucnredlist.org. The International Union for Conservation of Nature. Accessed: Mar 2022.

Johnson, S. & Bytebier, B. 2015. Orchids of South Africa: A Field Guide. Struik publishers, Cape Town.

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.C., and Collins, N.B. 2009. A Technique for rapidly assessing ecosystem services supplied by wetlands. Mondi Wetland Project.

Leroy, A. & Leroy, J. 2003. Spiders of Southern Africa. Struik publishers, Cape Town.

Lötter, M.C. & Le Maitre, D. 2021. Fine-scale delineation of Strategic Water Source Areas for surface water in South Africa using Empirical Bayesian Kriging Regression Prediction: Technical report. Prepared for the South African National Biodiversity Institute (SANBI), Pretoria. 33 pages.

Minter, L., Burger, M., Harrison, J.A. & Kloepfer, D. 2004. Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland. Smithsonian Institute Avian Demography Unit, Washington; Cape Town.

Monadjem, A., Taylor, P.J., Coterrill, F.D.P. & Schoeman, C. 2010. Bats of southern and central Africa: a biogeographic and taxonomic synthesis. Wits University Press, Johannesburg.

MTPA. 2014. Mpumalanga Biodiversity Sector Plan Handbook. Compiled by Lötter M.C., Cadman, M.J. and Lechmere-Oertel R.G. Mpumalanga Tourism & Parks Agency, Mbombela (Nelspruit).

Mucina, L. & Rutherford, M.C. (Eds.). 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelizia 19. South African National Biodiversity Institute, Pretoria, South African.

Mucina, L., Rutherford, M.C. & Powrie, L.W. (Eds.). 2007. Vegetation map of South Africa, Lesotho and Swaziland. 1:1 000 000 scale sheet maps. 2nd ed. South African National Biodiversity Institute, Pretoria.

National Environmental Screening Tool. 2022. National Environmental Screening Tool, 2022. Available from the Department of Forestry, Fisheries and the Environment website: https://screening.environment.gov.za/screeningtool/index.html#/pages/welcome.

NBA. 2018. Terrestrial Ecosystem Threat Status and Protection Level 2018. http://bgis.sanbi.org/. (Accessed: Mar 2022).

Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., Van Deventer, H., Funke, N., Swartz, E.R., Smith-Adao, L.B., Mbona, N., Downsborough, L. and Nienaber, S. 2011. Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801. Water Research Commission, Pretoria.

Pooley, E. 1998. A Field Guide to Wild Flowers: KwaZulu-Natal and Eastern Region. The Flora Publications Trust; ABC Bookshop, Durban.

POSA. 2019. South African National Biodiversity Institute. Botanical Database of Southern Africa (BODATSA) [dataset]. http://newposa.sanbi.org/. (Accessed: Mar 2022).

Raimondo, Domitilla & von Staden, Lize & Foden, Wendy & Victor, Janine & Helme, N.A. & Turner, R.C. & Kamundi, D.A. & Manyama, P.A.. 2009. Red list of South African plants 2009. Strelitzia. 25.

SABAP. 2019. (South African Bird Atlas Project 2). Available at: https://sabap2.birdmap.africa/coverage. (Accessed: Mar 2022).

SADAP (South Africa Protected Areas Database) and SACAD (South Africa Conservation Areas Database) (2021). http://egis.environment.gov.za

SANBI. 2013. Grasslands Ecosystem Guidelines: landscape interpretation for planners and managers. Compiled by Cadman, M., de Villiers, C., Lechmere-Oertel, R. and D. McCulloch. South African National Biodiversity Institute, Pretoria. 139 pages.

SANBI (South African National Biodiversity Institute). 2016. Red List of South African Plants version 2020. Redlist.sanbi.org (Accessed: Mar 2022).

SANBI (South African National Biodiversity Institute). 2017. Technical guidelines for CBA Maps: Guidelines for developing a map of Critical Biodiversity Areas & Ecological Support Areas using systematic biodiversity

planning. A., Holness, S. & Daniels, F. (Eds). 1st Edition. South African National Biodiversity Institute, Pretoria.

SANBI (South African National Biodiversity Institute). 2018. Terrestrial ecosystem threat status and protection level layer [Vector] 2018. Available from the Biodiversity GIS website: http://bgis.sanbi.org/SpatialDataset/Detail/2675. downloaded: March 2022.

South African National Biodiversity Institute (SANBI). 2019. National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria. pp. 1–214.

SANBI (South African National Biodiversity Institute). 2022. South Africa's official site for Species Information and National Red Lists. http://speciesstatus.sanbi.org/ (Accessed: Mar 2022).

Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (eds.). 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria.

Skinner, J.D. & Chimimba, C.T. 2005. The Mammals of the Southern African Subregion (New Edition). Cambridge University Press, South Africa.

Smith, G.F., Chesselet, P., van Jaarsveld, E.J., Hartmann, H., Hammer, S., van Wyk, B., Burgoyne, P., Klak, C. & Kurzweil, H. 1998. Mesembs of the world. Briza Publishers, Pretoria.

Stuart, C. & Stuart, M. 2000. Stuarts' Field Guide to the Tracks & Signs of Southern, Central & East African Wildlife. Penguin Random House, Midrand.

Van Deventer, H., Smith-Adao, L., Collins, N.B., Grenfell, M., Grundling, A., Grundling, P-L., Impson, D., Job, N., Lötter, M., Ollis, D., Petersen, C., Scherman, P., Sieben, E., Snaddon, K., Tererai, F. and Van der Colff D. 2019. South African National Biodiversity Assessment 2018: Technical Report. Volume 2b: Inland Aquatic (Freshwater) Realm. CSIR report number CSIR/NRE/ECOS/IR/2019/0004/A. South African National Biodiversity Institute, Pretoria. http://hdl.handle.net/20.500.12143/6230.

Van Ginkel, CE. & Cilliers, CJ. 2020. Aquatic and Wetland Plants of Southern Africa. First Edition. Briza Publications, Pretoria.

Van Wyk, B-E. & Van Wyk, P. 1997. Field guide to trees of Southern Africa. Struik Publishers, Cape Town.

Van Wyk, B-E. & Malan, S. 1998. Field Guide to the Wild Flowers of the Highveld: Also Useful in Adjacent Grassland and Bushveld, Struik Publishers, Cape Town.

Van Wyk, B-E. & Smith, G. 2014. Guide to the Aloes of South Africa. Third Edition. Briza Publications, Pretoria.

Van Wyk, B-E., Van Oudtshoorn, B. & Gericke, N. 2013. Medicinal Plants of South Africa. Briza Publications, Pretoria.

**Avifauna Impact Assessment**

BirdLife South Africa. (2017). Important Bird Areas Factsheet. http://www.birdlife.org

Birdlife South Africa (2017b). Birds and Solar Energy Best Practice Guidelines. https://www.birdlife.org.za/wp-content/uploads/2020/03/BLSA-Guidelines-Solar-and-Energy.pdf

Birdlife South Africa (2015). Fences & birds, minimizing unintended impacts. https://www.birdlife.org.za/what-we-do/landscape-conservation/what-we-do/birds-and-fences/

Coordinated Avifaunal Roadcounts (CAR) (2020). http://car.birdmap.africa/index.php

Del Hoyo, J., Collar, N.J., Christie, D.A., Elliott, A., Fishpool, L.D.C., Boesman, P. & Kirwan, G.M. (1996). HBW and BirdLife International Illustrated Checklist of the Birds of the World. Volume 2: Passerines. Lynx Editions and BirdLife International, Barcelona, Spain and Cambridge, UK.

Eskom. (2015). Taylor, M.R., Peacock, F. & Wanless, R.M. (Eds).The 2015 Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

Hockey, P.A.R., Dean, W.R.J. & Ryan, P.G. (Eds). (2005). Roberts – Birds of Southern Africa, VIIth ed. The Trustees of the John Voelcker Bird Book Fund, Cape Town.

Horvath, G., Blaho, M., Egri A., Kriska, G., Seres, I. & Robertson, B. 2010. Reducing the Maladaptive Attractiveness of Solar Panels to Polarotactic Insects Conservation biology 24 (6) 1644-1653

IUCN. (2021). The IUCN Red List of Threatened Species. www.iucnredlist.org

Jenkins, A.R., van Rooyen, C.S., Smallie, J.J., Harrison., J.A., Diamond., M., Smit-Robinson., H.A. & Ralston., S. (2015). Birds and Wind-Energy Best-Practice Guidelines. Birds and Wind-Energy Best-Practice Guidelines.

Lovich, J.E. & Ennen, J.R. (2011). Wildlife conservation and solar energy development in the desert southwest, United States. BioScience 61:982-992

SADAP (South Africa Protected Areas Database) and SACAD (South Africa Conservation Areas Database) (2021). http://egis.environment.gov.za

SANBI-BGIS. 2017. Technical guidelines for CBA Maps: Guidelines for developing a map of Critical Biodiversity Areas & Ecological Support Areas using systematic biodiversity planning.

Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (eds.). 2019. South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria.

Van Deventer, H., Smith-Adao, L., Mbona, N., Petersen, C., Skowno, A., Collins, N.B., Grenfell, M., Job, N., Lötter, M., Ollis, D., Scherman, P., Sieben, E. & Snaddon, K. 2018. South African National Biodiversity Assessment 2018: Technical Report. Volume 2a: South African Inventory of Inland Aquatic Ecosystems (SAIIAE). Version 3, final released on 3 October 2019. Council for Scientific and Industrial Research (CSIR) and South African National Biodiversity Institute (SANBI): Pretoria, South Africa.

Visser, Elke & Perold, V. & Ralston-Paton, S. & Cardenal, A. C. & Ryan, P.G., 2019. "Assessing the impacts of a utility-scale photovoltaic solar energy facility on birds in the Northern Cape, South Africa," Renewable Energy, Elsevier, vol. 133(C), pages 1285-1294

**Wetland Impact Assessment**

Department of Water Affairs and Forestry (DWAF). 2005a. A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas.

Department of Water and Sanitation (DWS). 2005b. River Ecoclassification: Manual for Ecostatus Determination. First Draft for Training Purposes. Department of Water Affairs and Forestry.

Department of Water and Sanitation (DWS). 2020. A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity per Sub Quaternary Reaches for Secondary Catchments in South Africa. Draft. Compiled by RQS-RDM.

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.C., and Collins, N.B. 2009. A Technique for rapidly assessing ecosystem services supplied by wetlands, Mondi Wetland Project.

Macfarlane, D.M., Bredin, I.P., Adams, J.B., Zungu, M.M., Bate, G.C. and Dickens, C.W.S. 2014. Preliminary guideline for the determination of buffer zones for rivers, wetlands and estuaries. Final Consolidated Report. WRC Report No TT 610/14, Water Research Commission, Pretoria.

Macfarlane, D.M., Kotze, D.C., Ellery, W.N., Walters, D., Koopman, V., Goodman, P. and Goge, C. 2007. A technique for rapidly assessing wetland health: WET-Health. WRC Report TT 340/08.

Mucina, L. and Rutherford, M.C., 2010. The vegetation of South Africa, Lesotho and Swaziland.

Nel J.L. and Driver A. 2012. South African National Biodiversity Assessment 2011: Technical Report. Volume 2: Freshwater Component. CSIR Report Number CSIR/NRE/ECO/IR/2012/0022/A, Council for Scientific and Industrial Research, Stellenbosch.

Nel JL, Murray KM, Maherry AM, Petersen CP, Roux DJ, Driver A, Hill L, Van Deventer H, Funke N, Swartz ER, Smith-Adao LB, Mbona N, Downsborough L and Nienaber S. 2011. Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

Ollis DJ, Snaddon CD, Job NM, and Mbona N. 2013. Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African Biodiversity Institute, Pretoria.

SANBI. 2009. Further Development of a Proposed National Wetland Classification System for South Africa. Primary Project Report. Prepared by the Freshwater Consulting Group (FCG) for the South African National Biodiversity Institute (SANBI).

**Pedology Impact Assessment**

Land Type Survey Staff. (1972 - 2006). Land Types of South Africa: Digital Map (1:250 000 Scale) and Soil Inventory Databases. Pretoria: ARC-Institute for Soil, Climate, and Water.

Mucina, L., & Rutherford, M. C. (2006). The Vegetation of South Africa, Lesotho, and Swaziland. Strelitzia 19. Pretoria: National Biodiversity Institute.

Smith, B. (2006). The Farming Handbook. Netherlands & South Africa: University of KwaZulu-Natal Press & CTA.

Soil Classification Working Group. (1991). Soil Classification A Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.

Soil Classification Working Group. (2018). Soil Classification A Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.

**Heritage Impact Assessment (including archaeology and palaeontology)**



| Nid | Report Type | Author/s | Date | Title |
|---|---|---|---|---|
| 137998 | Heritage Impact Assessment Specialist Reports | Shahzaadee Karodia Khan | | Notification of Intent to Develop: Environmental Impact Assessment (EIA) for an Integrated Waste Management License at the Landau Colliery |
| 138001 | HIA Letter of Exemption | Shahzaadee Karodia Khan | 25/10/2013 | Letter of Request for Exemption from a HIA for the EIA required for an Integrated Waste Management Licence at the Landau Colliery |
| 145878 | Archaeological Specialist Reports | Jaco van der Walt | 01/11/2013 | Archaeological Scoping Report for the Proposed Establishment of the Transalloys Coal-Fired Power Plant near Witbank, Mpumalanga Province |
| 145884 | PIA Desktop | Barry Millsteed | 01/11/2013 | Desktop Palaeontological Heritage Impact Assessment Report on the site of the Proposed Transalloys (Pty) Ltd's Power Station to be Location within Portions 25, 26, 33, 34, 35, 36 and 37 of the Farm Elandsfontein 309 JS and Portions 20, 24 and 38 of the Farm Schoongezicht 308 JS, Mpumalanga Province |
| **160495** | **HIA Phase 1** | **Anton Pelser** | **07/03/2014** | **A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT AT TRANSALLOYS ON PORTIONS 34 AND 35 (PORTION OF PORTION 34) OF THE FARM ELANDSFONTEIN 309 JS AND PORTIONS 20 AND 24 OF THE FARM SCHOONGEZICHT 308 JS, CLOSE TO EMALAHLENI, MPUMALANGA PROVINCE** |
| **163515** | **PIA Desktop** | **JF Durand** | **26/04/2014** | **Palaeontology Scoping Report: PROPOSED ESTABLISHMENT OF POLLUTION CONTROL DAMS AT TRANSALLOYS IN CLEWER NEAR EMALAHLENI (WITBANK), MPUMALANGA** |
| 168452 | AIA Phase 1 | Jaco van der Walt | 29/06/2014 | Archaeological Impact Assessment For the proposed Clay and Coal Mining project on a Portion of Portion 2 of the Farm Weltevreden 324 JS, Magisterial District of Witbank |

| | | | | |
|---|---|---|---|---|
| 169649 | PIA Desktop | JF Durand | 30/06/2014 | DESKTOP STUDY PALAEONTOLOGY: PROPOSED ESTABLISHMENT OF POLLUTION CONTROL DAMS AT TRANSALLOYS IN CLEWER NEAR EMALAHLENI (WITBANK), MPUMALANGA |
| 169649 | PIA Desktop | JF Durand | 30/06/2014 | DESKTOP STUDY PALAEONTOLOGY: PROPOSED ESTABLISHMENT OF POLLUTION CONTROL DAMS AT TRANSALLOYS IN CLEWER NEAR EMALAHLENI (WITBANK), MPUMALANGA |
| 174912 | Heritage Statement | Justin du Piesanie | 15/09/2014 | Notification of Intent to Develop for the Klipspruit Extension Weltevreden Project |
| 259292 | Archaeological Specialist Reports | Jaco van der Walt | 04/08/2014 | AIA for the Proposed Transalloys Coal-Fired Power Plant |
| 268555 | HIA Phase 1 | Justin du Piesanie, Johan Nel | 30/01/2015 | Environmental Authorisation for the KPSX Weltevreden Project: Heritage Impact Assessment |
| 273298 | AIA Phase 1 | Jaco van der Walt | 26/05/2015 | Archaeological Impact Assessment Doornrug |
| 274551 | HIA Phase 1 | | 11/01/2015 | A PHASE I HERITAGE IMPACT ASSESSMENT (HIA) STUDY FOR ANGLO OPERATIONS LIMITED GREENSIDE COLLIERYâ€™S NEW DISCARD FACILITY NEAR EMAHLALENI ON THE EASTERN HIGHVELD IN THE MPUMALANGA PROVINCE |
| 274553 | PIA Phase 1 | | 11/01/2015 | Greenside Colliery New Discard Facility eMalahleni Local Municipality, Mpumalanga Province Farm: Portion 0, 2 and 3 Groenfontein 331JS. Palaeontological Impact Assessment: Phase 1 Field study |
| 274558 | HIA Phase 1 | | 15/05/2015 | A PHASE I HERITAGE IMPACT ASSESSMENT (HIA) STUDY FOR THE PROPOSED LANDAU COLLIERY NAVIGATION SECTION UMLALAZI SOUTH BLOCK EXTENSION PROJECT NEAR EMAHLALENI (WITBANK) ON THE EASTERN HIGHVELD IN THE MPUMALANGA PROVINCE |
| 345587 | Palaeontological Specialist Reports | Dr Heidi Fourie | 16/11/2015 | Landau Colliery: Proposed Navigation West-South Block Extension Project Nkangala District Municipality, eMalahleni Local Municipality, Mpumalanga Province |
| 356304 | HIA Phase 1 | Anton van Vollenhoven | 29/05/2015 | A Report on a Heritage Impact Assessment for the Proposed Klarinet Phase 2 Residential Development, close to eMalahleni, Mpumalanga Province. |
| 356306 | PIA Phase 1 | Dr. Heidi Fourie | 19/05/2015 | Palaeontological Impact Assessment: Phase 1 Field Study. Klarinet Phase 2, eMalahleni Local Municipality, Mpumalanga Province. Farm: Various Portions of Blesboklaagte 296 JS and Portion of Erf 5017 Klarinet X7. |
| 356363 | AIA Phase 1 | Jaco van der Walt | 21/01/2016 | Archaeological Impact Assessment for the proposed processing project on Portion 30 and Portion 42 of the Farm Doornrug 302 JS, Balmoral District, Mpumalanga Province. |
| 6277 | AIA Phase 1 | Thomas Huffman | 31/10/1999 | Archaeological Survey of Blesboklaagte, Witbank |
| 6516 | AIA Phase 1 | Udo Kusel | 24/11/2006 | Cultural Heritage Resources Impact Assessment on Holding 23 of Dixon Agricultural Holding Witbank Mpumalanga |
| 8269 | AIA Phase 1 | McEdward Murimbika | 01/11/2008 | Phase 1 Archaeological and Heritage Impact Assessment specialist study report. Proposed construction of a new 132 KV deviation power line to link Wilge Substation to a new Bravo Substation in Emalahleni local Municipality, Nkangala District, Mpumalanga |

**Visual Impact Assessment**

Blue Oak Energy, 2016. https://www.blueoakenergy.com/blog/glint-and-glare-studies-for-commercial-and-industrial-solar-

Chief Directorate National Geo-Spatial Information, varying dates. 1:50 000 Topographical Maps and Data.

CSIR, 2017. Delineation of the first draft focus areas for Phase 2 of the Wind and Solar PV Strategic Environmental Assessment.

CSIR, 2015. The Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa.

DFFE, 2018. National Land-cover Database 2018 (NLC2018).

DFFE, 2021. South African Protected Areas Database (SAPAD_OR_2021_Q1).

DFFE, 2021. South African Renewable Energy EIA Application Database (REEA_OR_2021_Q1).

DEA&DP, 2011. Provincial Government of the Western Cape. Guideline on Generic Terms of Reference for EAPS and Project Schedules.

Department of Environmental Affairs and Tourism (DEA&T), 2001. Environmental Potential Atlas (ENPAT) for the Northern Cape Province.

FAA, 2015. Evaluation of Glare as a Hazard for General Aviation Pilots on Final Approach.

Forge Solar PV Planning and Glare Analysis, 2019. Guidance and information on using Forge Solar analysis tools.

JAXA, 2021. Earth Observation Research Centre. ALOS Global Digital Surface Model (AW3D30).

Meister Consultants Group, 2014.

http://solaroutreach.org/wp-content/uploads/2014/06/Solar-PV-and-Glare-_Final.pdf

National Botanical Institute (NBI), 2004. Vegetation Map of South Africa, Lesotho and Swaziland (Unpublished Beta Version 3.0)

Oberholzer, B. (2005). Guideline for involving visual and aesthetic specialists in EIA processes: Edition 1.

Pager Power Urban and Renewables, 2020. Solar Photovoltaic and Building Development – Glint and Glare Guidance.

The Environmental Impact Assessment Amendment Regulations. In Government Gazette Nr. 33306, 18 June 2010.