CHAPTER 3:

Description of the Environment

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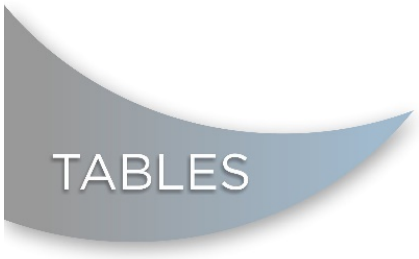
CONTENTS



FIGURES

3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter of the Scoping Report provides a broad overview of the affected environment for the proposed Kudu Solar Facility 2 and associated infrastructure (hereafter referred to as the "Kudu Solar Facility" or "proposed project") and the surrounding area.

The receiving environment is understood to include biophysical, socio-economic, and heritage aspects, which could be affected by the proposed project or which in turn might impact on the proposed project.

This information is provided to identify the potential issues and impacts of the proposed project on the environment and vice versa. The information presented within this chapter has been sourced from *inter alia*:

- Scoping inputs from the specialists that form part of the project team;
- Feedback from the National Department of Forestry, Fisheries and the Environment (DFFE) National Web-based Environmental Screening Tool (hereafter referred to as the Screening Tool), where applicable;
- Review of *inter alia* information sources available on the South African National Biodiversity Institute (SANBI) Biodiversity Geographical Information System (BGIS), Agricultural Geo-Referenced Information System (AGIS), Endangered Wildlife Trust (EWT) Threatened Species No-Go Map;
- Northern Cape Province Provincial Growth and Development Strategy;
- Northern Cape Provincial Spatial Development Framework (SDF);
- Pixley ka Seme District Municipality (PKSDM) Integrated Development Plan (IDP);
- PKSDM SDF;
- Renosterberg Local Municipality (RLM) IDP; and
- Emthanjeni Local Municipality IDP.

It is important to note that this chapter intends to provide a broad overview of the affected environment. Detailed descriptions of the preferred project footprint within the preferred site (i.e. the study area) that are focused on significant environmental aspects of the proposed project will be provided in the relevant specialist assessments during the Environmental Impact Assessment (EIA) Phase.

3.1 Background, Study Area, and Buildable Areas

As indicated in Chapter 1 of this Scoping Report, the proposed project forms part of a cluster of 12 Solar Photovoltaic (PV) facilities and associated infrastructure. The study area / preferred site for all 12 of the Kudu Solar Facilities constitutes the full extent of the eight affected farm portions indicated in Table 3.1, located north-east of De Aar in the Northern Cape Province. The total extent of the study area / preferred site is approximately 8 150 hectares (ha). The preferred site serves as the study area for this Scoping and EIA Process. Therefore, the terms "site" and "study area" are used synonymously in this report.

Table 3.1: Farm portions and SG codes for the Study Area

Farm Portion	SG Code
Remaining Extent of the Farm Bas Berg No. 88	C05700000000008800000
Remaining Extent of Portion 3 of the Farm Bas Berg No. 88	C05700000000008800003
Portion 4 (Portion of Portion 3) of the Farm Bas Berg No. 88	C05700000000008800004
Remaining Extent of Portion 2 (Middel Plaats) (a Portion of Portion 1) of the Farm Grasspan No. 40	C05700000000004000002
Remaining Extent of the Farm Annex Wolve Kuil No. 41	C05700000000004100000
Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41	C05700000000004100001
Portion 2 of the Farm Wolve Kuil No. 43	C05700000000004300002
Remaining Extent of the Farm Wolve Kuilen No. 42	C05700000000004200000

Initially, the Project Developer identified the **Original Scoping Buildable Areas** within the study area. As part of the Scoping and EIA Process, the specialists were commissioned to assess the full extent of the study area in order to identify environmental sensitivities and no-go areas, and also comment on and consider the Original Scoping Buildable Areas. The Scoping Buildable Areas serve as the “development footprints” for the 12 proposed PV facilities and fall within the preferred site / study area.

Following the identification of sensitivities and relevant specialist fieldwork during the Scoping Phase, as well as various considerations such as the capacities of the Bidding Window 6 and the requirements of landowners, the Project Developer took such sensitivities and considerations into account and formulated the **Revised Scoping Buildable Areas / development footprints**. The Revised Scoping Buildable Areas will be used to inform the design of the layout. Overall, the full extent of the study area has been assessed by the specialists and mapped accordingly in the Scoping Level Assessments to identify environmental sensitivities and no-go areas. The Original and Revised Scoping Buildable Areas both fall within the study area, and therefore both have been assessed by the specialists. Following the identification of sensitivities in relation to the Original Scoping Buildable Areas, each specialist study provides a “Statement on the Revised Scoping Buildable Areas”. Refer to Chapter 2 of this Final Scoping Report for additional information on how the study area evolved into the Scoping Buildable Areas.

The proposed project is located within the RLM and PKSDM. Figure 3.1 below provides a locality map of the study area.

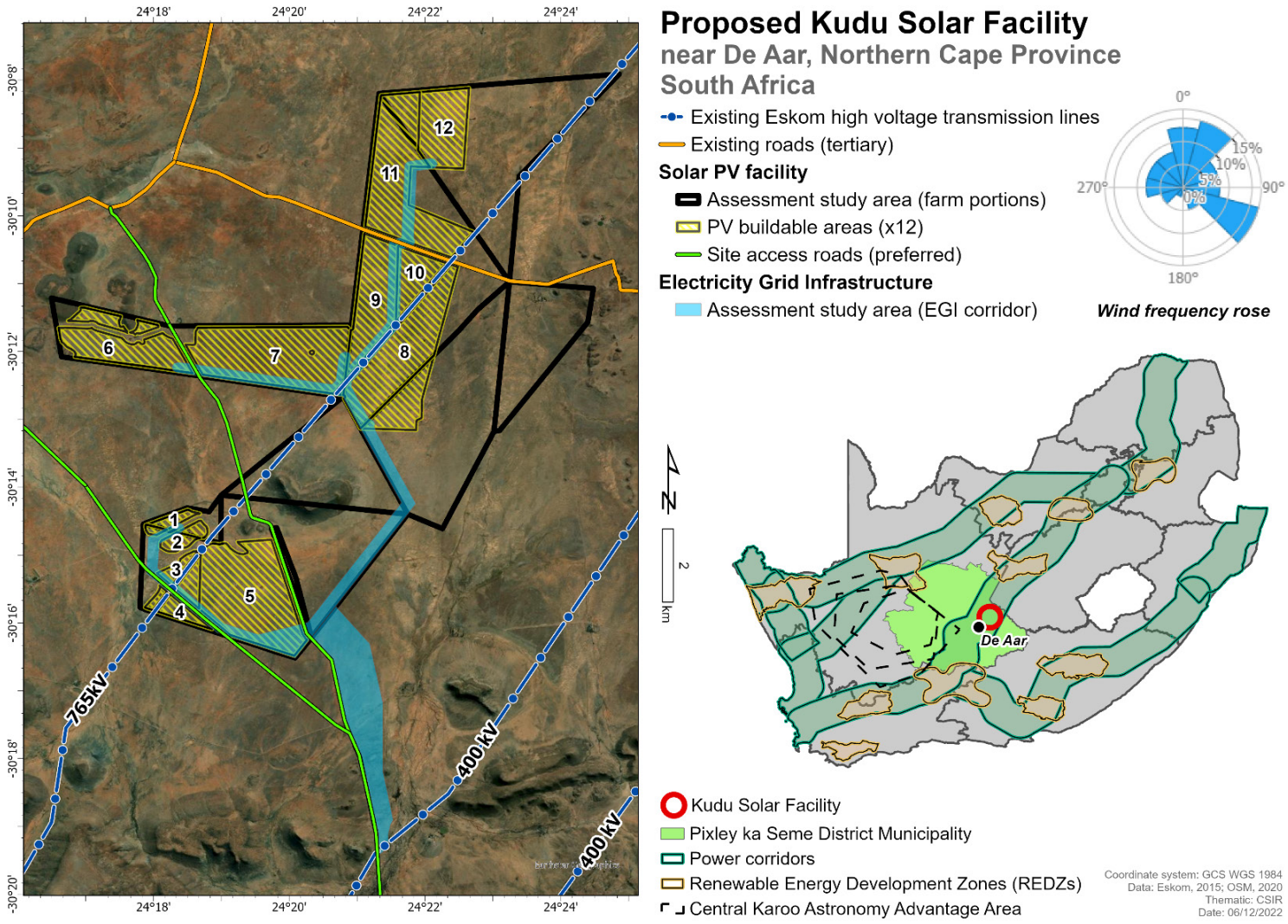


Figure 3.1: Locality map for the proposed projects situated north-east of De Aar the Northern Cape

3.2 Biophysical Environment

3.2.1 Climate and Climate Change

3.2.1.1 General Context

The study area lies near the eastern edge of the Nama Karoo Biome, which is situated on the central plateau of the western half of South Africa extending into south-eastern Namibia, and the Grassland Biome. The study area is located in three vegetation types, namely the Northern Upper Karoo (NKu3), the Eastern Upper Karoo (NKu4) and the Besemkaree Koppies Shrubland (Gh4) (Mucina and Rutherford, 2006, updated[1]).

More specifically, according to the Köppen-Geiger climate classification method the majority of the study area is classified "BSk", which is indicative of a cold semi-arid climate (Figure 3.2). The region is characterised with a mean annual rainfall of 287 mm and average temperatures varying from 5ºC in July to 31ºC in January. The highest average temperatures occur from December to February (Figure 3.5).

Figure 3.3 shows the average monthly distribution of rainfall within the De Aar area, including the proposed project study area, with most of the rainfall occurring during December to March. Figure 3.4 shows the average annual rainfall within the region for the period 2010 to 2022. Figure 3.5 shows the average monthly maximum and minimum temperature within the region. The area is characteristic of gusty winds prevailing for most of the year, with the average gust falling within the 15 to 30 kmph range (Figure 3.6).

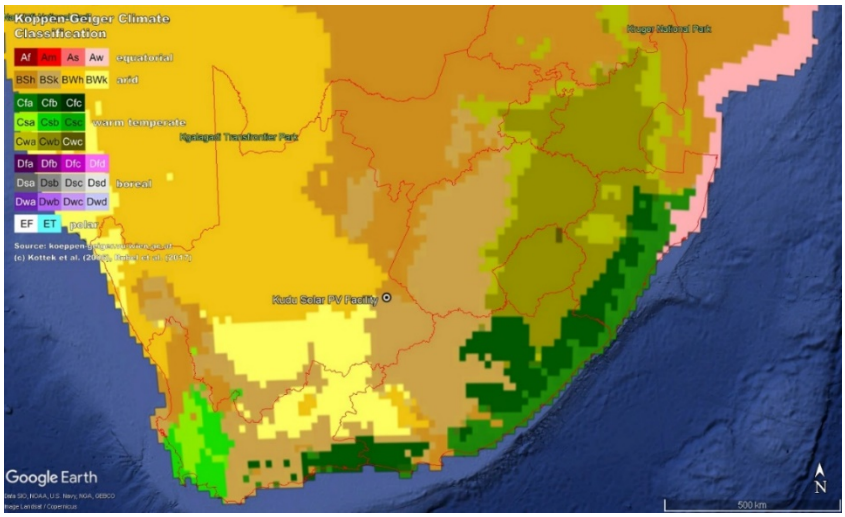


Figure 3.2: Köppen-Geiger Climate Classification of South Africa, including the study area (Source: Köppen-Geiger Climate Classification[2])

[1] Mucina, L. and Rutherford, M.C. (Eds.) 2010. The vegetation of South Africa, Lesotho and Swaziland. Strelizia 19. South African National Biodiversity Institute, Pretoria.

[2] Kottek, M., J. Grieser, C. Beck, B. Rudolf, and F. Rubel, 2006: World Map of the Köppen-Geiger climate classification updated. Meteorol. Z., 15, 259-263. DOI: 10.1127/0941-2948/2006/0130. Available at: http://koeppen-geiger.vu-wien.ac.at/present.htm [online]. Accessed: November 2022.

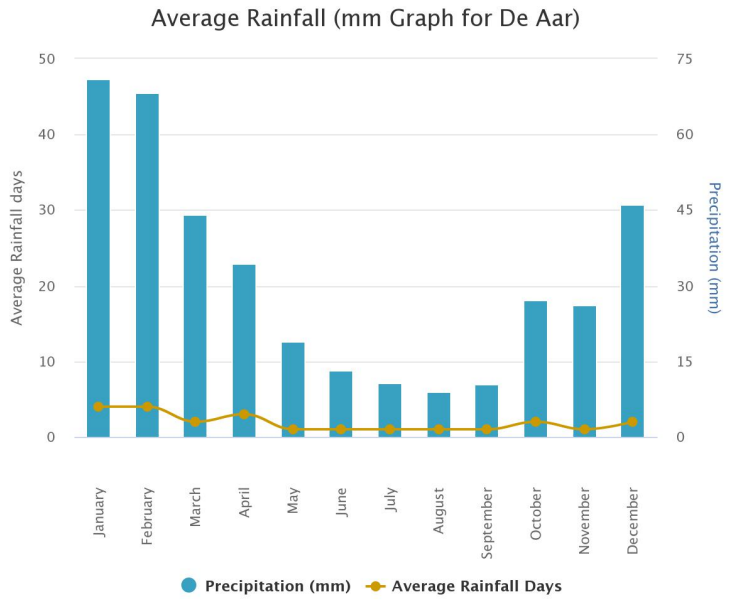


Figure 3.3: The average monthly distribution of rainfall within the De Aar area, including the study area (Source: World Weather Online, 2022[3])

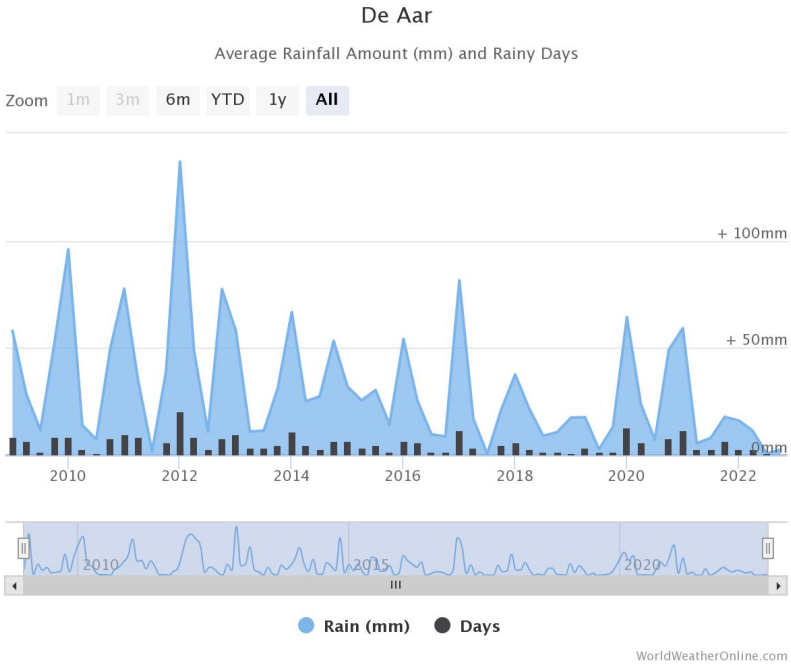


Figure 3.4: The average annual rainfall within the De Aar area, including the study area for the period 2010 – 2022 (Source: World Weather Online, 2022[4])

[3] World Weather Online. 2022. De Aar Annual Weather Averages. Available at: https://www.worldweatheronline.com/de-aar-weather-averages/north-western-province/za.aspx [online]. Accessed: 25 November 2022.

[4] World Weather Online. 2022. De Aar Annual Weather Averages. Available at: https://www.worldweatheronline.com/de-aar-weather-averages/north-western-province/za.aspx [online]. Accessed: 25 November 2022.

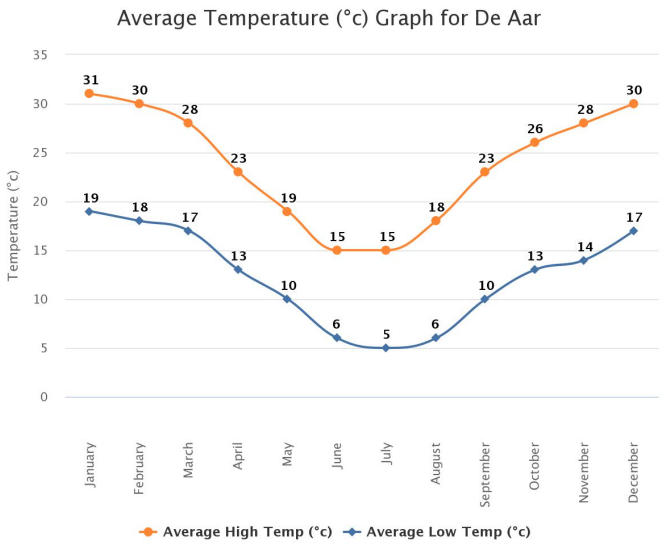


Figure 3.5: The average monthly maximum and minimum temperature for the De Aar area, including the study area (Source: World Weather Online, 2022[5])

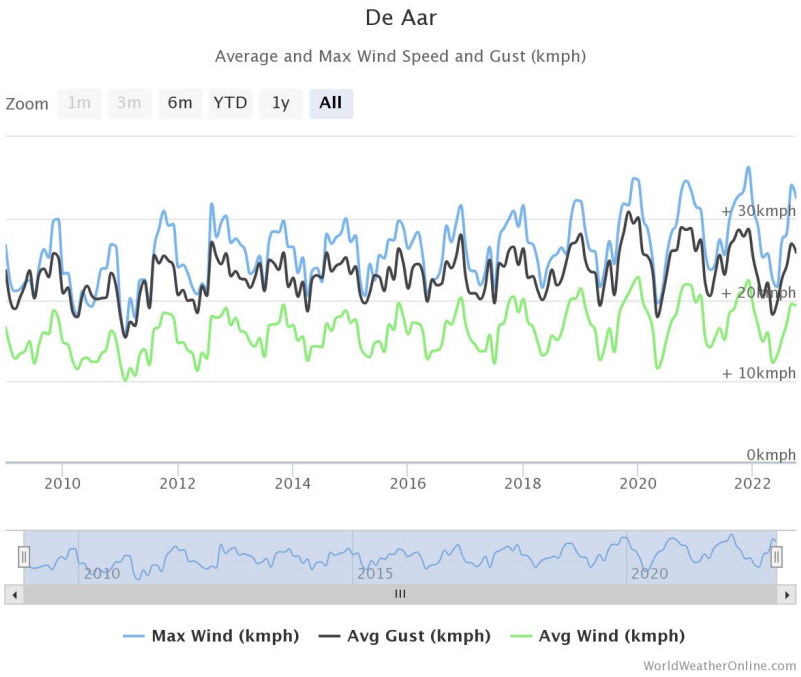


Figure 3.6: The average and maximum annual wind speeds and gusts for the De Aar area, including the study area for the period 2010 – 2022 (Source: World Weather Online, 2022[6])

[5] World Weather Online. 2022. De Aar Annual Weather Averages. Available at: https://www.worldweatheronline.com/de-aar-weather-averages/north-western-province/za.aspx [online]. Accessed: 25 November 2022.

[6] World Weather Online. 2022. De Aar Annual Weather Averages. Available at: https://www.worldweatheronline.com/de-aar-weather-averages/north-western-province/za.aspx [online]. Accessed: 25 November 2022.

3.2.1.2 Climate Change

Projected climate change data indicates that by 2025 the Northern Cape Province will be affected by higher annual average temperatures[7]. Regional predictions suggest a drying trend from west to east, a shift to more irregular rainfall of possibly greater intensity, and rising temperatures everywhere (Pixley ka Seme District, 2014)[8].

The higher temperatures will be associated with an increase in evaporation rates and an increase in the intensity of droughts. This will likely cause agricultural outputs to reduce, thereby adversely affecting food security. The drought periods coupled with increased evaporation and temperatures, will negatively impact the water supply, which is currently restricted. Furthermore, the increase in temperatures anticipated with climate change may result in increased fire frequencies. Invasive alien plants are often highly flammable and with their large volumes, are likely to fuel more frequent fires. The combination of more frequent and intense fires will have a devastating impact on the region. Consequently, climate change is one of the biggest risks facing the Northern Cape Province (Pixley ka Seme District, 2014[8]).

The Green Book provides detailed projections for future climate change in South Africa. The information captured below has been summarised from the Green Book (Engelbrecht et al., 2019[9]). The projections used in the Green Book are for the following two climate change mitigation scenarios: Representative Concentration Pathways (RCP) 8.5 – where low mitigation is implemented; and RCP 4.5 – where high mitigation is implemented.

- **Fire Likelihood** - The likelihood of wildfires occurring in the interface between developed land and fire-prone vegetation in the region of the RLM is regarded as low in terms of current hydro-meteorological trends. In terms of the projected number of fire danger days under an RCP 8.5 low mitigation (worst case) scenario, the study area varies from about 30 to 60. De Aar and Petrusville are at medium risk of increases in wildfires by the year 2050.

- **Flood Hazard** – The region of the RLM mainly includes a medium flooding hazard currently. There is largely a slight increase and moderate increase in extreme rainfall days projected for the year 2050. De Aar is at a low risk of increase in urban flooding under an RCP 8.5 low mitigation (worst case) scenario, whereas some areas within the study area and close to Petrusville area at a high and extreme risk (projected change for 2050).

- **Drought** – In terms of the projected change in drought tendencies for the period of 1995 to 2024, there is an increase in drought tendencies per 10 years within the region (ranging from 0 to -0.2) (more frequent than the observed baseline). De Aar and Petrusville are at medium and low risk of increases in drought tendencies, respectively, by the year 2050.

[7] https://letsrespondtoolkit.org/municipalities/northern-cape/

[8] Pixley Ka Seme District (2014). Pixley Ka Seme District Spatial Development Framework / Land Development Plan (SDF), 2013-2018. https://www.pksdm.gov.za/sdfs/PixleySDFMayFinal.pdf [online], Accessed November 2022.

[9] Engelbrecht, F., Le Roux, A., Arnold, K. & Malherbe, J. 2019. *Green Book. Detailed projections of future climate change over South Africa*. Pretoria: CSIR. Available at: https://pta-gis-2-web1.csir.co.za/portal/apps/GBCascade/index.html?appid=b161b2f892194ed5938374fe2192e537. Accessed November 2022.

3.2.2 Topography and Landscape

The information described below is based on scoping inputs provided by the Visual, Palaeontology and Socio-economic Specialists, which are included in Appendix G.5, Appendix G.7 and Appendix G.8, respectively, of this Scoping Report.

The study area lies within an expansive flattish landscape, composed of Ecca Group shales, interspersed with dolerite-capped koppies (*e.g.* Swartkoppies / Tierberg / Perdekop) and includes the small isolated *koppie* Basberg (1466 m amsl). These main scenic features in the area provide topographic relief in the expansive flattish landscape. The elevation ranges from 1000 to 1500 m in the region. The topography of Pixley Ka Seme region is one of its main assets with vast open spaces and unspoilt panoramic visual vistas stretching over great distances (Pixley ka Seme District, 2014[8]).

3.2.3 Geology and Soils

The information described below is based on scoping inputs provided by the Terrestrial Biodiversity, Palaeontology, Geohydrology and Geotechnical Specialists, which are included in Appendix G.2, G.7, G.11 and G.12 of this Scoping Report, respectively.

The main geology of the study area is listed in Table 3.2, and an extract from the 1:250 000 geology map 3024 Colesberg (Council for Geoscience, Pretoria) overlain by the study area is shown in Figure 3.7. The main geological units mapped within the wider study region include:

- Tierberg Formation (Ecca Group, Karoo Supergroup) – Pt (pale brown on Figure 3.7). Note that the upper part of this succession is now referred to the Waterford Formation.
- Adelaide Subgroup – Pa (pale green on Figure 3.7). Note that this is outside the study area.
- Karoo Dolerite Suite – Jd (pale red on Figure 3.7).
- Quaternary calcrete hardpans – Qc (pale yellow on Figure 3.7).
- Late Caenozoic alluvium – off white (flying bird symbol on Figure 3.7).
- Unmapped Late Caenozoic superficial sediments include colluvium, eluvial surface gravels and soils (including possible relict aeolian sands of the Gordonia Formation, Kalahari Group).

Table 3.2: Geological formations within the study area listed in order of relative age

Symbol	Formation	Group	Lithology
~	Quaternary Deposit		Alluvium / Terrace Gravel
Qc			Calcrete
Jd	Jurassic Intrusion		Dolerite
Pa	Adelaide Formation	Beaufort Group	Blue-grey silty mudstone, subordinate brownish-red mudstone; sandstone
Pt	Tierberg Formation	Ecca Group	Blue-grey to black shale with carbonate-rich concretions; subordinate siltstone and sandstone in upper part

The majority of the study area is underlain at depth by non-marine basinal mudrocks of the Tierberg Formation (Ecca Group, Karoo Supergroup) of Early to Middle Permian age (designated on hillslopes on the farm Swart Koppies 86, just south of the study area) (Figure 3.7). The Tierberg Formation is a recessive-weathering, mudrock-dominated succession consisting predominantly of dark, well-laminated, carbonaceous shales with subordinate thin, fine-grained sandstones. These Ecca sedimentary bedrocks are currently only mapped at surface on the slopes of Basberg (Pt, pale brown in Figure 3.7), as well as the koppies just east of Wolwekuil farmstead on Farm 42/RE where they crop out intermittently as low cliffs of metasediments which have been thermally metamorphosed by dolerite intrusion. Well-developed sills and dykes of the Early Jurassic Karoo Dolerite Suite build and / or cap all the koppies within and on the margins of the study area (including Basberg) and also underlie some lower-lying areas.

Soils are variable from shallow to deep, red-yellow, apedal, freely drained soils to very shallow Glenrosa and Mispah forms.

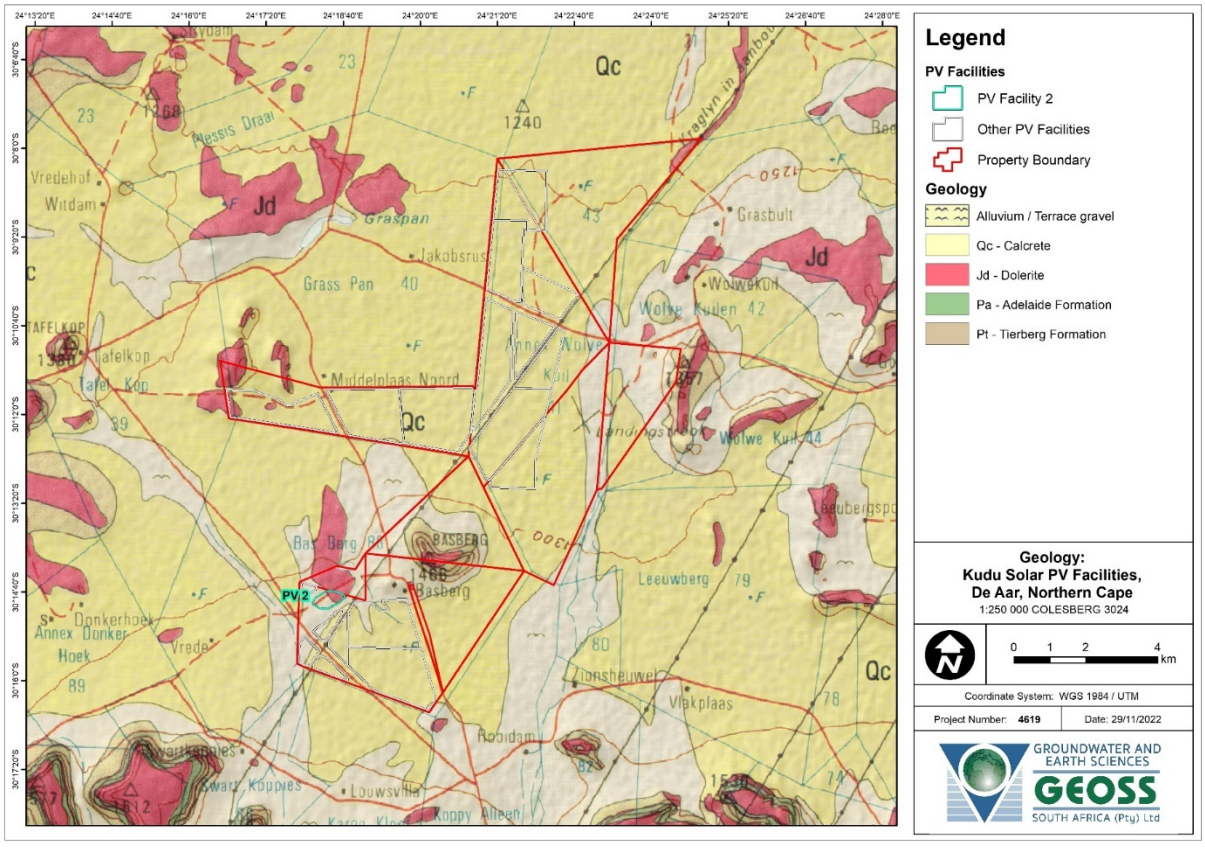


Figure 3.7: Geological setting for the proposed project and associated infrastructure (Source: Council for Geoscience, 1997, Map: 1:250 000 scale Colesberg 3024 in GEOSS, 2022b[10]).

[10] GEOSS (2022b). Geotechnical Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.12 of the Scoping Report.

3.2.4 Agriculture and Land Capability

The information described below is based on the Agriculture Compliance Statement included in Appendix G.1 of this Scoping Report.

3.2.4.1 General Context

Agricultural sensitivity, as used in the Screening Tool, is a direct function of the capability of the land for agricultural production. The general assessment of agricultural sensitivity that is employed in the Screening Tool, identifies all arable land that can support viable crop production, as high (or very high) sensitivity. This is because there is a scarcity of arable production land in South Africa and its conservation for agricultural use is therefore a priority. Land which cannot support viable crop production is much less of a priority to conserve for agricultural use and is rated as medium or low agricultural sensitivity.

The Screening Tool classifies agricultural sensitivity according to two independent criteria – the land capability rating and whether the land is used for cropland or not. All cropland is classified as at least high sensitivity, based on the logic that if it is under crop production, it is indeed suitable for it, irrespective of its land capability rating.

Land capability is defined as the combination of soil, climate, and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land, based on its soil, climate and terrain. The higher land capability classes (≥8 to 15) are likely to be suitable as arable land for the production of cultivated crops, while the lower classes are only likely to be suitable as non-arable grazing land.

In 2017, the then Department of Agriculture, Forestry and Fisheries (DAFF) released updated and refined land capability mapping across the whole of South Africa. This has greatly improved the accuracy of the land capability rating for any particular piece of land anywhere in the country. The new land capability mapping divides land capability into 15 different categories with 1 being the lowest and 15 being the highest. Values of below 8 are generally not suitable for production of cultivated crops. This land capability data is used by the Screening Tool.

3.2.4.2 Screening Tool Descriptions and Site Sensitivity Verification

A map of the study area and Revised Scoping Buildable Areas in relation to the Agricultural Sensitivity provided by the Screening Tool is shown in Figure 3.8. Since none of the land within the study area is classified as cropland, the agricultural sensitivity is therefore purely a function of land capability. The land capability of the study area, as depicted by the Screening Tool, is predominantly 5 and 6, but varies from 3 to 7. The small-scale differences in the modelled land capability across the study area are not very accurate or significant at this scale and are more a function of how the data is generated by modelling, than actual meaningful differences in agricultural potential on the ground. Values of 3 to 5 translate to a low agricultural sensitivity and values of 6 to 7 translate to a medium agricultural sensitivity, although there is little real difference between low and medium agricultural sensitivity on the ground. There is no scarcity of such agricultural land in South Africa and its conservation for agricultural production is not therefore a priority.

The agricultural sensitivity, as identified by the Screening Tool, is confirmed by the Agriculture Compliance Statement (Appendix G.1 of the Scoping Report). The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall of approximately 280 to 305 mm per annum and high evaporation of approximately 1 470 to 1 540 mm per annum) proves the area to be arid, and therefore of limited land capability. The land capability value is in keeping with the climate limitations that make the site totally unsuitable for dryland crop production.

The Site Sensitivity Verification (SSV) verified that the entire study area is of less than high agricultural sensitivity with a land capability value of 5 to 6. The required level of agricultural assessment is therefore confirmed as an Agricultural Compliance Statement. Based on the above and various factors, the impact of the proposed project on the agricultural production capability of the site is assessed as being acceptable. Therefore, from an agricultural impact point of view, it has been recommended that the proposed project be approved.

Therefore, there are no areas that specifically need to be avoided by the proposed project from an agricultural perspective. Furthermore, the Agriculture specialist has confirmed that the exact nature and layout of the different infrastructure within the proposed Kudu Solar Facility has no bearing on the significance of agricultural impacts because it is the total footprint size (and its agricultural production potential) that determines the impact significance. Any alternative layout within the footprint is considered acceptable. Furthermore, in this agricultural environment with uniformly low production potential, the location of the proposed project within the properties will also make absolutely no material difference to the significance of the agricultural impacts.

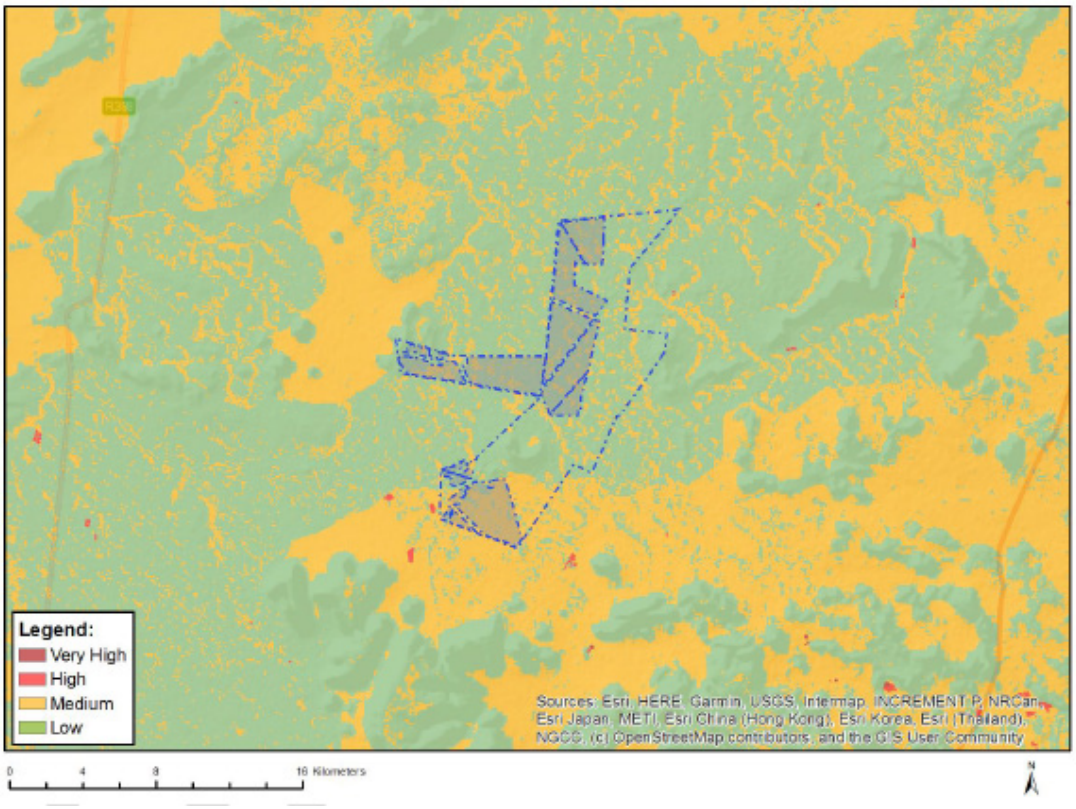


Figure 3.8: Agricultural sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

3.2.5 Geohydrology

The information described below is based on scoping inputs provided by the Geohydrology Specialist, which are included in Appendix G.11 of this Scoping Report.

3.2.5.1 Regional and Site-Specific Information

- **Regional Hydrogeology:**

The regional aquifer directly underlying the study area is classified by the Department of Water Affairs and Forestry (DWAF) as a fractured aquifer with an average yield potential of less than 2 litres a second. A fractured aquifer describes an aquifer where groundwater only occurs in narrow fractures within the bedrock. However, based on the geological map and the site-specific information it is known that the Quaternary Deposits of alluvium and calcrete form an intergranular aquifer on top of the fractured bedrock. An intergranular aquifer is a primary aquifer and is described as an aquifer in which groundwater is stored within the flows through open pore spaces in the unconsolidated Quaternary deposits.

Based on the DWAF (2005) (in GEOSS, 2022a[11]) mapping of the regional groundwater quality, as indicated by electrical conductivity (EC), the groundwater underlying the study area and the surrounding area is in the range of 70 – 300 milli-Siemens per metre (mS/m). This is considered to be "good to marginal" quality for water with respect to drinking water standards. These classifications are based on regional datasets, and therefore only provide an indication of conditions to be expected.

- **Aquifer Vulnerability:**

Mapping of groundwater vulnerability was undertaken at the national scale on a 1 km by 1 km cell (pixel) size basis by Conrad and Munch (2007) (in GEOSS, 2022a[12]). This national scale map indicates the relative vulnerability of groundwater resources throughout the country and provides project planners a clear idea of what level of groundwater protection is required. The proposed project study area has a Low to Medium groundwater vulnerability. The intergranular aquifer is aquifer is considered to be of medium groundwater vulnerability, as it lies on top of the fractured aquifer and has no means of protection. Therefore, any contamination that is introduced on the surface of the intergranular aquifer will infiltrate into the subsurface and can cause contamination of the intergranular aquifer.

[11] DWAF (2005). Groundwater Resource Assessment – Phase II (GRAII). Department of Water Affairs and Forestry. Pretoria. Cited in GEOSS (2022a). Geohydrology Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.11 of the Scoping Report.

[12] Conrad J. and Munch Z., (2007). Groundwater recharge and vulnerability mapping – a national scale approach; GWD Conference Bloemfontein, 8 – 10 October 2007 pp 46 – 56. Cited in GEOSS (2022a). Geohydrology Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.11 of the Scoping Report.

- **Site Specific and Existing Groundwater Information**

  - **National Groundwater Archive (NGA) Database**

The NGA database provides data on borehole positions, groundwater chemistry and yield, where available. The NGA indicated there is one borehole surrounding the study area (Figure 3.9). The borehole has a yield of 0.18 L/s, depth of 73.46 m and a lithology of shale followed by sandstone.

  - **Hydrocensus**

A representative hydrocensus was conducted by the Geohydrology Specialist in March 2022 on the farm portions that form the study area, and the surrounding farm portions. The hydrocensus boreholes are also shown on Figure 3.9. During the hydrocensus, borehole depth, water level (WL), pH, total dissolved solids (TDS) and electrical conductivity (EC) were measured. A total of 51 boreholes were identified, however, some of them could not be accessed due to poor weather conditions on site; and data could not be obtained from some of them due to a base plate that covered the whole borehole, or the information was unavailable.

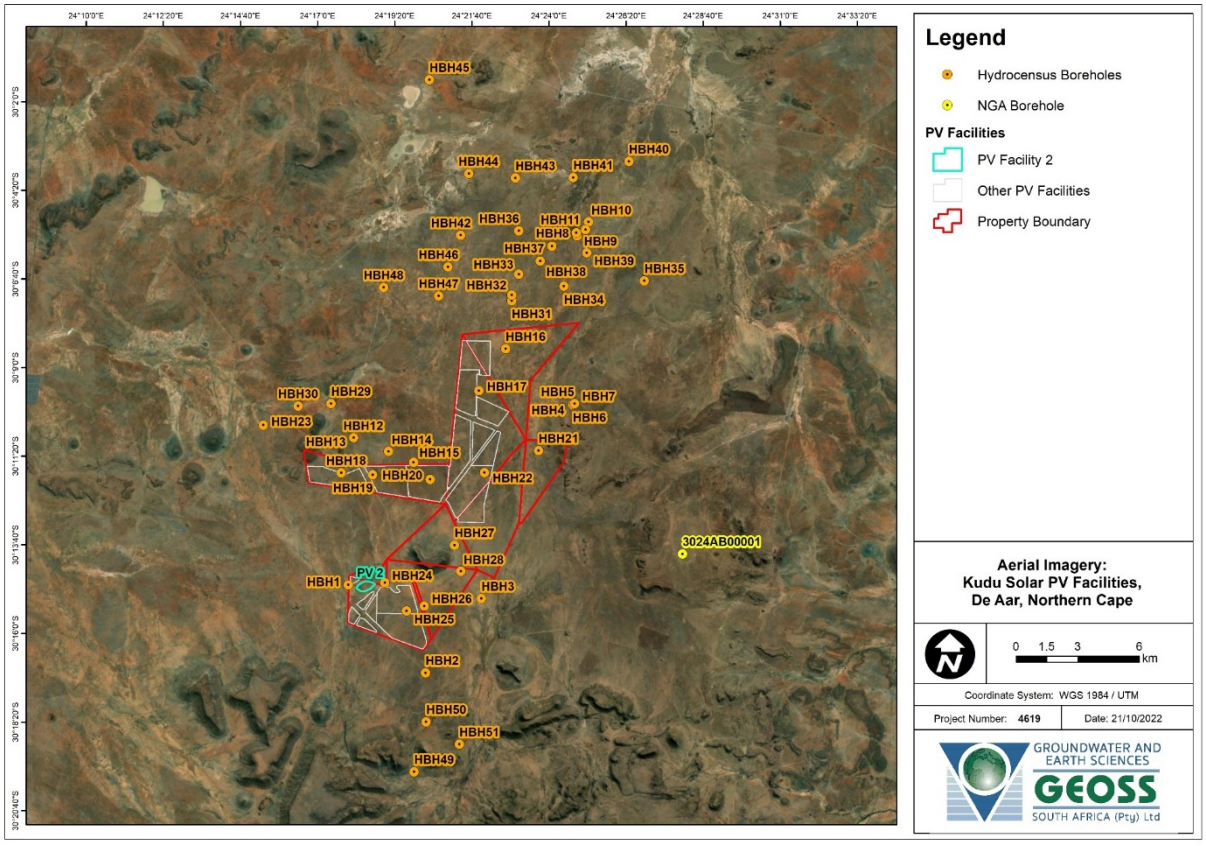


Figure 3.9: Hydrocensus boreholes and NGA borehole locations within and surrounding the study area (Source: GEOSS, 2022a[13]).

[13] GEOSS (2022a). Geohydrology Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.11 of the Scoping Report.

From the information obtained during the hydrocensus it is clear that the boreholes are shallow in the area as all of them were wind pumps, and all of the boreholes were only drilled into the alluvium (as confirmed by the farmers). The water is mainly used for domestic use and livestock watering. The boreholes had a pH that ranged from 6.8 to 9.6 (Figure 3.10), an EC that ranged from 57 mS/m to 126 mS/m (Figure 3.11), a TDS that ranged from 270 mg/L to 1260 mg/L (Figure 3.12), and a WL that ranged from 6.4 metres below ground level (mgbl) to 17.75 mgb/l (Figure 3.13).

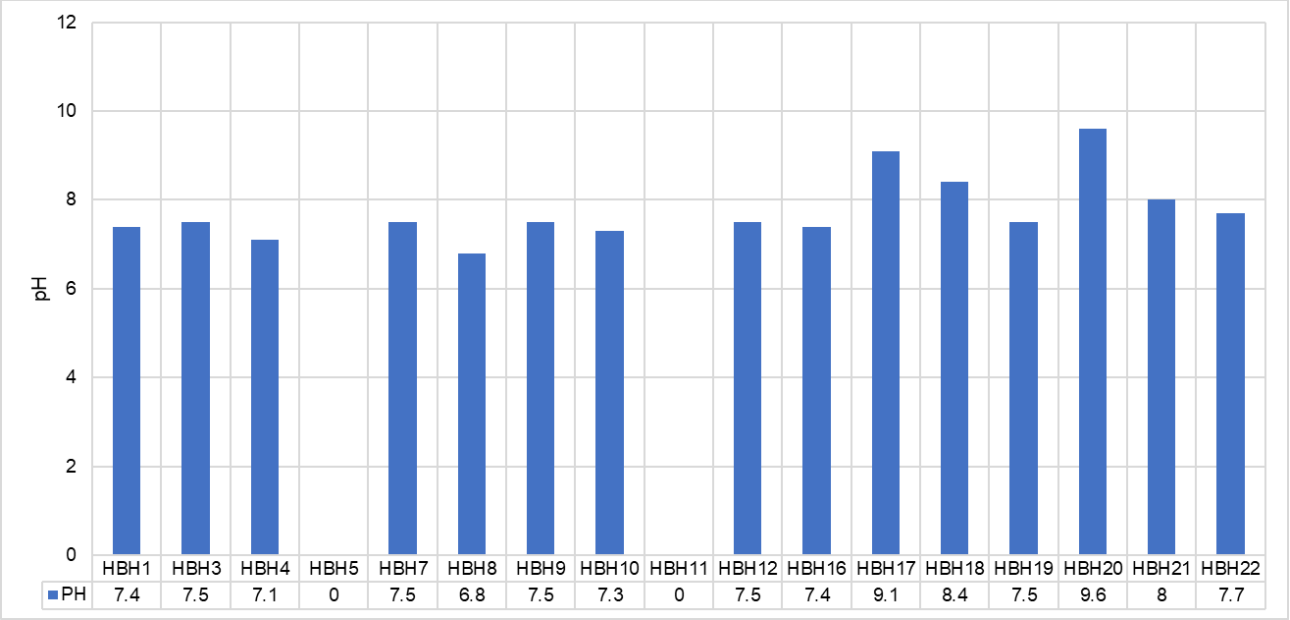


Figure 3.10: pH measured at the Hydrocensus boreholes (Derived from: GEOSS, 2022a).

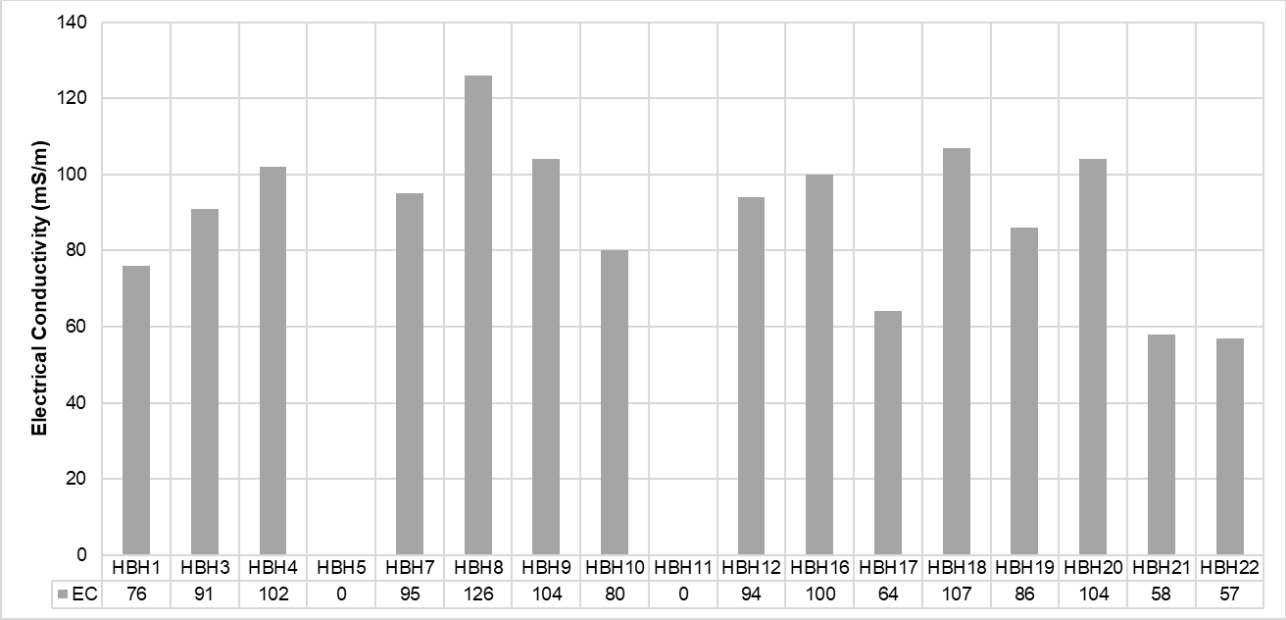


Figure 3.11: EC measured at the Hydrocensus boreholes (Derived from: GEOSS, 2022a).

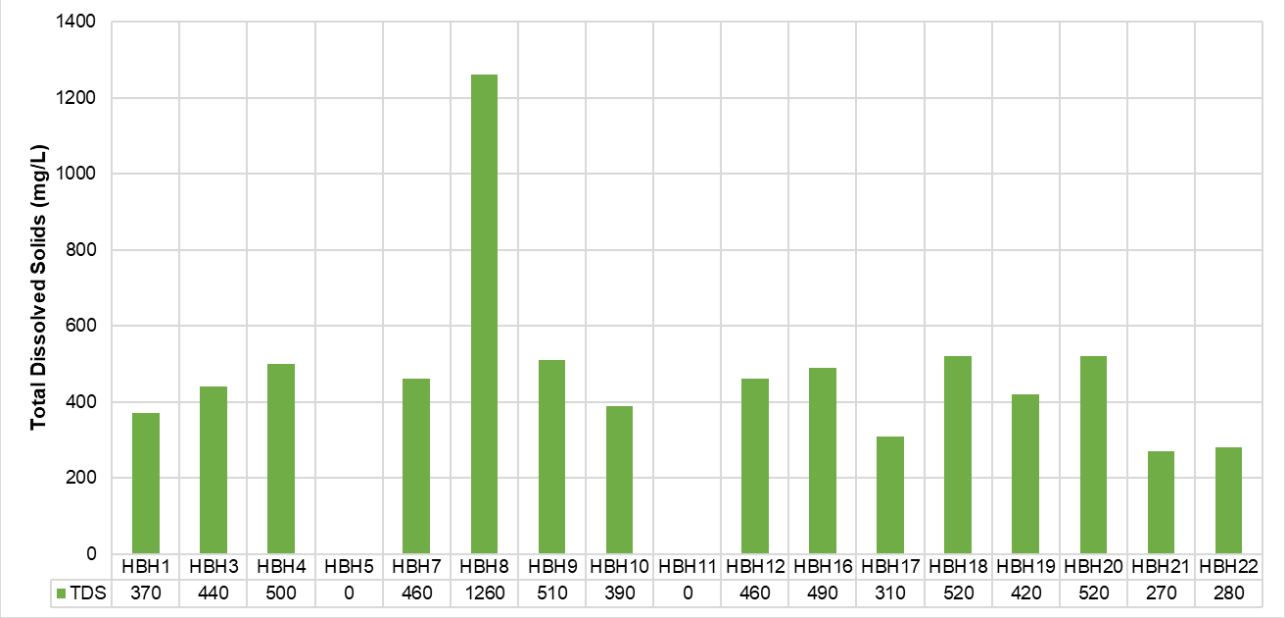


Figure 3.12: TDS measured at the Hydrocensus boreholes (Derived from: GEOSS, 2022a).

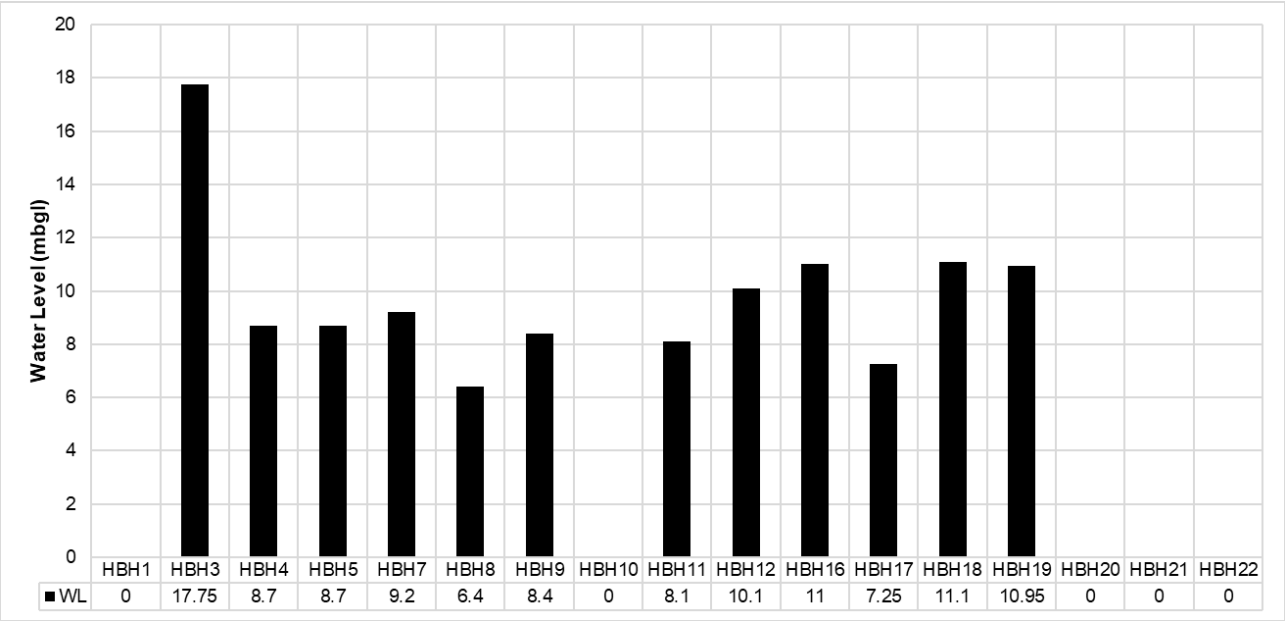


Figure 3.13: Water Level measured at the Hydrocensus boreholes (Derived from: GEOSS, 2022a).

The groundwater quality data obtained during the hydrocensus was assessed by the specialist to establish if the groundwater is suitable for the following uses: potable water; domestic use which will include housekeeping and ablutions; washing of panels; and general construction and concrete batching.

The available groundwater quality results (i.e. pH, EC and TDS) were compared to the following standards:

- **South African National Standards (SANS) 241-1:2015: Drinking water standards**. These standards have the following limits and associated risks for domestic water:
    - Health risks: parameters falling outside these limits may cause acute or chronic health problems in individuals.
    - Aesthetic risks: parameters falling outside these limits indicate that water is visually, aromatically or palatably unacceptable.
    - Operational risks: parameters falling outside these limits may indicate that operational procedures to ensure water quality standards are met may have failed.
- **Department of Water Affairs (DWA) (1998) [now operating as the Department of Water and Sanitation (DWS)): Drinking Water Assessment Guide**. These standards have the following classifications:
    - Blue: Class 0: Ideal water quality - suitable for lifetime use.
    - Green: Class I: Good water quality - suitable for use, rare instances of negative effects.
    - Yellow: Class II: Marginal water quality - conditionally acceptable. Negative effects may occur.
    - Red: Class III: Poor water quality - unsuitable for use without treatment. Chronic effects may occur.
    - Purple: Class IV: Dangerous water quality - totally unsuitable for use. Acute effects may occur.

Based on the above analysis, it was concluded that the groundwater quality within the study area is generally of good quality in terms of pH, EC and TDS. It is possible that the groundwater can be used for potable and domestic purposes with only minor treatment however a full laboratory analysis will be required.

With regards to the cleaning of panels it is understood that very clean water is required to clean the panels to prevent salt deposition on the panels. The EC for the groundwater is considered to be good to marginal. Although this water quality is relatively good it will not be suitable for panel washing as it will result in salts precipitating on the panels. The salts could be removed from the groundwater by thermal distillation (i.e. boiling since salt has a much higher boiling point than water) or by membrane separation (commonly reverse osmosis). Both techniques are possible but financial viability would have to be determined before commissioning as both techniques are costly on a large scale.

In terms of using groundwater for construction purposes and mixing of concrete the SANS 51008:2006 (Mixing water for concrete document) was referred to. Both the composition of the water and the application of the concrete needs to be considered. Potable water is considered to be suitable for concrete batching with no testing required. However, groundwater is considered to potentially be suitable for concrete batching however it requires testing as some groundwater can be very saline which is not considered to be suitable. Furthermore, the SANS 51008 Standard does specify maximum limits for chlorides, sulphates, alkalinity, phosphates, nitrates, lead and zinc. Most of these parameters are currently unknown and therefore it is unclear if the groundwater is suitable for construction and concrete batching.

Refer to Chapter 4 of this Scoping Report, as well as Appendix G.11 (Geohydrology Assessment) for the legal implications of usage of the existing boreholes.

Based on discussions with the landowners, the following water points might be closed or removed collectively for the entire development:

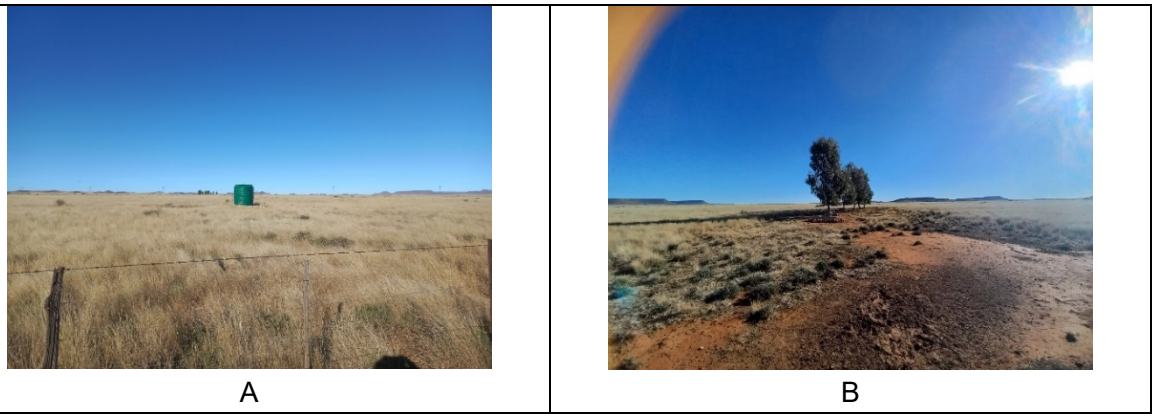
- **HBH 22 pipeline dam located on Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41**: This consists of a dam and water trough, and it is only fed via a pipeline from Borehole HBH 22 that is located to the south-south-east. Refer to Figure 3.14 for additional information.
- **HBH 22 dam located on Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41**: This consists of a dam that is only fed via a pipeline from a borehole to the north-east. Refer to Figure 3.15 for additional information.
- **HBH 20 pipeline dam located on Portion 2 of Farm Grass Pan 40**: This consists of a JoJo tank, pipeline dam and water trough. Refer to Figure 3.16 for additional information.
- **HBH 25 located on Remaining Extent of Portion 3 of the Farm Bas Berg No. 88**: This consists of a borehole and dam. Refer to Figure 3.17 for additional information.
- **Water point located on Remaining Extent of Portion 3 of the Farm Bas Berg No. 88**: This consists of a wind pump. Refer to Figure 3.18 for additional information.

A B

Figure 3.14: A) HBH22 pipeline dam, picture taken in an east-south-easterly direction. B) HBH22 pipeline dam and water trough, picture taken in a south-south-westerly direction. Photos: ABO Wind.

A B

Figure 3.15: A) HBH22, picture taken in a south-south-easterly direction. B) HBH22 dam, picture taken in an easterly direction. Photos: ABO Wind.



A B

Figure 3.16: A) HBH20 pipeline dam and JoJo tank, picture taken in the easterly direction. B) HBH20 pipeline dam water trough, picture taken at the same location as Figure 3.16 (A) in the westerly direction. Photos: ABO Wind.

A B

Figure 3.17: A) HBH25 borehole and dam, picture taken in a southerly direction. B) HBH25 borehole and dam, picture taken in a south easterly direction. Photos: ABO Wind.

Figure 3.18: Wind pump near Kudu Solar Facility 4. Picture taken in a south-easterly direction. Photo: L. Kellerman.

The relevant specialists have noted that closure or removal of the water points listed above are not a concern. After removal or closure, the pipelines would be left on site and the PV panels would be installed over them. In the event of future relocation, this will be dealt with as a separate process in line with the relevant regulations and legislative requirements at the time.

3.2.5.2 Screening Tool Descriptions and Site Sensitivity Verification

There are no dedicated Geohydrology or Groundwater themes on the Screening Tool as of November 2022 and February 2023, therefore the environmental sensitivity of the proposed project area as identified by the Screening Tool is not applicable. Furthermore, there is no dedicated assessment protocol prescribed for Geohydrology or Groundwater. Therefore, the specialist assessment has been undertaken in compliance with Appendix 6 of the 2014 National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) EIA Regulations (as amended), as stipulated in Part A of the Assessment Protocols published in Government Notice (GN) 320 in March 2022.

3.2.6 Strategic Water Source Areas

Strategic Water Source Areas (SWSAs) are defined as “areas of land that either: (a) supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important; or (b) have high groundwater recharge and where the groundwater forms a nationally important resource; or (c) areas that meet both criteria (a) and (b)” (Le Maitre *et al.*, 2018:1 in Department of Environment, Forestry and Fisheries (DEFF) [now operating as the DFFE], 2019: Page 60[14]).

[14] Department of Environment, Forestry and Fisheries (DEFF), 2019. Strategic Environmental Assessment for the Development of a Phased Gas Pipeline Network in South Africa. CSIR Report Number: CSIR/SPLA/EMS/ER/2019/0077/B. ISBN Number: ISBN 978-0-7988-5649-2. Stellenbosch and Durban.

Thirty-seven groundwater SWSAs have been identified in South Africa and are considered to be strategically important at a national level for water and economic security. The total area for groundwater SWSAs extends approximately 104 000 km^2 and covers approximately 9% of the land surface of South Africa (Le Maitre *et al.,* 2018, in DEFF, 2019: Page 61). They also include transboundary Water Source Areas that extend into Lesotho and Swaziland.

The proposed project study area is located about 28 km to the north-east of the De Aar Region Groundwater SWSA, however the proposed project will not impact this area.

3.2.7 Aquatic Biodiversity

The information described below is based on scoping inputs provided by the Aquatic Biodiversity Specialist, which are included in Appendix G.3 of this Scoping Report. The scoping inputs was informed by a combination of desktop assessments of existing freshwater ecosystem information for the study area and surrounding catchments, as well as by a more detailed assessment of the freshwater features within the study area. The study area was visited in March 2022 to verify the aquatic features occurring on the site. The field visit comprised of delineation, characterisation and integrity assessments of the aquatic habitats within the study area. Mapping of the freshwater features was undertaken using a GPS Tracker and mapped in PlanetGIS and Google Earth Professional.

3.2.7.1 General Context

The majority of the study area is located in the Upper Orange Water Management Area (WMA), whilst less than 10% thereof falls within the Lower Orange WMA. The Catchment Area is comprised of unnamed ephemeral tributaries of the middle reach of the Orange River and the study area is located within the D33B (Upper Orange) and D62F (Lower Orange) Quaternary Drainage Regions (QDRs). The majority of the landscape consists of flat to slightly undulating plains with shallow valleys and small hilltops that are drained by non-perennial (ephemeral), northward-flowing tributaries of the Orange River. General drainage within the study area is from south to north. The elevation of the study area ranges from approximately 1250 to 1350 m.a.s.l. Table 3.3 provides an overview and summary of the water resource information for the study area.

Table 3.3: Key water resources information for the proposed project development area

Descriptor	Name / details	Notes
Water Management Area (WMA)	Mostly in the Upper Orange WMA with less than 10% in the Lower Orange WMA	
Catchment Area	Unnamed ephemeral tributaries of the middle reach of the Orange River	
Quaternary Catchment	D33B (Upper Orange) and D62F (Lower Orange)	
Present Ecological state	Not assessed as ephemeral systems that do not contain much aquatic habitat but rather exist as drainage features within the landscape	DWS (2012) assessment for nearby watercourses
Ecological Importance (EI) and Ecological Sensitivity (ES)	EI (D33B): Low; (D62F): High ES (D33B): Very low; (D62F) Moderate	
Location of the centre of study area	30° 13' 03" S	Latitude
	24° 20' 34" E	Longitude

The aquatic features within the study area comprise ephemeral unnamed tributaries of the Orange River. The larger watercourses flow along the eastern and western extents of the study area, flowing in a northerly direction to join the Orange River downstream of Van der Kloof Dam. Associated with these larger watercourses are wide floodplains. The larger watercourse channels tend to be shallow and wide. Smaller watercourses and drainage features drain into the larger river corridors.

The rivers can all be characterised as foothill and lowland rivers within the Nama Karoo Ecoregion. A dominant feature of the larger rivers is the alluvial floodplains that are characterised by multiple channels that are interchangeably used during higher flow events. These sandy floodplains tend to have mostly bare beds, with vegetation occurring in clumps along the bed and more densely along the banks. The ephemeral watercourses are highly dependent on groundwater discharge. The substrate comprises a mix of gravel and alluvium. Wetland areas tend to comprise depressions on the valley floor that occur as a perched feature on calcrete layers.

Due to the climatic conditions of the area, the watercourses and the wetland areas that occur in the area are ephemeral (non-perennial), only containing water for short periods, immediately following local rainfall events.

The vegetation for the larger watercourses usually comprises indigenous grasses (*Eragrostis* and *Stipagrostis* species and *Themeda triandra*) with a distinct riparian vegetation comprising larger shrubs such as *Searsia pyroides* and *Melianthus comosus*. These smaller ephemeral streams and drainage features within the study area do not have a distinct channel or vegetation. Wetland areas contain *Phragmites australis* in the larger features, while the smaller features contain some wetland indicator species such as *Schoenoplectus* spp.

The ephemeral streams and floodplains provide aquatic habitat to a diverse array of faunal species that are adapted to the brief periods of inundation to carry out much of their life phases. Amphibians such as the Poynton's River Frog (*Amietia poyntoni),* Tandy's sand frog (*Tomopterna tandyi*), African bullfrog, (*Pyxicephalus adspersus*), Pygmy Toad (*Poyntonophrynus vertebralis*) and Karoo Toad, *Vandijkophrynus gariepensis* use the inundated pools for breeding. Other biota that use the temporary wet habitats comprise migratory birds and many invertebrates such as water fleas (*Daphnia* spp.) and tadpole shrimps (*Triops* spp.*)*. Connectivity between aquatic ecosystems and the surrounding terrestrial landscape is essential for supporting the fauna of these ecosystems.

The watercourses and associated wetlands and floodplains are in a largely natural to moderate condition due to the low level of impact in the area. It is recommended that the larger watercourses, floodplains and wetlands within the site are not allowed to degrade further from their current ecological condition of largely natural to moderately modified.

Impacts to the watercourses in the study area are associated with agricultural encroachment, livestock grazing and infrastructure (road and powerline) construction and maintenance. The ephemeral aquatic ecosystems are particularly vulnerable to changes in hydrology as they are specifically adapted to the sporadic flow conditions that naturally occur. Contaminants and sediment are not regularly flushed from these streams.

The catchments of the tributaries of the Orange River within the study area do not fall within any National Freshwater Ecosystem Priority Area (FEPA) river sub-catchments (Figure 3.21 (B)). FEPAs are priority areas for conserving freshwater ecosystems and supporting sustainable use of water resources and upstream management areas. FEPAs were identified based on the representation of ecosystem types and flagship free-flowing rivers, maintenance of water supply areas in areas with high yields of water, identification of connected ecosystems and preferential identification of FEPAs that overlapped with any free-flowing river and priority estuaries identified in the 2011 National Biodiversity Assessment.

The only FEPA Wetland within the study area is a largely artificial wetland associated with a farm dam or erosion control structure and is thus not considered of high aquatic biodiversity conservation significance. There is also a natural depression wetland that is within the valley floor of the river system to the west of the study area that is mapped as a FEPA Wetland. Both wetlands are located outside of the study area and are unlikely to be impacted by the proposed project. The artificial wetland is more than 100 m from the study area, while the natural wetland is more than 3 km away.

3.2.7.2 Screening Tool Descriptions and Site Sensitivity Verification

Figure 3.19 below presents the information from the Screening Tool for the Aquatic Biodiversity Combined Sensitivity as it relates to the study area and the Revised Scoping Buildable Areas. Evident from this data is that the area under consideration is generally considered to be of low Aquatic Biodiversity Combined Sensitivity. The very high sensitivity mapped within the study area is linked to the mapped wetlands in the National Wetland Map Version 5 (NWM5) (the wider river floodplains associated with the unnamed tributaries of the Orange River located in the eastern and western portions of the wider study area).

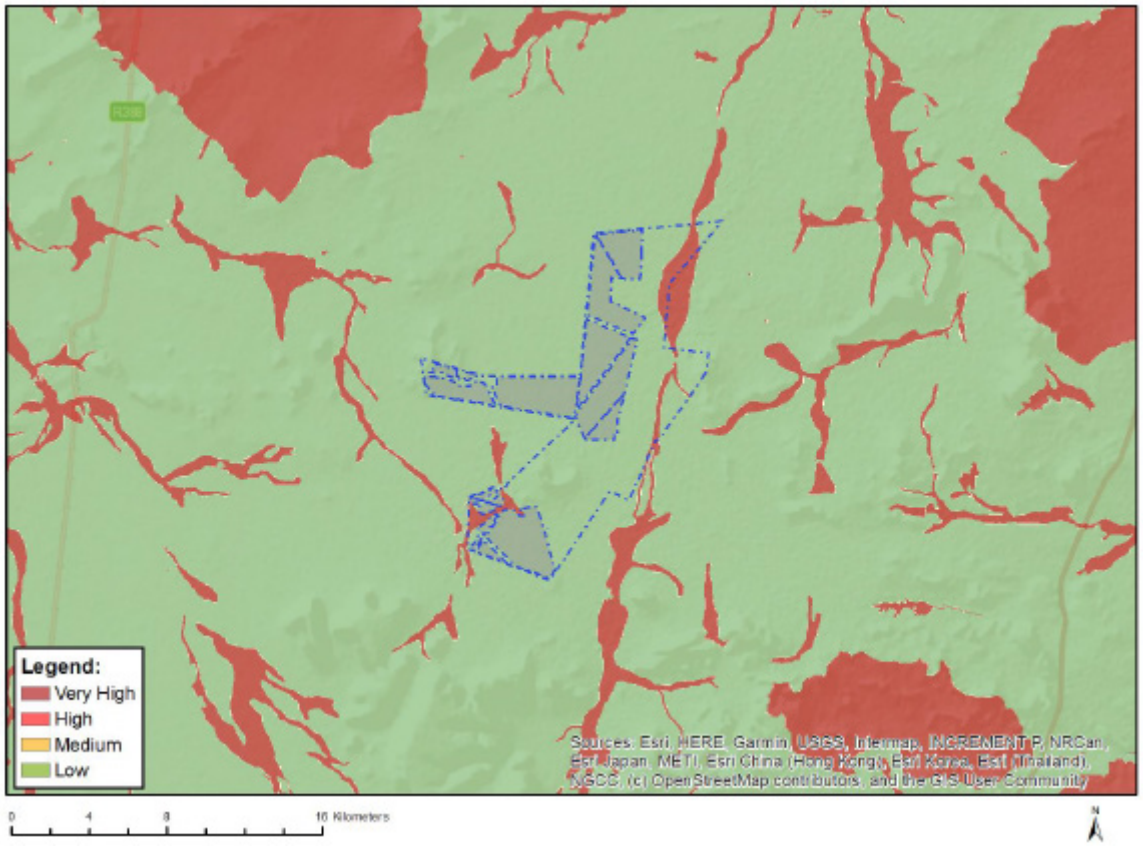


Figure 3.19: Aquatic Biodiversity Combined Sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

The wider floodplain of an unnamed tributary of the Orange River that crosses the site of Kudu Solar Facility 2 and its associated infrastructure and included in the NWM5, has been mapped as very high Aquatic Biodiversity Combined Sensitivity in the Screening Tool. The remainder of the site is located within areas mapped as being of low Aquatic Biodiversity Combined Sensitivity in the Screening Tool. It is recommended that the proposed project activities be located outside of the floodplain area such that they only take place within the areas of the site mapped as being of low sensitivity.

However, following the SSV, the aquatic constraints of the wider study area have been mapped in detail and their aquatic ecosystem sensitivities are shown below in Figure 3.20. The larger watercourses and associated floodplains, as well as wetland areas within the study area, are deemed to be of **medium aquatic ecological sensitivity**. The smaller watercourses and drainage lines that should not pose an aquatic ecosystem constraint to the proposed project are considered to be of **low aquatic ecological sensitivity**.

Based on the present ecological condition (largely natural to moderately modified) and ecological importance and sensitivity, as well as the recommended ecological condition of the watercourses (largely natural to moderately modified), buffers have been recommended to protect these ecosystems. The recommended buffer area between the aquatic features and the project components to ensure these aquatic ecosystems are not impacted by the proposed activities is as follows:

- **The larger tributary**: The delineated edge of the surrounding floodplain wetland features. No buffer area is deemed to be required considering that the floodplain is a wide transitional area between the tributary and the surrounding terrestrial areas.
- **Smaller streams and drainage features that are indicated to be of medium sensitivity**: At least 35 m for the watercourse or the delineated edge of wetland features to allow for the movement of water along these streams.
- In addition, with regards to the Battery Energy Storage System (BESS), this should preferably not be placed within **100 m of major rivers, watercourses and wetlands**.

The aquatic ecosystem sensitivity is discussed in more detail below.

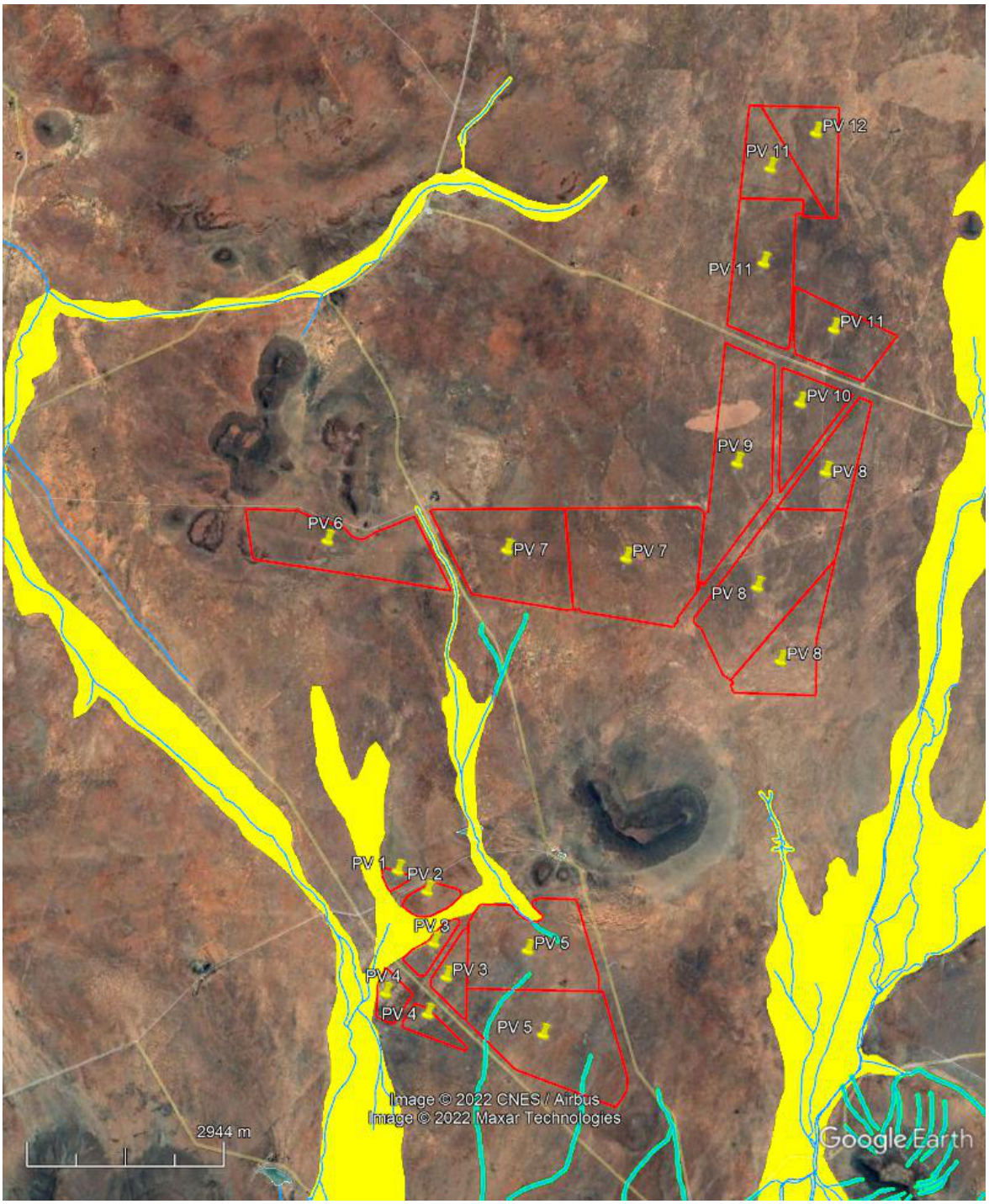


Figure 3.20: Mapped Aquatic Biodiversity Sensitivities within the study area following the SSV and detailed mapping, showing the Original Scoping Buildable Areas. Yellow indicates medium sensitivity (i.e. unnamed tributaries of the Orange River, larger watercourses and their floodplains, and wetlands) and green indicates low sensitivity (i.e. smaller feeder streams, drainage lines and their floodplains) (Source: Belcher, 2022[15])

[15] Belcher, A. (2022). Aquatic Biodiversity and Species Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.3 of the Scoping Report.

The wider floodplain of an unnamed tributary of the Orange River that crosses the site of the Original Scoping Buildable Area of Kudu Solar Facility 2 is considered to be of medium aquatic ecosystem sensitivity. The proposed project activities are located outside of this floodplain area in the Revised Scoping Buildable Area of Kudu Solar Facility 2.

3.2.8 Terrestrial Biodiversity

The information described below is based on scoping inputs provided by the Terrestrial Specialist, and which are included in Appendix G.2 of this Scoping Report.

A literature review of existing reports, scientific studies, databases, reference works, guidelines, and legislation relevant to the study area was conducted to establish the baseline ecological and vegetative condition of the study area. The literature review aimed to identify the potential habitats and flora Species of Conservation Concern (SCC) present within the study area. The Botanical Database of Southern Africa (BODATSA) (SANBI, 2022a[16] in Enviro-Insight, 2022) was used to access distribution records on southern African plants. The Red List of South African Plants website (SANBI, 2022b)[17] was also utilized to provide the most current account of the national status of flora. Relevant field guides and texts were also consulted for identification purposes in the field during the surveys.

A site visit was undertaken in February 2022 and March 2022 (wet season) where the Terrestrial Biodiversity and sensitive flora aspects of the survey area were evaluated. During the field surveys performed, the habitats were evaluated, and a series of georeferenced photographs were taken of the habitat attributes. The field surveys focused on identifying dominant flora species, main habitat types as well as the actual and potential presence of SCC (either classified as Threatened by the International Union for Conservation of Nature (IUCN) (2022), protected by the National Environmental Management: Biodiversity Act (NEMBA) (2007, as amended) or other legislation applicable provincially or nationally).

3.2.8.1 Regional Vegetation

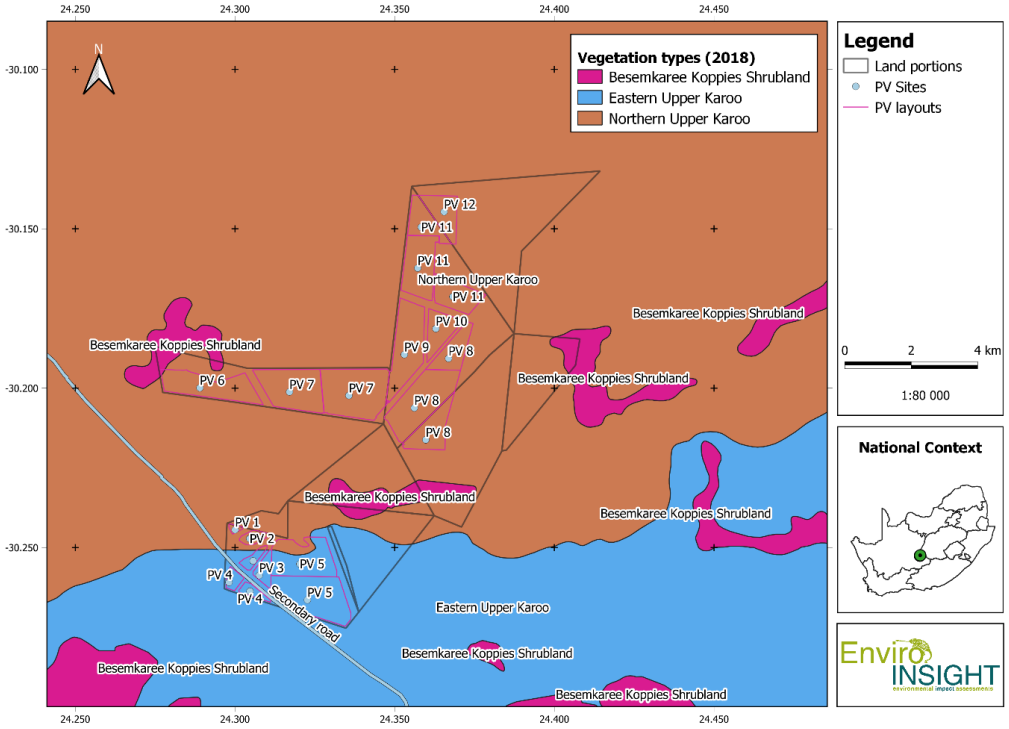
As noted above, the study area falls within the Nama Karoo and Grassland Biomes, covering three vegetation types, namely the Northern Upper Karoo (NKu3), the Eastern Upper Karoo (NKu4) and the Besemkaree Koppies Shrubland (Gh4) (Figure 3.21). The Northern Upper Karoo vegetation unit occupies the Northern regions of the Upper Karoo plateau from Prieska, Vosburg and Carnarvon in the west to Philipstown, Petrusville and Petrusburg in the east. Bordered in the north by Niekerkshoop, Douglas and Petrusburg and in the south by Carnarvon, Pampoenpoort and De Aar. A few patches occur in Griqualand West. The Eastern Upper Karoo vegetation type is one of the largest vegetation types in the country and is found in the Northern, Western and Eastern Cape, between Carnarvon and Loxton in the west, De Aar, Petrusville and Venterstad in the north

[16] SANBI (2022a): http://newposa.sanbi.org/. In Enviro-Insight (2022). Terrestrial Biodiversity and Species Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.2 of the Scoping Report.

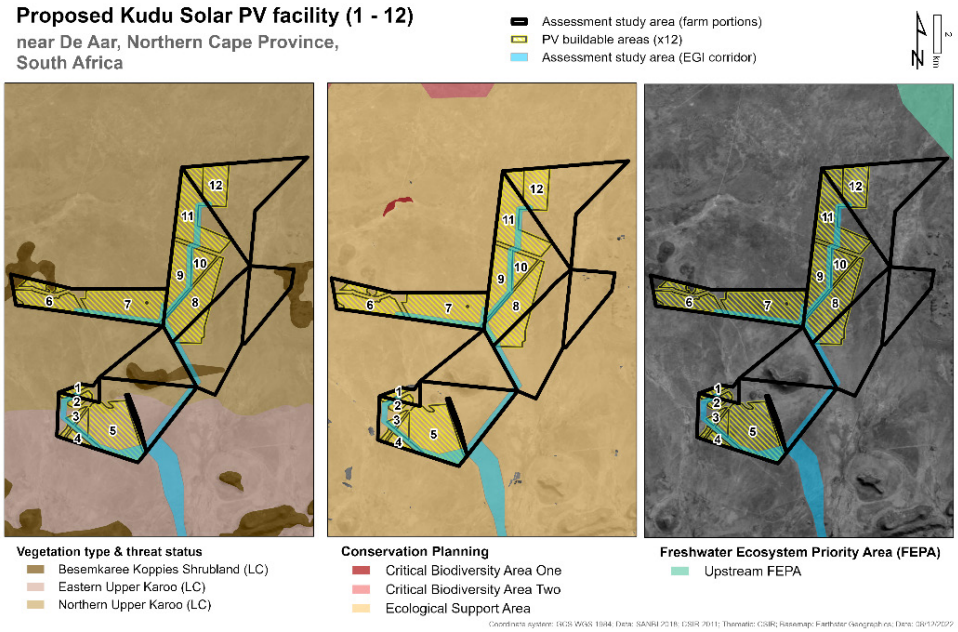
[17] SANBI (2022b): http://redlist.sanbi.org/. In Enviro-Insight (2022). Terrestrial Biodiversity and Species Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.2 of the Scoping Report.

and Burgersdorp and Cradock in the east, and the Great Escarpment in the south. Besemkaree Koppies Shrubland occurs in the Northern Cape, Free State and Eastern Cape provinces on the plains of the Eastern Upper Karoo, between Richmond and Middelburg in the south and the Orange River in the north.

More specifically, Kudu Solar Facility 2 includes Northern Upper Karoo.



(A)



(B)

Figure 3.21: (A): The study area and Original Scoping Buildable Areas in relation to the Vegetation Units. (Source: Enviro-Insight, 2022[18]). (B) The study area and Revised Scoping Buildable Areas in relation to Vegetation Types, Conservation Planning and Freshwater Ecosystem Priority Areas (FEPAs).

[18] Enviro-Insight (2022). Terrestrial Biodiversity and Species Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.2 of the Scoping Report.

3.2.8.2 Biodiversity Conservation Planning

Critically Endangered and Threatened Ecosystems

Based on scoping level input, no Critically Endangered, Threatened and/or Vulnerable Ecosystems appear to be present within the proposed project site. This will also be confirmed during the EIA Phase.

Critical Biodiversity Areas and Ecological Support Areas

Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) are indicated in terms of the Northern Cape Critical Biodiversity Area Map, which was published in 2016 to update, revise and replace all older systematic biodiversity plans and associated products for the province. This was developed by the Northern Cape Department of Environment and Nature Conservation (currently operating as the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR)) by using a Systematic Conservation Planning approach. The Northern Cape DAEARDLR confirmed that the Northern Cape 2016 CBA Map serves as "CBAs identified in systematic biodiversity plans adopted by the competent authority", as per the relevant listed activities in Listing Notice 3 of the 2014 NEMA EIA Regulations (as amended). Refer to Appendix E.10 for a copy of this correspondence from the Northern Cape DAEARDLR.

CBAs and ESAs together with Protected Areas are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole (Holness and Oosthuysen, 2016 in Enviro-Insight, 2022[19]).

CBAs are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. The primary purpose of CBAs is to inform land-use planning in order to promote sustainable development and protection of important natural habitat and landscapes. Biodiversity priority areas are described as follows:

- CBAs are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. In other words, if these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses. For CBAs the impact on biodiversity of a change in land-use that results in a change from the desired ecological state is most significant locally at the point of impact through the direct loss of a biodiversity feature (e.g., loss of populations or habitat). All FEPA prioritized wetlands and rivers have a minimum category of CBA1, while all FEPA prioritised wetland clusters have a minimum category of CBA2.
- ESAs are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of CBAs and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for CBAs. For ESAs a

[19] Holness, S., & Oosthuysen, E. (2016). Critical Biodiversity Areas of the Northern Cape: Technical Report. In Enviro-Insight (2022). Terrestrial Biodiversity and Species Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.2 of the Scoping Report.

change from the desired ecological state is most significant elsewhere in the landscape through the indirect loss of biodiversity due to a breakdown, interruption or loss of an ecological process pathway (e.g. removing a corridor results in a population going extinct elsewhere or a new plantation locally results in a reduction in stream flow at the exit to the catchment which affects downstream biodiversity). All natural non-FEPA wetlands and larger rivers have a minimum category of ESA.

Identified ESAs (2016 Northern Cape CBA Map) extend over a wide area in this specific region of the Northern Cape. The entire site / study area, and thus all identified buildable areas / development footprints are located in an ESA (Figure 3.21 (B) and Figure 3.22). The ESA is due to the study area being located in the Platberg-Karoo Conservancy, the vegetation units and important wetland and river features. From a Terrestrial Biodiversity perspective, the Platberg-Karoo Conservancy and the vegetation units are important systems for grasslands and grassland associated animals, as well as important areas for the conservation of avifauna. This section of the Karoo has the highest rainfall and provides an ecotone between the Nama Karoo and Grassland biomes. More information on the Platberg-Karoo Conservancy is provided below.

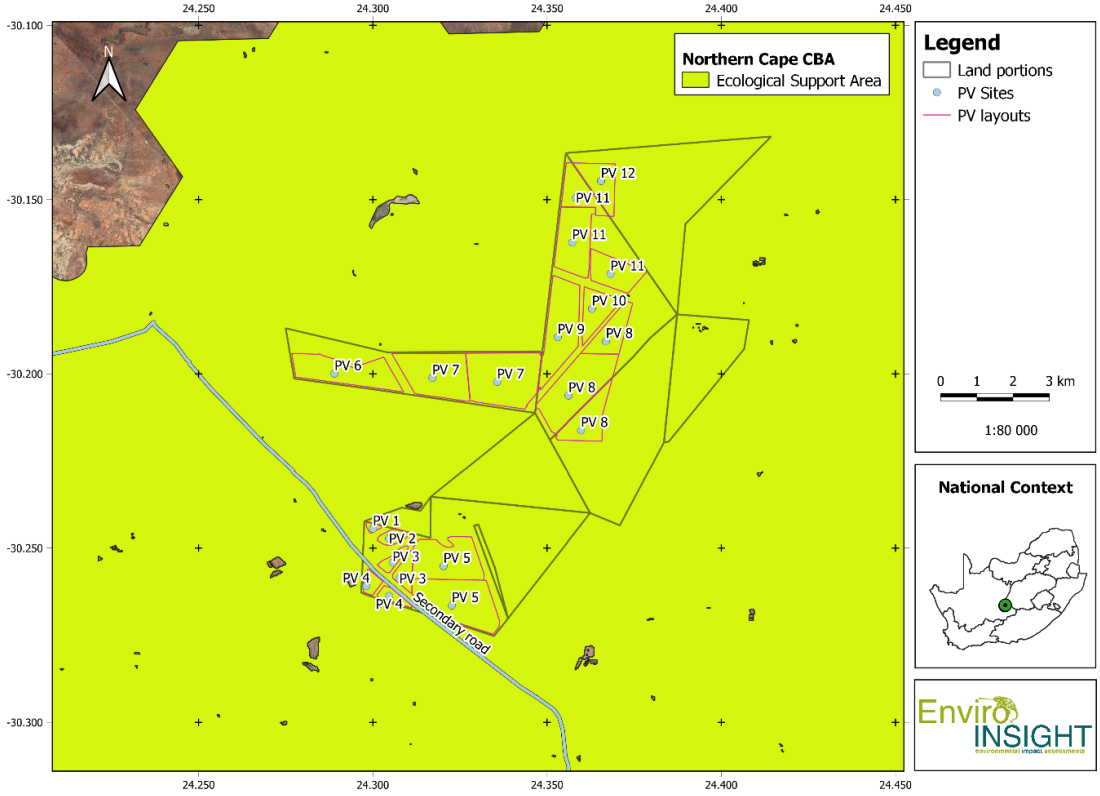


Figure 3.22: The study area and Original Scoping Buildable Areas in relation to the Northern Cape CBA Map (2016). (Source: Enviro-Insight, 2022)

Protected Areas

According to the South African Protected Areas Database (SAPAD), Quarter 2 (2022), the study area does not include any formally Protected Areas (Figure 3.23), as defined by the National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEM: PAA). This has also been confirmed by the DFFE Directorate: Protected Areas Planning and Management Effectiveness (Appendix E.10 of this Final Scoping Report). The closest formally Protected Area

is the Rolfontein Provincial Nature Reserve, which is located more than 30 km to the north-east of the study area. The Rolfontein Provincial Nature Reserve was declared in 1994, based on the information provided on SAPAD. The Tuinhoek Reserve and Grasberg Reserve lie directly adjacent to the Rolfontein Provincial Nature Reserve, and fall within the Free State, more than 40 km from the study area, towards the north-east. The Doornkloof Provincial Nature Reserve lies more than 50 km away from the study area, towards the south-east, in the Free State. In addition, the De Aar Nature Reserve lies more than 50 km away from the study area, towards the south-west, in the Northern Cape.

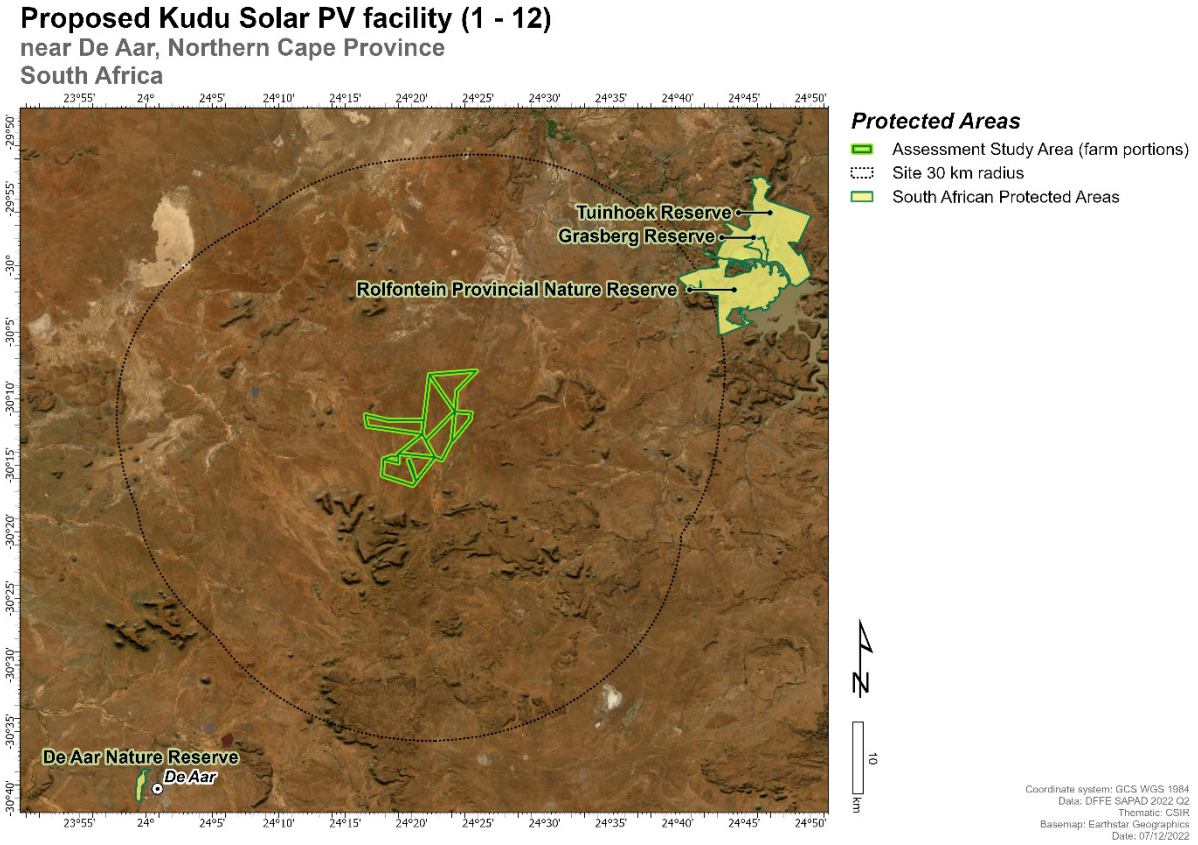


Figure 3.23: Protected Areas in relation to the Study Area

Conservation Areas

According to the South African Conservation Areas Database (SACAD), Quarter 2 (2022), the study area does not include any Conservation Areas.

National Protected Area Expansion Strategy (NPAES) Focus Areas

The NPAES focus areas for land-based protected area expansion are large, intact and unfragmented areas of high importance for biodiversity representation and ecological persistence, suitable for the creation or expansion of large, Protected Areas. Representative of opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. There are no National Protected Area Expansion Strategy (NPAES) focus areas within the study area.

Important Bird and Biodiversity Areas

The study area is located in the Platberg-Karoo Conservancy[20], which is regarded as an Important Bird and Biodiversity Areas (IBA).

The Platberg–Karoo Conservancy was established in July 1990. In collaboration with MD Anderson of DENC, various research and environmental awareness projects were initiated, including the Karoo Large Terrestrial Bird Survey, the Blue Crane Awareness Project and 11 years of colour-ringing Blue Crane chicks. The major threat of power-line collisions was initially investigated by the Eskom/EWT partnership and MD Anderson. This covered the impact of power lines on populations of large terrestrial bird species and evaluated the effectiveness of earth-wire marking devices.

The Platberg–Karoo Conservancy IBA covers the entire districts of De Aar, Philipstown and Hanover, including suburban towns. This IBA is in the Nama Karoo and Grassland Biomes. The land is used primarily for grazing and agriculture. Commercial livestock farming is mostly extensive wool and mutton production, with some cattle and game farming. Less than 5% of this IBA is cultivated under dry-land or irrigated conditions.

This IBA contributes significantly to the conservation of large terrestrial birds and raptors. These include Blue Crane *Anthropoides paradiseus*, Ludwig's Bustard *Neotis ludwigii*, Kori Bustard *Ardeotis kori*, Blue Korhaan *Eupodotis caerulescens*, Black Stork *Ciconia nigra*, Secretarybird *Sagittarius serpentarius*, Martial Eagle *Polemaetus bellicosus*, Verreauxs' Eagle *Aquila verreauxii,* and Tawny Eagle *Aquila rapax*.

Refer to the Avifauna Scoping Level Assessment (Appendix G.4 of this Scoping Report) which provides detailed information on the proposed project and resultant potential impacts on birds.

3.2.8.3 Fauna

A Compliance Statement was undertaken for the Terrestrial Animal Species (excluding Avifauna). Refer to Appendix G.2 of the Scoping Report for additional information. The Compliance Statement notes that the study area is in a natural or semi-natural state (due to presence of alien invasive species), and accordingly it is of a medium to low sensitivity for terrestrial animal species.

Leopard tortoise, Cape Ground Squirrel, Steenbok, Porcupine, Small-spotted genet, Springbok, Scrub hare, Common warthog, Bat eared fox, Puff Adder, Striped polecat, Cape cobra were recorded on site, and one animal SCC was recorded, namely *Sable Antelope*, however, since this is an introduced species, and it is believed that the species are from the adjacent property a full animal assessment is not required. The species could still be included as part of the construction and operational management plan, as the species moves between the two properties.

Almost all fauna species recorded within the study area are provincially protected, including species under Schedule 1 and 2 of the Northern Cape Nature Conservation Act (No. 9 of 2009). Should it be necessary to capture and relocate any of these animals prior to or during construction,

[20] A conservancy is a vehicle and platform for community-based conservation. It is a voluntary association of environmentally conscious land-owners and land-users who choose to cooperatively manage their natural resources in an environmentally sustainable manner without necessarily changing the land-use of their properties.

or during the operational phase of the project, a permit application with the provincial authority is required.

3.2.8.4 Habitats and Terrestrial Plant Species

Four main habitats were identified within the study area based on species composition and structure following the desktop review and field-based assessments done by the specialists. These are listed below and indicated in Figure 3.24, as well as described in Table 3.4:

- Shrubby Grassland;
- White Grassland;
- Koppies; and
- Watercourse.

In addition, transformed areas were included which makes up existing roads, homesteads and bare soil.

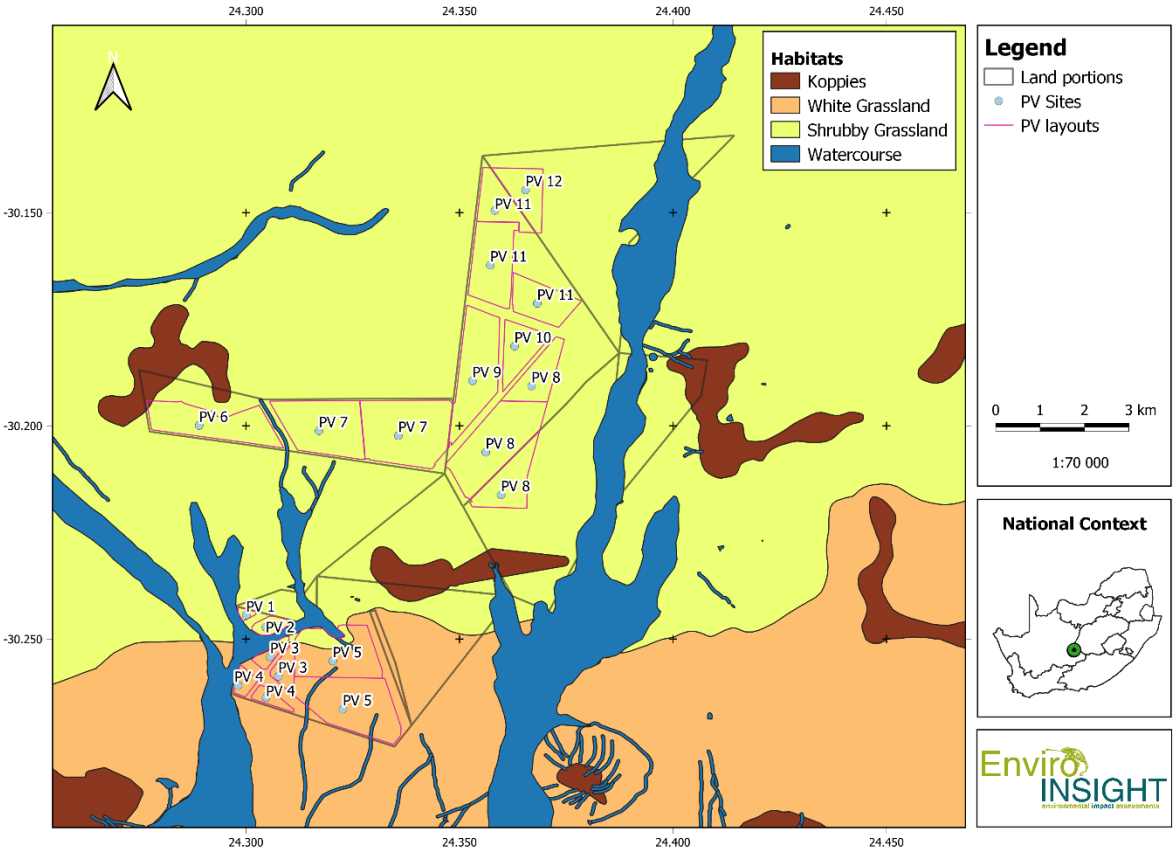


Figure 3.24: The main habitats identified in the wider region, study area and Original Scoping Buildable Areas (Source: Enviro-Insight, 2022)

Table 3.4: Description of the main habitats found within the Study Area (extracted from Enviro-Insight, 2022)

Habitat	Key information
Shrubby Grassland	This grassland has elements of shrubs and low trees, and white grasses dominating the lower layer (*Aristida* sp. and *Eragrostis* sp.). The key vegetation characteristics as described by Mucina and Rutherford (2006) are not present, as *Senegalia mellifera* is absent from the study area. If anything, this habitat is more characteristic of the Eastern Upper Karoo due to dwarf microphyllous shrubs with a dominant grass layer. It can even be described as an ecotone between the two vegetation units, with some elements of the Besemkaree Koppies shrubland as well. This habitat is considered moderately sensitive due to moderate species diversity and the presence of provincially protected species in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009) (of the genera *Aloe, Ruschia, Euphorbia, Haemanthus, Oxalis, Jamesbrittenia* and *Ammocharis*) and one protected tree in terms of the National Forests Act (Act 84 of 1998, as amended) (*Boscia albitrunca*). To maintain corridors between this and the Koppies, and ensure portions of the protected plants are conserved, a section has been excluded from development. Dominant species recorded include: ▪ Grasses – *Aristida congesta* subsp *congesta, Aristida junciformis, Aristida canescens, Aristida diffusa, Bromus catharticus, Chloris virgata, Eleusine coracana, Enneapogon cenchroides, Eragrostis chloromelas, Eragrostis curvula, Eragrostis nindensis, Eragrostis obtusa, Eragrostis plana, Eustachys paspaloides, Fingerhuthia Africana, Heteropogon contortus, Melinis repens, Pogonarthria squarossa, Stipagrostis uniplumis, Urochloa panicoides* ▪ Small trees – *Boscia albitrunca, Searsia* ▪ Shrubs – *Lycium cinereum, Pentzia incana, Salsola sp., Ricinus communis, Xanthium spinosum* ▪ Succulent Herbs – *Aloe broomii, Ruschia intricata*, *Euphorbia crassipes* ▪ Herbs – *Felicia muricata*, *Indigofera* sp., *Jamesbrittenia tysonii* The habitat provides suitable foraging and nesting habitat for fauna species. Refer to Appendix E of the Terrestrial Biodiversity and Species Scoping Level Assessment for more information.
White Grassland	This habitat is dominated by white grasses of the genera *Aristida* and *Eragrostis* interspersed with microphyllous shrubs such as *Lycium* spp. This habitat is considered moderately sensitive due to moderate species diversity and the presence of provincially protected species (of the genera *Aloe, Ruschia, Jamesbrittenia, Crassula, Haemanthus, Oxalis).* Dominant species recorded include: ▪ Shrubs – *Lycium cinereum, Ricinus communis* ▪ Grasses – *Aristida congesta* subsp *congesta, Aristida uniforms, Aristida canescens, Aristida diffusa, Chloris virgata, Enneapogon cenchroides, Eragrostis chloromelas, Eragrostis curvula, Eragrostis nindensis, Eragrostis obtusa, Eragrostis plana, Heteropogon contortus, Sporobolus fimbriatus, Stipagrostis ciliata, Stipagrostis obtusa, Themeda triandra* ▪ Succulent shrubs – *Ruschia intricata.* ▪ Succulents – *Aloe broomii* ▪ Herbs – *Indigofera alternans*, *Jamesbrittenia tysonii*

Habitat	Key information
	The habitat provides suitable foraging and nesting habitat for fauna species, including reptile like Puffadders and Cobras, small mammals like squirrels and mongoose, and grassland birds.
Koppies	The Koppies habitat consists of more woody species (trees and shrubs) compared to other habitats. The species composition is different from other habitats and the species diversity is considered higher. *Boscia albitrunca* (protected tree) occur on the Koppies and at their foot slopes (this is applicable to Kudu Solar Facility 6). Other provincially protected species include *Aloe broomii, Pelargonium spp. (PP), Euphorbia spp., Eucomis spp., Crassula spp., Adromischus spp., Haworthiopsis tessellata,* and *Lessertia frutescens.* Dominant species recorded include: ▪ Trees – *Boscia albitrunca*, *Ziziphus mucronata* ▪ Tall shrubs – *Euclea crispa, Searsia erosa, Olea europea subsp. africana, Diospyros lycioides, Tarchonanthus minor* ▪ Low shrubs – *Aptosimum* sp., *Asparagus suaveolens*, *Amphiglossa triflora, Felicia muricata, Helichrysum dregeanum*, *Lycium cinereum*, *Pentzia globosa*, *Rhigozum obovatum, Solanum* sp., *Stachys linearis* ▪ Grass – *Themeda triandra*, *Aristida diffusa, Aristida congesta, Cymbopogon caesius, Cynodon incompletus, Digitaria eriantha, Eragrostis curvula, Heteropogon contortus, Sporobolus fimbriatus* ▪ Succulents – *Aloe cf. grandidentata*, *Aloe broomii*, *Cotyledon orbiculate, Ruschia sp* ▪ Succulent herbs – *Adromischus sp., Crassula sp., Euphorbia caterviflora, Euphorbia mauritanica, Haworthiopsis tessellata, Stapelia grandiflora*, *Trichodiadema sp.* ▪ Geophytic herb – *Cheilanthes bergiana, Haemanthus humilis, Oxalis depressa, Pellaea calomelanos* ▪ Herbs – *Eucomis cf. autumnalis*, *Indigofera alternans*, *Lessertia frutescens*, *Pelargonium sp., Pollichia campestris* Owing to the rocky nature of the Koppies and elevation, the habitat provides refugia for smaller mammals and reptiles, as well as nesting and foraging sites for birds. Furthermore, due to the high functionality and resilience to climate change impacts, the Koppies habitat is considered sensitive. According to the Northern Cape CBA map and Technical Report (DENC 2016), all areas supporting climate change resilience are included as ESA.
Watercourse	The Watercourse habitat consists of drainage lines, some of which are smaller and poorly developed. The vegetation layer is not well-defined and is made up of woody cover in some areas but is mostly dominated by graminoids and herbaceous species. Dominant species include: • Trees – *Searsia lancea* • Shrubs – *Asparagus suaveolens*, *Euclea crispa, Diospyros lycioides, Lycium cinereum*, *Galenia africana, Rhigozum trichotomum, Tarchonanthus minor.* • Grasses – *Aristida congesta, Themeda triandra*, *Eragrostis curvula* • Sedges – *Afroscirpoides dioeca, Schoenoplectus sp., Cyperus sp. Juncus sp.* The Watercourse habitat acts as a landscape corridor for the movement of many fauna species, including small mammals such as hares. The Watercourse habitat also performs important ecosystem functions such as regulating water runoff and creating suitable conditions important for the survival of many fauna species including foraging and breeding habitat.

The Terrestrial Biodiversity specialist has noted that many species found within the study area are widespread and not of any conservation concern but protected due to the fact that the Northern Cape Nature Conservation Act (2009) protects entire families of flowering plants irrespective of whether some members are rare or common. Refer to Appendix G.2 for a comprehensive list of plant SCC observed within the study area. The provincially protected species must either be relocated prior to construction or alternative measures made (depending on comments received from the provincial authority). A permit application is required for submission to the relevant provincial department where the proposed development will impact on these species.

The protected tree *Boscia albitrunca* occurs in the Shrubby Grassland at the base of a Koppie (in the vicinity of Kudu Solar Facility 6), and where individuals are impacted on by the approved layout, a permit application for destruction must be submitted to the Northern Cape DFFE. Currently the only known individual is excluded from development.

3.2.8.5 Screening Tool Descriptions and Site Sensitivity Verification

Figures 3.25 to 3.27 below indicate the results of the Screening Tool in terms of terrestrial plant species, terrestrial animal species, and the terrestrial biodiversity combined sensitivity, respectively, for the proposed project.

The Screening Tool shows Low and Medium sensitivity for the Plant species theme due to suitable habitat for one SCC, namely *Tridentea virescens* (Figure 3.25). This species has an extensive, but very sporadic distribution from the south-eastern corner of Namibia to De Aar, Hopetown and Beaufort West in South Africa. Specimens are usually found in stony ground or hard loam in floodplains and they are often associated with shrubs of *Lycium* or *Rhigozum trichotomum*. No individuals were recorded during the survey within the study area. Even though *Lycium* and *Rhigozum* spp. are present throughout the study area, it does not always indicate suitable habitat for the species as the species tends to be sporadic. The species has a moderate likelihood of occurring on the study area, especially towards the northern boundary.

The Screening Tool shows that faunal populations for the study area are considered to be of medium sensitivity due to the presence of sensitive avifauna species (Refer to Section 3.2.9 of this chapter for additional information), while the remaining taxa groups are considered to be low sensitivity (Figure 3.26). Accordingly, only a compliance statement is required (refer to Appendix G.2 for more details).

In terms of the terrestrial biodiversity combined sensitivity layer on the Screening Tool, the study area is shown to have a very high sensitivity due to the ESA designation (Figure 3.27).

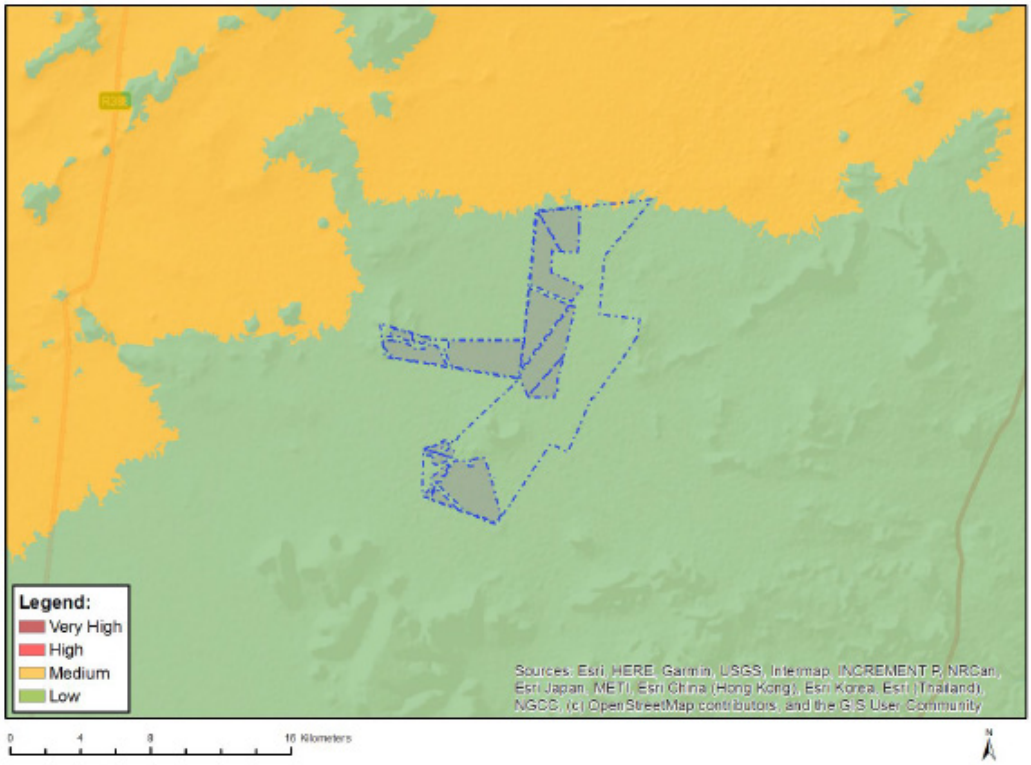


Figure 3.25: Terrestrial Plant Species sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

Figure 3.26: Terrestrial Animal Species sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

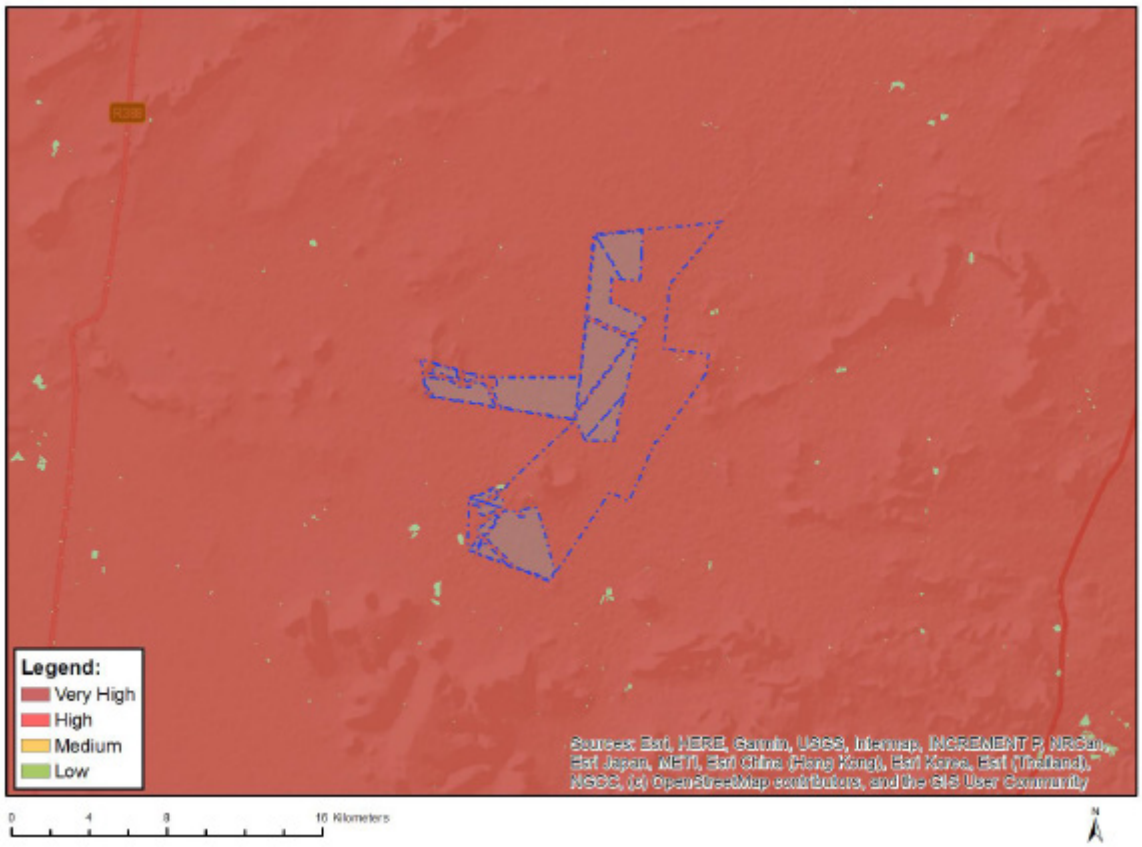


Figure 3.27: Terrestrial Biodiversity Combined Sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

The Terrestrial Biodiversity Combined Sensitivity Theme is indicated as Very High on the Screening Tool due to the ESA. Terrestrial Biodiversity theme The ESA is due to the site being in the Platberg-Karoo Conservancy (not formally protected), the vegetation units and important wetland and river features. The Terrestrial Biodiversity theme therefore includes information on avifauna and aquatic features – the relevant specialist assessments with regards to these specific taxa and features must be read in combination with the Terrestrial Biodiversity and Species Scoping Level Report (Appendix G.2 of the Scoping Report) to report to obtain a holistic view of the environment and in order to determine and assess relevant impacts from the proposed project on these features and taxa. The vegetation itself is not considered sensitive but does provide important feeding and breeding habitat for fauna. The relevant buffers indicated in the Avifauna Assessment must be incorporated into the layout design, and where necessary these areas must be avoided from development. Important river and wetland features occur in the landscape, which are vital for ecosystem services, maintaining connectivity in the landscape, and act as important habitats for many fauna species. Accordingly, the overall sensitivity of the study area in terms of Terrestrial Biodiversity is considered medium, with some landscape features, including the Koppies, as High sensitivity. These features need to be excluded from development as identified by the relevant specialists (refer to aquatic and avifauna assessments).

For the Plant Species theme, the identified suitable habitat for *Tridentea virescens* had to be further assessed, and accordingly the medium sensitivity rating was upgraded to comply with a Terrestrial Plant Species Specialist Assessment. *Tridentea virescens* has been recorded previously near to De Aar and could possibly occur within the study area.

The site verification confirmed the Very High environmental sensitivity of the Terrestrial Biodiversity theme and Low sensitivity for all other animal taxa groups.

The specialist identified the Site Ecological Importance (SEI) of the four habitats identified, and both Grassland habitats are considered as medium sensitivity. The watercourse habitats are considered low and medium sensitivity, as determined by the Aquatic Biodiversity Specialist. The Koppies habitat is considered highly sensitive (indicated in red) which must be avoided. The PV solar arrays and associated infrastructure should be focused in areas identified as medium sensitivity and lower (all areas not indicated as highly sensitive in Figure 3.28), should the appropriate mitigation measures be implemented.

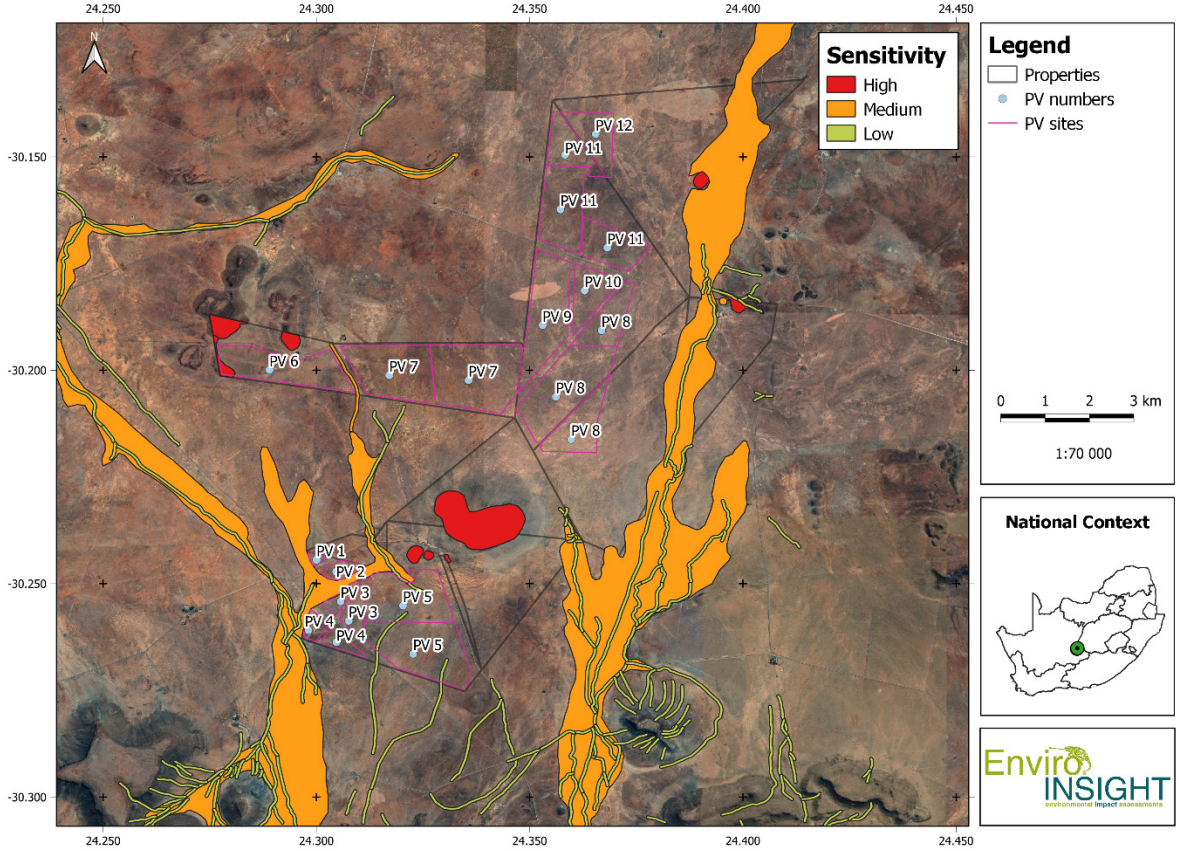


Figure 3.28: Terrestrial Biodiversity and Species sensitivity map for the study area, in relation to the Original Scoping Buildable Areas following the SSV and detailed mapping undertaken by the specialists (Enviro-Insight, 2022).

3.2.9 Avifauna

The information described below is based on scoping inputs provided by the Avifauna Specialist, which are included in Appendix G.4 of this Scoping Report.

An integrated pre-construction monitoring programme is currently being implemented at the study area. The pre-construction avifaunal monitoring programme is following an adapted Regime 2 protocol as defined in the Birds and Solar Energy best practice guidelines (Jenkins et al. 2017 in Chris van Rooyen Consulting, 2022[21]) which require a minimum of two surveys over a six-month period. At the time of release of this Scoping Report, both surveys have been conducted (the findings of the second survey does not change the findings of the Scoping Level Avifauna Assessment).

A total of 82 species could potentially occur within the Broader Area where the project is located. Of these, 21 are classified as priority species for solar developments. Of the 21 priority species, 17 were recorded during the monitoring so far, and 15 priority species have a medium to high probability of occurring regularly in the study area. Five Red Data species were recorded during the site surveys, namely Blue Crane, Martial Eagle, Verreaux's Eagle, Cape Vultures and White-backed Vulture. Refer to Table 3.5 for a list of priority species potentially occurring in the study area and potential impacts on them by the proposed project.

[21] Jenkins, A.R., Ralston-Patton, Smit- Robinson, A.H. 2017. Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa. BirdLife South Africa. In Chris van Rooyen Consulting (2022). Avifauna Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.4 of the Scoping Report.

Table 3.5: List of Priority species potentially occurring in the study area (Source: Chris van Rooyen Consulting, 2022[22])

Species name	Scientific name	SABAP2 reporting rate		Status					Recorded during monitoring	Likelihood of regular occurrence	Habitat					Impacts				
		Full protocol	Ad hoc protocol	Red List Global	Red List Regional[23]	Endemic (SA)	Endemic (SA) - detail	IBA trigger species			Grassy Karoo	Alien trees	Surface water	Ridges (koppies)	High voltage lines	Collisions with solar panels	Displacement: Disturbance	Displacement: Habitat transformation	Entrapment in fences	Electrocution in substations
Black-headed Canary	*Serinus alario*	0.00	33.33	-	-	X	Near endemic			L	x		x			x	x	x		
Blue Crane	*Grus paradisea*	33.33	16.67	VU	NT			x	x	H	x		x				x	x	x	
Blue Korhaan	*Eupodotis caerulescens*	0.00	8.33	NT	LC	X	Endemic (SA, Lesotho, Swaziland)	x		L	x					x	x	x	x	
Cloud Cisticola	*Cisticola textrix*	0.00	0.00	-	-	X	Near endemic		x	L	x					x	x	x		
Egyptian Goose	*Alopochen aegyptiaca*	33.33	16.67	-	-				x	M		x	x		x	x				x
Fairy Flycatcher	*Stenostira scita*	0.00	0.00	-	-	X	Near endemic		x	L	x					x	x	x		
Greater Kestrel	*Falco rupicoloides*	33.33	16.67	-	-				x	H	x	x			x		x	x		x
Jackal Buzzard	*Buteo rufofuscus*	0.00	8.33	-	-	X	Near endemic		x	M	x	x	x	x	x		x	x		x
Karoo Prinia	*Prinia maculosa*	0.00	0.00	-	-	X	Near endemic		x	L	x					x	x	x		
Large-billed Lark	*Galerida magnirostris*	33.33	8.33	-	-	X	Near endemic		x	H	x					x	x	x		
Martial Eagle	*Polemaetus bellicosus*	0.00	0.00	EN	EN			x	x	M	x	x	x	x	x		x	x		x

[22] In Chris van Rooyen Consulting (2022). Avifauna Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.4 of the Scoping Report.

[23] CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near-threatened; and LC: Least concern

Species name	Scientific name	SABAP2 reporting rate		Status					Recorded during monitoring	Likelihood of regular occurrence	Habitat					Impacts				
		Full protocol	Ad hoc protocol	Red List Global	Red List Regional[23]	Endemic (SA)	Endemic (SA) - detail	IBA trigger species			Grassy Karoo	Alien trees	Surface water	Ridges (koppies)	High voltage lines	Collisions with solar panels	Displacement: Disturbance	Displacement: Habitat transformation	Entrapment in fences	Electrocution in substations
Pale Chanting Goshawk	*Melierax canorus*	100.00	41.67	-	-				x	H	x	x	x		x		x	x		x
Pied Starling	*Lamprotornis bicolor*	33.33	8.33	-	-	X	Endemic (SA, Lesotho, Swaziland)		x	H	x	x	x			x	x	x		
Rock Kestrel	*Falco rupicolus*	0.00	0.00	-	-				x	M	x	x		x				x		x
South African Cliff Swallow	*Petrochelidon spilodera*	33.33	0.00	-	-	X	Endemic (SA, Lesotho, Swaziland) Breeding		x	M	x					x		x		
Three-banded Plover	*Charadrius tricollaris*	0.00	0.00	-	-				x	L			x			x				
Verreaux's Eagle	*Aquila verreauxii*	66.67	0.00	-	VU			x	x	H		x	x	x	x	x	x	x		x
Cape Vulture	*Gyps coprotheres*	0.00	0.00	VU	EN	X	Near endemic		x	M	x	x	x	x	x			x		x
White-backed Vulture	*Gyps africanus*	0.00	0.00	CR	CR				x	M	x	x	x		x			x		x
Ludwig's Bustard	*Neotis ludwigii*	0.00	0	EN	EN			x		H	x						x	x	x	
Secretarybird	*Sagittarius serpentarius*	0.00	0	EN	VU			x		M	x	x	x				x	x	x	

3.2.9.1 Screening Tool Descriptions and Site Sensitivity Verification

In terms of the Screening Tool, the study area and immediate environment is classified as medium and low sensitivity for terrestrial animals according to the Terrestrial Animal Species Theme (Figure 3.26). The Original and Revised Scoping Buildable Areas specifically are classified as medium sensitivity. In a Screening Tool Report that was generated in February 2022, the medium classification was linked to the potential occurrence of Ludwig's Bustard (Globally and Regionally Endangered) and Verreaux's Eagle (Regionally Vulnerable). However, in a Screening Tool Report that was generated in November 2022 for the study area, the medium classification was linked to the potential occurrence of Ludwig's Bustard (Globally and Regionally Endangered) and Tawny Eagle (Regionally Endangered). The study area contains confirmed habitat for species of conservation concern (SCC) as defined in the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020). The occurrence of SCC was confirmed during the surveys so far i.e. Martial Eagle (Globally and Regionally Endangered), Verreaux's Eagle (Regionally Vulnerable), Blue Crane (Globally Vulnerable and Regionally Near-threatened), Cape Vulture (Globally Vulnerable and Regionally Endangered) and White-backed Vulture (Globally and Regionally Endangered) was recorded in the Study Area, as well as habitat for Secretarybird (Globally and Regionally Endangered) and Ludwig's Bustard.

Based on the SSV conducted on 28 March 2022 to 1 April 2022, the specialists concluded that the study area is of high sensitivity for avifauna from a solar perspective as the presence of SCC in the study area was confirmed during the surveys so far. Therefore, the medium and low sensitivity on the Screening Tool for avifauna is disputed and a high sensitivity finding is confirmed and more appropriate.

The following sensitive zones and buffers were recommended by the specialists:

- **All infrastructure exclusion zones:** Verreaux's Eagle nest: A 1 km all infrastructure exclusion zone is recommended to prevent the displacement of the breeding pair during the construction phase due to disturbance (Figure 3.29). In addition, the buffer area will reduce the risk of injury to the juvenile bird due to collision with the solar panels, when it starts flying and practicing its hunting technique around the nest.
- **Solar panel exclusion zones (other infrastructure allowed):**
    - **Water points:** Surface water in this semi-arid habitat is crucially important for priority avifauna and many non-priority species. The Scoping Buildable Areas and the immediate surrounding area contain several boreholes which are sources of surface water. It is preferable to leave some open space where possible with no solar panels, for birds to access and leave the surface water area unhindered[24]. Surface water is also important area for raptors to hunt birds which congregate around water troughs, and they should have enough space for fast aerial pursuit. This will also benefit Blue Cranes which prefer to breed close to water bodies. It is noted that the area surrounding the Scoping Buildable Areas contain several boreholes that will not be affected by the proposed development, and these boreholes will ensure that the local avifauna will still have access to adequate sources of surface water.

[24] While some of the water points in the Scoping Buildable Area might be removed, the Applicant has agreed to retain some water points which will be buffered by a minimum circular solar panel exclusion zone of 50 m. The removal of some of the water points will therefore not be a significant impact.

- **High sensitivity zones**: The entire study area is a high sensitivity zone due to the potential presence of several SCCs including Ludwig's Bustard, Secretarybird, Martial Eagle, Cape Vulture and White-backed Vulture which could utilise the whole study area for foraging. However, these species do not require specific avoidance measures at this stage because there is still adequate habitat available outside the study areas.

Refer to Figure 3.29 for the avifaunal sensitivity zones identified for the study area based on pre-construction avifaunal monitoring data obtained. This map is subject to potential further refinement based on additional data to be collected in the field during the course of the monitoring.

The entire Original and Revised Scoping Buildable Area for Kudu Solar Facility 2 is High Sensitivity. There is no overlap with water point solar panel exclusion zones, but the Original and Revised Scoping Buildable Areas are less than 1 km away from three water points.

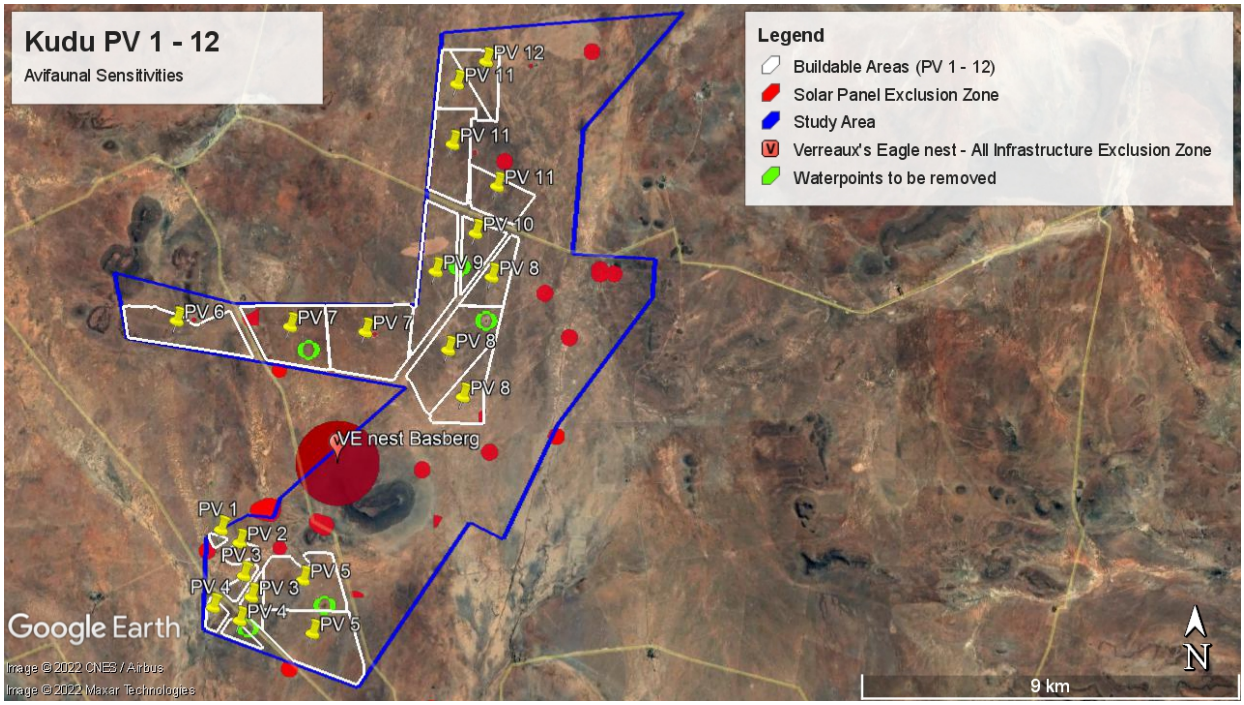


Figure 3.29: Avifaunal sensitivity zones identified for the study area based on pre-construction avifaunal monitoring data obtained (Source: Chris Van Rooyen Consulting, 2022).

3.2.10 Visual Aspects and Sensitive Receptors

The information described below is based on scoping inputs provided by the Visual Specialist, which are included in Appendix G.5 of this Scoping Report.

The visual assessment provides information on landscape, terrain, and vegetation, as well as other aspects such as land use and sensitive receptors. As described in Section 3.2.2 of this chapter, the study area lies within an expansive flattish landscape interspersed with dolerite-capped koppies and the small isolated *koppie* Basberg, which provide topographic relief.

The approach and methodology for the visual scoping specialist study is based on the "Guideline for Involving Visual and Aesthetic Specialists in EIA Processes" (Oberholzer, 2005), as well as a site visit undertaken by the specialists in March 2022, and the use of a 3D digital terrain model of the study area to determine the viewshed of the proposed project, as well as establishing a photographic record with the emphasis on views from potential sensitive receptors of the proposed project at varying distances, and panoramic photographs, which include GPS positions, to create the post-mitigation photomontages.

The assessment concluded that the viewshed, or zone of visual influence, potentially extends for some 5 km. Various potential scenic resources and sensitive receptors, such as farmsteads, as well as landscape features were identified within the study area and have been categorised into no-go (very high), high, medium and low visual sensitivity zones, as well as buffers, for the proposed project. The visual sensitivity mapping categories are shown in Table 3.6 and spatially indicated on Figure 3.31.

Table 3.6: Visual Sensitivity Mapping Categories (extracted from Oberholzer and Lawson, 2022[25])

Scenic Resources	Very high sensitivity	High visual sensitivity	Medium visual sensitivity	Low visual sensitivity
Topographic features	Feature	Within 250 m	-	-
Steep slopes	Slopes > 1:4	Slopes > 1:10	-	-
Drainage courses	Feature	Within 50 m	-	-
Cultural landscapes	within 250 m	within 500 m	-	
Protected Landscapes / Sensitive Receptors				
Nature reserves / game farms	within 500 m	within 1 km	within 2 km	-
Farmsteads outside site	within 500 m	within 1 km	within 2 km	-
Farmsteads inside site	within 250 m	within 500 m	-	
Arterial routes n/a	within 250 m	within 500 m	within 1 km	-
District roads	within 50 m	within 100 m	within 250 km	-

[25] Oberholzer, B. and Lawson, Q. (2022). Visual Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.5 of the Scoping Report.

3.2.10.1 Screening Tool Descriptions and Site Sensitivity Verification

The Screening Tool "Landscape" Combined Sensitivity Map as it relates to solar energy developments in the region is considered to be Very High in the northern and southern parts of the study area, where the very high sensitivities are mainly linked to slopes of more than 1:4., i.e. mountain tops and high ridges (Figure 3.30). These findings were partly disputed based on more detailed project-scale mapping of landscape features. A more accurate map of landscape features, along with recommended visual sensitivity buffers, has been prepared at the local project scale by the specialists, taking into account detailed viewshed mapping and local site conditions (Figure 3.31).

Kudu Solar Facility 2 borders on a drainage feature and local road but is located outside the associated no-go buffer areas in terms of the Original and Revised Scoping Buildable Areas. The Original and Revised Scoping Buildable Areas are also well outside the no-go buffer area of the nearest surrounding farmstead.

Figure 3.30: Potential Landscape (Solar) Combined Sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

Figure 3.31: Map of sensitive receptors and their associated visual sensitivity buffers following the SSV and detailed mapping (Source: Oberholzer and Lawson, 2022)

3.2.11 Heritage: Archaeology and Cultural Landscape

The information described below is based on scoping inputs provided by the Heritage Specialist, and which are included in Appendix G.6 of this Scoping Report. A detailed description of the archaeological features and cultural landscape within the study area will be provided in the Heritage Impact Assessment (Archaeology and Cultural Landscape), that will be included in the EIA Report.

Initial work was carried out using satellite aerial photography in combination with the specialist's accumulated knowledge of the wider Karoo landscape. This was used to determine areas most likely to be sensitive and that needed to be targeted during the survey. The subsequent fieldwork undertaken in April 2022 served to ground truth the study area, including areas identified as potentially sensitive. Desktop research was also used to inform on the heritage context of the area.

According to the Heritage Specialist, it is intended under Section 7(2) of the National Heritage Resources Act (Act 25 of 1999) (NHRA) that the various provincial authorities formulate a system for the further detailed grading of heritage resources of local significance, but this is generally yet to happen. The South African Heritage Resources Agency (SAHRA (2007)) in ASHA Consulting

(2022)[26] has formulated its own system[27] for use in provinces where it has commenting authority. In this system sites of high local significance are given Grade IIIA (with the implication that the site should be preserved in its entirety) and Grade IIIB (with the implication that part of the site could be mitigated and part preserved as appropriate) while sites of lesser significance are referred to as having 'General Protection' (GP) and rated as GP A (high/medium significance, requires mitigation), GP B (medium significance, requires recording) or GP C (low significance, requires no further action).

Sensitivity is in terms of development on the study area and is generally one level higher than the cultural significance as prescribed by the NHRA. For example, a heritage resource of medium or higher cultural significance would be seen as of high sensitivity for development, while a resource of low significance would be of medium sensitivity. Sites of very low cultural significance and all intervening areas would then be of low sensitivity for development.

A number of heritage resources were identified within the study area (Figure 3.32). Table 3.7 lists those heritage resources recorded by the specialist during the survey that have been allocated a very high and high **sensitivity**.

Table 3.7: List of heritage resources recorded during the survey with a very high and high sensitivity (extracted from ASHA Consulting, 2022)

Waypoint	Location	Description	Significance [Grade]
1038	S30 14 26.7 E24 19 17.1	A heavily overgrown (with grass) graveyard to the west of the Basberg fam complex. It is impossible to count the graves. There is one double grave. Another grave has a stone lying loose on top of it with much cursive writing on it. There are several graves that only have dolerite cobbles packed over them.	High [IIIA]
947	S30 11 13.0 E24 23 45.3	Farm complex on Wolwe Kuilen 42/Rem. The house is early 20th century, and it is in good condition (including inside). There are various outbuildings.	High
1044	S30 14 37.8 E24 19 20.7	A boulder right on the edge of the hilltop has a number of scraped engravings on its vertical face that faces onto the hill. The engravings look quite fresh but yet are poorly preserved. There seem to be two ostriches towards the right, but the rest are difficult to tell the species of. A large flake of dolerite on top of the boulder has been used as a rock gong and makes a fairly high-pitched sound.	High [IIIA]
957	S30 07 54.5 E24 24 50.2	These two points lie along the southern end of an approximately 5 km long dolerite stone wall that extends northwards along a dolerite dyke on Farm 209 ending at waypoint 959.	High [IIIB]
957B	S30 07 53.8 E24 24 46.2		
959	S30 07 53.1 E24 24 52.6	This point is at the northern end of the wall recorded under waypoint 957.	High [IIIB]
961	S30 07 53.4 E24 24 51.9	Two historical scratched horse engravings and a few other images. There is also a patch of multiple parallel lines that is very well patinated and must be far older.	Medium [IIIB]
1007	S30 11 33.2 E24 18 22.3	A farmstead on Portion 5 of Graspan 40, outside the study area. It was not visited. The house looks to be early 20th century.	High

[26] ASHA Consulting (2022). Heritage Scoping Level Assessment for the proposed Kudu Solar Facilities and associated infrastructure. Prepared for the Scoping and Environmental Impact Assessment (EIA) for the Kudu Solar Facilities and associated infrastructure. Appendix G.6 of the Scoping Report.

[27] The system is intended for use on archaeological and palaeontological sites only.

Waypoint	Location	Description	Significance [Grade]
1016	S30 14 36.0 E24 19 49.5	An area of 25 m diameter on a low dolerite hill with many historical/recent engravings. They include indistinguishable scratches and motifs, horses, ostriches and writing. Another rock has two ostriches, one with a shaded body, while two others have stylised horses scratched on them. The site demonstrates a connection with intangible heritage through its continuation of the engraving tradition. The same applies to all the rock engravings recorded below.	Medium-High [IIIB]
1018	S30 14 38.1 E24 19 51.3	This is another area on the same low hill as waypoint 1016 but it is about 5 m in diameter. The engravings here include a stylised horse which is somewhat patinated and could be older than the rest, a geometric motif similar to a Nine Men's Morris board, a set of three columns of 8, 9 and 10 short lines respectively, and some indeterminate scratches/motifs.	Medium-High [IIIB]
1023	S30 14 27.5 E24 19 26.2	The Basberg farm complex (on Bas Berg 88) has an assortment of structures of varying age. The main house is in very good condition and looks to be early-mid-20th century. A large barn made from clay bricks is probably a little older, as is a very small structure with two doors and an internal hearth. Right outside it is a pole with several hooks on it (possibly for hanging hunted animals). A werf wall of dolerite cobbles runs round the back of the main house.	Medium-High
1024	S30 14 27.7 E24 19 24.4	A large ash and rubbish midden measuring about 35 m long and about 10-20 m wide. It is on sloping ground. The waypoints are near each end. There is plenty of glass and ceramics as well as various types of metal (iron, copper and a grey metal, possibly pewter) and much bone. There are also rock and brick fragments present. Among the ceramics there is some stoneware but the vast majority of pieces are refined white earthenware including hand-painted, sponge-printed, transfer printed in various colours, lined industrial). The material probably does not go back beyond the late 19th century. A large scraper on a dolerite flake was also noted.	Medium-High [IIIB]
1041	S30 14 35.0 E24 19 18.5	This is an engraving of a single animal, likely an eland. It is somewhat stylised with a very small hump and a nose that ends in a point.	Medium-High [IIIB]
1057	S30 11 46.4 E24 17 44.3	Four boulders on a dolerite hill with various inscriptions.	Medium-High [IIIB]
1059	S30 11 41.7 E24 17 38.2	A rock with scratched writing on it.	Medium-High [IIIB]

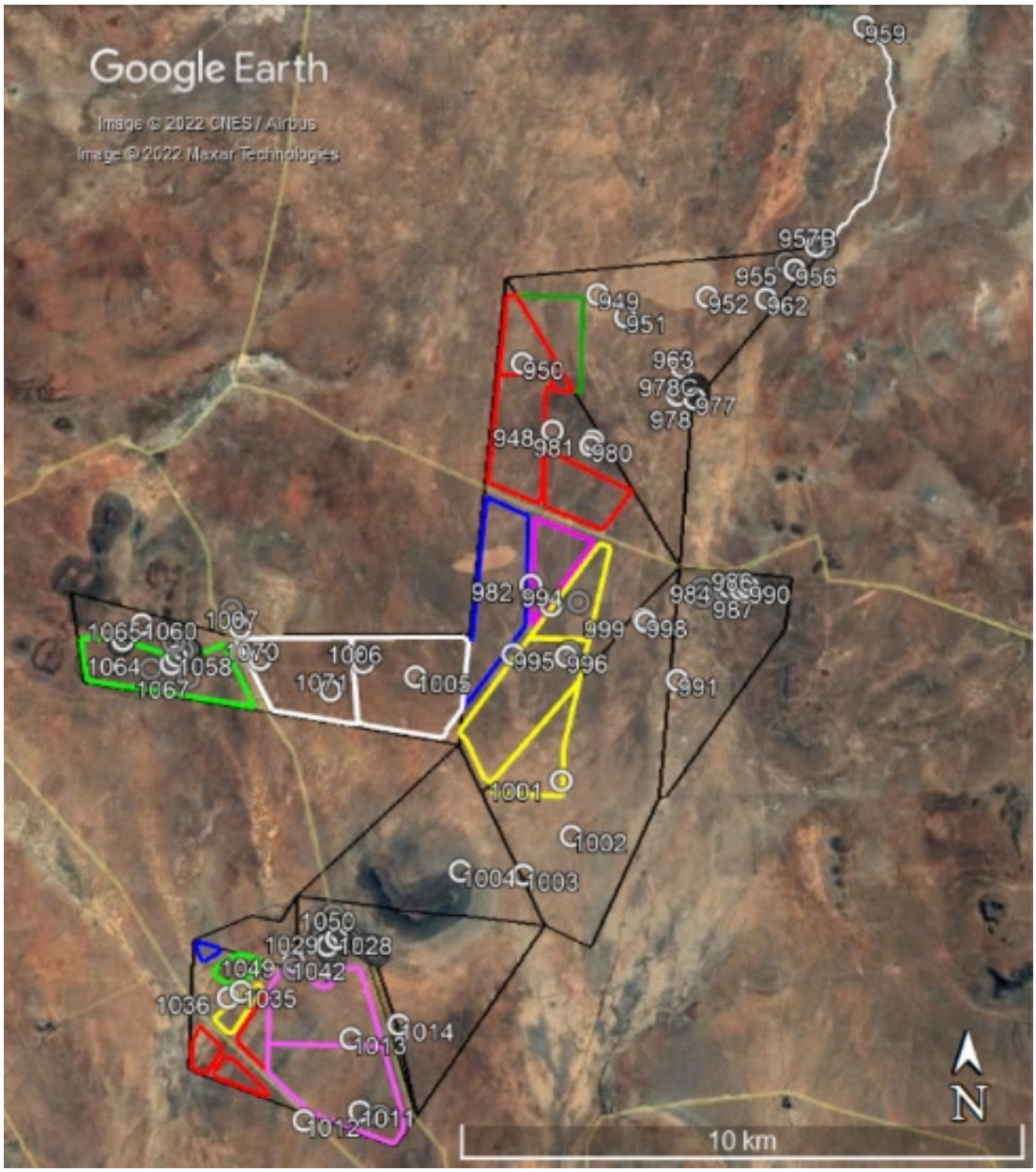


Figure 3.32: Map showing the locations of all heritage resources recorded in the study area (white symbols) in relation to the Original Scoping Buildable Areas (Source: ASHA Consulting, 2022).

There are no heritage concerns in the general area for Kudu Solar Facility 2. Archaeological materials may be affected during construction when equipment is brought onto site and grubbing, and excavation takes place. The chances of significant cultural materials being affected are extremely small (nothing worth more than Grade GPC was found). The landscape will definitely be affected if the project goes ahead, however it has a relatively low cultural significance.

3.2.11.1 Screening Tool Descriptions and Site Sensitivity Verification

Figure 3.33 indicates the archaeological and heritage sensitivity as assigned by the Screening Tool for the study area, as well as the Revised Scoping Buildable Areas. The overall heritage sensitivity of the study area is considered to be low based on the Screening Tool. The site visit by the specialist showed that much of the study area is indeed of low sensitivity, but several pockets of higher sensitivity were found to occur. These are places where archaeological and other heritage resources were found and tended to be near farmsteads or dolerite outcrops. These areas are considered to be of variably medium to very high sensitivity. The heritage specialist thus disputes the Screening Tool findings in that a uniform low sensitivity is not applicable to the entire study area. Refer to Appendix C of the Heritage Scoping Level Assessment (Appendix G.6 of the Scoping Report) for a spatial distribution of these higher sensitivity areas, although an equivalent scale map to the Screening Tool map is shown in Figure 3.34 below for easier comparison. Details of the SSV are included in Appendix G.6 of this Scoping Report.

In all cases the Very High, High and Medium sensitivity areas are located outside of the development footprints (i.e. Original and Revised Scoping Buildable Areas). Most resources located within the study areas are cultural landscape components and are of low cultural significance and hence sensitivity. The only exceptions are an engraving consisting of a few small scratches and a pair of stone-lined farm reservoirs, both near Kudu Solar Facility 6 and both also of low sensitivity. It is preferred, however, that the reservoirs be retained because of their relationship with the adjoining ruined farmstead and for this reason they have been included in the medium sensitivity polygon around the farmstead. There are no other areas in any of the remaining Original and Revised Scoping Buildable Areas that require avoidance on heritage grounds. Most of the features found have been buffered by 50 m, as discussed in Section 7 of this chapter.

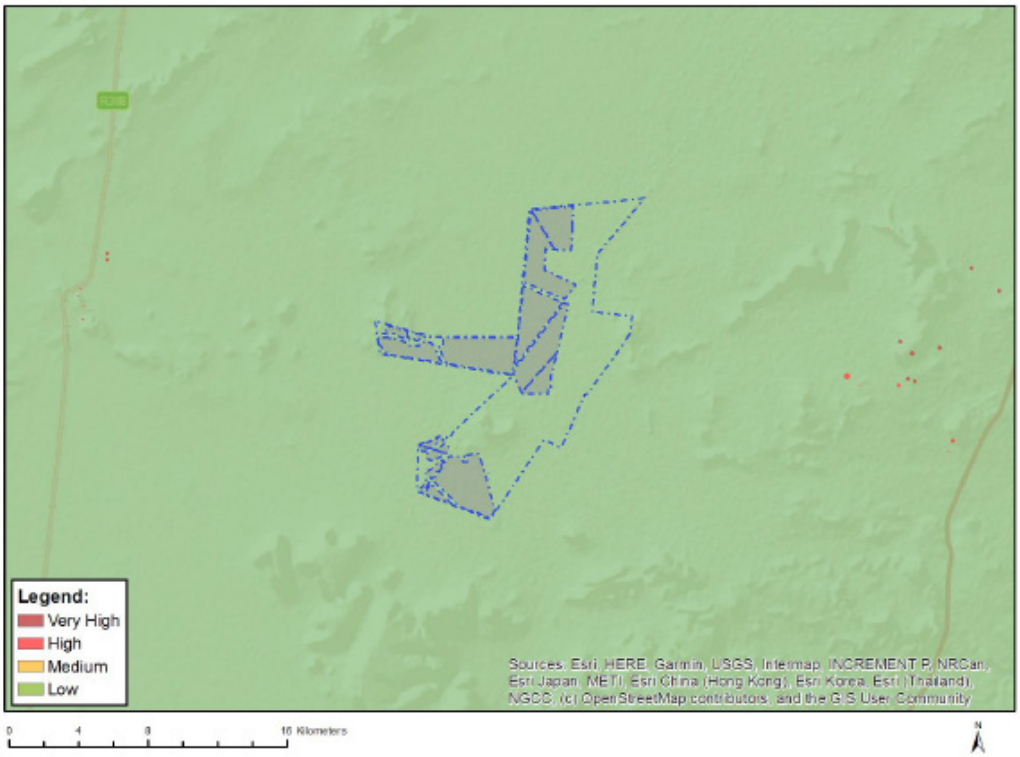


Figure 3.33: Archaeology and Cultural Heritage Combined Sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

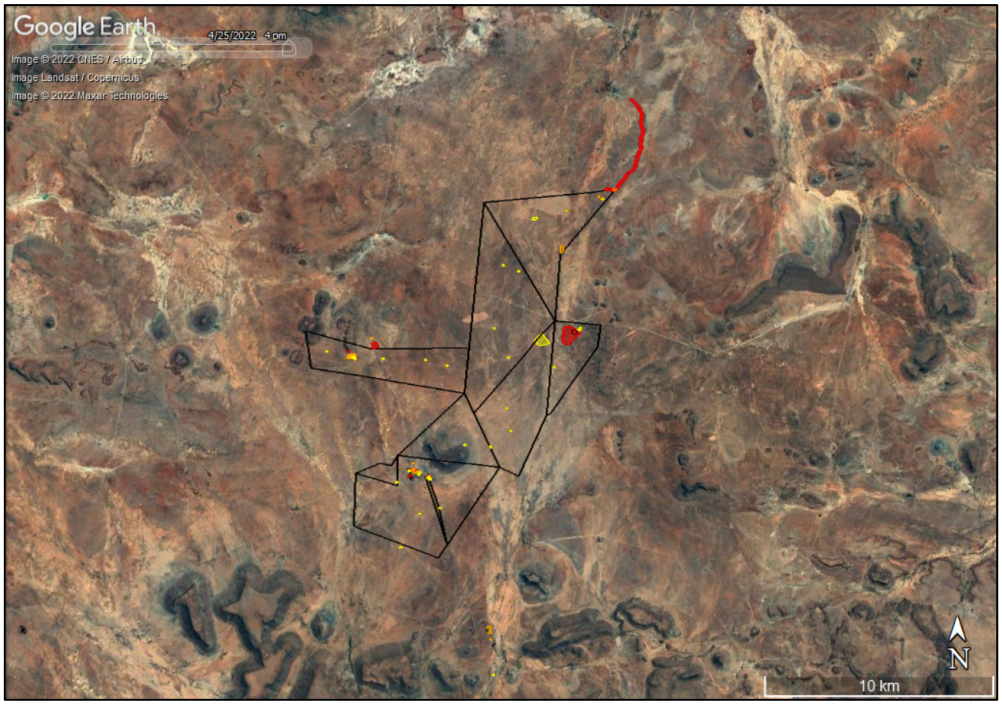


Figure 3.34: Archaeology and Cultural Heritage Sensitivity as determined through fieldwork and mapping. Dark red is very high sensitivity, red is high sensitivity, orange is medium sensitivity, and yellow is low sensitivity (Source: ASHA Consulting, 2022).

3.2.12 Palaeontology

The information described below is based on the SSV provided by the Palaeontologist, which is included in Appendix G.7 of this Scoping Report.

The study area largely comprises low-relief terrain mantled with thick Late Caenozioic calcrete hardpans, alluvial deposits, surface gravels and soils that are generally of low palaeo-sensitivity. Natural bedrock exposure here is very limited and mainly involves unfossiliferous dolerite as well as baked Ecca Group metasediments (probable Waterford Formation) building *kranzes* on upper hillslopes that will not be directly impacted by the proposed project. Early to Middle Permian basinal mudrocks of the Tierberg Formation (Ecca Group, Karoo Supergroup) underlie the majority of the study area but are rarely exposed and, where seen, are generally weathered, friable and extensively disrupted by near-surface calcrete veins. The offshore mudrocks of the Tierberg Formation are not known elsewhere to have a rich fossil record. In the study area, the potential for well-preserved fossils is further reduced by near-surface weathering, calcrete veining as well as baking of sedimentary bedrocks by intensive regional dolerite intrusion in Early Jurassic times. The only fossils recorded from the Ecca Group sediments during the 2-day palaeontological site visit comprise sparse, low diversity trace fossil assemblages of low scientific or conservation interest. Thick sandy to gravelly alluvial deposits associated with long-established drainage lines are extensively calcretised. No fossil remains were recorded within them.

3.2.12.1 Screening Tool Descriptions and Site Sensitivity Verification

According to the Screening Tool, the study area ranges from Medium to High palaeontological sensitivity (Figure 3.35). Based on several previous desktop and field-based Palaeontology Impact Assessment (PIA) studies undertaken in the broader De Aar - Kimberley region, as well as the 2-day palaeontological site visit, the Screening Tool sensitivity allocations have been contested by the specialist. It is concluded that the study area is in fact of Low to Very Low palaeo-sensitivity overall, thus disputing the Medium to High sensitivity of the Screening Tool (Figure 3.35). However, the potential for rare, largely unpredictable fossil sites of High palaeo-sensitivity associated with older alluvial and pan deposits in the subsurface cannot be entirely discounted. Most such fossil sites would probably be protected during construction by environmental buffer zones along drainage lines. If any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol (included in Appendix G.7 of the Scoping Report) should be fully implemented. These recommendations will also be included in the Environmental Management Programmes (EMPrs) for the proposed project, to be compiled during the EIA Phase.

Therefore, the project area for all the solar PV facilities, on-site substations, grid connection corridors and associated infrastructure are of low to very low palaeo-sensitivity.

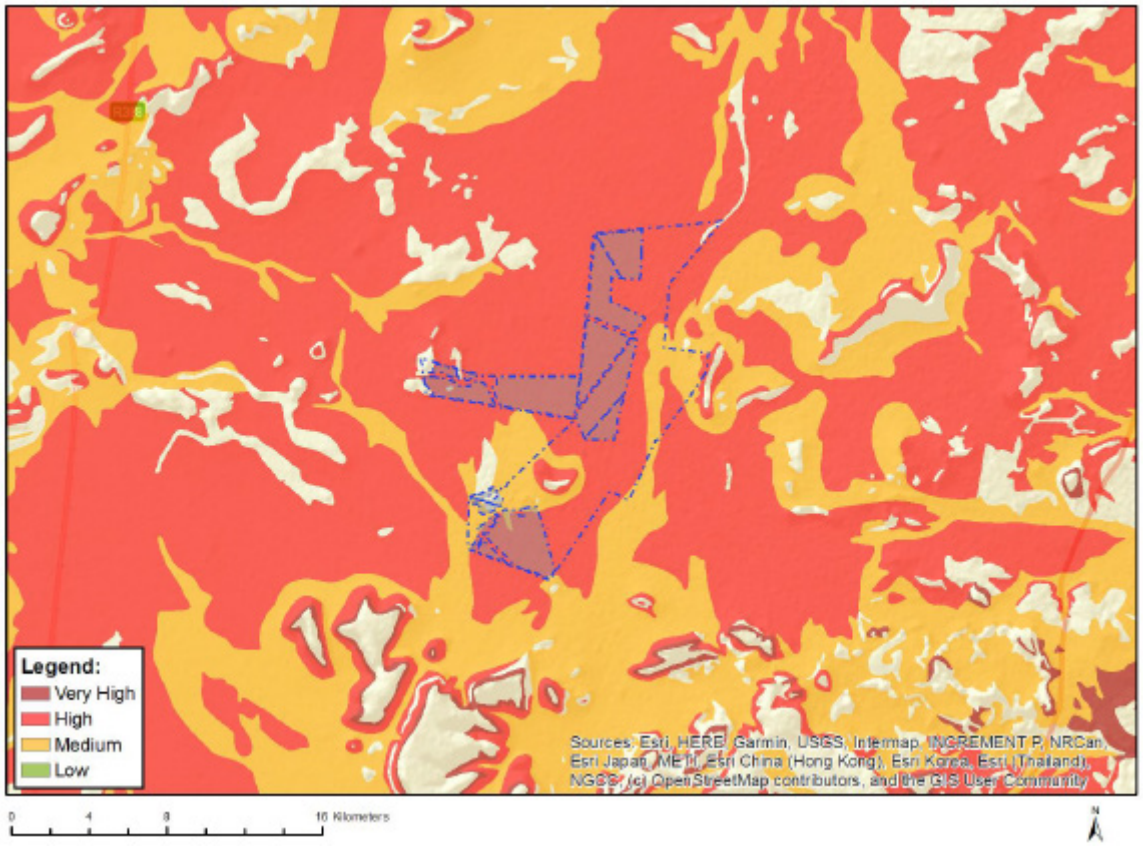


Figure 3.35: Palaeontology sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

3.3 Socio-Economic Environment

The available data used to compile the socio-economic baseline for the RLM, PKSDM, and De Aar area, although not exhaustive, is interpreted in terms of professional opinion and is indicative of generally accepted trends within the Northern Cape Province and the broader South Africa.

The information described below is based on scoping inputs provided by the Socio-Economic Specialist, which are included in Appendix G.8 of this Scoping Report, as well as a review of various planning documents such as IDPs and SDFs.

3.3.1 Regional Context – Pixley ka Seme District Municipality

As noted above, the study area is located within the RLM, which falls within the PKSDM in the Northern Cape Province. The PKSDM covers an area of 103 222 km^2 and is made up of eight Category B local municipalities which include Emthanjeni, Kareeberg, Thembelihle, Renosterberg, Siyathemba, Ubuntu, Siyancuma and Umsobomvu municipalities. De Aar is the administrative seat of the PKSDM.

3.3.1.1 Demographics and Economic Profile

According to the Statistics South Africa (StatsSA) Community Survey of 2016 (StatsSA, 2016)[28], the PKSDM had a population of 211 108 in 2016 (Table 3.8), which subsequently increased to 220 830 in 2019 (PKSDM District Development Model (DDM), 2020[29]). Of this, the largest (64 900) age category was the young working age (25-44), whilst at 16 200 the smallest category was 65 and over (StatsSA, 2016[28]). Per the national census of 2011, in terms of race groups, Coloureds made up 59.6% of the population in the PKSDM, followed by Black Africans (30.9%), Whites (8.8%), and Asians (0.66%) (StatsSA, 2012[30]). The main language spoken in 2011 was Afrikaans (78%), followed by Xhosa (17%) and Setswana (2%) (StatsSA, 2012[30]).

With a Gross Domestic Product (GDP) of R 12.5 billion in 2019 (up from R 6.67 billion in 2009), the PKSDM contributed 12.21% to the Northern Cape Province GDP in 2019 (PKSDM DDM, 2020[29]). The Community Services sector was the largest economic sector in 2019 within the PKSDM, at R 3.31 billion of the total Gross Value Added (GVA) (PKSDM DDM, 2020[29]). The transport sector (tertiary) was the second largest economic sector in the PKSDM, accounting for 13.6% of the GVA in 2019, followed by followed by the agriculture sector (primary) with 13.4% (PKSDM DDM, 2020[29]).

Table 3.8: Total population of the PKSDM, RLM, Northern Cape, and National for the period 2006 – 2016 (Sources: StatsSA 2016[28] and the Comparative Analysis for PKSDM, (Northern Cape Provincial Treasury, 2019[31])

Region → / Year ↓	PKSDM	RLM	Northern Cape	National Total	RLM as a % of the DM	RLM as a % of the province	RLM as a % of national
2006	177 559	10 081	1 094 500	47 800 000	5.6%	0.92%	0.021%
2016	211 108	12 458	1 193 780	55 908 900	6.09%	1.04%	0.024%

[28] Statistics South Africa (2016). Community Survey 2016, Statistical release P0301 / Statistics South Africa. Pretoria: Statistics South Africa, 2016. Available at: http://cs2016.statssa.gov.za/wp-content/uploads/2016/07/NT-30-06-2016-RELEASE-for-CS-2016-_Statistical-releas_1-July-2016.pdf [online]. Accessed November 2022.

[29] Pixley Ka Seme District Municipality District Development Model. 2019. Available at: https://www.cogta.gov.za/ddm/wp-content/uploads/2020/07/Pixley_Ka_Seme_District_Profile_.pdf [online]. Accessed: November 2022.

[30] Statistics South Africa (2012). Census 2011 Municipal report – Northern Cape/ Statistics South Africa. Pretoria: Statistics South Africa, 2012. Available at: http://www.statssa.gov.za/census/census_2011/census_products/NC_Municipal_Report.pdf [online]. Accessed November 2022.

[31] Northern Cape Provincial Treasury (2019). Comparative Analysis for Pixley ka Seme District Municipality. Available at: http://www.ncpt.gov.za/Portals/0/Pixley%20ka%20Seme%20Comparative%20Analysis%202019_compressed%20(1).pdf?ver=GwVZk3xUoqrh7HGZaFtZ8Q%3d%3d [online]. Accessed: November 2022. ISBN: 978-0-621-47166-3

3.3.1.2 Social Characteristics

Unemployment and inequality remain a challenge within the PKSDM (PKSDM IDP, 2022[32]). The district had an unemployment rate of 28.3% in 2011, which is lower than South Africa's national unemployment rate of 33.9% (PKSDM IDP, 2022[32]). However, the district has a higher (35.4%) youth unemployment rate (ages 15 to 34) than the national average. The Coloured population recorded the highest unemployment rate when comparing the race groups in the district, where females in general had a higher unemployment rate than males (PKSDM IDP, 2022[32]).

Based on the 2011 Census data, approximately 11% of households in the PKSDM had no income, whereas 3.4% of households earned up to R4800 per annum (StatsSA, 2012[30]). The majority of households (61%) had a monthly income of less than R3500, whilst 24.8% earned less than R15 0000 per month. This means that 90% of households in the PKSDM had a monthly income that is lower than that of the average South African household (R11 514) (StatsSA, 2012[30]). The COVID-19 pandemic likely impacted income levels and increased the number of households in the PKSDM that live close to or below the poverty line.

In the PKSDM, 82.3% of households lived in formal housing in 2017 and only 0.32% of households resided in traditional dwellings (Northern Cape Provincial Treasury, 2019[31]). Approximately 10.8% of households resided in informal dwellings.

3.3.2 Local Context – Renosterberg Local Municipality

The RLM is the smallest of eight municipalities in the district, making up only 5% or 5 529 km^2 of its geographical area. The RLM derives its name from Afrikaans meaning "rhinoceros mountain". The municipality is named after the mountain range found in the area. It was formed through the amalgamation of three towns, that is, Petrusville, Vanderkloof and Phillipstown. The administrative seat of the RLM is Petrusville. Table 3.9 provides an overview of various key statistics for the RLM.

Table 3.9: Key statistics for the RLM for 2016, 2011, and 2001 (StatsSA, 2011[33] and 2016[28])

	YEAR		
KEY STATISTICS	**2016**	**2011**	**2001**
Total population	11 818	10 976	9 070
Young (0-14)	27.4%	32.8%	32.9%
Working Age (15-64)	66.5%	61%	61%
Elderly (65+)	6.1%	6.2%	6.5%
Dependency ratio	No data	64%	65.1%
Gender ratio	No data	95,8	94.7
Growth rate	1.7%	1.91%	-0.78%
Population density	No data	2 persons/km^2	No data

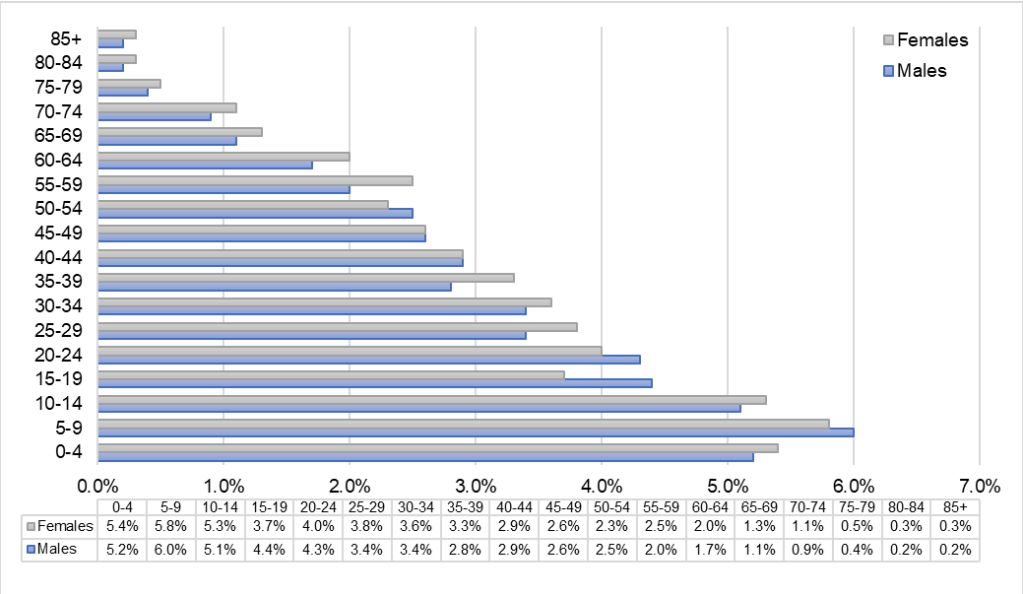
[32] Pixley Ka Seme District Final Integrated Development Plan (IDP) 2022 – 2027. 2022. Available: https://www.pksdm.gov.za/idps/PKSDM%20Final%20Integrated%20Development%20Plan%20(IDP)%202022-2027.pdf. [online] Accessed: November 2022

[33] StatsSA, 2011, Renosterberg. Available: https://www.statssa.gov.za/?page_id=993&id=renosterberg-municipality [online]. Accessed November 2022.

	YEAR		
KEY STATISTICS	**2016**	**2011**	**2001**
Unemployment rate	No data	26.8%	48.9%
Youth unemployment rate	No data	29.8%	55.8%
No schooling aged 20+	11.4%	16%	26.1%
Higher education aged 20+	5%	6.6%	6.1%
Matric aged 20+	32.7	21,8%	12.4%
Number of households	3 563	2 995	2 448
Number of Agricultural households	No data	616	No data
Average household size	3.3	3.4	3.7
Female headed households	No data	34.8%	30.3%
Formal dwellings	85.1%	94.7%	91.1%
Housing owned/paying off	No data	52.3%	67.9%
Flush toilet connected to sewerage	77.4%	71.7%	37.7%
Weekly refuse removal	54.9%	74.4%	72.9%
Piped water inside dwelling	43.3	53.4%	43.8%
Electricity for lighting	86.3%	88.1%	72.1%

3.3.2.1 Demographics and Economic Profile

The population of the RLM in 2016 was 11 818, thereby accounting for the smallest share (6%) in the district (StatsSA 2016[28]). Approximately 40.9 % of the population was under the age of 20, approximately 52.60% were between 20 and 64, and about 6.3% were 65 and older in 2011 (StatsSA, 2011[33]) (Figure 3.36). The RLM therefore has a relatively large young population. This creates challenges in terms of creating employment opportunities.



	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Females	5.4%	5.8%	5.3%	3.7%	4.0%	3.8%	3.6%	3.3%	2.9%	2.6%	2.3%	2.5%	2.0%	1.3%	1.1%	0.5%	0.3%	0.3%
Males	5.2%	6.0%	5.1%	4.4%	4.3%	3.4%	3.4%	2.8%	2.9%	2.6%	2.5%	2.0%	1.7%	1.1%	0.9%	0.4%	0.2%	0.2%

Figure 3.36: Gender and age distributions within the RLM (Redrawn based on StatsSA, 2011[33]).

In terms of race groups, Coloureds made up about 57.4% of the population, followed by Black Africans (32.9%) and Whites (8.6%) in 2011 (Figure 3.37). In 2011, the main first language spoken in the RLM was Afrikaans (71%), followed by IsiXhosa (23.9%) and Sesotho (1.2%).

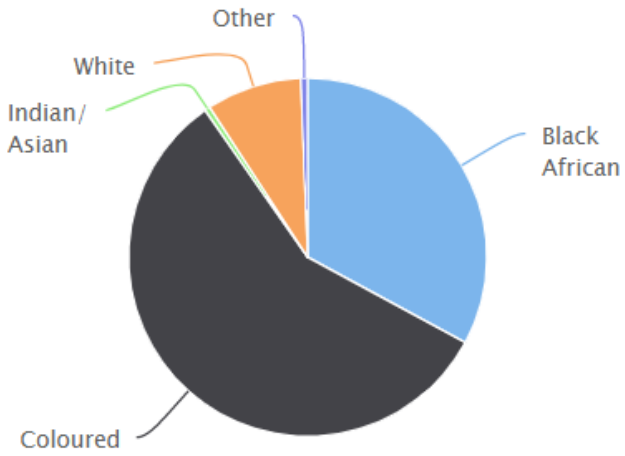


Figure 3.37: Population groups within the RLM (StatsSA, 2011[33]).

The RLM contributed 4.7% to the PKSDM GDP in 2017 (Northern Cape Provincial Treasury, 2019[31]). This is the lowest GDP contribution per LM to PKSDM when compared to the remaining seven regions within the district. Additionally, the RLM had the third lowest annual economic growth at 4.44% in 2017 when compared to the remaining regions within the district (Northern Cape Provincial Treasury, 2019[31]). In terms of contributions by LMs to the economic industry totals for the PKSDM, the RLM made the largest contribution to electricity at 31.6% in 2007.

3.3.2.2 Education

In terms of the highest education level for all ages in 2011, approximately 3.1 % had no schooling, 51.2% had some Primary education, 7.2 % completed Primary School, 26.7 % had some Secondary education, 10.6 % completed Secondary education, and 0.8 % had Higher education (StatsSA, 2011[33]). The relatively poor education levels in the RLM pose a potential challenge for economic development.

3.3.2.3 Employment and Income

The RLM has the largest percentage of unemployment in the district at 31% (Pixley ka Seme District, 2014[8]). The figures of the 2011 Census also indicate that the majority of the population are not economically active, namely 41.8% (Figure 3.38). These figures are substantially higher than the official unemployment rate for the Northern Cape Province (14.5%) and PKSDM (14.8%). This reflects the limited employment opportunities in the area, which in turn are reflected in the low income and high poverty levels. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in the RLM. Recent figures released by Stats SA also indicate that South Africa's unemployment rate is in the region of 36%. The youth unemployment rates are closer to 50%.

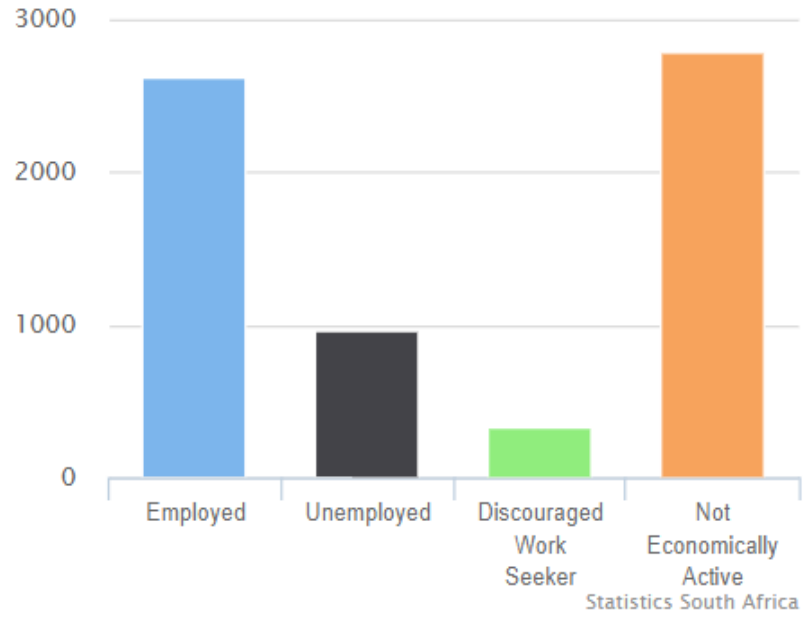


Figure 3.38: Employment status (ages 15 – 64) within the RLM (StatsSA, 2011[33]).

Based on the data from the 2011 Census, 11.2% of the population of the RLM had no formal income, 4% earned less than R4 800, 6.4% earned between R4 801 and R9 600 per annum, 23.1% between R9601 and R19 600 per annum, and 23.4% between R19 601 and R38 200 per annum (StatsSA, 2011[33]) (Figure 3.39). Based on the poverty gap indicator produced by the World Bank Development Research Group, in the region of 70% of the households in the RLM live close to or below the poverty line. This figure is higher than the provincial level of 62.9%. The low-income levels reflect the limited employment opportunities in the area and dependence on the agricultural sector. This is also reflected in the high unemployment rates.

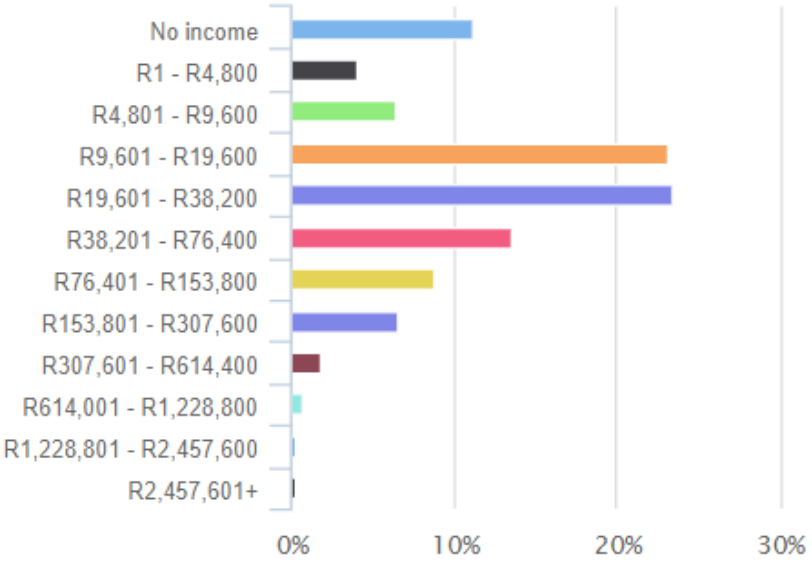


Figure 3.39: Average household income within the RLM (StatsSA, 2011[33]).

Household income levels are likely to have been impacted by the COVID-19 pandemic. The number of households in the RLM and PKSDM that live close to or below the poverty line is likely to have increased over the last 18 months. This, coupled with the high dependency ratio, is a major cause of concern for the area. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the RLM. This in turn impacts on the ability of the RLM to maintain and provide services.

The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15 - 64). The dependency ratios for the RLM, Northern Cape, and national in 2011 was 64%, 55.7%, and 52.7% (StatsSA, 2011[33]). The higher dependency ratio of the RLM reflects the limited employment opportunities in the area and represent a significant risk to the district and local municipality. The high dependency ratio also highlights the importance to maximising local employment opportunities and the key role played by training and skills development programmes.

3.3.2.4 Health and Community Services

The PKSDM is served by 3 District Hospitals, 8 Community Health Centres, 28 Primary Health Care Clinics, 4 satellite clinics and 1 mobile clinic, distributed over the district. The RLM has 1 District Hospital and 6 Primary Health Care clinics. There are no community health centres within RLM that provide a 24-hour service. A new hospital was built in De Aar and was opened in 2017. The Central Karoo Hospital serves as the referral hospital for the district.

In terms of education the RLM has 16 schools of which 13 are no-fee schools. The RLM also has libraries.

3.3.2.5 Municipal Services

Access to services is generally high across the RLM in 2011. The majority of households have access to electricity for lighting (88.1%), municipal water supply (79.9%), flush toilets connected to sewerage (71.7%), and refuse removal (74.4%) (Figure 3.40).

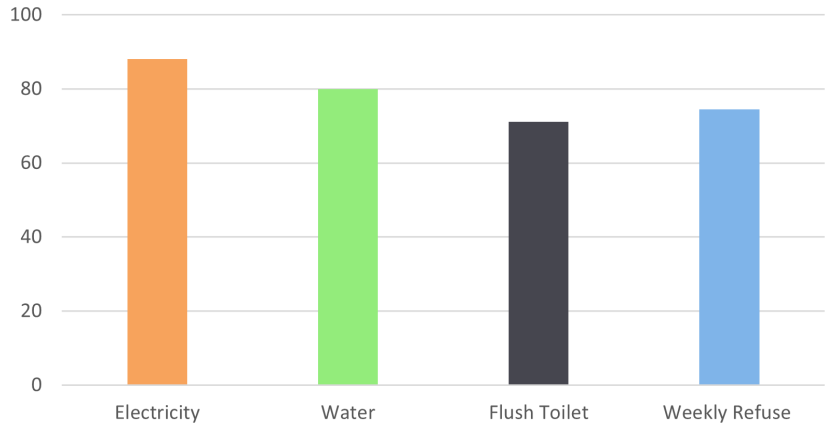


Figure 3.40: Percentage of households with access to basic services within the RLM (StatsSA, 2011[33]).

3.3.3 Study Area Context

The proposed project is located approximately 60 km north of De Aar. De Aar, which means “the artery”, was founded in 1904, and is the second most important railway junction in the country. Rail lines linking Gauteng, Cape Town, Gqeberha (formerly Port Elizabeth) and Namibia all pass through the town. The decline of the railway sector over the last 20 years has impacted negatively on the towns economy. De Aar also has the largest abattoir in the Southern Hemisphere and supplies all the major centres throughout the entire country with the famous “Karoo” lamb and mutton. Apart from meat production, the sheep farms around De Aar are also major suppliers of wool. The town is total dependant on boreholes for its water supply.

The smaller settlements of Philipstown and Petrusville are located approximately 24 km and 22 km to the south-east and east of the study area respectively. Orania and Hopetown are located approximately 35 km and 64 km to the north and north-west of the study area respectively.

The Gariep (Orange) River and Vanderkloof Dam are located approximately 35 km to the north-east of the site. The landscape associated with the study area is a typical Karoo landscape consisting of dolerite koppies and ridges separated by valley bottoms. The land uses are linked to livestock farming, specifically sheep farming.

3.4 Eco-Tourism Activities

The information described below is based on scoping inputs provided by the Visual and Socio-economic Specialists, which are included in Appendix G.5 and G.8, respectively, of this Scoping Report.

The RLM consists of three towns, namely Petrusville (administrative centre), Philipstown, and Vanderkloof. It is located along the Orange River and adjoining the Vanderkloof Dam. The locality of the area along the Orange River provides a sustainable water resource that offers various development opportunities in terms of tourism and agriculture. The only known guest farm / game farm in the area, which provides visitor facilities, is Jakkalskuil. The nearest nature reserves are in the vicinity of Vanderkloof, which is located more than 30 km to north-east of the study area. The main focus of Vanderkloof is for residential and recreational purposes and the town is a well-established holiday resort town. The tourism potential of the town and the surrounding area are linked to the water sports activities in the Vanderkloof Dam (boating, swimming, fishing etc.), and the Vanderkloof and Rolfontein Nature Reserves. In contrast, Philipstown’s tourism potential is linked to farm stays and hunting. There are also a number of San Rock Art sites in the area.

3.5 Civil Aviation

The Screening Tool has indicated that the study area is of low sensitivity as it relates to Civil Aviation (Figure 3.41). The low sensitivity was verified during a site visit undertaken in August 2022, whereby no civil aviation features or installations were found within the study area. Therefore, as required by GN 320, a Civil Aviation SSV was compiled and is included in Appendix G.13 of this Scoping Report. Additionally, in line with GN 320, no further requirements are applicable i.e., a Civil Aviation Compliance Statement is not required.

The Air Traffic and Navigation Services SOC Limited (ATNS) data has confirmed that there is an unlicensed aerodrome outside of the 30 km radius of the proposed project study area. The Petrusville Airfield (International Civil Aviation Organisation Code: FAPV) is located approximately 26 km north-east of the entire study area. During the site visit it was concluded that the airfield is out of use, as indicated by the dilapidated condition of the runway and lack of civil aviation infrastructure, such as windsocks. The location of the Petrusville Airfield, which is approximately 1.4 km long and is oriented SE to NW, is indicated on the Screening Tool as medium sensitivity for solar PV developments; and high sensitivity within 8 km of the aerodrome for substation developments (based on the general methodology); however, the actual aerodrome will not be impacted on by the proposed solar facility and associated infrastructure due to its distance from the study area.

Research indicates that the Department of Defence Ammunition Depot and School of Ammunition is located approximately 5 km north-west of De Aar (ArchaeoMaps Archaeological Consultancy, 2009)34. The ATNS data classifies this facility as restricted airspace, which is located more than 50 km to the south-west of the study area. The Screening Tool shows this area as dangerous and restricted airspace (high sensitivity) based on the general methodology for substations; however, it is not identified for the Solar PV methodology. The De Aar Airport (International Civil Aviation Organisation Code: FADA) lies roughly 4 km east of the Department of Defence Ammunition Depot and School of Ammunition; and approximately 55 km south-west of the study area (at its closest point), thus falling outside of the 30 km radius around the study area. Based on their locations, neither the restricted airspace nor the De Aar Airport will be impacted on by the proposed project.

The ATNS data also notes that both Conventional (Upper and Lower ATS) and Area Navigation Routes associated with the Johannesburg Area Central Airspace fall within the 30 km radius of the study area.

Figure 3.42 indicates the location of the civil aviation features noted above, which informed the SSV.

[34] ArchaeoMaps Archaeological Consultancy (2009). Archaeological Impact Assessment: Establishment of an Ammunition Disposal Plant, Sinclair's Dam 133, De Aar, Northern Cape, South Africa. Date: 2009-03-23. Available online:
https://sahris.sahra.org.za/sites/default/files/heritagereports/AIA%20-%20ADP,%20Sinclairs%20Dam,%20De%20Aar,%20NC.pdf, Accessed October 2022.

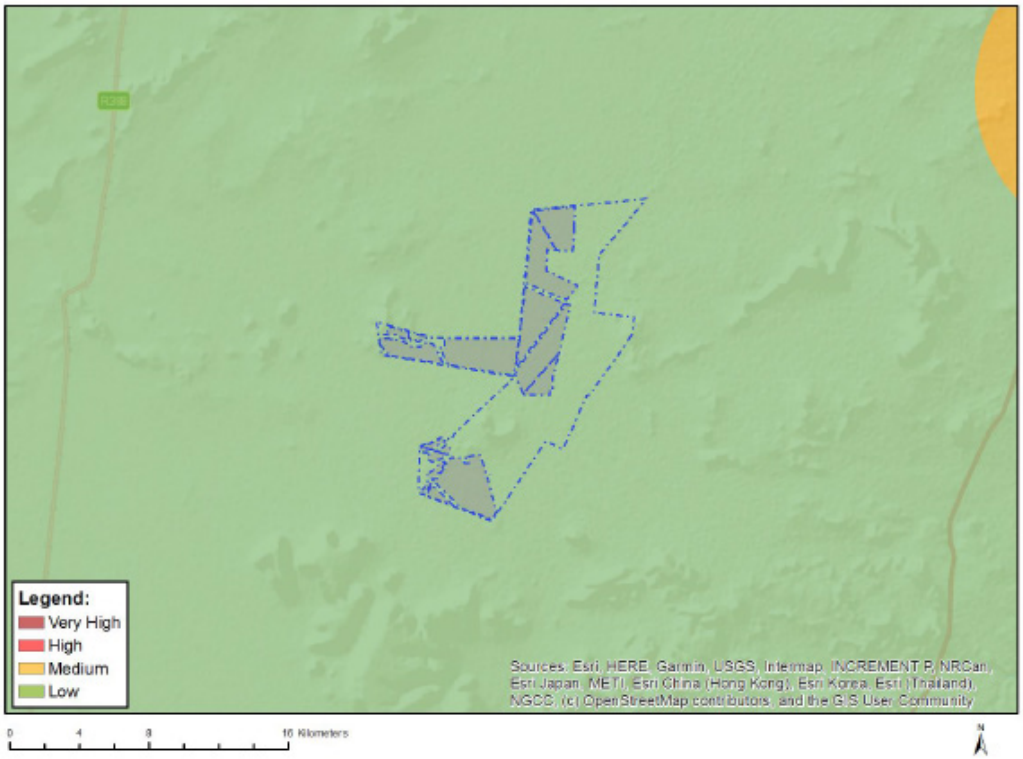


Figure 3.41: Civil Aviation sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

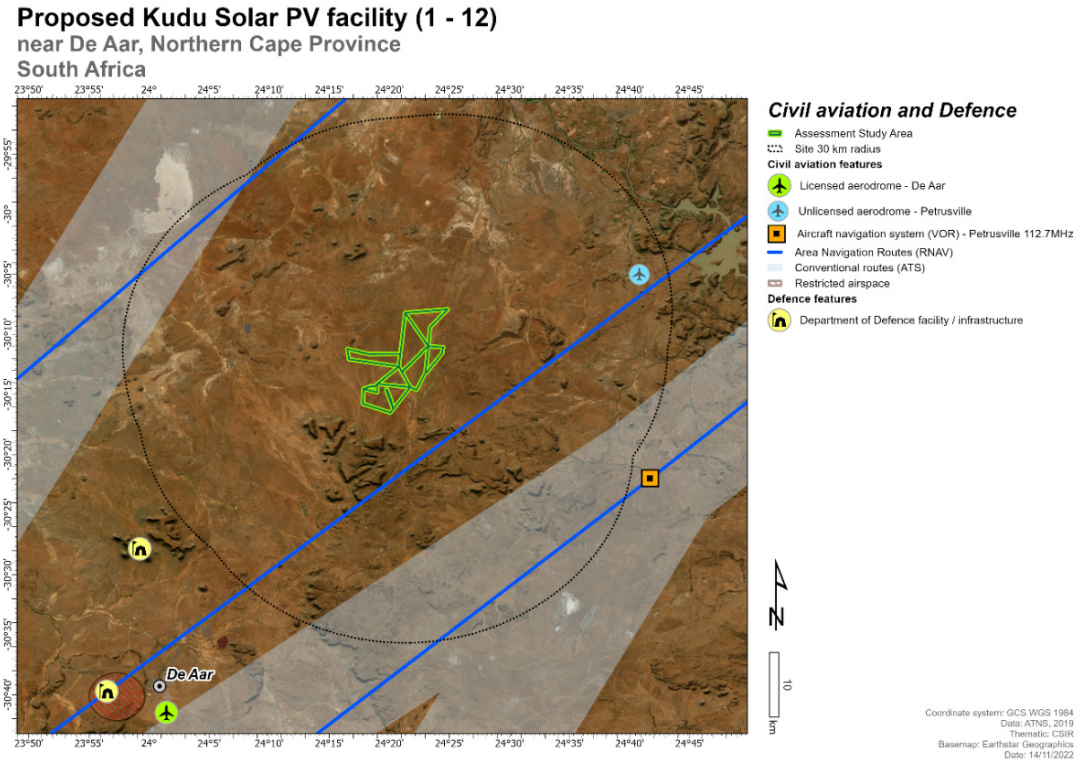


Figure 3.42: Civil Aviation and Defence features relative to the proposed project study area based on the site visit and existing databases.

3.6 Defence

The Screening Tool has indicated that the study area is of low sensitivity as it relates to Defence (Figure 3.43). The low sensitivity was verified during a site visit undertaken in August 2022, whereby no defence features or installations were found within the study area. Therefore, as required by GN 320, a Defence SSV was compiled and is included in Appendix G.14 of this Scoping Report. Additionally, in line with GN R320, no further requirements are applicable i.e., a Defence Compliance Statement is not required.

Refer to Section 3.5 for feedback on the Department of Defence Ammunition Depot and School of Ammunition. The Screening Tool shows this area as low sensitivity in relation to the solar methodology; however, based on the general methodology for substations, this area is indicated as medium and very high sensitivity (for a military and defence site). The Screening Tool also shows another military and defence site as very high sensitivity located approximately 25 km north-west of De Aar and 37 km south-west of the study area. This same facility is highlighted under the RFI theme as a Sentech High Power Terrestrial Broadcasting Facility and a Telecommunication Facility. However, based on its location and vast distance from the study area, it will not be impacted on by the proposed project.

Figure 3.42 indicates the location of the defence features noted above, which informed the SSV.

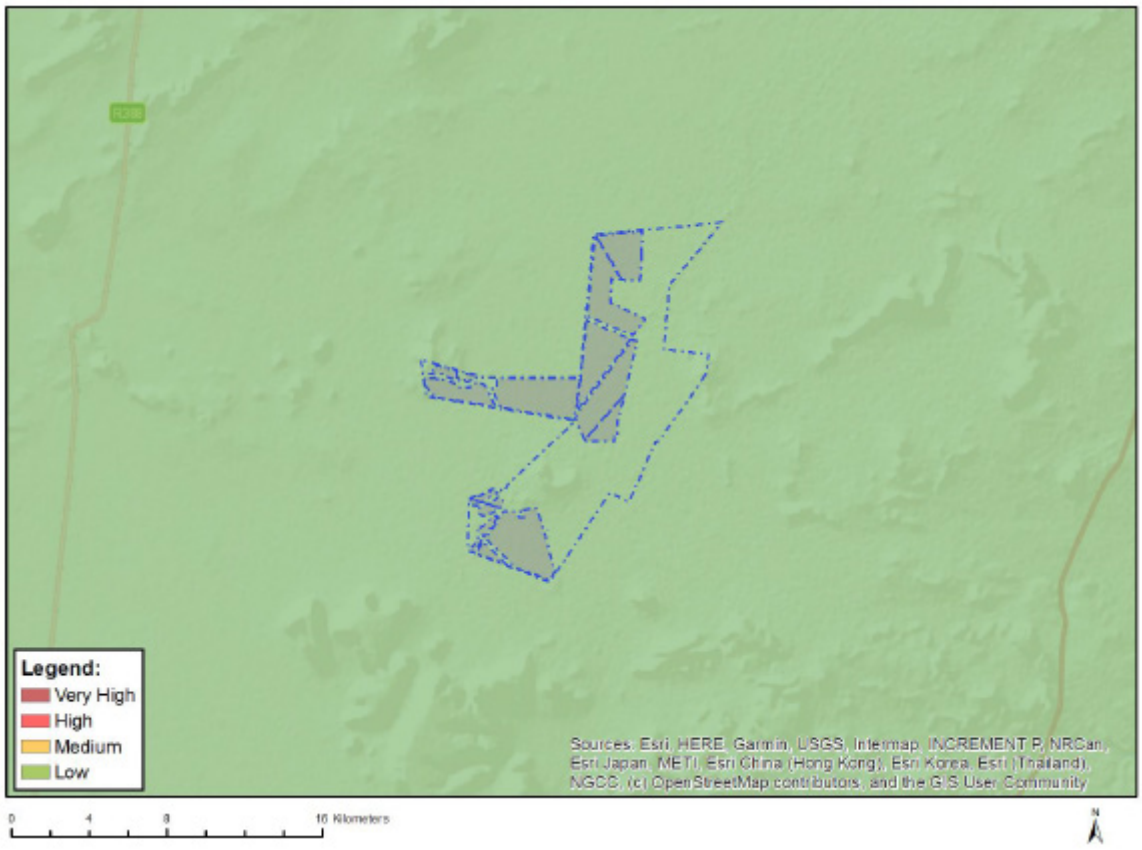


Figure 3.43: Defence sensitivity of the study area based on the Screening Tool. The Revised Scoping Buildable Areas are shown in grey (Source: Screening Tool, 2022)

3.7 Environmental Sensitivity Mapping

Based on the environmental sensitivities identified and verified by the Specialists on site during the Scoping Phase (included as Appendix G to this Scoping Report), an overall combined environmental feature map and environmental sensitivity map has been compiled for the study area. The comments received from the DFFE on the requirements for the sensitivity maps have been considered as best as possible, and the maps updated accordingly.

Figure 3.44 shows the identified and assessed environmental features present within the study area and allocated buffers; whereas Figure 3.45 shows the environmental sensitivity that has been allocated to these features. Figure 3.46 shows the environmental sensitivities in relation to the development footprints within the entire study area. These maps indicate that the inherent environmental sensitivity of the proposed project study area is generally medium to low, with some very high and high sensitivity areas. The study area is suited for the development of the proposed project based on the understanding that measures have been taken to firstly avoid the sensitive features as best as possible, and all aspects to manage or mitigate potential impacts will be taken into consideration and detailed during the EIA Phase.

These identified sensitivities and buffers will be further refined, where required, during the EIA Phase. The specialist impact assessments will be included in the EIA Report. Table 3.10 provides a summary of the environmental sensitivities identified by the relevant specialists.

The Revised Scoping Buildable Areas / development footprints are overlain onto these maps to show how they relate to the environmental features and sensitivities, and how the no-go areas have been avoided. These project specific maps (i.e. preliminary layout maps; and combined preliminary layout and sensitivity maps) are included in Chapter 7 of this Scoping Report.

Table 3.10: Key Environmental Features and Sensitivities identified by relevant Specialists at Scoping

Specialist Study or Theme	Sensitivity Description
Agriculture	▪ The Site Sensitivity Verification (SSV) verified that the entire study area is of less than high agricultural sensitivity with a land capability value of 5 to 6. There are no areas that need to be avoided from an agricultural perspective. The layout has no relevance to agricultural impact in this case. Refer to the Agricultural Compliance Statement for additional information.
Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species	**High Sensitivity:** ▪ The Koppies habitat is considered highly sensitive which must be avoided. No buffers are allocated. ▪ Linear infrastructure such as roads and overhead powerlines should not cross the Koppies, and pylons should not be constructed in this habitat. **Medium Sensitivity:** ▪ The White and Shrubby Grasslands are considered of medium sensitivity owing to its pristine nature with limited major impacts.

Specialist Study or Theme	Sensitivity Description
	▪ The Watercourse sensitivity is medium as per the findings of the Aquatic Specialist. **Very Low Sensitivity:** ▪ Existing transformed areas.
Aquatic Biodiversity	▪ The recommended buffer area between the aquatic features and the project components to ensure these aquatic ecosystems are not impacted by the proposed activities is as follows: o The larger tributary: The delineated edge of the surrounding floodplain wetland features. No buffer area is deemed to be required. o Smaller streams and drainage features that are indicated to be of medium sensitivity: At least 35 m for the watercourse or the delineated edge of wetland features. o The Battery Energy Storage System (BESS) should be preferably not be placed within 100 m of major rivers, watercourses and wetlands.
Avifauna	▪ **All infrastructure exclusion zones**: Verreaux's Eagle nest: A 1 km all infrastructure exclusion zone is recommended to prevent the displacement of the breeding pair during the construction phase due to disturbance. ▪ **Solar panel exclusion zones (other infrastructure allowed)**: **Water points**: It is preferable to leave some open space where possible with no solar panels, for birds to access and leave the surface water area unhindered. Some water points have been buffered by a minimum of 50 m, and some may be removed.
Visual	The following features need to be avoided: ▪ Scenic Resources: o Topographic features: Feature. o Steep slopes: Slopes > 1:4. o Drainage courses: Feature. o Cultural landscapes within 250 m. ▪ Protected Landscapes / Sensitive Receptors: o Nature reserves / game farms within 500 m. o Farmsteads outside study area within 500 m. o Farmsteads inside study area within 250 m. o Arterial routes within 250 m (not applicable). o District roads within 50 m.
Heritage (Archaeology and Cultural Heritage)	▪ Most resources located within the study area are cultural landscape components and are of low cultural significance and hence sensitivity. There are no areas that require avoidance on heritage grounds, except for some features near Kudu Solar Facility 6 (discussed in the relevant report for Kudu Solar Facility 6). A minimum 50 m buffer has been placed around relevant features.

Specialist Study or Theme	Sensitivity Description
Palaeontology	▪ There are no areas that need to be avoided from a palaeontology perspective. The site visit undertaken by the specialist found very less bedrock exposure and concluded that the site is of low to very low palaeo-sensitivity.
Socio-Economic Assessment	▪ Not applicable. There are no sensitivities of this nature that can be mapped and that would influence the layout of the proposed project.
Traffic	▪ Not applicable. There are no sensitivities of this nature that can be mapped and that would influence the layout of the proposed project.
BESS High Level Risk Assessment	▪ Ideally the BESS should be placed at least 50 m away from known boreholes and water points, and 100 m away from major surface water features, such as major rivers and wetlands. ▪ Ideally, due to the possibility of noxious smoke from potential fires, any lithium-ion BESS should be located over 500 m from residential areas, in this case isolated farm houses that are occupied. If this is not possible, it is noted that the risks are low and advice of mitigative measures should be provided to the farm occupants, e.g. shelter in place indoors. This will be considered during the EIA Phase.
Geohydrology	▪ It is recommended that all BESS are placed a minimum of 50 m from any borehole.
Geotechnical	▪ It must be noted that there are no areas within the study area that should be avoided from a geotechnical sensitivity perspective. However, areas of moderate to steep topography would likely render development financially unfeasible.
Civil Aviation	▪ No sensitive civil aviation features have been identified within the study area.
Defence	▪ No sensitive defence features have been identified within the study area.

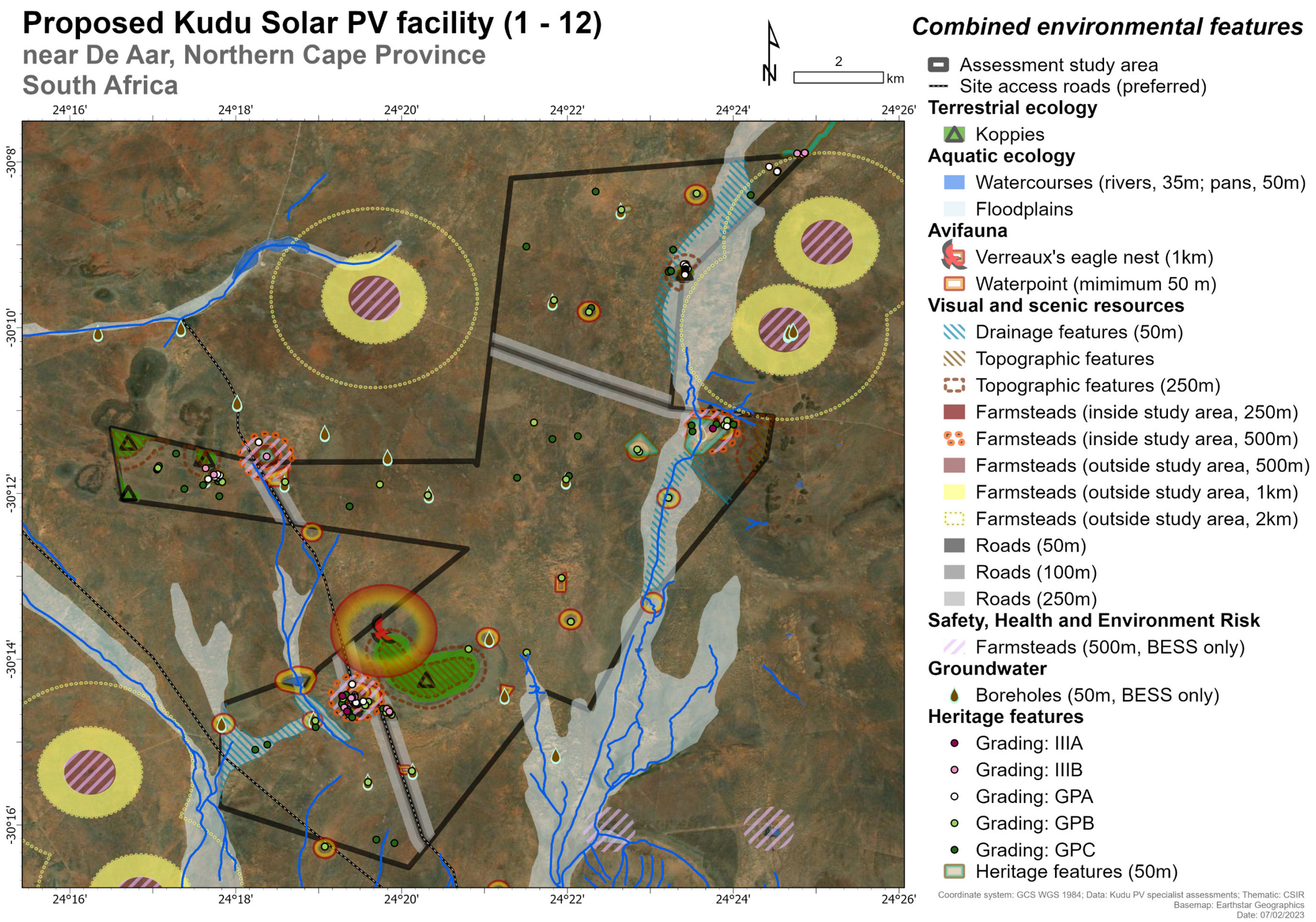


Figure 3.44: Preliminary combined environmental feature map for the proposed project study area based on scoping level specialist inputs.

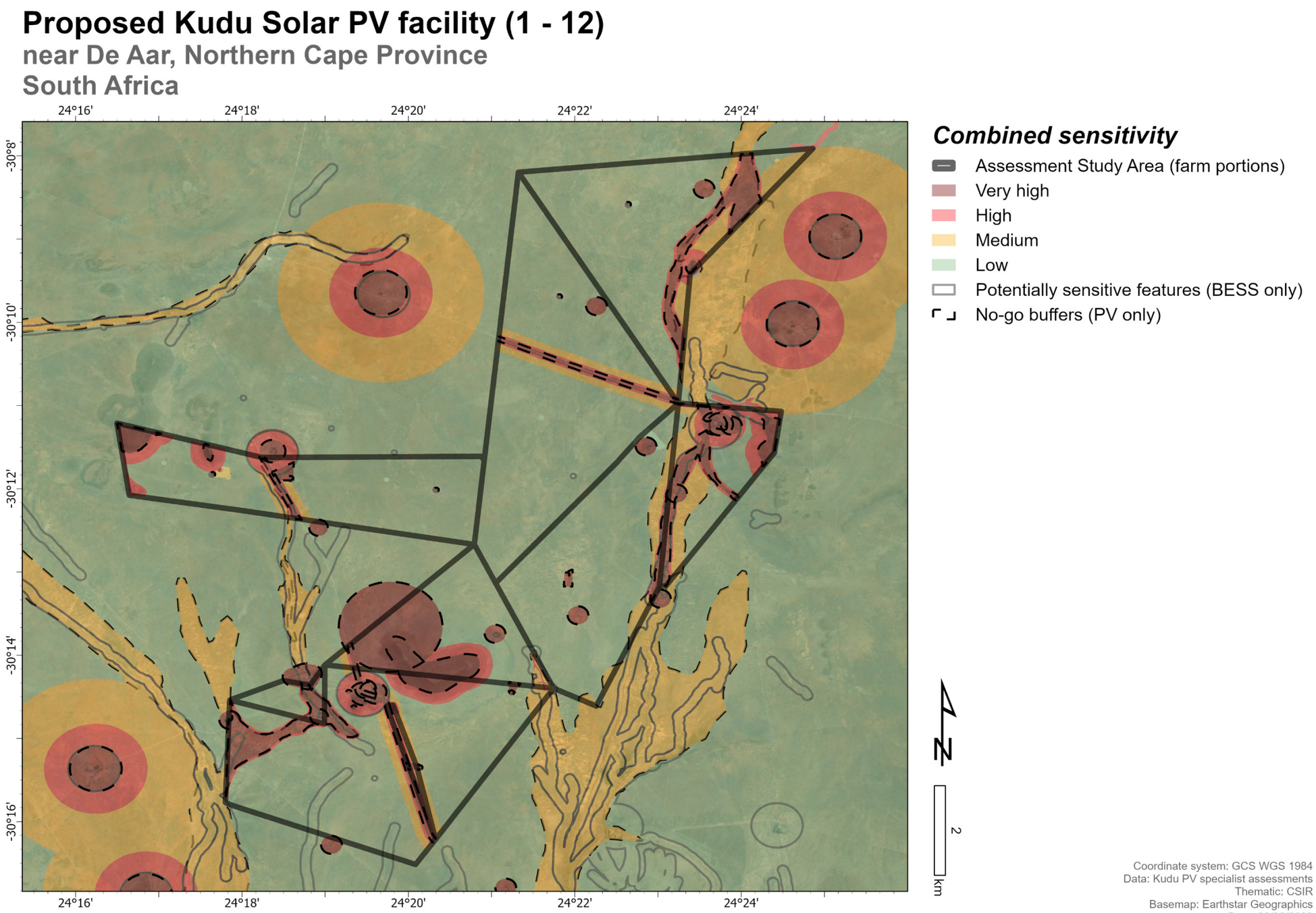


Figure 3.45: Preliminary combined environmental sensitivity map for the proposed project study area based on scoping level specialist inputs.

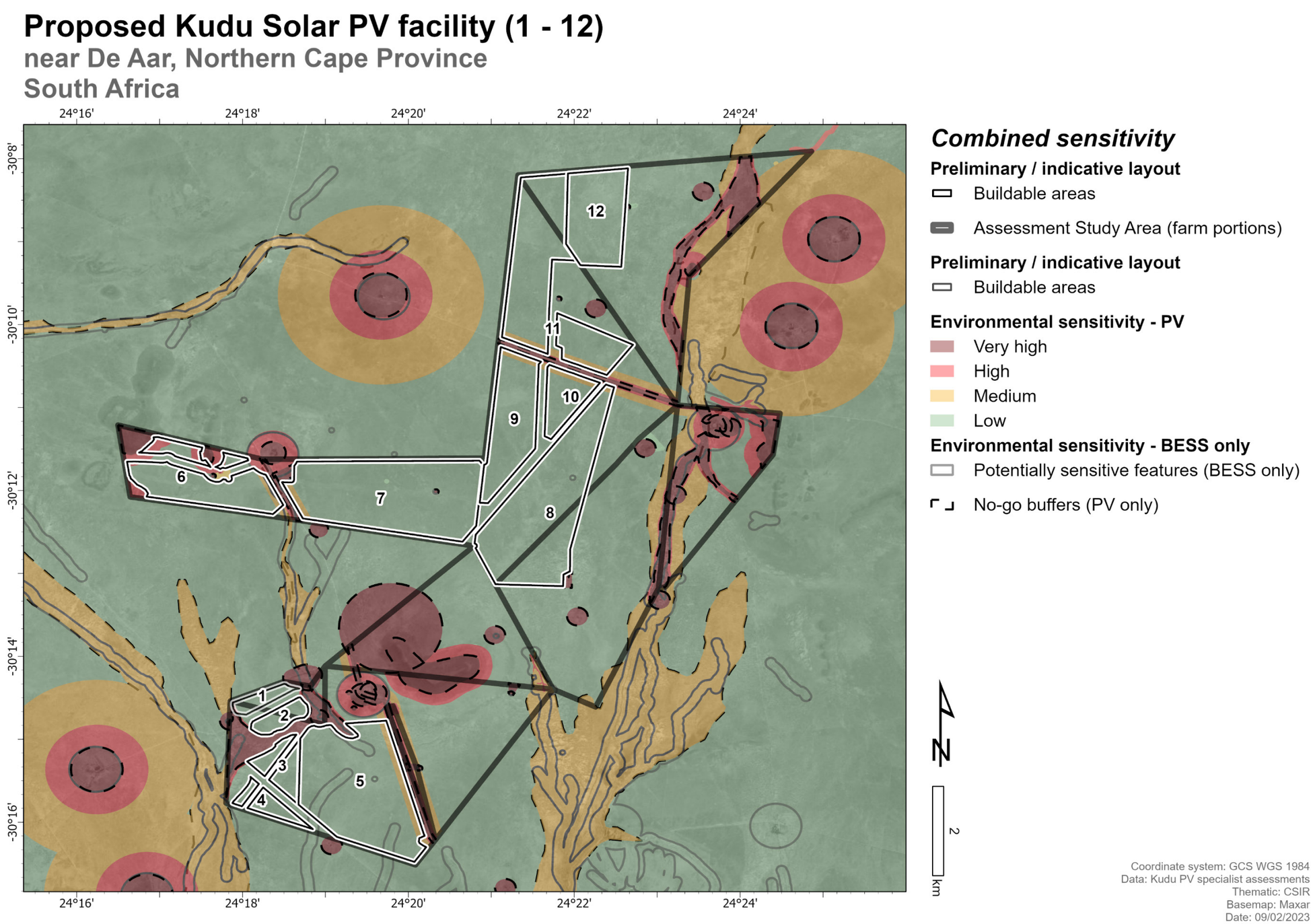


Figure 3.46: Preliminary combined environmental sensitivity map for the proposed project study area and Revised Scoping Buildable Areas/development footprint based on scoping level specialist inputs.

CHAPTER 4:

Approach to EIA Process and Public Participation

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Touching lives through innovation

TABLES

FIGURES

4. APPROACH TO THE EIA PROCESS AND PUBLIC PARTICIPATION

This chapter gives particular attention to the legal context and guidelines that apply to this Environmental Impact Assessment (EIA) for the Kudu Solar Facility 2 (hereafter referred to as the "Kudu Solar Facility" or "proposed project"[1]), and the steps in the Public Participation Process (PPP) of the Scoping Phase of the EIA, in accordance with Regulations 41, 42, 43 and 44 of Government Notice (GN) R326 of the 2014 National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) EIA Regulations (as amended), and the schedule for the Scoping and EIA Process.

4.1 Legislation, Policies and Guidelines Pertinent to this EIA

The scope and content of this Scoping Report has been informed by the main legislation, policies, guidelines and information series documents described in this section. Additional information on applicable legislation is provided in the Scoping Level Specialist Assessments or Inputs included in Appendix G of this Scoping Report.

4.1.1 National Legislation

4.1.1.1 The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution, which is the supreme law of the Republic of South Africa, provides the legal framework for legislation regulating environmental management in general, against the backdrop of the fundamental human rights. Section 24 of the Constitution 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*."

Section 24 of the Bill of Rights therefore guarantees the people of South Africa the right to an environment that is not detrimental to human health or well-being, and specifically imposes a duty on the State to promulgate legislation and take other steps that ensure that the right is upheld and that, among other things, ecological degradation and pollution are prevented.

[1] Note that an integrated PPP is being undertaken for all the Kudu Solar Facilities and EGI Projects, hence in some cases this is referred to as "proposed projects".

In support of the above rights, the environmental management objectives of the proposed project are to protect ecologically sensitive areas and support sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development in the towns nearest to the study area[2].

4.1.1.2 NEMA and EIA Regulations

Chapter 1, Section 2 of the NEMA sets out several principles to give guidance to developers, private landowners, members of the public and authorities. The proclamation of the NEMA gives expression to an overarching environmental law. Various mechanisms, such as cooperative environmental governance, compliance and non-compliance, enforcement, and regulating government and business impacts on the environment, underpin NEMA. NEMA, as the primary environmental legislation, is complemented by many sectoral laws governing marine living resources, mining, forestry, biodiversity, protected areas, pollution, air quality, waste and integrated coastal management. Principle number 3 determines that a development must be socially, environmentally and economically sustainable. Principle Number 4(a) states that all relevant factors must be considered, *inter alia* i) that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; and viii) that negative impacts on the environment and on peoples' environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

Section 24 (1) of the NEMA, as amended states that "*In order to give effect to the general objectives of integrated environmental management laid down in this Chapter, the potential impact on the environment of listed activities must be considered, investigated, assessed and reported to the Competent Authority charged by this Act with granting the relevant EA*". The reference to "listed activities" in Section 24 (1) of NEMA relates to the regulations promulgated in GN R982, R983, R984 and R985 in Government Gazette (GG) 38282, dated 4 December 2014, which came into effect on 8 December 2014. These were amended in GN R326, R327, R325 and R324 in GG 40772, dated 7 April 2017. GN R326 contains the regulations for the Environmental Assessment Process. GN R327 and GN R324 includes listed activities that trigger the need for a Basic Assessment (BA) Process, whereas GN R325 includes listed activities that trigger the need for a full Scoping and EIA Process.

The 2014 NEMA EIA Regulations (as amended) were further amended as follows:

- GG 41766, GN 706 on 13 July 2018;
- GG 43358, GN 599 on 29 May 2020;
- GG 44701, GN 517 on 11 June 2021; and
- GG 45999, GN 1816 on 3 March 2022.

[2] The preferred site for the proposed Kudu Solar Facility comprises the full extent of the affected farm portions which cover a combined footprint of 8 150 ha, which serves as the study area for this Scoping and EIA Process. Therefore, the terms "site" and "study area" are used synonymously in the report. The Original and Revised Scoping Buildable Areas serve as the "development footprint" and fall within the preferred site (or study area).

Based on the transitional arrangements, these amendments (where they have been commenced with) apply to the proposed project as the original Application for Environmental Authorisation (EA) was not submitted before the above amendments took effect (where relevant). The relevant amendments have been taken into consideration in this Scoping and EIA Process.

In terms of the NEMA and the 2014 NEMA EIA Regulations (as amended), a Scoping and EIA Process is required for the proposed development of the Kudu Solar Facility and associated infrastructure. Refer to Section 4.2 of this chapter for additional information on the 2014 NEMA EIA Regulations (as amended).

4.1.1.3 GN 960 (published 5 July 2019)

GN 960 was published on 5 July 2019 and came into effect for compulsory use of the National Web Based Environmental Screening Tool (hereafter referred to as the Screening Tool) from 4 October 2019. The notice outlines the requirement to submit a report generated by the Screening Tool, in terms of Section 24(5)(h) of the NEMA and Regulation 16(1)(b)(v) of the 2014 NEMA EIA Regulations (as amended), when submitting an Application for EA in terms of Regulations 19 and 21 of the 2014 NEMA EIA Regulations (as amended). As such, the proposed project has been run through the Screening Tool, and the associated reports generated and attached to the Application for EA, which was submitted to the Department of Forestry, Fisheries and the Environment (DFFE) with the Draft Scoping Report (DSR) on 9 December 2022. A comment was received from the DFFE Chief Directorate: Integrated Environmental Authorisations during the 30-day review period on the DSR, which explained that individual Screening Tool Reports must be provided for each project, and signed, as opposed to one report with all twelve proposed projects. As such, individual Screening Tool Reports have been generated showing the proposed development footprint (i.e., Revised Scoping Buildable Area). However, the original Screening Tool Reports have still been included for background and context as it shows the entire study area or preferred site that has been assessed for all projects. The individual Screening Tool Reports have been included as an appendix to the Amended Application for EA, and in Appendix H of this Final Scoping Report (FSR). In addition, the findings of the Screening Tool Report are discussed in the Scoping Level Specialist Assessments included in Appendix G of this Scoping Report, as well as Chapters 3 and 4 of this Scoping Report.

4.1.1.4 GN 320 (published 20 March 2020)

GN 320 prescribes the general requirements for undertaking site sensitivity verifications and protocols for the assessment and minimum report content requirements for identified environmental impacts for environmental themes in terms of Sections 24(5)(a) and (h) and 44 of NEMA, when applying for EA. The protocols were enforced within a period of 50 days of publication of the notice i.e., on 9 May 2020.

The Specialist Assessments undertaken as part of this Scoping and EIA Process will comply with GN 320, where applicable, specifically Agriculture, Terrestrial Biodiversity, and Aquatic Biodiversity. Some of the remaining specialist assessments will comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), and where relevant, Part A of GN 320 which contains site sensitivity verification requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed. This specifically applies to the Visual; Heritage (Archaeology and Cultural Heritage); Palaeontology; Socio-Economic; Traffic; Geohydrology; and Geotechnical Assessments. However, in some instances there are no themes on the Screening Tool that relate to some of these studies and as such sensitivities cannot be verified against the

Screening Tool. More information in this regard is included in Appendix G of this Scoping Report, which also address the aspect of Site Sensitivity Verifications. Some of the specialist assessments will comply with the Assessment Protocols published in GN R1150 on 30 October 2020, specifically Terrestrial Biodiversity and Species and Avifauna (as described below). The Battery Energy Storage System (BESS) High Level Safety, Health and Environment Risk Assessment will serve as a technical report, and the aforementioned legislation will thus not be applicable.

The site sensitivity verifications for Civil Aviation and Defence will also comply with GN 320. Additional detail on Civil Aviation and Defence is included in Appendix G.13 and Appendix G.14 of this Scoping Report.

4.1.1.5 GN 1150 (published on 30 October 2020)

GN 1150 prescribes procedures and protocols in respect of specific environmental themes for the assessment of, as well as the minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA, when applying for EA. GN 1150 includes a protocol for the specialist assessment and minimum report content requirements for environmental impacts on a) terrestrial animal species and b) terrestrial plant species. The requirements of these protocols apply from the date of publication (i.e., from 30 October 2020), except where the Project Applicant provides proof to the Competent Authority that the specialist assessment affected by these protocols had been commissioned prior to the date of publication of these protocols in the GG, in which case Appendix 6 of the 2014 NEMA EIA Regulations (as amended) will apply to such applications.

The Terrestrial Biodiversity and Species Assessment that is being undertaken as part of this Scoping and EIA Process was commissioned following the publication date of the Species Protocols. Therefore, the Terrestrial Animal and Plant Species components will be undertaken in compliance with GN 1150. One combined report will be compiled for Terrestrial Biodiversity, Terrestrial Animal Species and Terrestrial Plant Species. The Scoping Level Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species Assessment is included in Appendix G.2 of this Scoping Report. The Avifauna Assessment will also comply with GN 1150.

4.1.1.6 National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (Act 10 of 2004, as amended) (NEMBA) provides for “the management and conservation of South Africa’s biodiversity within the framework of the NEMA, the protection of species and ecosystems that warrant national protection, and the use of indigenous biological resources in a sustainable manner, amongst other provisions”. The Act states that the state is the custodian of South Africa’s biological diversity and is committed to respect, protect, promote and fulfil the constitutional rights of its citizens.

Overall, the NEMBA focuses on the protection of national biodiversity through the regulation of activities that may affect biodiversity including habitat disturbance, culture of and trade in organisms, both exotic and indigenous. Lists of threatened ecosystems (Sections 52 (1) (a)), threatened and protected species (Sections 56 (1)), and alien invasive organisms (Section 97 (1)) have been published and maintained in terms of NEMBA.

Chapter 1 sets out the objectives of the Act, and they are aligned with the objectives of the Convention on Biological Diversity, which are the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of the benefits of the use of genetic resources. The Act also gives effect to CITES, the Ramsar Convention, and the Bonn Convention on Migratory Species of Wild Animals. The State is endowed with the trusteeship of biodiversity and has the responsibility to manage, conserve and sustain the biodiversity of South Africa.

This Act therefore serves to control the disturbance and land utilisation within certain habitats, as well as the planting and control of certain exotic species. Effective disturbance and removal of threatened or protected species encountered on or around the sites, will require specific permission from the applicable authorities.

Furthermore, NEMBA states that the loss of biodiversity through habitat loss, degradation or fragmentation must be avoided, minimised or remedied. The loss of biodiversity includes *inter alia* the loss of endangered, threatened or protected plant and animal species.

4.1.1.6.1 Threatened Ecosystems

GG 34809, GN 1002, published on 9 December 2011 in terms of Section 52 (1) (a) of the NEMBA, provides a list of threatened terrestrial ecosystems categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Protected.

However, a revised national list of ecosystems that are threatened and in need of protection was published in GG 47526, GN 2747 on 18 November 2022 in terms of Section 52 (1) (a) of NEMBA. The revised list includes threatened terrestrial ecosystem types that are classed as CR, EN and VU.

The list of threatened ecosystems includes threatened ecosystems based on vegetation types present within these ecosystems. Should a project fall within a listed vegetation type or ecosystem that is listed, actions in terms of NEMBA are triggered. In addition, Listing Notice 3 (GN R324) of the 2014 NEMA EIA Regulations (as amended) includes Listed Activity 12, for the clearance of an area of 300 m^2 or more of indigenous vegetation in the Northern Cape, specifically within any CR or EN ecosystem listed in terms of Section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as CR in the National Spatial Biodiversity Assessment 2004.

As explained in the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Scoping Report), the vegetation within the study area falls within the Northern Upper Karoo (NKu3), Eastern Upper Karoo (NKu4), and Besemkaree Koppies Shrubland (Gh4) (Mucina and Rutherford 2006). These vegetation types are classified as **Least Threatened**, and therefore the above GN and Listed Activity does not apply.

4.1.1.6.2 Threatened and Protected Species

The 2007 Threatened or Protected Species Regulations of the NEMBA declares species of high conservation value, national importance or that are considered threatened and in need of protection. Furthermore, the regulations provide for the prohibition of specific restricted activities involving specific listed threatened or protected species.

The list of CR, EN, VU or Protected species was published in GG 29657, GN R151 on 23 February 2007 in terms of Section 56 (1) of the NEMBA. The list was further amended in GG 30568, GN R1187 on 14 December 2007, as well as in GG 43386, GN R627 of 3 June 2020. Should a project include threatened and protected species that are listed, actions in terms of NEMBA are triggered.

Based on the site sensitivity verification undertaken by the Terrestrial Biodiversity Specialists, the following faunal species were recorded within the larger study area (as noted in Appendix G.2 of this Scoping Report):

- *Hippotragus niger niger*, Sable Antelope, Vulnerable, Provincially Protected;
- *Stigmochelys pardalis*, Leopard tortoise, Least Concern, Provincially Protected;
- *Xerus inauris*, Cape Ground Squirrel, Least Concern, Provincially Protected;
- *Raphicerus campestris*, Steenbok, Least Concern, Provincially Protected;
- *Hystrix africaeaustralis*, Porcupine, Least Concern, Provincially Protected;
- *Genetta genetta*, Small-spotted genet, Least Concern, Provincially Protected;
- *Antidorcas marsupialis*, Springbok, Least Concern, Provincially Protected;
- *Lepus saxatilis*, Scrub hare, Least Concern, Provincially Protected;
- *Phacochoerus africanus*, Common warthog, Least Concern, Provincially Protected;
- *Otocyon megalotis*, Bat eared fox, Least Concern, Provincially Protected;
- *Bitis arietans*, Puff Adder, Least Concern;
- *Ictonyx striatus*, Striped polecat, Least Concern, Provincially Protected; and
- *Naja nivea*, Cape cobra, Least Concern.

This will be detailed as part of the Terrestrial Biodiversity and Species Assessment to be undertaken during the EIA Phase.

4.1.1.6.3 Alien and Invasive Species

Chapter 5 of NEMBA (Sections 73 to 75) regulates activities involving invasive species, and lists duty of care as follows:

- the landowner/land user must take steps to control and eradicate the invasive species and prevent their spread, which includes targeting offspring, propagating material and regrowth, in order to prevent the production of offspring, formation of seed, regeneration or re-establishment;
- take all required steps to prevent or minimise harm to biodiversity; and
- ensure that actions taken to control/eradicate invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.

The Alien and Invasive Species Regulations, published in 2014 and amended in 2020, in terms of the NEMBA provides for the protection of biodiversity through the control and eradication of listed alien and invasive species categorised as follows:

- Category 1a Listed Invasive Species – must be combatted or eradicated;
- Category 1b Listed Invasive Species – must be controlled or 'contained' in accordance with the requirements of an Invasive Species Management Programme;
- Category 2 Listed Invasive Species – require a permit to carry out a restricted activity e.g., cultivation within an area;
- Category 3 Listed Invasive Species – species that are less-transforming invasive species, but introduction, trade or transportation should be limited. Category 3 plant species are automatically Category 1b species where located within riparian and wetland areas;
- Exempted Alien Species – species that are not regulated; and
- Prohibited Alien Species – species for which a permit for restricted activities (e.g., inter alia hunting, gathering, breeding, cultivating, trading, transporting) may not be issued.

The Alien and Invasive Species List was published in terms of sections 66(1), 67(1), 70(1)(a), 71(3) and 71A of the NEMBA in GG 40166, GN 864 on 29 July 2016.

As noted in the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Scoping Report), *Prosopis* spp., planted Eucalyptus, and *Opuntia* species are present. In some areas, *Opuntia* has spread into the grassland.

4.1.1.7 The National Heritage Resources Act (Act 25 of 1999)

The National Heritage Resources Act (Act 25 of 1999) (NHRA) introduces an integrated and interactive system for the management of national heritage, archaeological and palaeontological resources (which include landscapes and natural features of cultural significance).

Parts of sections 35(4), 36(3) (a) and 38(1) of the NHRA apply to the proposed project:

Archaeology, palaeontology and meteorites:
Section 35 (4) – No person may, without a permit issued by the responsible heritage resources authority:

a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
c) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

Burial grounds and graves:
Section 36 (3) (a) - No person may, without a permit issued by South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority:

a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

Heritage resources management:
38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorized as:
a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
b) the construction of a bridge or similar structure exceeding 50 m in length;
c) any development or other activity which will change the character of the site –
    (i) exceeding 5 000 m^2 in extent, or
    (ii) involving three or more 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 resources authority;
d) the re-zoning of a site exceeding 10 000 m^2 in extent; or
e) any other category of development provided for in 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.

While landscapes with cultural significance do not have a dedicated Section in the NHRA, they are protected under the definition of the National Estate (Section 3). Section 3(2)(c) and (d) list “historical settlements and townscapes” and “landscapes and natural features of cultural significance” as part of the National Estate. Furthermore, Section 3(3) describes the reasons a place or object may have cultural heritage value. Section 38 (2a) of the NHRA states that if there is reason to believe that heritage resources will be affected then an impact assessment report must be submitted.

A Scoping Level Heritage Impact Assessment (Archaeology and Cultural Heritage) has been commissioned and included in Appendix G.6 of this Scoping Report. The Scoping Level Assessment includes a high-level assessment of potential impacts on archaeology and cultural heritage, as well as a site sensitivity verification. It is not intended to meet the requirements of the NHRA and Appendix 6 of the 2014 NEMA EIA Regulations (as amended) at the Scoping Phase, as this will be the purpose of the EIA Phase. The Screening Tool indicates that the study area (i.e., preferred site) is low sensitivity in terms of the archaeological and cultural heritage theme. The site visit undertaken by the Heritage Specialist indicated that much of the study area is indeed of low sensitivity, but several pockets of higher sensitivity were found to occur. These are places where archaeological and other heritage resources were found and tended to be near farmsteads or dolerite outcrops. These areas are of variably medium to very high sensitivity. Additional detail is provided in Chapters 3 and 6 of this Scoping Report. A Heritage Impact Assessment (including Archaeology and Cultural Landscape) will be undertaken during the EIA Phase of the proposed project in accordance with GN 320 (Part A) and Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as the requirements of NHRA. This specialist study will be included in the

Draft EIA Report that will be released to Interested and Affected Parties (I&APs) for review during the EIA Phase.

In terms of Palaeontology, a Site Sensitivity Verification Report (in terms of Part A of GN 320) was compiled during the Scoping Phase, as included in Appendix G.7 of this Scoping Report. Based on a site visit and several previous field-based and desktop Palaeontology Impact Assessment studies undertaken by the specialist in the De Aar region, it is concluded that the study area is, in practice, of Low to Very Low palaeo-sensitivity in general. Provided that the recommended Chance Fossil Finds Protocol is incorporated into the Environmental Management Programme (EMPr) and fully implemented during the construction phase of the proposed project, there are no objections on palaeontological heritage grounds to authorisation of the proposed Solar PV Facility and associated infrastructure. Pending the discovery of significant new fossil finds before or during construction, the specialist has thus confirmed that **no further specialist palaeontological studies, monitoring or mitigation are recommended for the Kudu Solar PV Facilities and Electricity Grid Infrastructure (EGI) projects**. Refer to Appendix G.7 for additional information.
Ngwao-Boswa Ya Kapa Bokone (Heritage Northern Cape) and the SAHRA are required to provide comment on the proposed project. To this end and to facilitate comment from the relevant heritage authorities, the Background Information Document (BID) was loaded onto the South African Heritage Resources Information System (SAHRIS) during the Project Initiation Phase. A single case (Case Number 18899) was created for all 12 Solar PV and 14 EGI proposed projects and the necessary project information was uploaded to the SAHRIS. Comments were provided by SAHRA (dated 28 July 2022) and loaded onto SAHRIS in response to the review of the BID (as part of the Project Initiation Phase). These comments have been captured in Appendices E.4 and E.5 of this Scoping Report.

The DSR was also uploaded onto SAHRIS for each proposed project during the 30-day review period. SAHRA provided an interim comment for each proposed project, and assigned Case Numbers (i.e., SAHRIS Case ID 20336 – 20347). Copies of the comments received from SAHRA during the 30-day review of the DSR are included in Appendix E.10 of this FSR and captured and responded to as part of the Comments and Responses Trail in Appendix E.11. The recommendations provided by SAHRA for the HIA will be addressed therein during the EIA Phase. Any issues raised by the SAHRA will then be addressed as part of the Final Scoping Report (FSR) or during the EIA Phase, where required.

Once a final comment has been issued by the heritage authority, the recommendations should be included in the conditions of the EA (should such authorisation be granted). This will essentially give ‘permission’ from the heritage authority to proceed.

The proposed project may require a permit in terms of the NHRA prior to any fossils or artefacts being removed by professional palaeontologists and archaeologists. If archaeological mitigation is needed, then the appointed archaeologist will need to contact SAHRA and/or the Heritage Northern Cape in order to confirm requirements to conduct the work. The permit application must be carried out well in advance of construction to ensure that there is enough time for the authorities to approve the mitigation work before construction commences. Should professional palaeontological mitigation be necessary during the construction phase, the palaeontologist concerned will need to apply for a Fossil Collection Permit. Palaeontological collection should comply with international best practice. All fossil material collected must be deposited, together with key collection data, in an approved depository (museum / university). Palaeontological

mitigation work including the ensuing Fossil Collection reports should comply with the minimum standards specified by SAHRA (2013).

4.1.1.8 National Forests Act (Act 84 of 1998)

The National Forests Act (Act 84 of 1998, as amended) (NFA) allows for the protection of certain tree species. The Minister has the power to declare a particular tree to be a protected tree. The most recent list of protected tree species was published in 2018 in GN 536. In terms of Section 15(1) of the NFA, no person may cut, disturb, damage or destroy any protected tree; or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. The DFFE is authorised to issue licences for any removal, cutting, disturbance, damage to or destruction of any protected trees. Therefore, the removal of any protected tree species listed within the NFA will require a tree removal permit, which can be obtained from the DFFE.

As noted in the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Scoping Report), *Boscia albitrunca* is a protected tree in terms of the NFA and was found within the larger study area. Where the proposed project impacts on these species, a permit for the removal of *Boscia albitrunca* from the DFFE will be required during the pre-construction phase, should EA be granted. This has also been commented on by the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR) during the 30-day review of the DSR. A copy of this correspondence is included in Appendix E.10 of this FSR and captured and responded to as part of the Comments and Responses Trail in Appendix E.11.

In addition, protection of natural forests through gazetted lists of Natural Forests in terms of Sections 7 (2) of the NFA must also be highlighted. In terms of section 7(1) of the NFA, no person may cut, disturb, damage or destroy any indigenous tree in, or remove or receive any such tree from a natural forest except in terms of (a) a license issued under subsection (4) or section 23 of the NFA; or (b) an exemption from the provisions of subsection (4) of the NFA published by the Minister in the Gazette.

4.1.1.9 Conservation of Agricultural Resources Act (Act 43 of 1983)

The objectives of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) are to provide for the conservation of the natural agricultural resources of South Africa by the:

- maintenance of the production potential of land;
- combating and prevention of erosion and weakening or destruction of the water sources; and
- protection of the vegetation and the combating of weeds and invader plants.

The CARA states that no land user shall utilise the vegetation of wetlands (a watercourse or pans) in a manner that will cause its deterioration or damage. This includes cultivation, overgrazing, diverting water run-off and other developments that damage the water resource. The CARA includes regulations on alien invasive plants. According to the amended regulations (GN R280 of March 2001), declared weeds and invader plants are divided into three categories:

- Category 1 may not be grown and must be eradicated and controlled,
- Category 2 may only be grown in an area demarcated for commercial cultivation purposes and for which a permit has been issued, and must be controlled, and
- Category 3 plants may no longer be planted, and existing plants may remain as long as their spread is prevented, except within the flood line of watercourses and wetlands. It is the legal duty of the land user or landowner to control invasive alien plants occurring on the land under their control.

Invasive alien species likely to occur on site are listed above and in the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Scoping Report). These alien plant species will be managed in line with the EMPr (to be compiled during the EIA Phase).

As noted in the Agriculture Compliance Statement (Appendix G.1 of this Scoping Report), rehabilitation after disturbance to agricultural land is managed by the CARA. A consent in terms of CARA is required for the cultivation of virgin land. Cultivation is defined in CARA as “any act by means of which the topsoil is disturbed mechanically”. The purpose of this consent for the cultivation of virgin land is to ensure that only land that is suitable as arable land is cultivated. Therefore, despite the above definition of cultivation, disturbance to the topsoil that results from the construction of a renewable energy facility and its associated infrastructure does not constitute cultivation as it is understood in CARA. This has been corroborated by the National Department of Agriculture, Land Reform and Rural Development (DALRRD). The construction and operation of the proposed Solar PV Facility will therefore not require consent from the DALRRD in terms of this provision of CARA.

4.1.1.10 Subdivision of Agricultural Land Act (Act 70 of 1970)

As noted in the Agriculture Compliance Statement (Appendix G.1 of this Scoping Report), two approvals from the DALRRD are required if a proposed renewable energy facility is located on agriculturally zoned land.

The first approval is a No Objection Letter for the change in land use issued by the Deputy Director General (Agricultural Production, Health and Food Safety, Natural Resources and Disaster Management). This letter is one of the requirements for receiving municipal rezoning. It is advisable to apply for this as early in the process as possible. A positive EA does not assure DALRRD’s approval of this. This application requires a motivation backed by good evidence that the development will not significantly compromise the future agricultural production potential of the development site, and the Agricultural Compliance Statement will suffice in this regard. Such an application will be submitted for the proposed Kudu Solar Facility.

The second required approval is a consent for long-term lease in terms of the Subdivision of Agricultural Land Act (Act 70 of 1970) (SALA). If the DALRRD approval for the proposed project has already been obtained in the form of the No Objection Letter, then SALA approval should not present any difficulties. Note that SALA approval is not required if the lease is over the entire farm portion. In the case of the proposed Kudu Solar Facility, only portions of the farm portion would be leased. SALA approval can only be applied for once the Municipal Rezoning Certificate and EA is in hand.

4.1.1.11 National Water Act (Act 36 of 1998)

One of the important objectives of the National Water Act (Act 36 of 1998) (NWA) is to ensure the protection of the aquatic ecosystems of South Africa's water resources. Section 21 of this Act identifies certain land uses, infrastructural developments, water supply/demand and waste disposal as 'water uses' that require authorisation (licensing) by the Department of Water and Sanitation (DWS). Chapter 4 (Part 1) of the NWA sets out general principles for the regulation of water use. Water use is defined broadly in the NWA, 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 the bed, banks, course or characteristics of a watercourse, removing water found underground for certain purposes, and recreation. In general, a water use must be licensed unless it is listed in Schedule I, is an existing lawful use, is permissible under a General Authorisation (GA), or if a responsible authority waives the need for a licence. The Minister may limit the amount of water which a responsible authority may allocate. In making regulations the Minister may differentiate between different water resources, classes of water resources and geographical areas.

All water users who are using water for agriculture: aquaculture, agriculture: irrigation, agriculture: watering livestock, industrial, mining, power generation, recreation, urban and water supply service must register their water use. This covers the use of surface- and groundwater.

Section 21 of the NWA lists the following water uses that need to be licensed:

a) taking water from a water resource;
b) storing water;
c) impeding or diverting the flow of water in a watercourse;
d) engaging in a stream flow reduction activity contemplated in section 36;
e) engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
g) disposing of waste in a manner which may detrimentally impact on a water resource;
h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
i) altering the bed, banks, course or characteristics of a watercourse;
j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
k) using water for recreational purposes.

Any activities that take place within the outer edge of the 1 in 100 year flood line and /or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam; within a watercourse; within 100 m of the edge of a watercourse; or within 500 m of a delineated wetland boundary, will require a water use authorisation in terms of Section 21 (c) and Section 21 (i) of the NWA. An application for water use authorisation for the proposed project may be required should any of the planned structures or infrastructure associated with the proposed project trigger water uses in terms of Section 21 (c) and Section 21 (i) of the NWA.

The GA for Section 21 (c) and (i) water uses as defined under the NWA were revised in 2016 (GN R509). Determining if a Water Use Licence is required for these water uses is now associated with the risk of degrading the ecological status of a watercourse. A low risk of impact could be authorised in terms of a GA. According to the Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Scoping Report), the risk of the proposed project altering the ecological integrity of the adjacent aquatic ecosystems, if mitigated as recommended, is likely to be low such that the associated water use activities in terms of Section 21 (c) and (i) of the NWA would fall within the ambit of the GA.

Based on the preliminary risk matrix assessment undertaken to inform the Section 21 (c) and (i) water use authorisation process for the proposed project and associated infrastructure, the associated risk to the aquatic features for the proposed project would be low.

The NWA also provides for measures to prevent, control and remedy the pollution of surface and groundwater sources. The study area is located mainly within quaternary catchment D33B with small sections within quaternary catchment D62F. Both of these quaternary catchments form part of the Lower Orange Water Management Area in the Northern Cape. The groundwater GA for both of the catchments is 45 m^3/ha/a (published on 2 September 2016, in GG 40243, GN 538 (i.e., Revision of GA for the taking and storing of water)). If the proposed project is planned appropriately with regards to groundwater use, all the water can be obtained from groundwater, with the use being Generally Authorised. Registration of the usage in terms of the GA with the DWS would be required. This will be undertaken post EA. Refer to the Geohydrology Assessment in Appendix G.11 of this Scoping Report for additional information.

Should groundwater be used as a water source for the proposed project, then water pipelines may need to be constructed to transfer groundwater from existing boreholes or they may be transported by trucks from the boreholes to the site. Groundwater may also need to be stored on site in suitable containers or reservoir tanks during the construction and operational phases. Such storage may trigger the need for a Water Use Authorisation. The need for such an authorisation will be investigated during the EIA Phase.

4.1.1.12 Water Services Act (Act 108 of 1997)

Water will be required during the construction, operational and decommissioning phases of the proposed project. Potable water is only to be utilised for human consumption purposes, whereas greywater is to be used for earthworks, dust suppression, etc. Water will be sourced from the following potential sources (in the order of likelihood): Renosterberg Local Municipality; third-party water supplier; existing boreholes or drilled boreholes on site. Should the latter be selected for water use, the boreholes will be subjected to complete geohydrological testing and an assessment, as well as a Water Use Licence Application process. This will be undertaken as a separate process,

once more detailed information becomes available, outside of these current EA Application for the proposed project. Compliance with the Water Services Act (Act 108 of 1997) will be undertaken during the relevant phase of the proposed project, in consultation with the local and district municipalities.

4.1.1.13 Hazardous Substances Act (Act 15 of 1973)

During the proposed project, fuel and diesel will be utilised to power vehicles, generators and equipment. In addition, potential spills of hazardous materials could occur during the relevant phases. Such management actions will be recommended in the EMPr during the EIA Phase, which will be included as an Appendix to the Draft and Final EIA Reports.

4.1.1.14 National Environmental Management: Waste Act (Act 59 of 2008, as amended) (NEMWA)

The National Environmental Management: Waste Act (Act 59 of 2008, as amended) (NEM:WA) was published with one of the main objectives to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. Section 19 of the NEM:WA allows the Minister to publish a List of Waste Management Activities that have, or are likely to have, a detrimental effect on the environment published. Such a list specifies the waste management activities that will require a Waste Management Licence.

The List of Waste Management Activities was originally published in GN 921 on 29 November 2013, and thereafter amended in GN 332 on 2 May 2014; GN 633 on 24 July 2015; GN 1094 on 11 October 2017; and GN 1757 on 11 February 2022. The List of Waste Management Activities include Categories A, B and C. If any waste management activities listed in Category A are triggered by a development, a BA process must be undertaken in terms of the 2014 NEMA EIA Regulations (as amended), as part of the Waste Management Licence application. Waste management activities in Category B will, however, require a full Scoping and EIA Process in terms of the 2014 NEMA EIA Regulations (as amended), as part of the Waste Management Licence application. If any of the waste management activities in Category C are triggered, then the relevant Norms and Standards must be followed.

Based on a review of the project description, the proposed project (and all projects that form part of the Kudu Solar Facilities and EGI Projects) will **not** trigger the need for a Waste Management Licence. However, general and hazardous waste will be generated during the construction, operational and decommissioning phases, which will require proper management. Such management actions will be recommended in the EMPr during the EIA Phase, which will be included as an Appendix to the Draft and Final EIA Reports.

4.1.1.15 National Environmental Management: Air Quality Act (Act 39 of 2004)

The National Environmental Management: Air Quality Act (Act 39 of 2004, as amended) (NEM: AQA) was published in 2004 and came into full effect on 31 March 2010, when the Atmospheric Pollution Prevention Act (Act 45 of 1965) (APPA) was repealed. The NEM: AQA was published with the overall objective to:

- "*reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development;*
- *provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto*".

The list of activities which result in atmospheric emissions which have or may have a significant detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage was published under GN 248, GG 33064 dated 31 March 2010 and thereafter amended in GN 893, GG 37054 dated 22 November 2013. The list of activities was further amended in GN 551, GG 38863 dated 12 June 2015; GN 1207, GG 42013 dated 31 October 2018; GN 687, GG 42472 dated 22 May 2019; and GN 421, GG 43174 dated 27 March 2020.

Section 22 of the NEM: AQA deals with the consequences of listing, and it states that "no person may without a provisional atmospheric emission licence, or an atmospheric emission licence conduct an activity (a) listed on the national list anywhere in the Republic; or (b) listed on the list applicable in a province anywhere in that province". Therefore, a Provisional Atmospheric Emissions Licence (AEL) and/or AEL is required for any plant or proposed development that triggers a listed activity.

Based on a review of the project description, the proposed project (and all projects that form part of the Kudu Solar Facilities and EGI Projects) will **not** trigger the need for an AEL. However, the proposed stockpiling activities, including earthworks, may result in the unsettling of, and temporary exposure to, dust. Appropriate dust control methods will need to be applied. Such management actions will be recommended in the EMPr in the EIA Phase, which will be included as an Appendix to the Draft and Final EIA Reports.

4.1.1.16 Astronomy Geographic Advantage (Act 21 of 2007)

The Astronomy Geographic Advantage (AGA) Act (Act 21 of 2007) aims to provide for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy; to provide for intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and to provide for matters connected therewith. The purpose of the AGA Act is to preserve the geographic advantage areas that attract investment in astronomy. The AGA Act also notes that declared astronomy advantage areas are to be protected and properly maintained in terms of Radio Frequency Interference (RFI). The AGA Act is administered by the Department of Higher Education, Science and Technology (previously the Department of Science and Technology).

According to the CSIR Wind and Solar Phase 2 SEA (Department of Environment, Forestry and Fisheries (DEFF), 2019: Part 3, Page 2[3]), the majority of the mid-frequency dish array of the Square Kilometre Array (SKA) will be constructed in the core which is in located in the Northern Cape; with dish antennas being located in the spiral arms. The South African component of the SKA will consist of approximately 3 000 receptors comprising dish antennas, each with a diameter of 15 m, and radio receptors known as dense aperture-arrays. The outer stations in the spiral arms will extend beyond the borders of South Africa and at least 3 000 km from the core area. About 80% of the receptors, including a dense core and up to 5 spiral arms, will be located in the Karoo Central Astronomy Advantage Area (KCAAA) (DEFF, 2019[2]: Part 3, Page 2).

The KCAAA, which is located between Brandvlei, Van Wyksvlei, Carnarvon and Williston in the Northern Cape Province, was officially declared in 2014 by the Minister of Science and Technology in terms of the AGA Act for the purposes of protection RFI and Electromagnetic Interference (EMI). The declaration of the KCAAA ensures the long-term viability of the area to be used for astronomical installations (DEFF, 2019[2]: Part 3, Page 2).

PV installations are known to have unintentional radiated emissions from electrical and electronic equipment that have the potential to interfere with the SKA Radio Telescope project in the Northern Cape. This can result in interference to celestial observations and/or data loss. Such interference is typically referred to as RFI (DEFF, 2019[2]: Part 3, Page 2).

The proposed project study area is not located within the KCAAA, and therefore not expected to have any significant impacts on the SKA. Refer to the locality map provided in Chapter 1 of this FSR for additional information in this regard.

The South African Radio Astronomy Observatory (SARAO) / SKA Office have been pre-identified as a key stakeholder and therefore included on the project database of I&APs (as shown in Appendix D of this Scoping Report). As such, the SKA office was provided with a copy of the BID and Letter 1 during the Project Initiation Phase; as well as a notification of the release of the DSR for a 30-day comment period (i.e., Letter 2) during the Scoping Phase. ABO Wind has also communicated with the SARAO. SARAO provided a letter to ABO Wind confirming that they have undertaken a high-level impact assessment based on the information provided for the proposed projects, and it was determined that the proposed projects represent a **low risk of interference to the nearest SKA radio telescope with a compliance surplus of 279.92 dBm/Hz**. As such, the SARAO does not have any objection to the proposed development. Refer to Appendix H of the Scoping Report for a copy of this correspondence from the SARAO.

4.1.1.17 Development Facilitation Act (Act 67 of 1995)

The Development Facilitation Act (Act 67 of 1995) (DFA) sets out a number of key planning principles which have a bearing on assessing proposed developments in light of the national planning requirements. The planning principles most applicable to the study area include:

- Promoting the integration of the social, economic, institutional and physical aspects of land development;
- Promoting integrated land development in rural and urban areas in support of each other;

[3] Department of Environment, Forestry and Fisheries (DEFF), 2019. Phase 2 Strategic Environmental Assessment for wind and solar PV energy in South Africa. CSIR Report Number: CSIR/SPLA/SECO/ER/2019/0085 Stellenbosch, Western Cape.

- Promoting the availability of residential and employment opportunities in close proximity to or integrated with each other;
- Optimising the use of existing resources including such resources relating to agriculture, land, minerals, bulk infrastructure, roads, transportation and social facilities;
- Contributing to the correction of the historically distorted spatial patterns of settlement in the Republic and to the optimum use of existing infrastructure in excess of current needs;
- Promoting the establishment of viable communities; and
- Promoting sustained protection of the environment.

4.1.1.18 Other Applicable Legislation

Other applicable national legislation that may apply to the proposed project include:

- Advertising on Roads and Ribbons Act (Act 21 of 1940);
- Electricity Act (Act 41 of 1987);
- Electricity Regulations Amendments (August 2009);
- Promotion of Administrative Justice Act (Act 2 of 2000);
- Civil Aviation Act (Act 13 of 2009) and Civil Aviation Regulations (CAR) of 1997;
- Civil Aviation Authority Act (Act 40 of 1998);
- White Paper on Renewable Energy (2003);
- Integrated Resource Plan for South Africa (2019);
- Occupational Health and Safety Act (Act 85 of 1993), as amended by Occupational Health and Safety Amendment (Act 181 of 1993)[4];
- Road Safety Act (Act 93 of 1996);
- Fencing Act (Act 31 of 1963);
- National Environmental Management: Protected Areas Act (NEM:PA) (Act 57 of 2003); and
- National Road Traffic Act (Act 93 of 1996).

[4] The proposed Battery Energy Storage Systems (BESS) must be designed, operated, maintained and decommissioned according to the requirements of Occupational Health and Safety Act (Act 85 of 1993).

4.1.2 Provincial Legislation

4.1.2.1 Northern Cape Nature Conservation Act (Act 9 of 2009)

The Northern Cape Nature Conservation Act (Act 9 of 2009) (NCNCA) has reference to the proposed project. This Act aims at improving the sustainability in terms of balancing natural resource usage and protection or conservation thereof. It includes six schedules, as follows:

- Schedule 1 - Specially Protected species;
- Schedule 2 - Protected species;
- Schedule 3 - Common indigenous species;
- Schedule 4 - Damage causing animal species;
- Schedule 5 - Pet species; and
- Schedule 6 - Invasive Species.

With regards to protected flora, the NCNCA includes a list of protected flora.

Based on the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Scoping Report), no SCC were recorded, and some Provincially Protected species were found. These Provincially Protected species are protected in terms of the NCNCA. Relocation permits will be required from the Northern Cape DAEARDLR under the NCNCA, should the final development footprint of the proposed project necessitate the removal or relocation of these species. Refer to the Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Scoping Report) for additional information.

The Terrestrial Biodiversity and Species Scoping Level Assessment (Appendix G.2 of this Scoping Report) also notes that according to the Screening Tool, habitat in the study area could support *Tridentea virescens*, but no individuals were found during the site sensitivity verification survey. The species is listed as Rare as it is highly habitat specific and/or have small numbers of individuals, all of which makes it vulnerable to extinction should it lose habitat. The species is extremely small and grows underneath shrubs (especially *Rhigozum trichotomum* which is dominant on the study area), making it difficult to observe. Furthermore, the grass layer was tall and dense during the site sensitivity verification survey (which was a first for the area in over 10 years due to good rains), which made the visibility of the species more difficult. It accordingly has a moderate likelihood of occurring. Since it is not a highly threatened species (and a succulent), relocation could be considered as a viable option should it be found. The optimal time to search for it is between February to March when the species is in flower. It is therefore suggested that the species form part of the search and rescue procedure during the appropriate flowering period, and if recorded to apply for a permit application with the provincial authority for relocation.

Therefore, it will be recommended as part of the EMPr, that a detailed plant search and rescue operation be conducted before the final design process, during the appropriate flowering period where needed, and prior to the commencement of the construction phase. If any of the listed species are found, the relevant permits should be obtained by the Project Applicant prior to their relocation or destruction.

The Northern Cape DAEARDLR, serving as the provincial authority for issuing of the relevant permits, has been pre-identified as a key stakeholder and is included on the project database (as shown in Appendix D of this Scoping Report). Efforts have been made to ensure that the Northern

Cape DAEARDLR is aware of the progress of the Scoping and EIA Processes. The Department has also provided comments on the DSR, and these comments are included in Appendix E.10 and adequately recorded and responded to in Appendix E.11 of this FSR.

4.1.2.2 Northern Cape Strategic Plan 2020-2025

The vision of the Strategic Plan is a modern, growing, and successful Northern Cape. In addition, the main aim of the Plan is to govern the Northern Cape Province towards alleviating the triple challenges (e.g., unemployment, inequality, and poverty) and towards a people centred Public Service.

The Northern Cape Strategic Plan 2020 stated that the province is one of the best sites in the world to produce solar renewable energy and that this potential has attracted a large number of investors to the province. However, the Plan also stated that the province also experiences inequality, unemployment, and poverty.

The proposed project aligns itself with the aim of this Strategic Plan in that it will provide employment opportunities as well as a required source of energy to the national grid. Employment creation would mainly be temporary in nature during the construction phase with limited opportunities created during the operational phases. Refer to Chapter 2 of this Scoping Report for additional information on the proposed employment opportunities.

4.1.2.3 Northern Cape Provincial Spatial Development Framework (2018)

The focus areas on the Northern Cape Provincial Spatial Development Framework (SDF) include urban and rural development; enhancing regional connectivity; promoting infrastructure investment; and protecting local resources. In addition, the SDF stresses the need to address spatial inefficiencies and inequalities, identify areas of opportunity and ensure proactive management of natural resources and ecosystems in the Northern Cape. The SDF also outlines that sustainability is central to provincial economic policies, as well as to its social development agenda. The proposed project is in line with the focus areas of the Northern Cape SDF. It will uplift the local communities through employment creation and increased investment in infrastructure. In addition, the proposed development will provide a sustainable source of energy for the national grid.

4.1.3 District and Local Planning Legislation

4.1.3.1 Environmental Management Framework

Research indicates that there is no Environmental Management Framework (EMF) for the Pixley Ka Seme District Municipality (PKSDM). The Screening Tool also notes that no intersections with EMF areas have been found.

4.1.3.2 PKSDM Integrated Development Plan (IDP)

The strategic objectives of the PKSDM Integrated Development Plan (IDP) 2022 - 2027 are (PKSDM, 2022[5], Page 99):

- "To enhance compliance with the tenets of good governance as prescribed by legislation and best practice;
- To administer finances in a sustainable manner and strive to comply with legislative requirements to achieve a clean audit outcome;
- To monitor and support local municipalities to enhance service delivery;
- To promote economic growth in the district;
- To guide local municipalities in the development of their IDP's and in spatial development;
- To provide a professional, people- centred human resources and administrative service to citizens, staff and Council;
- To provide an independent and objective internal audit assurance and consulting service to add value and to improve the administrative operations of all the municipalities in the district through an approach that is systematic and disciplined;
- To provide disaster management services to the citizens; and
- To provide municipal health services to improve the quality of life of the citizens."

The IDP (PKSDM, 2022[4]) emphasises that there is great opportunity for renewable energy development in the PKSDM, since there is a vision of placing the PKSDM as the leading innovative region and global centre for renewable energy. Specifically, the IDP highlights that the Renosterberg Local Municipality, in which the proposed project will be located, recognises solar energy as an opportunity and aspires to harness solar energy as an alternative that can be directly sold to the community, thereby accentuating the renewable energy sector as a strategic economic sector (PKSDM, 2022[4]).

The proposed project is line with the PKSDM IDP because it will enable the PKSDM to achieve environmental sustainability and to build resilience (PKSDM, 2022[4]). Furthermore, the IDP states that the district has favourable conditions for solar energy development which is a significant positive factor for the proposed project. Furthermore, the proposed project is aligned with one of the objectives of the IDP in that it will encourage local economic growth through increased investment and employment opportunities. The proposed project will create job opportunities and economic spin offs during the construction and operational phases (if EA is granted by the DFFE).

4.1.3.3 Guidelines, Frameworks and Protocols

The following guidelines, frameworks and protocols are applicable to the proposed project:

- Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - Guideline on Alternatives (DEA, 2014);
  - Guideline on Transitional Arrangements (Department of Environmental Affairs and Development Planning (DEA&DP), 2013);
  - Guideline on Alternatives (DEA&DP, 2013);
  - Guideline on Public Participation (DEA, 2012; DEA&DP, 2013; DEA, 2017);

[5] Pixley Ka Seme District Final Integrated Development Plan (IDP) 2022 – 2027. 2022. Available: https://www.pksdm.gov.za/idps/PKSDM%20Final%20Integrated%20Development%20Plan%20(IDP)%202022-2027.pdf. [online] Accessed: November 2022.

  - National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008;
  - Guideline on Need and Desirability (DEA&DP, 2013; DEA, 2017);
- Information Document on Generic Terms of Reference for Environmental Assessment Practitioners (EAPs) and Project Schedules (March 2013);
- Integrated Environmental Management Information Series (Booklets 0 to 23) (Department of Environmental Affairs and Tourism (DEAT), 2002 – 2005);
- Guidelines for Involving Specialists in the EIA Processes Series (DEA&DP; CSIR and Tony Barbour, 2005 – 2007);
- BirdLife South Africa (BLSA) 2017 Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa;
- Species Environmental Assessment 2020 Guideline: Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for EIAs in South Africa. South African National Biodiversity Institute (SANBI);
- United Nations Framework Convention on Climate Change (1997); and
- Kyoto Protocol (which South Africa acceded to in 2002).

4.1.4 International Finance Corporation Performance Standards

In order to promote responsible environmental stewardship and socially responsible development, the proposed project will as far as practicable incorporate the environmental and social policies of the International Finance Corporation (IFC). These policies provide a frame of reference for lending institutions to review environmental and social risks of projects, particularly those undertaken in developing countries.

Through the Equator Principles, the IFC's standards are now recognised as international best practice in project finance. The IFC screening process categorises projects into A, B or C in order to indicate relative degrees of environmental and social risk. The categories are:

- *Category A* - Projects expected to have significant adverse social and/or environmental impacts that are diverse, irreversible, or unprecedented;
- *Category B* - Projects expected to have limited adverse social and/or environmental impacts that can be readily addressed through mitigation measures; and
- *Category C* - Projects expected to have minimal or no adverse impacts, including certain financial intermediary projects.

Accordingly, projects such as the proposed Kudu Solar Facility are categorised as Category B projects. The EIA Process for Category B projects examines the project's potential negative and positive environmental impacts. As required for Category B projects, a Scoping and EIA Process is being undertaken.

Other Acts, standards and/or guidelines which may also be applicable will be reviewed in more detail as part of the specialist studies to be conducted for the EIA Process.

4.2 Legal Context for this EIA

In terms of the NEMA and the 2014 NEMA EIA Regulations (as amended), a full Scoping and EIA Process is required for the proposed project. The need for the full Scoping and EIA Process is triggered by, amongst others, the inclusion of Activity 1 listed in GN R325 (Listing Notice 2):

- ***"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facility or infrastructure is for photovoltaic installations and occurs (a) within an urban area; or (b) on existing infrastructure".***

Note that the proposed project is not located within any of the 11 Renewable Energy Development Zones (REDZs) gazetted in GN 114 on 16 February 2018 and GN 144 on 26 February 2021. However, the proposed EGI projects (which will be subjected to separate BA and/or Standard Registration processes[6]) are located within the Central Strategic Transmission Corridor that was gazetted in GN 113 on 16 February 2018.

Therefore, a full Scoping and EIA Process is being undertaken for the proposed Kudu Solar Facility, subjected to a 107-day decision-making timeframe.

All the listed activities forming part of this proposed development and therefore requiring EA were included in the Application Form for EA that was prepared and submitted to the DFFE with the DSR. However, during the 30-day review period on the DSR, various comments were raised by the DFFE Chief Directorate: Integrated Environmental Authorisations on the applicability of certain listed activities, and specifications of the project description and how they relate to the applicable listed activities. Refer to Appendix E.10 for a copy of these comments from the DFFE, as well as Appendix E.11 wherein the comments have been captured and responded to. Based on these comments, the applicability of certain listed activities has been updated and as such an Amended Application Form for EA has been submitted with the FSR. A summary is provided below describing the main updates made:

- **Activity 11 of Listing Notice 1**: The Independent Power Producer (IPP) Substation is required to facilitate the connection of the proposed Kudu Solar Facility to the national grid. As noted in the DSR, the applicability of this listed activity was to be confirmed with the DFFE during the 30-day comment period, to clarify if the IPP Substation can be included in this EIA or whether a separate process is required under the EGI Standard (similar to Projects 13 to 26). Based on the feedback received (as captured in Appendix E.10 and E.11 of this FSR), this listed activity will be retained in the current application for the proposed project (i.e., the PV and associated infrastructure application). Therefore, the IPP Substation will not be subjected to a separate registration process in terms of the EGI Standard published in Government Gazette (GG) 47095; Government Notice (GN) 2313, dated 27 July 2022. This has been updated in the FSR and the Amended Application for EA.
- **Activity 14 of Listing Notice 1**: More clarity has been provided around the proposed Redox Flow BESS. This listed activity is not applicable to the Lithium-Ion BESS.

[6] The registration processes are based on the Standard for the Development and Expansion of Power Lines and Substations within identified Geographical Areas and the Exclusion of this Infrastructure from the Requirement to obtain an Environmental Authorisation, published in Government Gazette 47095, GN 2313, published on 27 July 2022.

- **Listing Notice 3 Listed Activities:** The DFFE requested that written confirmation must be obtained from the relevant authority (i.e., Northern Cape DAEARDLR) to confirm if there is an adopted bioregional plan or systematic biodiversity plan in relation to Critical Biodiversity Areas (CBAs). As noted in Appendix E.10 of this FSR, the Northern Cape DAEARDLR confirmed that the Northern Cape CBA Map is adopted as by the Department as a systematic biodiversity plan, and that the Northern Cape does not have any bioregional plans. Therefore, the relevant listed activities in Listing Notice 3 are applicable to the proposed project; excluding **Activity 12** of Listing Notice 3, as this only relates to CBAs identified in bioregional plans. This has been updated in the FSR and the Amended Application for EA.
- **Overall certainty needed on the applicability of the listed activities:** The applicability of the listed activities has been updated, where possible, to ensure that it is more specific and to describe how the listed activities applied for are linked to the project description. However, it must also be noted that at Scoping Phase there are some project aspects that are still to be confirmed during the EIA Phase, and it is necessary to follow the maximum development scenario or precautionary approach. In such instances, the applicability of the listed activities will be confirmed during the EIA Phase, and an Amended Application for EA will be submitted accordingly.

The updated listed activities triggered by the proposed project are indicated in Table 4.1. All updates have been carried through to the Amended Application for EA which will be submitted to the DFFE with the FSR.

Table 4.1: Listed Activities in GN R327, GN R325, and GN R324 that will be potentially triggered by the proposed project

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
Listing Notice 1, GN R327		
Activity 11 (i)	The development of facilities or infrastructure for the transmission and distribution of electricity: (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	The proposed project will entail the construction of an on-site substation complex at the Solar PV Facility. The on-site substation complex will include various infrastructure, as well as an On-site Independent Power Producer (IPP) or Facility Substation. This will include the relevant section that will be maintained by the IPP (i.e., the high voltage infrastructure leading up to the Point of Connection (the Project Applicant's section of the proposed on-site substation complex)). This constitutes facilities for the distribution and transmission of electricity. The on-site substation complex will be up to 4 ha in area and will have a height of up to 10 m, with a capacity stepping up to 132 kV. The proposed project will take place outside of an urban area. It will be constructed on various affected farm portions, north-east of the town of De Aar, in the Renosterberg Local Municipality and Pixley Ka Seme District Municipality, in the Northern Cape Province. **<u>Note from the CSIR</u>: The DFFE confirmed that this listed activity can be included in the current Application for EA.**
Activity 12 (ii) [(a) and (c)]	The development of: (ii) infrastructure or structures with a physical footprint of 100 square metres or more;	The proposed project will entail the construction of various infrastructure and structures (such as the solar field, on-site substation complex, Battery Energy Storage System (BESS), laydown area, internal roads, and various ancillary infrastructure such as Operation and Maintenance (O&M) building / centre, site office,

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
	where such development occurs: (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding: (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of commencement of the development and where indigenous vegetation will not be cleared.	workshop, staff lockers, bathrooms/ablutions, warehouse, guard house, etc.). The Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Scoping Report) notes that aquatic features within the study area comprise ephemeral unnamed tributaries of the Orange River. The larger watercourses flow along the eastern and western extents of the study area, flowing in a northerly direction to join the Orange River downstream of Van der Kloof Dam. These larger watercourses have wide floodplains. Smaller watercourses and drainage features drain into the larger river corridors. Refer to the Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Scoping Report) for additional information. The infrastructure and structures will exceed a footprint of 100 m^2 and some may occur within small drainage features and 32 m of the watercourses. Additional detail will be provided during the EIA Phase. The proposed project will take place outside of an urban area. It will be constructed on various affected farm portions, north-east of the town of De Aar, in the Renosterberg Local Municipality and Pixley Ka Seme District Municipality, in the Northern Cape Province.
Activity 14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	The construction and operational phases of the proposed Solar PV Facility are expected to require dangerous goods such as chemicals, fuels, oils, lubricants and solvents. Therefore, infrastructure for the storage and handling of dangerous goods of more than 80 m^3 but not exceeding 500 m^3 are proposed at the Solar PV Facility.

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		The proposed Solar PV facility will also include the installation of a BESS. The BESS will cover an area of approximately 1 ha and will have a maximum height of 10 m, with a capacity of up to 500 MW / 500 MWh. Two types of technology for the BESS are being assessed as part of this Scoping and EIA Process. One of the technologies is Redox Flow BESS, as some of the electrolytes will be stored separately in above ground storage tanks for use in the BESS during operations. There are various electrolytes that can be used for Redox Flow BESS's, such as but not limited to, Hydrochloric Acid, which is considered a dangerous good in terms of the definition provided in the 2014 NEMA EIA Regulations (as amended). These tanks will have a capacity of more than 80 m^3 but not exceeding 500 m^3, therefore triggering this listed activity. The exact capacity will be confirmed during the EIA Phase. As discussed with the DFFE during the Pre-Application Meeting, two BESS technology types (one of which is Redox Flow and relates to this Listed Activity) will be assessed during the Scoping and EIA Processes, and a motivation will be included in the EIA Report to potentially authorise both technology types if both are found to be acceptable and preferred during the EIA Phase. If both BESS technologies are found acceptable and both are preferred; or if the specialists confirm that only Redox Flow is preferred, then the relevant listed activities would have been covered for, as Redox Flow BESS is already included here. However, should the EIA Phase confirm that Redox Flow is not acceptable, then the applicability of Activity 14 of Listing Notice 1 will be updated (to remove reference to the Redox Flow BESS; however, this Listed Activity will still apply based on the first paragraph in this section).

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		The preferred BESS technology or whether both are preferred can only be confirmed during the EIA Phase as the specialists need to fully assess both BESS technologies, as well as provide mitigation measures in further detail. The BESS will be located within the on-site substation complex, and therefore the storage tanks for the dangerous goods will be located within this vicinity. Additional details will be provided during the EIA Phase, where required.
Activity 19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving- a) will occur behind a development setback; b) is for maintenance purposes undertaken in accordance with a maintenance management plan; c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	The proposed project may entail the excavation, removal and moving of more than 10 m^3 of soil, sand, pebbles or rock from nearby watercourses on site. The proposed project may also entail the infilling of more than 10 m^3 of material into the nearby watercourses. The Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Scoping Report) notes that aquatic features within the study area comprise ephemeral unnamed tributaries of the Orange River. The larger watercourses flow along the eastern and western extents of the study area, flowing in a northerly direction to join the Orange River downstream of Van der Kloof Dam. These larger watercourses have wide floodplains. Smaller watercourses and drainage features drain into the larger river corridors. Refer to the Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Scoping Report) for additional information. The specifications around the excavation, removal, moving and infilling from or into watercourses will be confirmed during the EIA Phase.

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
Activity 28 (ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	The proposed project will take place outside of an urban area. It will be constructed on various affected farm portions, north-east of the town of De Aar, in the Renosterberg Local Municipality and Pixley Ka Seme District Municipality, in the Northern Cape Province. The Terrestrial Biodiversity and Plant and Animal Species Scoping Level Assessment (Appendix G.2) notes that the land within the study area is currently being used for livestock grazing, with some game animals such as springbok. Therefore, the land earmarked for the development of the proposed Kudu Solar Facility is currently used for agricultural purposes (mainly low intensive livestock farming). The proposed solar PV facility, which is considered a commercial/industrial development, will have an estimated footprint in excess of 1 ha (minimum footprint of about 33 ha). The proposed project will also entail the construction of various infrastructure and structures (such as the solar field, on-site substation complex, BESS, laydown area, internal roads, and various ancillary infrastructure such as O&M building / centre, site office, workshop, staff lockers, bathrooms/ablutions, warehouse, guard house, etc.). This will constitute infrastructure with a physical footprint of more than 1 ha.

Activity 56 (ii)	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-
	
	(i) where the existing reserve is wider than 13,5 meters; or
	(ii) where no reserve exists, where the existing road is wider than 8 metres;
	
	excluding where widening or lengthening occur inside urban areas.
		Existing roads will be used as far as practically achievable. The proposed project study area can be accessed via various existing main roads and unnamed farm gravel roads. The potential access routes are discussed below:
		
		▪ Access Route Option 1:
		  ▪ Route A: Along TR3801, DR3093, and DR3096;
		  ▪ Route B: Along TR3801, DR3093 and DR3084;
		▪ Access Route Option 2:

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		▪ Route A: Along MR790, DR3093 and DR3084; ▪ Route B: Along MR790 and DR3093; ▪ Route C: Along MR790, DR3093 and DR3096; ▪ Access Route Option 3: ▪ Route A: Along TR3801, TR3802, and DR3096; ▪ Route B: Along TR3801, TR3802, DR3096 and DR3093; and ▪ Route C: Along TR3801, TR3802, DR3096, DR3093 and DR3084. The existing main roads, divisional roads and unnamed farm gravel roads may need to be upgraded for access to the proposed Kudu Solar cluster, depending on which route is used. Upgrading of the main access point from the R48 is likely to need upgrading. Such upgrading will include lengthening of less than 1 km. Details will be confirmed during the EIA Phase. The Traffic Specialist has also noted that, based on preliminary investigations, the roads leading to the study area are of a sufficient width to accommodate truck movement, however widening by more than 4 m or more than 6 m may be required at localised positions as required (i.e., intersections). Details of this will be provided during the EIA Phase. If lengthening of the intersections is required, then such lengthening will not exceed 1 km. Exact details of the length will be confirmed during the EIA Phase.
Listing Notice 2, GN R325		
Activity 1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of	The proposed project is a Solar PV Facility (i.e., facility for the generation of electricity from a renewable resource) with an estimated capacity of up to 50 MWac (more than 20 MWac).

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
	facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or (b) on existing infrastructure.	The proposed project will take place outside of an urban area. It will be constructed on various affected farm portions, north-east of the town of De Aar, in the Renosterberg Local Municipality and Pixley Ka Seme District Municipality, in the Northern Cape Province.
Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for: (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed Solar PV Facility will have an estimated footprint in excess of 20 ha (minimum footprint of about 33 ha). As a result, more than 20 ha of indigenous vegetation could be removed for the construction of the proposed Solar PV Facility. Based on the feedback from the Terrestrial Biodiversity and Plant and Animal Species Scoping Level Assessment (Appendix G.2 of this Scoping Report), the vegetation in question is regarded as indigenous.
Listing Notice 3, GN R324		
Activity 4 (g) (ii) (ee)	The development of a road wider than 4 meters with a reserve less than 13.5 meters. g. Northern Cape ii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	Internal roads will be constructed at the Solar PV Facility. The internal roads are estimated to have a width ranging between 4 m and 5 m. The Terrestrial Biodiversity and Plant and Animal Species Scoping Level Assessment (Appendix G.2 of this Scoping Report) notes that the entire study area (i.e., preferred site), which contains the Revised Scoping Buildable Area (i.e., development footprint), falls within an Ecological Support Area (ESA) according to the Northern Cape Critical Biodiversity Area (CBA) Map (2016). As confirmed with the Northern Cape DAEARDLR, the Northern Cape CBA map includes CBAs as identified in a systematic biodiversity plan adopted by the competent authority. The proposed project will take place outside of an urban area. It will be constructed on various affected farm portions, north-east of the

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		town of De Aar, in the Renosterberg Local Municipality and Pixley Ka Seme District Municipality, in the Northern Cape Province.
Activity 14 (ii) (a) and (c); (g), (ii) (ff)	The development of – (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs – (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; g. Northern Cape ii. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The proposed project will take place outside of an urban area, on a site that is classified as an ESA in terms of the 2016 Northern Cape CBA Map. As confirmed with the Northern Cape DAEARDLR, the Northern Cape CBA map includes CBAs as identified in a systematic biodiversity plan adopted by the competent authority. It will be constructed on various affected farm portions, north-east of the town of De Aar, in the Renosterberg Local Municipality and Pixley Ka Seme District Municipality, in the Northern Cape Province. The proposed project will entail the construction of various infrastructure and structures (such as the solar field, on-site substation complex, BESS, laydown area, internal roads, and various ancillary infrastructure such as O&M building / centre, site office, workshop, staff lockers, bathrooms/ablutions, warehouse, guard house, etc.). The Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Scoping Report) notes that aquatic features within the study area comprise ephemeral unnamed tributaries of the Orange River. The larger watercourses flow along the eastern and western extents of the study area, flowing in a northerly direction to join the Orange River downstream of Van der Kloof Dam. These larger watercourses have wide floodplains. Smaller watercourses and drainage features drain into the larger river corridors. Refer to the Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Scoping Report) for additional information.

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		The infrastructure and structures will exceed a footprint of 10 m^2 and some may occur within small drainage features and 32 m of the watercourses. Additional detail will be provided during the EIA Phase.

Activity 18 (g) (ii) (ee) (ii)	The widening of a road by more than four meters, or the lengthening of a road by more than one kilometre:
	
	g. Northern Cape
	
	ii. Outside urban areas:
	
	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;
	
	(ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;
		The proposed project will take place outside of an urban area, on a site that is classified as an ESA in terms of the 2016 Northern Cape CBA Map. As confirmed with the Northern Cape DAEARDLR, the Northern Cape CBA map includes CBAs as identified in a systematic biodiversity plan adopted by the competent authority. It will be constructed on various affected farm portions, north-east of the town of De Aar, in the Renosterberg Local Municipality and Pixley Ka Seme District Municipality, in the Northern Cape Province.
		
		Existing roads will be used as far as practically achievable. The proposed project study area can be accessed via various existing main roads and unnamed farm gravel roads. The potential access routes are discussed below:
		
		▪ Access Route Option 1:
		  ▪ Route A: Along TR3801, DR3093, and DR3096;
		  ▪ Route B: Along TR3801, DR3093 and DR3084;
		▪ Access Route Option 2:
		  ▪ Route A: Along MR790, DR3093 and DR3084;
		  ▪ Route B: Along MR790 and DR3093;
		  ▪ Route C: Along MR790, DR3093 and DR3096;
		▪ Access Route Option 3:
		  ▪ Route A: Along TR3801, TR3802, and DR3096;
		  ▪ Route B: Along TR3801, TR3802, DR3096 and DR3093; and
		  ▪ Route C: Along TR3801, TR3802, DR3096, DR3093 and DR3084.

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		The existing main roads, divisional roads and unnamed farm gravel roads may need to be upgraded for access to the proposed Kudu Solar cluster, depending on which route is used. Upgrading of the main access point from the R48 is likely to need upgrading. Such upgrading will include lengthening of less than 1 km. Details will be confirmed during the EIA Phase. The Traffic Specialist has also noted that, based on preliminary investigations, the roads leading to the study area are of a sufficient width to accommodate truck movement, however widening by more than 4 m or more than 6 m may be required at localised positions as required (i.e., intersections). Details of this will be provided during the EIA Phase. Details of this will be provided during the EIA Phase. If lengthening of the intersections is required, then such lengthening will not exceed 1 km. Exact details of the length will be confirmed during the EIA Phase. The Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Scoping Report) notes that aquatic features within the study area comprise ephemeral unnamed tributaries of the Orange River. The larger watercourses flow along the eastern and western extents of the study area, flowing in a northerly direction to join the Orange River downstream of Van der Kloof Dam. These larger watercourses have wide floodplains. Smaller watercourses and drainage features drain into the larger river corridors. Refer to the Aquatic Biodiversity Scoping Level Assessment (Appendix G.3 of this Scoping Report) for additional information.

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		The intersection widening may occur within small drainage features and/or 100 m of watercourses. Additional detail will be provided during the EIA Phase.

Activity 23 (ii) (a) (g) (ii) (ee)	The expansion of:
	
	(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;
	
	where such expansion occurs
	
	(a) within a watercourse; if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;
	
	g. Northern Cape
	
	ii. Outside urban areas:
	
	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.
		The proposed project will take place outside of an urban area, on a site that is classified as an ESA in terms of the 2016 Northern Cape CBA Map. As confirmed with the Northern Cape DAEARDLR, the Northern Cape CBA map includes CBAs as identified in a systematic biodiversity plan adopted by the competent authority. It will be constructed on various affected farm portions, north-east of the town of De Aar, in the Renosterberg Local Municipality and Pixley Ka Seme District Municipality, in the Northern Cape Province.
		
		Existing roads will be used as far as practically achievable. The proposed project study area can be accessed via various existing main roads and unnamed farm gravel roads. The potential access routes are discussed below:
		
		▪ Access Route Option 1:
		  ▪ Route A: Along TR3801, DR3093, and DR3096;
		  ▪ Route B: Along TR3801, DR3093 and DR3084;
		▪ Access Route Option 2:
		  ▪ Route A: Along MR790, DR3093 and DR3084;
		  ▪ Route B: Along MR790 and DR3093;
		  ▪ Route C: Along MR790, DR3093 and DR3096;
		▪ Access Route Option 3:
		  ▪ Route A: Along TR3801, TR3802, and DR3096;
		  ▪ Route B: Along TR3801, TR3802, DR3096 and DR3093; and
		  ▪ Route C: Along TR3801, TR3802, DR3096, DR3093 and DR3084.

Listed Activity Number	Listed Activity Description	Description of the portion of the proposed project to which the applicable listed activity relates
		The existing main roads, divisional roads and unnamed farm gravel roads may need to be upgraded for access to the proposed Kudu Solar cluster, depending on which route is used. Upgrading of the main access point from the R48 is likely to need upgrading. Such upgrading will include lengthening of less than 1 km. Details will be confirmed during the EIA Phase. The Traffic Specialist has also noted that, based on preliminary investigations, the roads leading to the study area are of a sufficient width to accommodate truck movement, however widening by more than 4 m or more than 6 m may be required at localised positions as required (i.e., intersections). Details of this will be provided during the EIA Phase. If lengthening of the intersections is required, then such lengthening will not exceed 1 km. Exact details of the length will be confirmed during the EIA Phase. The intersection widening and lengthening constitutes the expansion of infrastructure where the physical footprint is expanded by 10 m^2 or more. Additional detail will be provided during the EIA Phase.

4.3 Screening Tool

As noted above, GN 960 (dated 5 July 2019) stipulates the compulsory requirement (as from 4 October 2019) to submit a report generated by the Screening Tool, when submitting an Application for EA. The proposed project has accordingly been run through the Screening Tool, and the associated report generated and attached to the Application for EA. Additional Screening Tool Reports, showing only the development footprint / Revised Scoping Buildable Area for each project have been run and added to the Amended Application for EA and Appendix H of this FSR.

Based on the selected classification, the Screening Tool provides a list of specialist assessments that should be undertaken as part of the Scoping and EIA Process, as well as identifies the sensitivities on site that need to be verified by either the EAP or the specialists, where relevant, as noted in the Assessment Protocols of 20 March 2020 (GN 320) and 30 October 2020 (GN 1150). The classification that applies to the proposed project is **Utilities Infrastructure; Electricity; Generation; Renewable; Solar; PV**.

The following list of Specialist Assessments have been identified by the Screening Tool for inclusion in the Scoping and EIA Processes (Table 4.2). **The Screening Tool Report notes that it is the responsibility of the EAP to confirm this list and to motivate in the Scoping Report, the reason for not including any of the identified specialist assessments, where relevant**.

As discussed at the Pre-Application Meeting held on 26 April 2022, the DFFE noted that the Screening Tool must be used as a guidance in terms of what studies are required and not required, and that the EAP must confirm this. Hence, the EAP is recommending that certain studies are not required. Refer to the discussion below.

Table 4.2: List of Specialist Assessments identified by the Screening Tool for the proposed project

	Specialist Assessment Required by the Screening Tool	Assessment undertaken in Scoping and EIA Process	Type of Assessment undertaken in Scoping and EIA Process or Motivation/Feedback for not undertaking the recommended study	Appendix of Scoping Report for Scoping Level Assessment (Not EIA Phase Assessment)
1	Agricultural Impact Assessment	Yes	Protocol GN 320: Part B: Agriculture (Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Agricultural Resources by Onshore Wind and/or **Solar PV** Energy Generation Facilities where the Electricity Output is 20 MW or more): **Compliance Statement**	Appendix G.1
2	Landscape/Visual Impact Assessment	Yes	Protocol GN 320: Part A: Site Sensitivity Verification; and Appendix 6 of the 2014 NEMA EIA Regulations (as amended): **Impact Assessment**	Appendix G.5
3	Archaeological and Cultural Heritage Impact Assessment	Yes	Protocol GN 320: Part A: Site Sensitivity Verification; and Appendix 6 of the 2014 NEMA EIA Regulations (as amended): **Impact Assessment**	Appendix G.6
4	Palaeontology Impact Assessment	Yes (Site Sensitivity Verification)	Protocol GN 320: Part A: Site Sensitivity Verification; and Appendix 6 of the 2014 NEMA EIA Regulations	Appendix G.7

Specialist Assessment Required by the Screening Tool		Assessment undertaken in Scoping and EIA Process	Type of Assessment undertaken in Scoping and EIA Process or Motivation/Feedback for not undertaking the recommended study	Appendix of Scoping Report for Scoping Level Assessment (Not EIA Phase Assessment)
			(as amended): **Motivation for no further requirements and no Impact Assessment**	
5	Terrestrial Biodiversity Impact Assessment	Yes	Protocol GN 320: Part B: Biodiversity (Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Terrestrial Biodiversity): **Impact Assessment** **Note that the reporting for Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species are combined in one report.**	Appendix G.2
6	Aquatic Biodiversity Impact Assessment	Yes	Protocol GN 320: Part B: Biodiversity (Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Aquatic Biodiversity): **Impact Assessment** Note there is currently no Species Protocol applicable to Aquatic Plants and Animals.	Appendix G.3
7	Civil Aviation Assessment	Yes (Site Sensitivity Verification)	Protocol GN 320: Part B: Civil Aviation (Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Civil Aviation Installations): **Site Sensitivity Verification or Compliance Statement** The Screening Tool indicates that the proposed project area is of “low” sensitivity. This has been verified and confirmed on site. As per the protocols, a Site Sensitivity Verification is only required. This has been provided in Appendix G.13 of this Scoping Report. The South African Civil Aviation Authority and Air Traffic Navigation Services (ATNS) is included on the Interested and Affected Party (I&AP) database, and were provided with access to the DSR in order to seek comment during the 30-day review period. No comment has been received to date from these stakeholders. Proof of correspondence is included in Appendix E.8 of this FSR. They will be contacted again during the EIA Phase.	Appendix G.13
8	Defence Assessment	Yes (Site Sensitivity Verification)	Protocol GN 320: Part B: Defence (Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Defence Installations): **Site Sensitivity Verification or Compliance Statement** The Screening Tool indicates that the proposed project area is of “low” sensitivity. This has been verified and confirmed on site. As per the protocols,	Appendix G.14

	Specialist Assessment Required by the Screening Tool	Assessment undertaken in Scoping and EIA Process	Type of Assessment undertaken in Scoping and EIA Process or Motivation/Feedback for not undertaking the recommended study	Appendix of Scoping Report for Scoping Level Assessment (Not EIA Phase Assessment)
			a Site Sensitivity Verification is only required. This has been provided in Appendix G.14 of this Scoping Report. The Department of Defence was provided with access to the DSR in order to seek comment during the 30-day review period. No comment has been received to date from this stakeholder. Proof of correspondence is included in Appendix E.8 of this FSR. The Department will be contacted again during the EIA Phase.	
9	Radio Frequency Interference (RFI) Assessment	No	Protocol GN 320: Part A: Site Sensitivity Verification; and Appendix 6 of the 2014 NEMA EIA Regulations (as amended): **Impact Assessment** The Screening Tool indicates that the proposed project area is of medium and low sensitivity in terms of RFI. The medium sensitivity is based on the study area being located between 30 and 60 km from a Weather Radar installation and within the radar's line of sight. ABO Wind has communicated with the South African Weather Service (SAWS). SAWS provided a letter that notes that tests conducted by the SAWS indicated that the proposed projects will not have any direct impact on the SAWS radar station located in De Aar. Therefore, SAWS supports the development of the Kudu Solar Facilities at the proposed location. Therefore, this is not a concern from an RFI perspective. Refer to Appendix H of this Scoping Report for a copy of this correspondence. Furthermore, the SARAO also confirmed that proposed projects represent a low risk of interference to the nearest SKA radio telescope with a compliance surplus of 279.92 dBm/Hz; and as such, the SARAO does not have any objection to the proposed development. Refer to Appendix H of this Scoping Report for a copy of this correspondence. Further to the above, the proposed project is located outside of the KCAAA and thus not expected to impact significantly on the SKA. Therefore, it is proposed not to undertake an RFI Assessment during the EIA Phase. Refer to additional information in Section 4.3.2 below.	Not applicable

Specialist Assessment Required by the Screening Tool		Assessment undertaken in Scoping and EIA Process	Type of Assessment undertaken in Scoping and EIA Process or Motivation/Feedback for not undertaking the recommended study	Appendix of Scoping Report for Scoping Level Assessment (Not EIA Phase Assessment)
10	Geotechnical Assessment	Yes	Appendix 6 of the 2014 NEMA EIA Regulations (as amended): **Impact Assessment** There are no themes on the Screening Tool that currently relate to Geotechnical features that could be verified on site. Hence Part A of GN 320 (Site Sensitivity Verification) is not applicable in this regard.	Appendix G.12
11	Socio-Economic Assessment	Yes	Appendix 6 of the 2014 NEMA EIA Regulations (as amended): **Impact Assessment** There are no themes on the Screening Tool that currently relate to Socio-Economic features that could be verified on site. Hence Part A of GN 320 (Site Sensitivity Verification) is not applicable in this regard.	Appendix G.8
12	Plant Species Assessment	Yes	Protocol GN 1150: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species: **Impact Assessment** **Note that the reporting for Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species are combined in one report.**	Appendix G.2
13	Animal Species Assessment	Yes	Protocol GN 1150: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species: **Compliance Statement** **Note that the reporting for Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species are combined in one report.**	Appendix G.2

4.3.1 Additional Specialist Assessments

It must be noted that the Screening Tool did not identify the need for the following specialist assessments, however these studies have been commissioned as part of the Scoping and EIA Process to ensure that all potential impacts resulting from the proposed project are considered as best as possible:

- **Avifauna Impact Assessment**: The Scoping Level study is included in Appendix G.4 of this Scoping Report, and will be supplemented, as required, during the EIA Phase. The Avifauna Impact Assessment is being undertaken in compliance with GN 1150 (Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species: Impact Assessment);

- **Traffic Impact Assessment**: The Scoping Level study is included in Appendix G.9 of this Scoping Report, and will be supplemented, as required, during the EIA Phase. The Traffic Impact Assessment is being undertaken in compliance with Appendix 6 of the 2014 NEMA EIA Regulations (as amended);
- **BESS High Level Safety, Health and Environment Risk Assessment:** The Scoping Level inputs are included in Appendix G.10 of this Scoping Report, and will be supplemented, as required, during the EIA Phase. This is a technical report and does not need to fulfil the requirements of the 2014 NEMA EIA Regulations (as amended).
- **Geohydrology Impact Assessment**: The Scoping Level study is included in Appendix G.11 of this Scoping Report, and will be supplemented, as required, during the EIA Phase. The Geohydrology Impact Assessment is being undertaken in compliance with Appendix 6 of the 2014 NEMA EIA Regulations (as amended).

4.3.2 RFI Assessment

The Screening Tool identified the need for an RFI Assessment. However, an RFI Assessment is not being undertaken as part of the Scoping and EIA Process because the proposed project does not fall within the KCAAA region, and thus not expected to have a significant impact on the SKA. Refer to the locality map provided in Chapter 1 of this Scoping Report for additional information.

The SARAO confirmed that proposed projects represent a low risk of interference to the nearest SKA radio telescope and that the SARAO does not have any objection to the proposed development. Refer to Appendix H of this Scoping Report for a copy of this correspondence, as well as Section 4.1.1.16 of this chapter for additional information.

The RFI Theme on the Screening Tool indicates medium and low sensitivity due to the proposed project being located between 30 and 60 km from a Weather Radar installation and within the radar's line of sight. Research indicates that this is the De Aar Weather Office. The CSIR Wind and Solar Phase 2 SEA (DEFF, 2019[2]: Part 3.13, Page 2) notes that solar PV development generally does not have an impact on weather surveillance radar, however wind turbines are known to influence such systems. The SEA Report notes that there are no specific assessment requirements for impacts on weather radar systems, and that the South African Weather Services (SAWS) should be consulted for comment where a proposed development is in an area which may impact weather radars. In addition, the SEA explains that in medium sensitivity areas there is a low potential for negative impacts, there is a high likelihood of mitigation in the event of impacts, and further assessment of the potential impacts may not be required. The SAWS did provide comment on the proposed projects and confirmed that tests conducted by the SAWS indicated that the proposed projects will not have any direct impact on the SAWS radar station located in De Aar; and that the SAWS supports the development of the Kudu Solar Facilities at the proposed location.

In addition, photographs of the site are included in the Civil Aviation and Defence Site Sensitivity Verifications (Appendix G.13 and Appendix G.14 of this FSR, respectively). These can be referred to for a general overview of the site.

Based on this, the EAP is of the opinion that an RFI Assessment is not warranted.

This motivation for exclusion was acknowledged by the DFFE during the pre-application meeting, with the recommendation for such motivation to be included in the Scoping Report. All correspondence relating to the pre-application meeting is addressed in Appendix F of this Scoping Report.

4.4 Principles for Scoping and Public Participation

4.4.1 Objectives of the Scoping Phase

This Scoping Process was planned and conducted in a manner that intended to identify and provide sufficient information to enable the authorities to reach a decision regarding the scope of issues to be addressed in this EIA Process, and in particular to convey the range of specialist assessments that will be included as part of the EIA Phase, as well as the approach to these specialist assessments.

As highlighted in Chapter 1 of this Scoping Report, within this context, the objectives of this Scoping Process, as per the 2014 NEMA EIA Regulations (as amended), are to:

- Identify the relevant policies and legislation relevant to the proposed activity;
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Clarify the project scope to be covered;
- Identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
- Identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- Clarify the alternatives being considered and ensure due consideration of alternative options regarding the proposed development, including the “No-go” option;
- Conduct an open, participatory and transparent approach and facilitate the inclusion of stakeholder issues in the decision-making process;
- Identify and inform a broad range of stakeholders about the proposed development;
- Confirm the process to be followed and opportunities for stakeholder engagement;
- Identify and document the key issues to be addressed in the impact assessment phase (through a process of broad-based consultation with stakeholders) and the approach to be followed in addressing these issues;
- Confirm the level of assessment to be undertaken during the impact assessment, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

4.4.2 Introduction to the PPP

This section provides an overview of the tasks that were undertaken in the Scoping Phase, with a particular emphasis on providing a clear record of the PPP that has been followed. An integrated PPP is being undertaken for the 12 Kudu Solar Facilities (Projects 1 to 12) and for the EGI (Projects 13 to 26), as confirmed with the DFFE during the Pre-Application Meeting[7]. As explained in Chapters 1 and 2 of this Scoping Report, the BA and/or EGI Standard Registration Processes for the EGI projects are being undertaken separately.

The integrated PPP for the proposed projects ensures that all public participation documents (such as newspaper advertisements, site notices, notification letters, emails etc.) will serve to notify I&APs, Stakeholders and Organs of State of the joint availability of reports for the abovementioned projects and will provide I&APs with an opportunity to comment on the reports. This approach is being undertaken due to the proximity of the sites (i.e., the proposed projects will take place within the same geographical area) and that proposed projects entail the same activity (i.e., generation of energy using a renewable source (i.e., Solar PV), and distribution of electricity via power lines (which are subjected to separate BA and/or EGI Standard Registration Processes)).

Guideline 4 on "*Public Participation in support of the EIA Regulations*" published by the former Department of Environmental Affairs and Tourism (DEAT) in May 2006, states that public participation is one of the most important aspects of the Environmental Assessment Process. This stems from the requirement that people have a right to be informed about potential decisions that may affect them and that they must be afforded an opportunity to influence those decisions. Effective public participation also improves the ability of the Competent Authority to make informed decisions and results in improved decision-making as the view of all parties are considered.

An effective PPP could therefore result in stakeholders working together to produce better decisions than if they had worked independently. The DEAT guideline states the following in terms of PPP:

- "*Provides an opportunity for I&APs, EAPs and the Competent Authority to obtain clear, accurate and understandable information about the environmental impacts of the proposed activity or implications of a decision;*
    - *Provides I&APs with an opportunity to voice their support, concern and question regarding the project, application or decision;*
    - *Enables an applicant to incorporate the needs, preferences and values of affected parties into its application;*
    - *Provides opportunities for clearing up misunderstanding about technical issues, resolving disputes and reconciling conflicting interests;*
    - *Is an important aspect of securing transparency and accountability in decision-making; and*
    - *Contributes toward maintaining a health, vibrant democracy*."

[7] At the pre-application phase, a total of 15 PV Projects and 17 EGI Projects were proposed, however following the sensitivity mapping, discussions with landowners and capacities of Bid Window 6, the number of projects have been reduced to 12 PV projects and 14 EGI Projects.

To the above, one can add the following universally recognised principles for public participation:

- Inclusive consultation that enables all sectors of society to participate in the consultation and assessment processes;
- Provision of accurate and easily accessible information in a language that is clear and sufficiently non-technical for I&APs to understand, and that is sufficient to enable meaningful participation;
- Active empowerment of grassroots people to understand concepts and information with a view to active and meaningful participation;
- Use of a variety of methods for information dissemination in order to improve accessibility, for example, by way of discussion, documents, meetings, workshops, focus group discussions, and the printed and broadcast media;
- Affording I&APs sufficient time to study material, to exchange information, and to make contributions at various stages during the assessment process;
- Provision of opportunities for I&APs to provide their inputs via a range of methods, for example, via briefing sessions, public meetings, written submissions or direct contact with members of the EIA team; and
- Public participation is a process and vehicle to provide sufficient and accessible information to I&APs in an objective manner to assist I&APs to identify issues of concern, to identify alternatives, to suggest opportunities to reduce potentially negative or enhance potentially positive impacts, and to verify that issues and/or inputs have been captured and addressed during the assessment process.

At the outset it is important to highlight two key aspects of public participation:

- There are practical and financial limitations to the involvement of all individuals within a PPP. Hence, the PPP aims to generate issues that are representative of societal sectors, not each individual and will be designed to be inclusive of a broad range of sectors relevant to the proposed project; and
- The PPP will aim to raise a diversity of perspectives and will not be designed to force consensus amongst I&APs. Indeed, diversity of opinion rather than consensus building is likely to enrich ultimate decision-making. Therefore, where possible, the PPP will aim to obtain an indication of trade-offs that all stakeholders (i.e., I&APs, technical specialists, the authorities and the development proponent) are willing to accept with regard to the ecological sustainability, social equity and economic growth associated with the project.

The Department of Environmental Affairs (2017), Public Participation guideline in terms of the NEMA EIA Regulations is also being considered throughout this Scoping and EIA Process.

The key steps in the PPP for this Scoping and EIA Process are described below and also illustrated in Figure 4.1. This approach is structured in line with the requirements of Chapter 6 (PPP) of the 2014 NEMA EIA Regulations (as amended, i.e., GN R326), as described below. Various mechanisms will be undertaken to provide notice to all potential and registered I&APs of the proposed project, as described below.

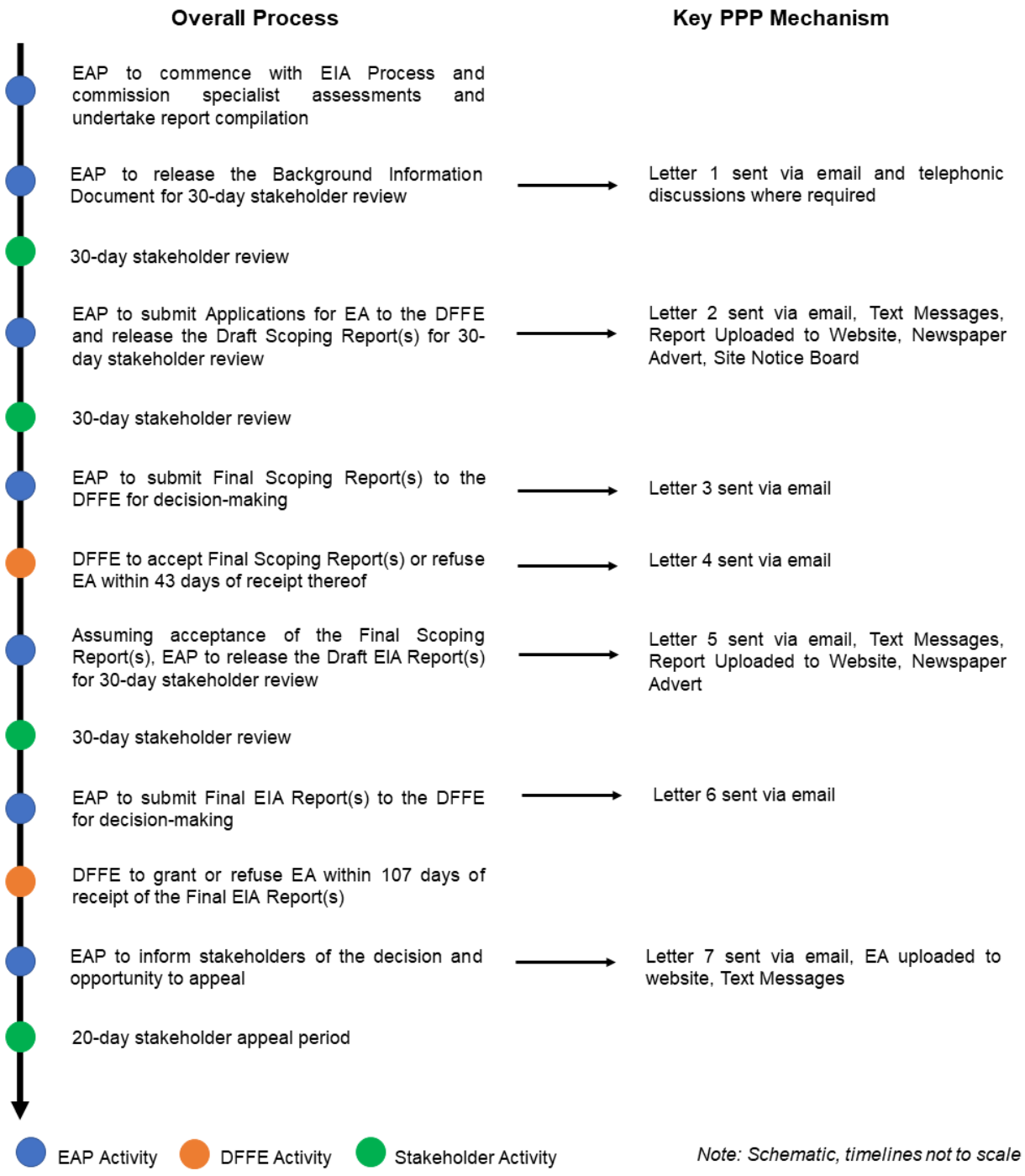

Figure 4.1. Overview of the Scoping and EIA Process and PPP

4.4.3 Requirement for a Public Participation Plan

On 5 June 2020, the Minister of Forestry, Fisheries and the Environment issued Directions in terms of Regulation 4 (10) of the Regulations issued by the Minister of Cooperative Governance and Traditional Affairs in terms of Section 27(2) of the Disaster Management Act, 2002 (Act 57 of 2002). These Directions were published in GG 43412, GN 650 on 5 June 2020, regarding measures to address, prevent and combat the spread of COVID-19 relating to national environmental management permits and licences. GN R650 was applicable to Alert Level 3 and was repealed by GN R970. GN R970, published on 9 September 2020, contained updated related Directions. The above Directions stipulated the need for a Public Participation Plan to document proposals on how the identification of and consultation with all potential I&APs will be ensured in light of the COVID-19 pandemic. However, GN R650 and GN R970 were repealed on 22 March 2022 by GG 46075, GN 1914.

The proposed Public Participation Plan was discussed at the Pre-Application Meeting on 26 April 2022, and the plan was submitted via email to the assigned DFFE Case Officers on 6 May 2022. However, the DFFE confirmed via email on 16 May 2022 that Public Participation Plans are no longer required for Applications for EA. Refer to Appendix E.1 of this Scoping Report for a copy of this email correspondence, confirming that no Public Participation Plan is required for the proposed project.

4.4.4 Pre-Application Consultation with the DFFE

A request for a Pre-Application Meeting was submitted to the DFFE on 5 April 2022 after which the EAP received a response from the DFFE on 6 April 2022 (Reference Number: 2022-04-0005). The DFFE later confirmed via email that a Pre-Application Meeting was scheduled for 26 April 2022. The Pre-Application Meeting was undertaken in order to discuss and agree on various aspects prior to the release of the BID and Scoping Report for comment. The following points were discussed with the DFFE:

- Description of the proposed projects;
- Discussion on the approach towards the reporting, including a request for combination of the projects, in terms of Regulation 11 of the 2014 NEMA EIA Regulations (as amended), and the issuing of multiple EAs (should they be granted) in terms of Regulations 25 (1) and (2) of the 2014 NEMA EIA Regulations (as amended);
- Discussion and confirmation on the specialist assessments and compliance statements to be undertaken; and to discuss and confirm the associated specialist reporting;
- Discussion on the approach towards including Lithium-Ion or Redox Flow BESS;
- Discussion and confirmation of the proposed Public Participation Plan; and
- Discussion of the proposed schedule and overall process for the EIA and BA Processes, including applicable Listed Activities and Cumulative Impact Assessment Approach.

Refer to Appendix F.1 of this Scoping Report for a copy of the Pre-Application Meeting Request Form that was submitted to the DFFE; Appendix F.2 for a copy of the presentation delivered at the Pre-Application Meeting; Appendix F.3 for a copy of the Pre-Application Meeting Notes; Appendix F.4 for the submission of the Pre-Application Meeting Notes to the DFFE; and Appendix F.5 for a copy of correspondence from the DFFE with approval of the Pre-Application Meeting Notes. The

Pre-Application Meeting Notes were submitted to the DFFE via email on 6 May 2022 and approved by the DFFE on 16 May 2022.

As noted above, a request for a combination application and multiple EA approach was also discussed with the DFFE during the Pre-Application Meeting, which was formally submitted to the DFFE in a letter dated 26 May 2022, which was eventually refused. A copy of this refusal letter from the DFFE is included in Appendix F.6 of this Scoping Report.

4.4.5 Landowner Written Consent

Regulation 39 (1) of the 2014 NEMA EIA Regulations (as amended) states that "*if the proponent is not the owner or person in control of the land on which the activity is to be undertaken, the proponent must, before applying for an environmental authorisation in respect of such activity, obtain the written consent of the landowner or person in control of the land to undertake such activity on that land*".

Regulation 39 (2) of the 2014 NEMA EIA Regulations (as amended) further states that "*sub-regulation (1) does not apply in respect of: (a) linear activities; (b) activities constituting, or activities directly related to prospecting or exploration of a mineral and petroleum resource or extraction and primary processing of a mineral or petroleum resource; and (c) strategic integrated projects as contemplated in the Infrastructure Development Act, 2014*".

The proposed project constitutes non-linear activities, and landowner consent is therefore required for the affected properties listed in Chapter 2 of this report.

Written consent has been obtained from the respective landowners of the affected farm portions on which the non-linear infrastructure is proposed to be located. The written consent was included as an appendix to the Application for EA, which was submitted to the DFFE, together with the DSR for comment. The consent has been retained in the Amended Application Form for EA that is being submitted to the DFFE with the FSR for decision-making.

4.4.6 Determination of Appropriate Consultation Measures, and I&AP Identification, Registration and the Creation of an Electronic Database

In order to accommodate the varying needs of I&APs and develop their capacity to participate in the process, information sharing forms an integral and ongoing component of the EIA Process to ensure effective public participation.

In line with Regulation 41 (2) (b) of the 2014 NEMA EIA Regulations (as amended) and prior to the commencement of the Scoping and EIA Processes (and advertising the EA Processes in the local print media), an initial database of I&APs (including key stakeholders and Organs of State) was developed for the Scoping and EIA Processes. This was undertaken based on research.

In line with Regulation 41 (2) (b) of 2014 NEMA EIA Regulations (as amended), the database includes the details of the following:

- Landowners of the affected farm portions;
- Occupiers of the affected farm portions;
- Landowners of the neighbouring adjacent farm portions;
- The municipal councillor of the ward in which the proposed project will be undertaken;
- The municipality which has jurisdiction in the area (i.e., Renosterberg Local Municipality and PKSDM);
- Relevant Organs of State that have jurisdiction in respect of any aspect of the activity (e.g., Northern Cape DAEARDLR (previously operating as the Northern Cape Department of Environment and Nature Conservation (DENC), Department of Water and Sanitation (DWS), DALRRD, Eskom etc.); and
- Any other party as required by the Competent Authority.

In addition, the I&AP database includes the Competent Authority (i.e., DFFE); and potential and registered I&APs.

The above stakeholders, Organs of State and I&APs have accordingly received written notification of the commencement of the Scoping and EIA Processes, and were informed of the release of the DSR for comment, and will be notified of the availability of the Draft EIA Report for comment for the Kudu Solar Facilities (as well as the relevant reports for the EGI Projects 13 to 26 which will be subjected to separate BA and/or EGI Standard Registration Processes).

While I&APs have been encouraged to register their interest in the project from the start of the process, following the public announcements, the identification and registration of I&APs is ongoing for the duration of the study. Stakeholders from a variety of sectors, geographical locations and/or interest groups are expected to show an interest in the proposed project, for example:

- Provincial and Local Government Departments;
- Local interest groups, for example, Councillors and Rate Payers associations;
- Surrounding landowners;
- Farmer Organisations;
- Environmental Groups and NGOs; and
- Grassroots communities and structures.

As per Regulation 42 of the 2014 NEMA EIA Regulations (as amended), in terms of the electronic database, I&AP details will be captured and automatically updated as and when information is distributed to or received from I&APs. This ongoing record of communication is an important component of the PPP. It must be noted that while not required by the regulations, those I&APs proactively identified at the outset of the Scoping and EIA Process will remain on the project database throughout the process and will be kept informed of all opportunities to comment and will only be removed from the database by request.

In accordance with the Protection of Personal Information Act (Act 4 of 2013), the CSIR will conduct itself responsibly when collecting, processing, storing and sharing any personal information collected for the purposes of PPP in terms of the 2014 NEMA EIA Regulations (as amended). By registering as an I&AP and/or submitting information and comments, the stakeholder essentially

consents to the collection, collation, processing, and storing of such information and the use and disclosure of such information for the aforementioned purpose[8].

The above was explained to I&APs in the correspondence issued for the release of the BID and DSR and will be maintained on all remaining correspondence sent throughout the EIA Process. The stakeholders have also been given an opportunity to send an email to the EAP if they wish to opt out of communications on the proposed project.

Appendix D of this FSR includes a copy of the latest I&AP Database, which indicates interaction with I&APs and key stakeholders, as well as all I&APs that have been added to the project database thus far, including those that have submitted comments.

4.4.7 Site Notices

One specific mechanism of informing I&APs of the proposed projects includes the placement of site notice boards. Regulation 41 (2) (a) of the 2014 NEMA EIA Regulations (as amended) requires that a notice board providing information on the project and Scoping and EIA Process is fixed at a place that is conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of the site where the application will be undertaken or any alternative site.

Notice boards in the Afrikaans and English languages were placed at the key affected farm portions on which the proposed projects will be constructed, as well as at other strategic locations, such as well-known retail, public and/or government facilities in the wider region, as indicated in Table 4.3.

Table 4.3: Site Notice Board Placement for the Proposed Projects

Number	Locality / Description	Co-ordinates
1	At the entrance of the Petrusville Community Library on the R48, Petrusville	30°4'55.35"S; 24°39'27.74"E
2	At the entrance of the Frans Jooste Library on the R48, Philipstown	30°26'10.27"S; 24°28'15.51"E
3	At the entrance of the Hennie Liebenberg Junior Library on Voortrekker Street, De Aar	30°39'0.44"S; 24°0'42.46"E
4	At the entrance of the Renosterberg Local Municipality Office on the R48, Philipstown	30°26'8.62"S; 24°28'23.11"E
5	At the entrance of the Renosterberg Local Municipality Office on Skool Street, Petrusville	30° 4'48.58"S; 24°39'24.21"E
6	At the entrance of the Pixley ka Seme District Municipality on Culvert Road, De Aar	30°38'14.31"S; 24°1'21.04"E
7	At the Saamstaan Shopping Centre on Saffier Street, Orania	29°48'47.54"S; 24°24'33.98"E
8	Centrally located between the proposed Kudu Solar Facility 1 and Kudu Solar Facility 2 at an entrance gate to Remaining Extent of the Farm Bas Berg No. 88	30°14'39.15"S; 24°18'15.59"E
9	Centrally located between the proposed Kudu Solar Facility 3 and Kudu Solar Facility 4 along the fence of Remaining Extent of Portion 3 of the Farm Bas Berg No. 88	30°15'43.45"S; 24°18'30.54"E
10	Centrally located at the main access road at the road split, southeast of the proposed Kudu Solar Facility developments	30°17'26.22"S; 24°20'48.07"E
11	Along the fence of Remaining Extent of Portion 3 of the Farm Bas Berg No. 88 on the eastern border of the proposed Kudu Solar Facility 5	30°15'24.33"S; 24°20'0.47"E
12	At an entrance gate of Remaining Extent of Portion 2 (Middel Plaats) (a portion of Portion 1) of the Farm Grasspan No. 40 on the north-eastern border of the proposed Kudu Solar Facility 6	30°11'37.87"S; 24°18'14.99"E

[8] CSIR Privacy Notice. Website: https://www.csir.co.za/csir-privacy-notice

Number	Locality / Description	Co-ordinates
13	Along the fence of Remaining Extent of Portion 2 (Middel Plaats) (a portion of Portion 1) of the Farm Grasspan No. 40 on the southwestern border of the proposed Kudu Solar Facility 7	30°12'16.62"S; 24°18'37.41"E
14	At an entrance gate of Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41 on the southwestern border of the proposed Kudu Solar Facility 11	30°10'12.20"S; 24°21'5.70"E
15	Along the fence of Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41 on the northern border of the proposed Kudu Solar Facility 10	30°10'32.53"S; 24°22'2.50"E

Refer to Appendix E.6 of this Scoping Report for a copy of the content and proof of placement of the site notice boards. The site notice boards include the following, in compliance with Regulation 41 (3) of the 2014 NEMA EIA Regulations (as amended):

- The details of the proposed projects that are subjected to public participation;
- Explanation that a Scoping and EIA procedure is applicable to the proposed Kudu Solar Facilities; and BA procedure *may* be applicable to the EGI needed to support the PV facilities (i.e., Projects 13 to 26);
- The nature and location of the proposed projects;
- Details on where further information on the proposed projects can be obtained; and
- The manner in which and the person to whom representations in respect of the proposed projects can be made.

4.4.8 Newspaper Advertisements

Regulation 41 (2) (c) of the 2014 NEMA EIA Regulations (as amended) requires the placement of a newspaper advertisement in one local newspaper or any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of the NEMA EIA Regulations.

In line with this, in order to notify and inform the public of the proposed projects, to invite I&APs to register on the project database, as well as to inform I&APs of the release of the Scoping Reports for comment, the Scoping and EIA Processes was advertised in the following three local newspapers at the commencement of the 30-day comment period for the Scoping Report: a) Echo/Midland News; b) Noordkaap Bulletin; and c) Bloemnuus. The content of the newspaper advertisement complies with Regulation 41 (3) of the 2014 NEMA EIA Regulations (as amended) and also included the details of the project website, where information available on the proposed project can be downloaded from. Refer to Appendix E.7 of this Scoping Report for a copy of the content of- and proof of placement of -the newspaper advertisements.

At this stage, there are no official Gazettes published specifically for the purpose of providing public notice of applications or other submissions made in terms of the 2014 NEMA EIA Regulations (as amended).

4.4.9 Technical Scoping with the Project Proponent and EIA Team

The Scoping Process was designed to incorporate two complementary components: a stakeholder engagement process that includes the relevant authorities and wider I&APs; and a technical process involving the EIA team and the project proponent.

The purpose of the technical scoping process is to draw on the past experience of the EIA team and the project proponent to identify environmental issues and concerns related to the proposed project and confirm that the necessary specialist assessments have been identified. Most of the specialists have worked with the CSIR on several other projects, as well as having experience from EIAs for other renewable energy projects in the Northern Cape. The specialists were therefore able to identify issues (as shown in Chapter 6 of this Scoping Report) to be addressed in the EIA Phase based on their experience and knowledge of the area and type of activity. Their inputs have informed the scope and Terms of Reference for the specialist assessments (as included in Chapter 7 of this Scoping Report). The findings of the scoping process with input from the stakeholders and the authorities will inform the specialist assessments.

4.4.10 Scoping Report Phase

In terms of Regulation 41 (6) of GN R326 the section below outlines the PPP for the Scoping Phase of this assessment in order to provide potential I&APs, Stakeholders and Organs of State access to information on the project and the opportunity to comment at the various stages of the scoping process.

4.4.10.1 Review of the BID

As noted above, the BID for the proposed projects was released to I&APs, Stakeholders and Organs of State for a 30-day comment period. This was undertaken in order to accommodate the varying needs of I&APs as well as capture their views and issues regarding the proposed project during the Project Initiation Phase. The section below summarises the PPP for the review of the BID.

- **Database Development and Maintenance:** In line with Regulation 41 (2) (b) of GN R326, an initial database of potential I&APs was developed for the Scoping and EIA Process and will be updated throughout the process.
- **Letter 1 to I&APs (Commencement of the Environmental Assessment Processes):** Written notification of the availability of the BID (i.e., Letter 1) was sent to all I&APs and Organs of State, and affected and adjacent landowners, included on the project database via email, where email addresses are available. This letter was sent at the commencement of the 30-day review period on the BID and included information on the proposed projects and notification of the release and availability of the BID. Letter 1 was written in English. Proof of email, as well as copies of the Letter 1 and emails sent are included in Appendix E.3 of this Scoping Report.
- **30-day Comment Period:** As noted above, potential I&APs, including authorities and Organs of State, were notified via Letter 1, of the 30-day comment and registration period within which to submit comments on the BID and/or to register on the I&AP database. The comment period extended from 6 June 2022 to 7 July 2022 (excluding public holidays).
- **Availability of Information:** The BID (Appendix E.2 of this Scoping Report) was uploaded to the project website (i.e., https://www.csir.co.za/environmental-impact-assessment) for I&APs to access it. The BID was also uploaded onto SAHRIS. Refer to Appendix E.3 of this Scoping Report for proof of such uploading.
- **Comments Received:** A key component of the Scoping and EIA Process is documenting and responding to the comments received from I&APs and the authorities. Copies of all comments received during the review of the BID are included in Appendix E.4 of this Scoping Report.
- **Issues and Responses Trail:** The comments received from I&APs, via email, during the 30-day review of the BID, were captured in the Issues and Responses Trail contained in Appendix

E.5 of this Scoping Report. The Issues and Responses Trail includes comments received from I&APs, stakeholders, and affected authorities in response to the first notification distributed on the proposed project. The Issues and Responses Trail also includes responses from the EIA team (and, in some cases, the project proponent) to the issues raised. In general, the responses indicate how the issues will be addressed in the EIA Process. In some cases, immediate responses and clarification were provided. Where issues were raised that the EIA team considers beyond the scope and purpose of this EIA Process, clear reasoning for this view was provided.

4.4.10.2 Review of the Scoping Report

The Scoping Report for the proposed project was released to I&APs, Stakeholders and Organs of State for a 30-day comment period extending from 09 December 2022 to 30 January 2023 (excluding the DFFE regulated shutdown period, as per Regulation 3 (2) of the 2014 NEMA EIA Regulations (as amended). The section below summarises the PPP undertaken for the review of the DSR.

- **Database Development and Maintenance:** In line with Regulation 41 (2) (b) of GN R326, an initial database of potential I&APs was developed for the Scoping and EIA Process and will be updated throughout the process. Refer to Appendix D of this FSR for a copy of the latest I&AP database that includes all I&APs that have registered, commented on the DSR and have been communicated with during the 30-day review period.
- **Site Notice Boards:** As noted in Section 4.4.7 above, notice boards have been placed for the proposed projects. A copy of the content and proof of placement of the notice boards is included in Appendix E.6 of this Scoping Report.
- **Advertisements to Register Interest:** As noted in Section 4.4.8 above, an advertisement was placed in Afrikaans and English in three local newspapers (Echo / Midland News; Noordkaap Bulletin; and Bloemnuus) at the commencement of the 30-day comment period for the Scoping Report. A copy of the content of- and proof of placement of -the newspaper advertisements is included in Appendix E.7 of this Scoping Report.
- **Submission of the Application for EA and Scoping Report to the DFFE and DFFE Acknowledgement of Receipt**: The Application Form for EA and Scoping Report was submitted to the DFFE via the DFFE Novell S-Filer System on 9 December 2022 and proof of upload was emailed to the DFFE. Proof of submission of the Scoping Report for comment and Application for EA to the DFFE and proof of upload to the DFFE Novell S-Filer System is included in Appendix E.9 of the FSR. The DFFE acknowledged receipt of the Applications for EA and DSRs for comment on 9 December 2022 (as included in Appendix E.10 of this FSR), and assigned the following reference numbers to the projects:
    - Kudu Solar Facility 1: 14/12/16/3/3/2/2244;
    - Kudu Solar Facility 2: 14/12/16/3/3/2/2245;
    - Kudu Solar Facility 3: 14/12/16/3/3/2/2246;
    - Kudu Solar Facility 4: 14/12/16/3/3/2/2247;
    - Kudu Solar Facility 5: 14/12/16/3/3/2/2248;
    - Kudu Solar Facility 6: 14/12/16/3/3/2/2249;
    - Kudu Solar Facility 7: 14/12/16/3/3/2/2250;
    - Kudu Solar Facility 8: 14/12/16/3/3/2/2251;
    - Kudu Solar Facility 9: 14/12/16/3/3/2/2252;
    - Kudu Solar Facility 10: 14/12/16/3/3/2/2253;
    - Kudu Solar Facility 11: 14/12/16/3/3/2/2254; and

  - Kudu Solar Facility 12: 14/12/16/3/3/2/2255.
- **Letter 2 to I&APs (Release of the Scoping Report for the Kudu Solar Facilities 1 to 12):** Written notification of the availability of the Scoping Report (i.e., Letter 2) was sent to all I&APs, stakeholders and Organs of State included on the project database via email, where email addresses are available. This letter was sent at the commencement of the 30-day review period on the DSR (i.e., on 9 December 2022) and included information on the proposed projects and a notification of the release and availability of the report. Letter 2 was written in English. Proof of email, as well as copies of the Letter 2, have been included in Appendix E.8 of this FSR that is being submitted to the DFFE for decision-making.
- **Text Messaging:** SMS texts were sent to all I&APs on the database, where cell phone numbers are available, to inform them of the proposed projects and how to access the Scoping Report. These text messages were sent on 9 December 2022 for the release, and 17 January 2023 as a reminder of the comment period closure. Refer to Appendix E.8 of this FSR for proof of text message consultation.
- **Executive Summaries of the Scoping Report:** Executive Summaries of the Scoping Report was uploaded to the project website.
- **30-day Comment Period:** As noted above, potential I&APs, including authorities and Organs of State, were notified via Letter 2, of the 30-day comment and registration period within which to submit comments on the Scoping Report and/or to register on the I&AP database.
- **Broader Networks**: Attempts were made to contact the ward councillor(s) to request that they send notifications of the projects as well as report availability and executive summaries via their local networks (such as WhatsApp groups, Neighbourhood Watch groups, other social media mechanisms, etc.). However, no feedback was obtained. Refer to Appendix E.8 of this FSR for proof of correspondence.
- **Availability of Information:** The Scoping Report was made available for a 30-day comment period and was distributed electronically to ensure access to information on the project and to communicate the Plan of Study for the EIA Phase. The Scoping Report was uploaded to the project website (i.e., https://www.csir.co.za/environmental-impact-assessment) for I&APs to access it. As a supplementary mechanism, the Scoping Report was also uploaded to another alternative web-platform (i.e., Google Drive: https://bit.ly/KUDU_SOLAR_PV). As noted in the DSR, if an I&AP could not access the report via the project website or Google Drive, and if additional information was required (other than what was provided in the Executive Summaries), then the I&AP could contact the EAP, to then make an electronic copy available (*where feasibly possible*). However, no such requests were received during the 30-day comment period of the DSR. As a supplementary mechanism, the DSRs were also saved onto USBs and sent to key libraries (i.e., Philipstown Library, Petrusville Library, and Hennie Liebenberg Junior Library) via courier, should any party wish to refer to the report. Refer to Appendix E.8 of this FSR for the proof of courier.
- **Reminder / Follow Up Emails of the Comment Period Closure**: A number of reminder / follow up emails informing stakeholders of the comment period closure and to seek comments were sent to I&APs, stakeholders and Organs of State included on the project database, where email addresses are available. Refer to Appendix E.8 of this FSR for proof of such correspondence.
- **Comments Received:** A key component of the Scoping and EIA Process is documenting and responding to the comments received from I&APs and the authorities. Copies of all comments received during the 30-day review of the DSR are included in Appendix E.10 of this FSR, as well as in the Issues and Responses Trail in Appendix E.11, as completed for the BID (refer to Section 4.10.1 of this chapter). Comments were received from the following stakeholders during the 30-day review of the DSR:

- DFFE Chief Directorate: Integrated Environmental Authorisations (Competent Authority);
- DFFE: Biodiversity Conservation / CBO: Biodiversity Mainstreaming and EIA Directorate;
- DFFE: Protected Areas Planning and Management Effectiveness Directorate;
- Northern Cape DAEARDLR Environmental Research and Development (ERD);
- Eskom;
- Telkom;
- SAHRA; and
- Various private individuals / I&APs.

4.4.11 Compilation of the FSR for Submission to the DFFE (Current Stage)

Following the 30-day commenting period of the Scoping Report and incorporation of the comments received into the report, the FSR will be submitted to the DFFE in line with Regulation 21 (1) of the 2014 NEMA EIA Regulations (as amended). The reports will be submitted electronically to the DFFE via the Novell S-Filer system, as recommended by the DFFE since June 2020.

In line with best practice, I&APs on the project database will be notified via Letter 3 via email (where email addresses are available) of the submission of the FSR to the DFFE for decision-making. To ensure ongoing access to information, copies of the FSR that will be submitted for decision-making, will be placed on the project website (i.e., https://www.csir.co.za/environmental-impact-assessment). As a supplementary mechanism, the FSR will also be uploaded to other alternative web-platforms such as Dropbox or Google Drive.

The FSR that will be submitted for decision-making to the DFFE will include proof of the PPP that was undertaken to inform Organs of State, Stakeholders and I&APs of the availability of the Scoping Report for the 30-day review (as explained above).

The DFFE will have 43 days (from receipt of the FSR) to either a) accept the scoping report, with or without conditions, and advise the applicant to proceed with the tasks contemplated in the plan of study for EIA; or b) refuse EA (respectively in line with Regulation 22 (a) and (b) of the 2014 NEMA EIA Regulations, as amended). In line with best practice, I&APs on the project database will be notified via Letter 4 via email (where email addresses are available) of the outcome of the decision-making on the FSR.

This step marks the end of the PPP for the Scoping Phase. The PPP for the subsequent EIA Phase is presented in the Plan of Study for the EIA i.e., Chapter 7 of this Scoping Report.

4.5 Schedule for the Scoping and EIA Processes

The proposed schedule for the Scoping and EIA Processes based on the legislated EIA timeframes, is presented in Table 4.4. It should be noted that this schedule could be revised during the EIA Process, depending on factors such as the time required for decisions from authorities.

As noted above, the BA and/or EGI Standard Registration Processes will be undertaken separately for the EGI Projects 13 to 26. However, where possible the processes will be aligned with the Scoping and EIA Processes as best as possible, including PPP mechanisms, where relevant.

Table 4.4: Provisional Schedule for the proposed Kudu Solar Facilities 1 to 12 (Projects 1 to 12)

Key Milestones	Proposed Timeframe
Appointment of CSIR by ABO Wind	December 2021
Appointment of Specialists	January 2022 to early March 2022
Specialist Site Visits	February 2022 to May 2022
Project Initiation and Pre-Application Consultation with the Department of Forestry, Fisheries and the Environment (DFFE)	April 2022
Approval of Notes of the Pre-Application Meeting	16 May 2022
Submission of Combination Request	26 May 2022
DFFE Decision on the Combination Request	21 June 2022
Release Background Information Document (BID) for 30-day comment period for the Kudu Solar Facilities Environmental Impact Assessment (EIA) Projects and the Electricity Grid Infrastructure (EGI) Basic Assessment (BA) Projects	6 June 2022 to 7 July 2022 (excluding Public Holidays)
Specialist Inputs to the Draft Scoping Reports (DSRs) for the Kudu Solar Facilities EIA Projects (Projects 1 to 12)	May 2022 to December 2022
Prepare DSRs and Plan of Study for EIA including specialist inputs for the Kudu Solar Facilities EIA Projects (Projects 1 to 12)	May 2022 to December 2022
Release DSRs for the Kudu Solar Facilities EIA Projects (Projects 1 to 12) for 30-day comment period	9 December 2022 to 30 January 2023 (excluding mandatory regulated shutdown period)
Submit Final Scoping Reports (FSRs) for the Kudu Solar Facilities EIA Projects (Projects 1 to 12) to the DFFE for Decision-Making	Mid-February 2023
DFFE to Accept FSRs for the Kudu Solar Facilities EIA Projects (Projects 1 to 12) or Refuse EAs	End March 2023
Specialist Assessments for the Kudu Solar Facilities EIA Projects (Projects 1 to 12)	December 2022 to mid-April 2023
Prepare Draft EIA Reports for the Kudu Solar Facilities EIA Projects (Projects 1 to 12)	December 2022 to end April 2023

Key Milestones	Proposed Timeframe
Release Draft EIA Reports for the Kudu Solar Facilities EIA Projects (Projects 1 to 12) for 30-day comment period	May 2023 to early June 2023
Submit Final EIA Reports for the Kudu Solar Facilities EIA Projects (Projects 1 to 12) to DFFE for Decision-Making	Mid-June 2023
DFFE Decision-Making on the Final EIA Reports and issue of Decisions (i.e., grant or refuse EA): 107 days	Early October 2023
EAP to Notify I&APs of Decisions (14 days)	Mid-October 2023

CHAPTER 5:

Project Alternatives

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5. APPROACH TO THE ASSESSMENT OF ALTERNATIVES

This chapter discusses the alternatives that have been considered as part of the Scoping Phase, as well as the selection process of the preferred alternatives that will be considered and assessed as part of the Environmental Impact Assessment (EIA) Phase. Sections 24(4) (b) (i) and 24(4A) of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) require an Environmental Assessment to include investigation and assessment of impacts associated with alternatives to the proposed project. In addition, Section 24O (1)(b)(iv) also requires that the Competent Authority, when considering an application for EA, takes into account "*where appropriate, any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment*".

Therefore, the assessment of alternatives should, as a minimum, include the following:

- The consideration of the no-go alternative as a baseline scenario;
- A comparison of the reasonable and feasible alternatives; and
- Providing a methodology for the elimination of an alternative.

The 2014 NEMA EIA Regulations (as amended) define "alternatives", in relation to a proposed activity, "as different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

- property on which or location where the activity is proposed to be undertaken;
- type of activity to be undertaken;
- design or layout of the activity;
- technology to be used in the activity;
- operational aspects of the activity; and
- includes the option of not implementing the activity".

Appendix 2 of the 2014 NEMA EIA Regulations (as amended) provides the following objectives, *inter alia*, of the Scoping Process in relation to alternatives:

- To identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks; and
- To identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment.

The Scoping Report is therefore required to provide a full description of the process followed to reach the proposed preferred activity, technology, site and location of the development footprint within the site, including details of all the alternatives considered and the outcome of the site selection matrix. The details presented in this chapter applies to the Kudu Solar Facility 2 (hereafter referred to as the "Kudu Solar Facility" or "proposed project").

5.1 Assessment of Alternatives

5.1.1 No-go Alternative

The no-go alternative assumes that the proposed project will not go ahead i.e. it is the option of not developing the proposed solar photovoltaic (PV) facility and associated infrastructure. This alternative would result in no environmental impacts on the site or surrounding local area as a result of the proposed project. It provides the baseline against which other alternatives are compared. The following implications will occur if the “no-go” alternative is implemented (i.e. the proposed project does not proceed):

- No benefits will be derived from the implementation of an additional land-use;
- No additional power will be generated or supplied through means of renewable energy resources by the proposed project at this location;
- The “no go” alternative will not contribute to and assist the government in achieving its renewable energy target of 26 630 MW total installed capacity by 2030 (for Wind, Solar PV and Concentrated Solar Power (CSP)) (Integrated Resource Plan (IRP), 2019);
- Electricity generation will remain constant (i.e. no renewable energy generation will occur on the site for the proposed project) and as a result, the local economy in terms of surrounding communities and towns within the local municipality will not be diversified, while existing electricity generation sources nationally will age and degrade over time, with maintenance requirements potentially leading to outages;
- There will be lost opportunity for skills transfer and education/training of local communities;
- The positive socio-economic impacts likely to result from the project such as increased local spending and the creation of local employment opportunities will not be realised;
- There will be no opportunity for additional employment in an area, where job creation is identified as a key priority;
- The local economic benefits associated with the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) will not be realised, and socio-economic contribution payments into the local community trust will not be realised;
- The development of solar PV facilities instead of coal fired power stations can directly contribute to South Africa’s response to climate mitigation; and
- Wind and solar energy are the cheapest source of electricity in South Africa, as seen in the REIPPPP Bidding Window 5 Preferred Bidder announcement on 28 October 2021. The development of the proposed Solar PV Facilities can contribute to the competitive nature of the REIPPPP to drive prices down even further to ensure that South Africans have access to affordable yet clean electricity.

Converse to the above, the following benefits could occur if the “no-go” alternative is implemented:

- Only the agricultural land use (livestock farming) will remain;
- No vegetation or protected species (flora) will be removed or disturbed during the development of the proposed project;
- No aquatic resources will be impacted upon during the construction and operation of the proposed project;
- No destruction of habitat will occur;

- No change to the current landscape will occur (i.e. the visual character of the area will remain unchanged);
- No heritage features will be impacted on;
- No noise impacts associated with construction activities will occur;
- No avifaunal impacts will occur due to the establishment of the project;
- No additional traffic will be generated; and
- No additional water use will be required.

The no-go alternative will be considered further by the specialists during the EIA Phase. Some of the specialists have discussed the no-go alternative in the current Scoping Level Specialist Assessments captured in Appendix G of this Scoping Report. It is important to note that none of the Scoping Level Specialist Assessments have identified any environmental fatal flaws, and overall, the high-level Scoping Phase Impact Assessments (as captured in Chapter 6 of this Scoping Report) have not resulted in any unacceptable residual impacts.

The no-go alternative means no addition of renewable energy, which means further reliance on fossil fuels that will continue to have a negative environmental impact. While the no-go alternative i.e. not developing the proposed project will not result in any negative environmental impacts in the area, it will also not have any positive community development or socio-economic benefits. In addition, it will not assist government in addressing climate change, reaching its set targets for renewable energy, nor will it assist in supplying the increasing electricity demand within the country. **Hence, the no-go alternative is not the preferred alternative, nor is it a reasonable and feasible alternative to be considered in this Scoping Process**.

5.1.2 Land-Use Alternatives

According to the Agricultural Compliance Statement, included in Appendix G.1 of the Scoping Report, the arid climate is the limiting factor for land capability, regardless of the soil capability and terrain. Moisture availability is insufficient for crop production without irrigation and the potential agricultural land use of the study area is therefore limited to grazing. The farm portions forming part of the study area are used for grazing sheep and game. Grazing capacity of the study area is fairly low at 20 hectares (ha) per large stock unit.

The Agricultural Site Sensitivity Verification verifies that the entire study area is classified as low and medium agricultural sensitivity with a land capability value of 5 to 6, which is in line with the climate limitations that make the site totally unsuitable for dryland crop production. There is no scarcity of such agricultural land in South Africa and its conservation for agricultural production is not therefore a priority. The proposed project offers positive impact on agriculture by way of improved financial security for farming operations, as well as security benefits against stock theft and other crime.

Hence, the agricultural land use is not a preferred alternative, and is not deemed as feasible to be considered in the EIA Phase, based on the motivation provided above.

5.1.3 Renewable Energy Alternatives

In terms of the type of activity, this relates to the generation of electricity from a renewable energy source, and in this particular case, from **solar** resources. As indicated in Chapter 1 of this Scoping Report, the South African subsidiary of ABO Wind focuses on solar, wind and biogas technologies and works with landowners, technology providers, regulators and investors to source and develop renewable energy projects. Therefore, the **generation of electricity from a renewable energy source** was the only activity considered by the Project Applicant, and thus considered in this Scoping Report. **No other activity types were considered or deemed appropriate based on the expertise of the Project Applicant, as motivated below**.

Where the "activity" is the generation of electricity from a renewable energy source, possible alternatives that could potentially be considered include Biomass, Hydro Energy, Wind Energy and Solar Energy. However, based on the preliminary investigations undertaken by the Project Applicant, **Solar PV development is the preferred technology alternative** and no other renewable energy technologies are deemed to be feasible for the study area. The unsuitability of other renewable energy technologies in the study area, and impacts of each, are discussed below.

5.1.3.1 Biomass Energy

The proposed project study area does not contain an abundant or sustainable supply of biomass. As indicated in Figure 5.1, the proposed project area has less than 5 000 t/a annual forestry residue, which is the lowest for this category. Therefore, the study area does not have any biomass energy potential.

Therefore, the implementation of a Biomass Energy Facility within the study area is not considered to be a reasonable and feasible alternative to be assessed as part of this Scoping and EIA Process.

5.1.3.2 Hydro Energy

The proposed project study area does not contain any large inland water bodies, which excludes the possibility of renewable energy from small- or large-scale hydro energy generation. In terms of macroscale hydropower potential (Figure 5.1), the study area falls within an area classified as "Not Suitable" (i.e. less than 1 000 kWh/year).

Therefore, the implementation of a Hydro Energy Facility within the study area is not considered to be a reasonable and feasible alternative to be assessed as part of this Scoping and EIA Process.

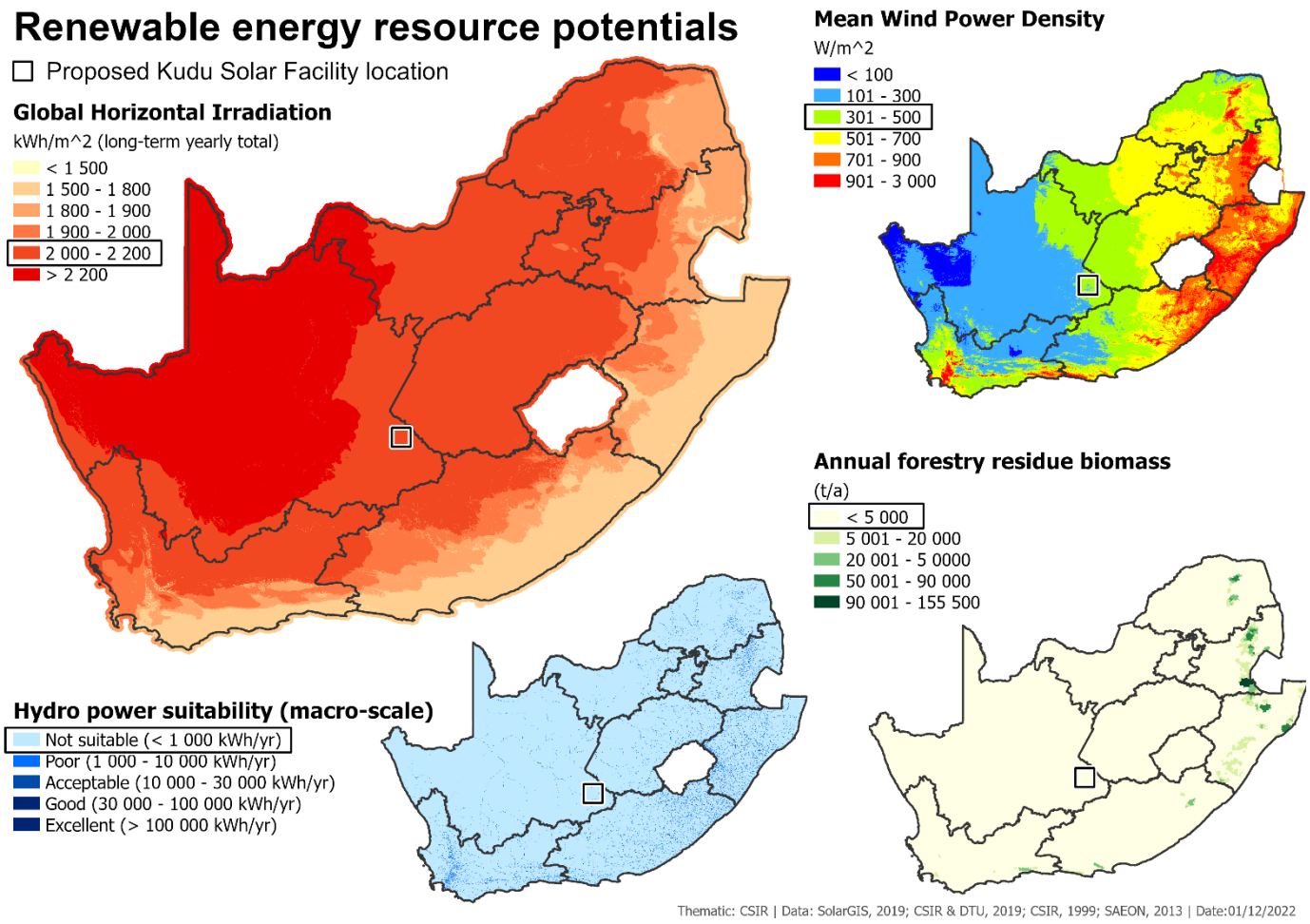

Figure 5.1: Solar Resource Availability / Global Horizontal Irradiation (kWh/m^2); Annual Mean Wind Power Density (W/m^2); Hydropower Potential (kWh/year); and Biomass Potential in terms of Annual Forestry Residue (t/a) for South Africa. The proposed project location is indicated by the black square.

5.1.3.3 Wind and Solar Energy

5.1.3.3.1 National Planning: IRP 2019

The 2019 IRP was published in Government Gazette (GG) 42784, Government Notice (GN) 1360 on 18 October 2019 for the period 2019 to 2030. As indicated in Figure 5.2 for the projection to 2030, coal makes up approximately 43 % of the total installed capacity, whereas Wind and Solar PV respectively make up 23 % and 10 % (Table 5, Page 42 of the IRP 2019 published in GG 42784).

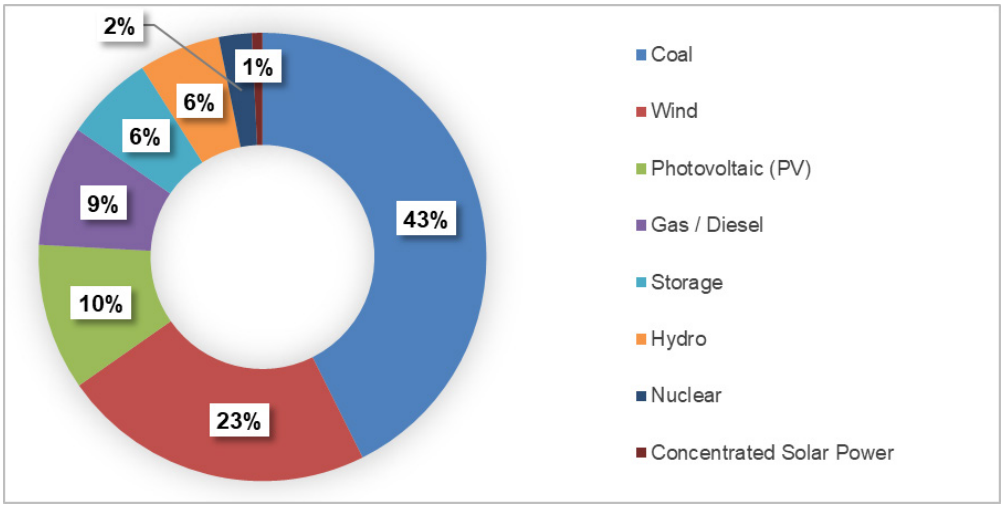

Figure 5.2: Total Installed Capacity for 2030 (% of MW) in the IRP of 2019.

The 2019 IRP proposes to secure 26 630 MW of renewable energy capacity by 2030 (for Wind, Solar PV and CSP). This amount excludes Hydropower and Storage. Of this total, 1 474 MW of Solar PV, 1 980 MW of Wind and 300 MW of CSP is already installed capacity. In addition, of the 26 630 MW, approximately 814 MW of Solar PV, 1 362 of Wind and 300 MW of CSP is committed or already contracted capacity. Furthermore, of the 26 630 MW total, 6 000 MW is allocated to Solar PV, and 14 400 MW is allocated to wind as new additional capacity. Refer to Figure 5.3 for additional information.

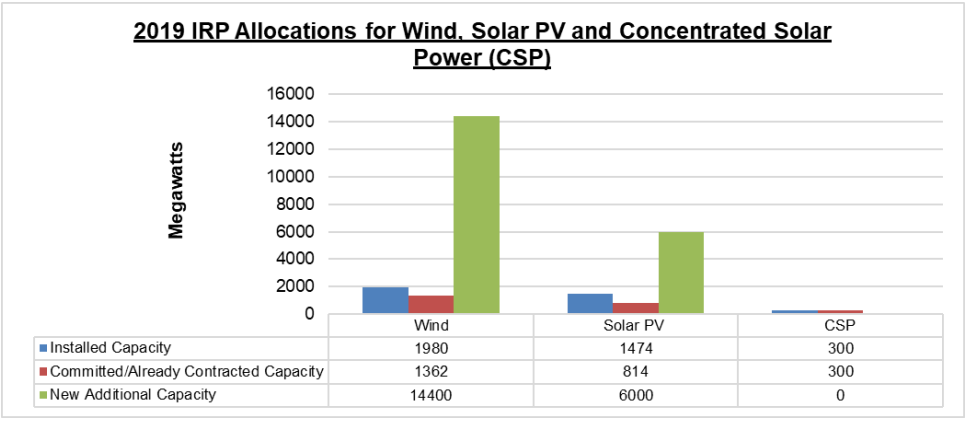

Figure 5.3: 2019 IRP Allocations for Wind, Solar and CSP in MW.

As part of the rollout of renewable energy in the country, the Department of Mineral Resources and Energy (DMRE) developed a bidding process for the procurement of a set amount (MW) of renewable energy in accordance with the IRP from Independent Power Producers (IPPs). The REIPPPP was launched in 2011 to implement the vision of the IRP and it included several bidding rounds (called "Bidding Windows"). To date, Bidding Windows 1, 2, 3, 3.5, 4, 5 and 6 have been announced.

On 18 August 2015, an additional procurement target of 6 300 MW to be generated from renewable energy sources was added to the REIPPPP for the years 2021 - 2025, as published in GN 733, GG 39111. Of this, the additional target allocated for solar PV was 2 200 MW.

On 28 October 2021, the Minister of Mineral Resources and Energy (DMRE, 2021a[1]) announced the Preferred Bidders of Bid Window 5 of the REIPPPP, which was released in April 2021. The aim was to procure a total of 2 600 MW (consisting of 1 600 MW from onshore wind and 1 000 MW from Solar PV). Approximately 102 Bids were submitted in August 2021. Twenty-five (25) Preferred Bidder Projects, totalling 2 583 MW, were selected (DMRE, 2021a[1]). Of the 2 583 MW, approximately 1 608 MW and 975 MW will be respectively procured from 12 wind projects and 13 Solar PV projects (DMRE, 2022a[2]). In Bid Window 5, the Preferred Bidders provided an average tariff of 50 c/kWh for wind and of 43 c/kWh for solar PV. This is a considerable reduction in tariff from Bid Window 4 in November 2015 where the tariff provided for wind and solar PV were both 78 c/kWh. This confirms the crucial role that renewable energy is playing in being the lowest cost energy alternative in South Africa, while supporting the decarbonisation of the power system and ensuring that electricity is cost-effective and sustainable.

According to the IPP Office, in a presentation made at the Bid Window 6 Bidders' Conference on 7 July 2022 (IPP Office, 2022b[3]), as of March 2022 (excluding Bid Window 5 statistics), the DMRE had selected 92 Preferred Bidders, with a total combined electricity capacity of 6 323 MW procured, of which 5 826 MW is already operational from 87 IPPs.

Bid Window 6 was announced in April 2022 and closed on 3 October 2022, and will aim to procure 4200 MW (i.e. 3 200 MW from wind and 1 000 MW from Solar PV).

On 7 July 2020, in GG 43509, GN R753, the Minister of Mineral Resources and Energy, in consultation with the National Energy Regulator of South Africa (NERSA), determined that new generation capacity needs to be procured to contribute towards energy security. Specifically, the gazette noted that 2000 MW needs to be procured from a range of energy source technologies in accordance with the short-term risk mitigation capacity allocated for the years 2019 to 2022 (under "other" in the allocation table contained in 2019 IRP). In line with this, the Risk Mitigation IPP Procurement Programme (RMIPPPP) was designed and launched in August 2020 by the DMRE in order to fulfil the GN R753 Ministerial Determination. Bids were submitted by various IPPs on

[1] DMRE (2021a). Announcement by the Minister of Mineral Resources and Energy, the Honourable Gwede Mantashe 28 October 2021 Renewable Energy IPP Procurement Programme (REIPPPP) Bid Window 5 Announcement of Preferred Bidders. https://ipp-projects.co.za/PressCentre [online]. Accessed November 2021.

[2] DMRE (2022a). Media Statement by the DMRE: Signing of an additional three project agreements under the 5th Bid Window of the Renewable Energy Independent Power Producer Programme (REIPPPP BID WINDOW 5), dated 10 November 2022. https://ipp-projects.co.za/PressCentre [online]. Accessed November 2022.

[3] IPP Office (2022b). Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) Bid Window 6 Bidders' Conference dated 7 July 2022. https://ipp-projects.co.za/PressCentre [online]. Accessed August 2022.

22 December 2020, and on 18 March 2021, the Minister of Mineral Resources and Energy, announced eight Preferred Bidders selected under the RMIPPPP, totalling 1 845 MW (DMRE, 2021b[4]). Three additional Preferred Bidder projects were also announced on 1 June 2021 under the RMIPPPP with a combined capacity of 150 MW, resulting in a total of approximately 1 995 MW to be procured under the RMIPPPP (DMRE, 2021c[5]).

As indicated in Chapter 2 of this Scoping Report, the proposed project forms part of a cluster of 12 Solar PV Facilities, which will each have a generation capacity that ranges from 50 MWac to 350 MWac. **It is intended for these projects to be bid under the future rounds of the REIPPPP or similar bidding processes, following the issuing of Environmental Authorisations (EAs), should such be granted**.

5.1.3.3.2 Wind Energy

In order to ensure that a Wind Energy Facility is successful, a reliable wind resource is required. Wind resource is defined in terms of average wind speed and includes Weibull distribution (used to describe wind speed distributions); turbulence, wind direction, and pattern of wind direction (as depicted by a wind rose). These factors are all key considerations used in determining whether a site is suitable for the development of a Wind Energy Facility. A mean wind power density map has been created (CSIR, 2018), which is not related to any specific turbine type and demonstrates the wind resource of the country. The mean wind power density map shows that the project study area falls within an area of approximately 301 – 500 W/m^2 (Figure 5.1).

Overall, wind energy development can occur within this area but other localities in South Africa may be more favourable for such development. Site specific requirements for **Wind Energy Facilities** however make this proposed project study area a **less feasible alternative** when compared to solar PV.

The Avifauna Scoping Level Assessment (Appendix G.4 of the Scoping Report) notes that a suspected Verreaux's Eagle nest is present on the Hydra - Perseus 1 765 kV high voltage line within the study area for the proposed project. The Avifauna Specialist has recommended a 1 km all infrastructure exclusion zone around this nest to prevent the displacement of the breeding pair during the construction phase due to disturbance. In addition, the buffer area will reduce the risk of injury to the juvenile bird due to collision with the solar panels, when it starts flying and practicing its hunting technique around the nest. This buffer is in relation to the development of a solar PV project. For a proposed wind development, the buffer around this nest would be greater. According to the Avifauna Specialist, the wind energy buffers for Verreaux's Eagle are generally 3.7 km for a turbine exclusion zone, and 5.2 km buffer for medium sensitivity, wherein mitigation is required. Alternatively, a Verreaux's Eagle Risk Assessment (VERA) would be required for the wind energy development in order to inform the layout, and the results could be more restrictive.

[4] DMRE (2021b). Media Statement: To Announce Preferred Bidders for the Risk Mitigation IPP Procurement Programme (RMIPPPP). https://www.dmr.gov.za/news-room/post/1894/media-statement-to-announce-preferred-bidders-for-the-risk-mitigation-ipp-procurement-programme-rmipppp [online]. Accessed November 2021.

[5] DMRE (2021c). Media Statement: Department of Mineral Resources and Energy Announces Three Additional Preferred Bidders Appointed under the Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP). https://www.ipp-rm.co.za/ [online]. Accessed November 2021.

Therefore, it is understood that the development of wind energy within the study area would most likely result in impacts that are more difficult to manage and that there would be limited space available based on Very High sensitivities. Furthermore, one of the aims is to try and receive EA (should it be granted) as promptly as possible in order to ensure the project is bid in the next bidding windows of the REIPPPP or similar tender processes; and development of Wind Energy Facilities would need at least 12 months of pre-construction monitoring for birds and bats. In addition, for wind energy developments, collecting on-site wind data is necessary to confirm both the presence of the wind resource on site and the bankable viability of the proposed project. The provision of at least 12 months on-site wind monitoring data is also a requirement of the REIPPPP. The timelines for these monitoring programmes are not favourable to the overall current project schedule.

Therefore, the implementation of a Wind Energy Facility within the proposed project study area is not considered to be a feasible alternative to be assessed as part of this current Application for EA. However, it is possible for ABO Wind to pursue this technology in the future and undertake detailed environmental screening to determine if it is feasible.

5.1.3.3.3 Solar Energy

In terms of the suitability of solar energy development at this location, the proposed project study area falls within the **second highest** Global Horizontal Irradiation[6] (GHI) category, relevant to PV installations (Figure 5.1). As indicated in Figure 5.1, the study area has a GHI of 2 000 kWh/m^2 to 2 200 kWh/m^2 in terms of the long-term yearly total.

Therefore, this area is deemed as one of the most suitable for the construction and operation of solar energy facilities as opposed to other areas and provinces within South Africa. For example, coastal regions within the Eastern Cape and Western Cape mainly have a lower GHI (shown in the lighter orange shades in Figure 5.1), which is not completely feasible for the proposed project. It is important to note that there are three operational PV facilities, that received Preferred Bidder status, located within 30 km of the proposed project study area; and there are several other approved PV projects within the 30 km radius as indicated in Chapter 7 of this Scoping Report. Furthermore, as indicated in the earlier discussion on the outcomes of Bid Window 5 in October 2021, solar PV is currently the least cost energy generation option for South Africa. These factors substantiate that use of solar resources in the area is extremely viable and support the development of Solar PV within the proposed project study area.

Therefore, the implementation of a solar energy facility within the study area is more favourable and feasible than wind energy, biomass and hydropower development, especially from a project economic and energy generation viability and location compatibility perspective. Therefore, the proposed Solar PV Facility is the most feasible and preferred Renewable Energy Alternative.

Finally, since the alternative renewable energy generation activities considered were deemed to be unreasonable and unfeasible for the study area, no other Renewable Energy alternatives were further assessed as part of the current Scoping and EIA Processes.

[6] Global Horizontal Irradiance is the total amount of shortwave radiation received from above by a surface horizontal to the ground.

5.1.3.3.4 Summary of the Renewable Energy Alternatives

Table 5.1 presents a summary and an evaluation matrix for the possible renewable energy alternatives with regards to resource suitability and availability, and potential risks and impacts.

Table 5.1: Summary of Evaluation of Potential Risks and Impacts for Renewable Energy Alternatives

Type of Renewable Energy Alternative	Are suitable resources available at the proposed project site?	Main Potential Impacts and Risks	Is this the preferred Alternative?
Biomass Energy	▪ No – not suitable i.e. less than 5 000 t/a annual forestry residue.	▪ Significant Waste Generation with the potential need for a Waste Management Licence; and ▪ Air Emissions with the potential need for an Atmospheric Emissions Licence.	▪ No
Hydro Energy	▪ No – "Not Suitable" (i.e. less than 1 000 kWh/year)	▪ Significant impacts on aquatic biodiversity and hydrology of the affected river system; ▪ Water Use Licence would be required for the establishment of an in-stream hydropower development; and ▪ Long lead times would be required for the various permits needed for such development.	▪ No
Wind Energy	▪ Yes, but other sites might have better wind resources - 301 – 500 W/m^2	▪ Visual impacts as a result of construction activities and turbines during operation; ▪ Noise generation as a result of construction activities and turbines during operation; ▪ Bird and bat collisions during the operational phase; ▪ More restrictive buffers due to Verreaux's Eagle, Cape Vulture, and White-backed Vulture (which were recorded during the site monitoring); ▪ Impacts on aquatic ecology and terrestrial ecology; ▪ Impact on archaeology and palaeontology; and ▪ Impact on Civil Aviation due to nearby aerodromes.	▪ No
Solar Energy	▪ Yes – 2 000 - 2 200 kWh/m^2	▪ Visual impacts as a result of construction activities and the PV panels during operation; ▪ Noise generation as a result of construction activities; ▪ Loss of agricultural land (i.e. grazing); ▪ Impacts on heritage resources (i.e. archaeology and palaeontology); ▪ Impacts on the water balance as a result of water required for panel cleaning; ▪ Impacts on avifauna, aquatic ecology and terrestrial ecology.	▪ Yes

5.1.4 Site Alternatives

As per the requirements listed within Appendix 2 – [(1) (d)] and [(2) (1) (g) (ix)] of the 2014 NEMA EIA Regulations (as amended), a site selection matrix should be provided to show how the preferred site was determined through a site selection process. Within this context, the "site" is the farms or land portions earmarked for the development of the proposed project. This is essentially the proposed project study area, which consists of farm portions indicated in Table 5.2. The total study area for all the Kudu Solar Facilities is approximately 8 150 ha. Refer to the previous chapters of this Scoping Report for feedback in this regard i.e. the terms site and study area are used synonymously in this report.

Table 5.2: Farm portions forming the study area of the Kudu Solar Facilities

FARM PORTION	SG CODE
Remaining Extent of the Farm Bas Berg No. 88	C05700000000008800000
Remaining Extent of Portion 3 of the Farm Bas Berg No. 88	C05700000000008800003
Portion 4 (Portion of Portion 3) of the Farm Bas Berg No. 88	C05700000000008800004
Remaining Extent of Portion 2 (Middel Plaats) (a Portion of Portion 1) of the Farm Grasspan No. 40	C05700000000004000002
Remaining Extent of the Farm Annex Wolve Kuil No. 41	C05700000000004100000
Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41	C05700000000004100001
Portion 2 of the Farm Wolve Kuil No. 43	C05700000000004300002
Remaining Extent of the Farm Wolve Kuilen No. 42	C05700000000004200000

The preferred site (i.e. study area) was strategically selected by the Project Developer based on various factors and detailed research, as noted below:

- As an initial step, the Project Developer undertook internal research, exploration work, and a desktop feasibility analysis (based on the grid connection options, solar resource and land availability) in order to identify the preferred site.
- The Project Developer then consulted the National Department of Forestry, Fisheries and the Environment (DFFE) Screening Tool and other available datasets, such as the Northern Cape Critical Biodiversity Area (CBA) map, and the South African National Biodiversity Institute (SANBI) Biodiversity GIS (BGIS) system, as well as the Endangered Wildlife Trust (EWT) No-Go Screening Tool, in order to identify desktop environmental sensitivities and to determine if there are any fatal flaws and concerns. The findings indicated that the study area is generally developable.
- The Project Developer then consulted with the owners of the farm portions forming the study area to obtain consent to develop the proposed project, and to also identify any areas where development must be excluded based on the requirements of the landowners. These landowner exclusion zones were then acknowledged and implemented, which influenced the site selection process.
- The Project Developer also considered adjacent farm portions and approached the landowners; however, this exercise was unsuccessful as the land had already been secured by other developers.

- The study area falls inside the Central Strategic Transmission Corridor that was gazetted in GN 113 of 16 February 2018, which allows for streamlining of the Environmental Assessment for Electricity Grid Infrastructure (EGI) development within the corridor, whereby a Basic Assessment and 57 days decision-making can be followed, instead of a full Scoping and EIA with 107 days decision-making. In addition, the EGI Standard was published on 27 July 2022, in GG 47095; GN 2313, which allows for the exclusion from an Environmental Assessment for EGI development within the gazetted corridors in low and medium sensitivity areas. Should the EGI Standard apply, then the development for the EGI components of the project would only be subjected to a registration process with a decision-making of 30 days. This benefit was considered very significant by the Project Developer, and therefore obtaining a site within any of the gazetted Strategic Transmission Corridors was focused on.
- The Eskom Transmission Development Plan (TDP) 2022 – 2031 (Eskom, 2022[7]) notes that the Hydra B 400/132 kV Substation, a new substation, is required in the Northern Cape over the current TDP period. The Hydra B Substation is proposed to be located "approximately 50 km from the existing Hydra Substation along the Hydra-Perseus 400 kV line" (Eskom, 2022, Page 115). Eskom also confirmed that the proposed location of the Hydra B Substation falls within the EGI Corridor to be separately assessed as part of Projects 13 – 26. Refer to Chapter 1 of this Scoping Report for additional feedback in this regard. Therefore, since the proposed Hydra B Substation is planned to be constructed in the same area, this makes a potential connection opportunity available. This is considered a significant benefit for the Project Developer, as grid connection is an important factor.
- It was also important for the site to be located outside of the Karoo Central Astronomy Advantage Area (KCAAA) so that there are no unacceptable impacts on the Square Kilometre Array (SKA), which could potentially be a fatal flaw or require significant investment in Radio Frequency Interference and Electromagnetic Control studies to be undertaken.

At a local level, the affected farm portions for the development of the proposed project were selected based on a combination of the factors listed above. Furthermore, from an impact and risk assessment perspective, the implementation of the proposed project at the **preferred site** will most likely result in fewer risks in comparison to its implementation at alternative sites within the Northern Cape (i.e. regions with similar solar radiation levels), based on the following points:

- There is no guarantee that the current land use of alternative sites will be flexible in terms of development potential, for example, the agricultural potential at the alternative sites might be higher and of greater significance.
- There is no guarantee of the willingness of other landowners to allow the implementation of a solar facility on their land and if the landowners strongly object, then the project will not be feasible.
- There is no guarantee that other sites will be located close to existing or proposed EGI to enable connection to the national grid. The further away a project is from the grid, the higher the potential for significant environmental and economic impacts.

[7] Eskom (2022). Eskom Transmission Development Plan: 2022 – 2031. Available online: https://www.eskom.co.za/wp-content/uploads/2022/03/TDP2022-2031Rev1.pdf. Accessed September 2022.

5.1.4.1 Site Specific Considerations

As indicated above, the preferred site for the proposed project extends over the farm portions indicated in Table 5.2.

On a site specific level, the preferred site was deemed suitable due to all the site selection factors (such as land availability, environmental sensitivities, irradiation levels, distance to the national grid, site accessibility, topography, current land use and landowner willingness) being favourable. The site selection criteria considered by ABO Wind are discussed in detail below in Table 5.3.

Table 5.3: Site selection factors and suitability of the preferred site for the development of the proposed project

FACTOR	SUITABILITY OF THE PREFERRED SITE
Land Availability	The farm portions comprising the preferred site are of a suitable size for the proposed project. The land available for the development of all the proposed projects is approximately 8 150 ha in extent. Although this total area was assessed by the specialists during the site verifications and Scoping Phase and will be further assessed during the EIA Phase, only approximately 129 ha (on average) will be required for the permanent development footprint of the proposed project and its associated infrastructure.
Environmental Sensitivity	Although the preferred site for the proposed project does contain environmental features that need to be avoided due to very high or high environmental sensitivity, as described in Chapter 3 and Appendix G of this Scoping Report, following these exclusions sufficient suitable land is still available to ensure the development feasibility of the project (see Section 5.1.5 below).
Irradiation Levels	The availability of the solar resource is the main driver of project viability. The project site was identified by the Project Developer through a desktop analysis based on the estimation of the solar energy resource, and other factors. This viable solar resource ensures the best value for money is gained from the project, allowing for competitive pricing and maximum generation potential, with the resulting direct and indirect benefits for the South African economy. The study area has a GHI of 2 000 to 2 200 kWh/m^2 in terms of the long-term yearly total.
Distance to and availability of the Grid	The proposed project is planned to connect to the existing Hydra-Perseus 400 kV overhead power line via a dedicated proposed 132 kV power line and an independent Main Transmission Substation (MTS). However, if the proposed Eskom Hydra B Substation is built by Eskom, then additional upgrades of this Eskom substation would be undertaken to ensure that the substation can accommodate the power generated by the proposed 12 Kudu Solar Facilities. Separate Basic Assessment (BA) and/or EGI Standard Registration Processes will be undertaken for the EGI Projects (Projects 13 – 26). Eskom has confirmed that the proposed Hydra B Substation is located within the EGI corridor that will be assessed and considered separately as part of Projects 13 – 26.
Site Accessibility	The proposed project site can be accessed via the following roads: ▪ Divisional Road 3084 (DR 3084); ▪ Divisional Road 3093 (DR 3093); ▪ Divisional Road 3096 (DR 3096); ▪ Trunk Road 38/1 (TR 3801) (R48); ▪ Trunk Road 38/2 (TR 3802) (R48); and ▪ Main Road 790 (MR 790) (R388). Refer to the Scoping Level Traffic Impact Assessment (Appendix G.9 of the Scoping Report) and Chapter 2 of the Scoping Report for additional information on the route options per project.

FACTOR	SUITABILITY OF THE PREFERRED SITE
	Some of the existing intersections along the above roads may need to be widened to accommodate the turning movement of the trucks. Exact specifications of the widening will be confirmed as the EIA progresses. In addition, some access roads may need to be upgraded depending on which route is used. Upgrading of the main access point from the R48 is likely to need upgrading. Such upgrading will include lengthening of less than 1 km. Details will be confirmed during the EIA Phase. Internal service roads will also be constructed within the footprint of the PV facility. The internal roads are expected to be composed of gravel or will be paved and will extend approximately 4 to 5 m wide.
Topography	The Scoping Level Visual Impact Assessment (Appendix G.5 of this Scoping Report) notes that the study area lies within an expansive flattish landscape, composed of Ecca Group shales, interspersed with dolerite-capped koppies, which are the main scenic features of the area and provide topographic relief. The elevation ranges from 1000 to 1500 m in the region.
Current Land Use	Agriculture (mainly low-density livestock grazing)
Landowner Willingness	All affected landowners have signed letters of consent for the use of the land for the proposed project (should an EA be granted). This is considered an important aspect of the proposed project in terms of its viability (i.e. this will limit potential appeals during the decision-making process, as the landowner is willing and supportive of the proposed project being undertaken on the affected farm portions).

Furthermore, the proposed project forms part of a large cluster of 12 Solar PV projects. The main determining points for the Project Developer was to find suitable, developable land in one contiguous block to (i) optimize design, (ii) minimize construction and operational costs, and (iii) minimize sprawling development and limit the impact footprints. In addition, the proximity to the proposed Eskom Hydra B Substation, as well as existing Eskom 400 kV power lines, was also a major determinant for identifying suitable sites for the proposed development.

In order to submit a bid in terms of the REIPPPP, the proponent is required to have obtained an EA in terms of the EIA Regulations as well as several additional authorisations or consents. It is important to note that the National Department of Environmental Affairs (DEA) in discussion with the Department of Energy (DoE) (now respectively operating as the DFFE and DMRE), was mandated by MinMec to commission a Strategic Environmental Assessment (SEA) to identify the areas in South Africa that are of strategic importance for Wind and Solar PV development. The Phase 1 Wind and Solar PV SEA[8] was completed in 2015, and was in support of the Strategic Infrastructure Plan (SIP) 8, which focuses on the promotion of green energy in South Africa. Similarly, the Phase 2 Wind and Solar SEA was commissioned in 2017 and completed in 2019. The SEA aimed to identify strategic geographical areas best suited for the roll-out of large scale wind and solar PV energy projects, referred to as Renewable Energy Development Zones (REDZs). Through the identification of the REDZs, the key objective of the SEA was to enable strategic planning for the development of large scale wind and solar PV energy facilities in a manner that avoids or minimises significant negative impact on the environment while being commercially attractive and yielding the highest possible social and economic benefit to the country – for example through strategic investment to lower the cost and reduce timeframes of grid access. Following the completion of the Phase 1 Wind and Solar SEA, eight REDZs were gazetted in

[8] More information on the SEA can be accessed at https://redzs.csir.co.za

February 2018 in GN 114 by the Minister of Environmental Affairs. In addition, following the completion of the Phase 2 Wind and Solar SEA, three REDZs were gazetted in February 2021 in GN 144 by the Minister of Forestry, Fisheries and the Environment.

The proposed project is located approximately 120 km away (at its closest point) from the Kimberley REDZ. While the proposed project is not located within the REDZ, it still indeed supports the development of a large-scale renewable energy project at the proposed location. The proposed project is linked to the national planning vision for Renewable Energy development in South Africa.

Given the site selection requirements associated with solar energy facilities and the suitability of the land available on the **preferred site**, and the fact that no initial fatal flaws are present on the site, as well as the motivating factors listed above, **no other site alternatives were considered as part of this Scoping and EIA Process. Therefore, the site is deemed feasible and selected as the preferred site.**

5.1.5 Location Alternatives – Development Footprint within the Preferred Site

The strategic process followed to reach the preferred site and to consider various development footprints (or location alternatives) within the preferred site are discussed in this section and illustrated in Figure 5.4. The approach followed is to use environmental and social constraints to avoid sensitive features, thus applying mitigation hierarchy thinking. This approach replaces the need to rank alternative sites and locations, as it leads to the selection of the least sensitive development footprint. Refer to Chapter 2 of this Scoping Report for additional information in this regard, specifically the progression from the study area / preferred site to the buildable areas / development footprint.

Once the preferred site was identified, the Project Developer then determined the **Original Scoping Buildable Areas / development footprints** based on the high-level environmental screening. Following this, the Environmental Assessment Practitioner (CSIR) and Specialists were appointed by ABO Wind to undertake the Scoping and EIA Processes for the Kudu Solar Facilities.

The specialists then undertook the Scoping Level Specialist Assessments (included in Appendix G of this Scoping Report), and site sensitivity verifications, where necessary. The specialists assessed the full extent of the preferred site (i.e. approximately 8 150 ha), which serves as the Study Area for this Scoping and EIA Process. The specialists also provided feedback on the Original Scoping Buildable Areas. The Scoping Level Specialist Assessments resulted in the determination and verification of environmental sensitivities present on the preferred site.

Based on the findings of the Scoping Level Specialist Assessments, the **Original Scoping Buildable Areas** were revised in order to avoid the sensitivities identified. This resulted in the identification of the **Revised Scoping Buildable Areas**. Overall, the entire site / study area, and thus all identified buildable areas / development footprints were assessed by the specialists.

Based on these Scoping Level Specialist Assessments, environmental feature and sensitivity maps have been produced (included in Chapter 3 and Chapter 7 of this Scoping Report). These maps show the identified environmental features and sensitivities such as terrestrial biodiversity,

aquatic features, avifauna, heritage, visual, and geohydrological features present within the study area and development footprints. Chapter 7 provides a preliminary layout plan.

The no-go or very highly sensitive environmental features found within the preferred site, as described in the Scoping Level Specialist Assessments (Appendix G), and discussed in Chapter 3 of this Scoping Report, have been avoided by the location, layout and design of the proposed project. Following the exclusion of the required areas, sufficient developable area is still available on site which does not compromise the current ecological integrity of the site. The current layout and **Revised Scoping Buildable Areas / development footprints** are thus a culmination of extensive technical, economic and environmental planning.

The layout or location of the development footprint of the proposed project will be refined during the EIA Phase.

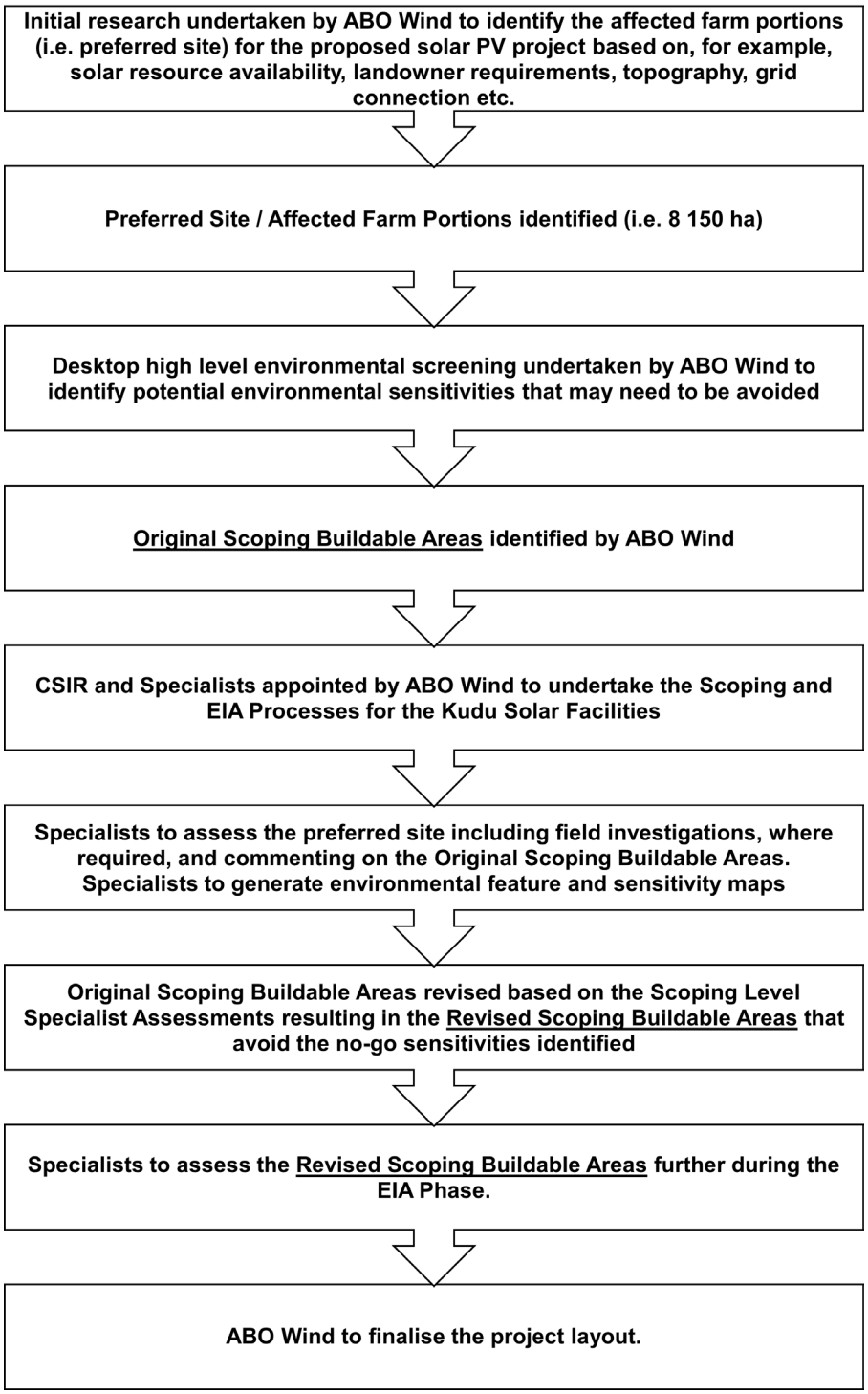

Figure 5.4: Process flow for the identification of the Preferred Site and Development Footprint

It must be re-iterated that a strategic site, location and development footprint identification process has been followed, where the selection is informed by the environmental constraints identified through screening. This is based on the mitigation hierarchy approach of firstly trying to avoid impacts through careful siting. Therefore, it must be noted that different site, location or development footprint alternatives are not ranked, but rather a strategic process was followed (as

shown in Figure 5.4) where sensitive features are screened out, such as in Table 5.3, in order to reach the preferred location or development footprint within the preferred site.

5.1.6 Technology Alternatives

The following technology alternatives are being considered as part of this Scoping and EIA Process.

5.1.6.1 Solar Panel Types

Only the PV solar panel technology type will be considered in this Scoping and EIA Process. Due to the scarcity of water in the proposed project area and the large volume of water required for CSP, this technology is not deemed feasible or sustainable and will not be considered in this Scoping and EIA Process. This is the main difference between PV and CSP technology that led to the selection of PV as the preferred solar panel technology.

Furthermore, CSP technology requires a larger development footprint to obtain the same energy output as PV technology, and it requires active solar tracking to be effective. As described above, in terms of the 2019 IRP, 300 MW capacity is already installed for CSP; and an additional 300 MW has been allocated for 2019, whilst there is no new additional capacity allocated for this technology. Solar PV is allocated an additional new capacity of 6 000 MW in terms of the 2019 IRP. This means that the need and desirability of CSP is not as evident and justified compared to PV.

5.1.6.2 PV Mounting System

Solar panels can be mounted in various ways to ensure maximum exposure of the PV panels to sunlight. The main mounting systems that will be considered as part of the Scoping and EIA Process and design are Single Axis Tracking structures (aligned north-south); Dual Axis Tracking (aligned east-west and north-south); Fixed Tilt Mounting Structure; Mono-facial Solar Modules and Bifacial Solar Modules.

Note that the mounting options will not be weighed against each other in order to identify the most preferred alternative at the end of the EIA Phase. Instead, the specialists will assess all of the above mounting systems and if acceptable, all will be put forward for approval in the EA (should it be granted). Regardless of the mounting system, the maximum height of the PV panel structure will be assessed by the specialists and will not be exceeded.

5.1.6.3 Battery Energy Storage Systems

As indicated in Chapter 2 of this Scoping Report, Lithium-Ion Battery Energy Storage Systems (BESS) and Redox Flow BESS are being considered for the proposed project. For Redox Flow BESS, various chemical compositions may be considered during the EIA Phase, such as Vanadium. Refer to Appendix G.10 of this Scoping Report for a High-Level Safety, Health and Environment Risk Assessment Scoping Input Report, which provides high level information on the safety, health and environmental risks of the BESS technologies being considered. Table 5.4 provides high level advantages and disadvantages of the two technologies.

Table 5.4: Advantages and disadvantages associated with the BESS technologies being considered for the proposed project (Sources: Parsons, 2017[9]; Zhang *et al*., 2016[10])

BESS technologies being considered	Advantages	Disadvantages
Lithium-ion BESS	▪ Sealed systems i.e. pre-assembled off site and delivered to site for placement (i.e. carries less potential risk to the environment in terms of spillages). Hence, they are easier to install and will not likely need many permanent staff. ▪ Reduced risk of spillage as storage of large quantities of electrolyte is not required.	▪ Explosions and fires can occur as well as the possibility of generating noxious smoke under these circumstances. This can occur as result of electrolytes mixing when a breach occurs due to: - improper maintenance near operating temperature, - thermal expansion, or - freeze thaw cycles. ▪ Over the long term, these BESS may be more difficult to repurpose / dispose of and may present cumulative long term environmental impacts.
Redox Flow Batteries (RFB)	▪ RFBs are self-discharging systems therefore generally require little maintenance. However, RFBs are more difficult to install, i.e. formal brick and mortar structures, and will potentially require many permanent staff. ▪ High economic efficiency, for example, Vanadium has a high economic value and can be recycled.	▪ Risk of spillage tends to be higher for RFB as opposed to sealed solid-state BESS as the storage tanks of RFB, may be subjected to leaks or spills during the replacement or blending of the electrolyte, or during transport of the battery to and from site.

Note that the specialists will assess both BESS technologies and if both are acceptable, it will be motivated to the DFFE in the EIA Phase that both options be considered for approval in the EA (should it be granted). This was discussed with the DFFE at the Pre-Application Meeting. The relevant listed activities have been addressed in the Amended Application for EA.

[9] Parsons, 2017. US Trade and Development Agency. South Africa Energy Storage Technology and Market Assessment. Order Number: TDA-IE201511210. USTDA Activity Number: 2015-11032A. Parsons Job Number: 640368.

[10] Zhang, X., Tang, Y., Zhang, F., and Lee, C. S., (2016). A novel aluminum–graphite dual-ion battery. Advanced energy materials, 6(11), p.1502588.

5.2 Concluding Statement of Preferred Alternatives

As per Appendix 2, Section 2 (1) (g) (xi) of the 2014 NEMA EIA Regulations (as amended), and based on Section 5.1 above, the following alternatives will be taken forward into the EIA Phase for further assessment:

- **No-Go Alternative:**
  - The no-go alternative assumes that the proposed project will not go ahead i.e. it is the option of not constructing the proposed Kudu Solar Facility. This alternative would result in no environmental impacts (positive and negative) on the preferred site or surrounding local area, as a result of the proposed project. It will provide a baseline against which other alternatives will be compared and considered during the EIA Phase. The no-go alternative will be assessed in detail by all the specialists on the project team during the EIA Phase. **At this Scoping Phase, the no-go alternative is not preferred**.

- **Land-Use Alternative:**
  - The current land-use is agriculture, specifically low density small stock grazing. There is no cultivation in the area. The study area has low to medium agricultural sensitivity and is **not deemed feasible to assess further during the EIA Phase**. The proposed project offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits. The development of the proposed project at the preferred site is more favourable than the agricultural land-use alternative.

- **Type of Activity Alternative:**
  - This relates to the generation of electricity from a renewable energy source, and in this particular case, from solar resources. The **generation of electricity from a renewable energy source was the only activity considered** by the Applicant, and thus considered in this Scoping Report. **No other activity types were considered or deemed appropriate** based on the expertise of the Applicant.

- **Renewable Energy Alternatives:**
  - Given the above, the development of Solar PV is the preferred and only renewable energy technology to be developed on site because the site has a **very good solar resource availability** (i.e. GHI of 2 000 to 2 200 kWh/m^2 in terms of the long-term yearly total) and the **local conditions are favourable**.
  - In addition, **Hydro Power and Biomass Energy** are deemed **unsuitable**.
  - The study area does have wind resources (i.e. 301 – 500 W/m^2), however other sites might have better wind resources. In addition, based on the findings of the Avifauna Scoping Level Assessment, the presence of certain bird species would make wind energy development and associated impacts **more difficult to manage and there would be limited space available based on the Very High and High sensitivities**.

- **Preferred Site and Development Footprint within the site:**
  - The preferred site for all the proposed Kudu Solar Facilities comprises the following farm portions which cover a combined footprint of 8 150 ha, which serves as the study area for this Scoping and EIA Process:
    - Remaining Extent of the Farm Bas Berg No. 88
    - Remaining Extent of Portion 3 of the Farm Bas Berg No. 88
    - Portion 4 (Portion of Portion 3) of the Farm Bas Berg No. 88
    - Remaining Extent of Portion 2 (Middel Plaats) (a Portion of Portion 1) of the Farm Grasspan No. 40
    - Remaining Extent of the Farm Annex Wolve Kuil No. 41
    - Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41
    - Portion 2 of the Farm Wolve Kuil No. 43
    - Remaining Extent of the Farm Wolve Kuilen No. 42
  - This led to the identification of the Original Scoping Buildable Areas within the preferred site. Furthermore, a screening and site verification exercise of the study area was undertaken by the specialist team during this Scoping Phase. The Scoping Level Specialist Assessments are included in Appendix G of this Scoping Report. The findings of the Scoping Level Specialist Assessments were used to determine the Revised Scoping Buildable Areas. The Revised Scoping Buildable Areas largely avoid the no-go sensitivities identified by the specialists.
  - The preferred project layout will be confirmed following the input from the various specialists during the EIA Phase. A preliminary layout plan has been included in the Plan of Study for EIA (Chapter 7 of the Scoping Report).

- **Technology Alternatives**
  - Only the PV solar panel type will be considered in this Scoping and EIA Process, along with various mounting options that will be considered in the design.
  - The following types of BESS technologies will be assessed in the EIA Phase and the preferred alternative will thereafter be selected or both alternatives will be put forward for approval in the EA (should it be granted):
    - Lithium-ion BESS; and
    - RFB.

5.3 Summary of Legislative Requirements for the Assessment of Alternatives

As noted in Chapter 1 of this Scoping Report, the 2014 NEMA EIA Regulations (as amended) have certain requirements in terms of the selection of the **proposed preferred activity, site and location of the development footprint within the site**. Table 5.5 below indicates the requirements of the 2014 NEMA EIA Regulations (as amended) in terms of the process leading to the preferred activity, site and development footprint location alternatives. Table 5.5 also includes a response from the EAP showing how the requirements of the 2014 NEMA EIA Regulations (as amended) have been addressed in this report.

Table 5.5: Requirements for the consideration of Alternatives based on the 2014 NEMA EIA Regulations (as amended)

	Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended)	Response from EAP
1	Appendix 2 – 2 – 1 – g – (i)	2. (1) A scoping report must contain the information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include: (g) a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including: (i) details of all the alternatives considered;	Refer to Sections 5.1, 5.2, and 5.3 (i.e. this section) of this chapter which provides a description of the process that led to the identification of the preferred alternatives and which alternatives will be taken further into the EIA Phase for assessment.
2	Appendix 2 – 2 – 1 – g – (ii)	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Refer to Chapter 4 of this Scoping Report and Appendix E, which details the process followed in terms of Public Participation and includes the supporting documentation.
3	Appendix 2 – 2 – 1 – g – (iii)	(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;	Refer to Appendix E.5 of this Scoping Report for an Issues and Responses Trail, which includes the issues raised by Interested and Affected Parties (I&APs) during the 30-day comment period on the Background Information Document. Furthermore, Appendix E.11 of this Final Scoping Report includes a record of all comments received during the 30-day comment period on the Draft Scoping Report, as well as adequate responses. No new issues or impacts were raised during this process that have not been addressed at a high-level during Scoping Phase or planned to be addressed in the EIA Phase. Chapter 6 of this Final Scoping Report includes a high-level assessment of the potential issues and impacts identified by the specialists during the Scoping Phase. Such issues are also captured in the Plan of Study for EIA.
4	Appendix 2 – 2 – 1 – g – (iv)	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Refer to Chapter 3 and Appendix G of this Scoping Report for a description of the environmental sensitivities associated with the preferred site.

	Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended)	Response from EAP
			Section 5.1.4 of this chapter also provides information on environmental attributes that were considered in the selection of the preferred site for the proposed project.
5	Appendix 2 – 2 – 1 – g – (v)	(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified 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;	In terms of the no-go alternative, this is not considered as the preferred alternative, as discussed in Section 5.1.1 of this chapter. The impacts and risks of both adopting and not adopting the no-go alternative have been discussed in this section. Furthermore, this will be unpacked during the EIA Phase. Feedback on the impacts and risks that informed the identification of the preferred activity (i.e. generation of energy from solar resources) is provided in Section 5.1.3 and Section 5.1.4 above. Such feedback relating to the preferred site and location of the development footprint within the site is captured in Chapter 6 of this Scoping Report. This chapter includes a high-level assessment of impacts and risks of the proposed project at the preferred site, and it includes a description and assessment of the nature, significance, consequence, extent, duration and probability of the identified impacts for the preferred alternatives, as well as an assessment of the reversibility and irreplaceability of the potential identified impacts, as well as the degree to which the identified impacts can be avoided, managed or mitigated. Furthermore, various technologies for the BESS will be assessed in terms of impacts and risks in the EIA Phase. The preferred alternative will be selected or both alternatives will be put forward for approval in the EA (should it be granted).
6	Appendix 2 – 2 – 1 – g – (vi)	(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Refer to Chapter 7 of this Scoping Report for the impact assessment methodology that was used in the assessment of impacts captured in Chapter 6. The same impact assessment methodology will be used in the EIA Phase and as such has only been mentioned once in the Scoping Report.

	Section of the EIA Regulations	Requirements for a Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations (as amended)	Response from EAP
7	Appendix 2 – 2 – 1 – g – (vii)	(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;	Feedback on the impacts and risks that informed the identification of the preferred activity (i.e. generation of energy from solar resources) is provided in Section 5.1.3 and Section 5.1.4 above. Such feedback relating to the preferred site is captured in Chapter 6 of this Scoping Report. This chapter includes a high-level assessment of impacts and risks of the proposed project at the preferred site.
8	Appendix 2 – 2 – 1 – g – (viii)	(viii) the possible mitigation measures that could be applied and level of residual risk;	
9	Appendix 2 – 2 – 1 – g – (ix)	(ix) the outcome of the site selection matrix;	Refer to Section 5.1.4 and Section 5.1.5 of this chapter for information on the process that led to the identification of the preferred site.
10	Appendix 2 – 2 – 1 – g – (x)	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Where no further alternatives were considered, a motivation has been provided in this chapter, within the relevant sections.
11	Appendix 2 – 2 – 1 – g – (xi)	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Refer to Section 5.2 of this chapter for a concluding statement.

CHAPTER 6:

Issues and Potential Impacts

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TABLES

6. ISSUES AND POTENTIAL IMPACTS

The purpose of this chapter is to present a synthesis of the key issues, potential impacts (direct, indirect and cumulative, where applicable), and mitigation measures that have been identified by specialists thus far as part of the Scoping Process for the proposed Kudu Solar Facility 2 (hereafter referred to as the "Kudu Solar Facility" or "proposed project"). These issues and impacts have been identified based on an evaluation of the status quo of the receiving environment, either through desktop assessments or site investigations. The issues raised during the 30-day review of the Draft Scoping Report (Appendix E.11 of this Final Scoping Report) are in line with the potential impacts and issues listed herein. The specialist assessments to be undertaken during the EIA Phase will comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), or the Assessment Protocols published in Government Notice (GN) R320 on March 2020; or the Assessment Protocols published in GN R1150 on October 2020 (Table 6.1). However, the Battery Energy Storage System (BESS) High Level Safety, Health and Environment Risk Assessment serves as a technical report and the aforementioned legislation will thus not be applicable. Refer to Chapter 7 of this Scoping Report for the Plan of Study for EIA, which includes the methodology for the assessment of impacts; and the Terms of Reference for the specialist assessments that will be detailed during the EIA Phase.

Table 6.1: Specialist assessments undertaken and the applicable legislation

Applicable Legislation → **Specialist Assessment ↓**	**Appendix 6 of the 2014 NEMA EIA Regulations (as amended)**	**Assessment Protocols in GN R320 (March 2020)**	**Assessment Protocols in GN R1150 (October 2020)**	**Technical Input**
Agriculture and Soils Compliance Statement		✓		
Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species Assessment		✓	✓	
Aquatic Biodiversity		✓		
Avifauna Assessment			✓	
Visual Impact Assessment	✓	✓		
Heritage Impact Assessment (Archaeology and Cultural Landscape)	✓	✓		
Palaeontology Site Sensitivity Verification Report		✓		
Socio-Economic Assessment	✓			
Traffic Impact Assessment	✓			
Battery Energy Storage System High Level Safety, Health and Environment Risk Assessment				✓
Geohydrology Assessment	✓			
Geotechnical Assessment	✓			

The high-level preliminary impact assessment provided in each section is based on a scoping level assessment and, where necessary, the impact ratings will be confirmed and detailed during the EIA Phase. The mitigation measures provided in this chapter are also high-level for the purposes of Scoping and will be detailed during the EIA Phase. Cumulative impacts are based on considering other renewable energy projects within a 30 km radius, as described in Chapter 7 of the Scoping Report.

6.1 Soils and Agricultural Potential

The specialist has confirmed that the agricultural sensitivity within the study area is largely low and medium sensitivity and therefore an Agricultural Compliance Statement is needed. As noted in the Agricultural Compliance Statement (Appendix G.1 of this Scoping Report), formally rating potential agricultural impacts is not required by the Assessment Protocol of GN 320, however it is required to indicate whether the proposed development will have an unacceptable impact on the agricultural production capability of the site. The following potential direct and negative impacts were identified during the Scoping Phase:

- **Construction Phase**: Loss of agricultural potential by the occupation of land – Agricultural land that is directly occupied by the proposed infrastructure will become unavailable for agricultural use, with consequent potential loss of agricultural productivity for the duration of the project lifetime.

- **Construction and Decommissioning Phases:**
    - Loss of agricultural potential by soil degradation – Erosion; topsoil loss; and contamination can cause soil degradation. Soil degradation will reduce the ability of the soil to support vegetation growth. Although the site is susceptible to soil erosion, it can be easily and effectively managed by standard best practice control measures (to be included in the Environmental Management Programme (EMPr)).
    - Loss of agricultural potential by dust generation – The disturbance of the soil surface will generate dust that can negatively impact surrounding veld and farm animals.

In addition, the following two indirect positive agricultural impacts were also identified:

- Increased financial security for farming operations via the creation of a reliable income stream through the lease of the land for the proposed project. This is likely to increase cash flow and could improve farming operations and productivity through increased investment into farming.
- Improved security against stock theft and other crime due to the presence of security infrastructure and personnel at the proposed Kudu Solar Facility.

The agricultural impact of the proposed project is regarded as being of low significance. The extent to which any of these impacts is likely to affect levels of agricultural production is small.

The potential cumulative agricultural impact of importance is a regional loss (including by degradation) of future agricultural production potential. The cumulative impact of loss of agricultural land use will not have an unacceptable negative impact on the agricultural production capability of the area. As noted above, the proposed project poses a low risk in terms of causing soil degradation, and if the risk for each individual development considered in the cumulative impact assessment is low, then the cumulative risk is also low.

Due to the generally low agricultural potential of the site, and the consequent low agricultural impact, there are no restrictions relating to agriculture, which could preclude authorisation of the proposed development and therefore, from an agricultural impact point of view, the development should proceed to the EIA Phase and should receive approval.

6.2 Terrestrial Biodiversity and Species

The potential impacts on Terrestrial Biodiversity and Species identified during the Scoping Phase are listed below:

Construction Phase:

- **Fragmentation and loss of habitat and sensitive features**: The solar arrays will be positioned approximately 3.5 m above ground, and groundworks will be minimal for these areas. Vegetation cover will still remain, albeit at a lower species composition and structure. Clearance for structures such as internal roads will result in loss of vegetation and will increase habitat fragmentation as small islands of vegetation will remain. The functionality of these vegetation patches will be reduced.

- **Loss of protected species**: Several provincially protected species occur within the study area which must either be relocated prior to construction or alternative measures made (depending on comments received from the relevant Provincial Authority). A permit application must be submitted to the relevant Provincial Authority where the proposed project will impact on these species.

- **Introduction and spread of alien invasive species**: Alien and invasive species are more likely to establish in disturbed areas due to construction activities.

- **Increased erosion and soil compaction**: Erosion is likely to occur where vegetation has been cleared. In addition, heavy machinery and vehicles operated during the construction phase will lead to soil compaction. Water infiltration is reduced in compacted areas and the runoff is higher, which could lead to increased erosion.

- **Littering and general pollution**: The site camp and construction activities are potential sources of pollution, including hydrocarbons, construction material, domestic waste and sewage. Pollution may inhibit plant growth and may cause soil and water pollution if not managed appropriately.

Operational Phase:

- **Increase in alien invasive species**: Following the completion of construction, alien invasive species could have established in optimal conditions. If not managed, these species can spread and reduce plant species diversity and could alter species composition.

- **Loss of species composition and diversity**: The shading effect from solar panels is likely to affect the species composition and diversity and may result in some bare patches. Emerging seedlings of protected species may also be affected by the shading.

- **Littering and general pollution**: The most likely type of pollutants are hydrocarbons spilled during operation phase activities, such as re-fuelling of vehicles. Pollution may inhibit plant growth and may cause soil and water pollution if not managed appropriately.

Decommissioning Phase:

- **Increase in alien invasive species**: During this phase, machinery can disturb the soil which can create optimal conditions for seeds to sprout. Vehicles can also transport seeds from other areas and introduce new species previously unknown to the area.

- **Loss of habitat**: Some vegetation may be destroyed during decommissioning, which may result in loss of species composition and diversity.

Cumulative Impacts:

- **Construction Phase: Habitat loss and fragmentation**: The entire site will not be cleared of vegetation. The basal layer will still maintain the grass and herbaceous layer, but shrubs will be removed which will alter the vegetation structure and species composition. In addition, additional loss will be due to internal road network.

Refer to the Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species Scoping Level Assessment in Appendix G.2 of this Scoping Report for additional information on the potential impacts identified and high-level mitigation measures recommended. Table 6.2 provides a summary of the Scoping Level impact assessment for this study.

Table 6.2: Scoping level assessment of the potential Terrestrial Biodiversity and Species risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Habitat loss and fragmentation	Status	Negative	High (2)	▪ No development should take place within High sensitivity areas or buffer zones. For example, the Koppies habitats should be avoided. ▪ No construction related activities, such as the site camp, storage of materials, temporary roads or ablution facilities may be located in the high sensitivity areas.	Moderate (3)	Medium
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Severe				
	Probability	Very Likely				
	Reversibility	Low				
	Irreplaceability	Moderate				
Loss of protected species	Status	Negative	High (2)	▪ Where the approved layout designs impact on individuals, permit applications are required for either the relocation or destruction of provincially protected species (in terms of the Northern Cape Nature Conservation Act (Act 9 of 2009) and for protected trees in terms of the National Forests Act (Act 84 of 1998).	Low (4)	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Severe				
	Probability	Very Likely				
	Reversibility	Irreversible				
	Irreplaceability	High				
Increased alien invasive species	Status	Negative	Moderate (3)	▪ Compile an alien and invasive species control and monitoring plan in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA).	Moderate (3) / Low (4)	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Increased erosion and soil compaction	Status	Negative	Moderate (3)	▪ Utilise existing access routes as far as possible. ▪ Confine the movement of vehicles to the access routes to and from the site and to the construction and operation areas. ▪ Do not drive in the natural veld. ▪ Rehabilitate new vehicle tracks and areas where the soil has been compacted as soon as possible.	Low (4)	Medium
	Spatial Extent	Site specific				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Irreplaceability	Moderate		▪ Monitor the entire site for signs of erosion throughout the construction, operational and decommissioning phases of the project. ▪ Refer to the Aquatic Biodiversity Assessment (Appendix G.3 of this Scoping Report) for mitigation measures relevant to watercourse crossings and development close to watercourses.		
Littering and general pollution	Status	Negative	Moderate (3)	▪ The site camp must not be located in high sensitivity areas and their buffer zones. ▪ Dangerous goods may not be stored within 100 m of a watercourse. ▪ Hydrocarbon fuels must be stored in a secure, bunded area. ▪ Sufficient waste disposal bins must be available on site and clearly marked. Skip bins may be required during the construction phase which must be emptied on a regular basis by an approved/licenced waste disposal contractor. Proof of disposal to be kept on file. ▪ Ablution facilities must be located outside sensitive areas and their buffer zones. ▪ Portable ablution facilities must be regularly cleaned and maintained in good working condition. ▪ Any spillage from ablution facilities must be cleaned up immediately and disposed of in an appropriate manner. ▪ Vehicles must be in good working condition, with no oil, water, or fuel leaks. Vehicles must be regularly inspected, and any problems corrected. ▪ Refuelling may only take place in an appropriate, bunded area. Refuelling may not take place in sensitive areas. ▪ Hydrocarbon spills must be contained and cleaned up immediately. Spill kits must be available on site in case of accidental spillage.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Short to Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
OPERATIONAL PHASE						
Loss of species composition and diversity	Status	Negative	Moderate (3)	▪ The loss of species composition and diversity cannot be mitigated due to a permanent structure which will change microclimatic conditions for the life of the facility operation. ▪ A rehabilitation plan is required to restore each habitat to a natural state that is representative of the respective vegetation type after decommissioning.	Moderate (3)	Medium
	Spatial Extent	Site specific				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Increased alien invasive species	Status	Negative	Moderate (3)	▪ Compile an alien and invasive species control and monitoring plan in terms of NEMBA.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Littering and general pollution	Status	Negative	Moderate (3)	▪ Vehicles must be in good working condition, with no oil, water or fuel leaks. ▪ Vehicles must be regularly inspected, and any problems corrected. ▪ Refuelling may only take place in an appropriate, designated bunded area. ▪ Any spillages must be reported immediately and dealt with appropriately. ▪ Spill kits must be available on site in case of accidental spillage. ▪ Sufficient waste disposal bins must be available on site and clearly marked.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Short to Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
Loss of habitat	Status	Negative	Low (4)	▪ The loss of vegetation is unavoidable within the approved layout development footprint, but sensitive areas must be avoided. ▪ A rehabilitation plan is required to restore each habitat to a natural state after decommissioning.	Very Low (5)	Medium
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Likely				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Reversibility	Low				
	Irreplaceability	Moderate				
Increased alien invasive species	Status	Negative	Moderate (3)	▪ Compile an alien and invasive species control and monitoring plan in terms of NEMBA.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Medium term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Low				
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Loss of vegetation	Status	Negative	Moderate (3)	▪ Transformation is considered low for this vegetation type but increased renewable developments could change this.	Moderate (3)	Medium
	Spatial Extent	Local				
	Duration	Permanent				
	Consequence	Substantial				
	Probability	Very Likely				
	Reversibility	Low				
	Irreplaceability	Moderate				

6.3 Aquatic Biodiversity

The potential impacts on Aquatic Biodiversity identified during the Scoping Phase are listed below. Most of the potential aquatic ecosystem impacts of the proposed project are likely to take place during the construction phase.

Construction Phase:

- **Disturbance of aquatic habitat and the associated impact to sensitive aquatic biota**. Construction activities within or in proximity to watercourses could result in the disturbance or destruction of sensitive habitats and any listed and or protected plant or animal species.

- **Removal of indigenous aquatic vegetation and associated loss of aquatic ecological integrity and functionality**. The removal of indigenous riparian and instream vegetation will reduce the ecological integrity and functionality of the watercourses. Construction work could result in the loss of riparian vegetation that provides ecosystem services within the site.

- **Water supply for construction and associated stress on available water resources**. The demand for water during the construction phase could place pressure on the existing available water resources.

- **Impeding flow in aquatic features as a result of the establishment of road crossing structures**. Loss of riparian vegetation that provides ecosystem services within the site and impeding of flow in the aquatic features would occur especially where new access roads are required, or road upgrades will widen any current road crossings.

- **Alien vegetation infestation may occur within the aquatic features due to disturbance**. The current presence of alien vegetation on the site is limited, and construction activities may create disturbance and enhance the spread of such species.

- **Increased sedimentation and risks of contamination of surface water runoff may result from construction activities**. During construction, the earthworks near watercourses will expose and mobilise soil, construction materials and chemicals that may end up in the water resources. Any spills in proximity to a watercourse have the potential to affect surrounding biota.

Operational Phase:

- Ongoing **disturbance of aquatic features and associated vegetation** along access roads or adjacent to the infrastructure that needs to be maintained.

- Modified runoff characteristics from hardened surfaces has the potential to concentrate the run-off and result in **erosion of adjacent watercourses**.

- **Water supply and water quality impacts** (e.g. contamination from sewage) as a result of the operation of the proposed project and associated infrastructure.

Decommissioning Phase:

- **Increased disturbance of aquatic habitat** due to the increased activity on the site.

- **Increased sedimentation and risks of contamination of surface water runoff**.

Cumulative Impacts:

Land use in the area currently consists of low-density livestock farming. Current land and water use impacts on the aquatic features within the larger study area are therefore low to very low. The nature of the proposed PV project allows it to have minimal impact on the surface water features, provided the project elements are placed far enough away from the freshwater features to not impact them, as has been recommended in the Aquatic Biodiversity Scoping Level Assessment. This will be further assessed during the EIA Phase. The following high-level impacts have been identified:

- **Construction and Decommissioning Phases**:
    - Increased disturbance of aquatic habitat due to the increased activity in the wider area.

- **Operational Phase:**
    - Degradation of the ecological condition of aquatic ecosystems.

Refer to the Aquatic Biodiversity Scoping Level Assessment in Appendix G.3 of this Scoping Report for additional information on the potential impacts identified and high-level mitigation measures recommended. Table 6.3 provides a summary of the Scoping Level impact assessment for this study.

Table 6.3: Scoping level assessment of the potential Aquatic Biodiversity risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Disturbance of aquatic habitat and the associated impact to sensitive aquatic biota	Status	Negative	Very Low (5)	▪ Implement recommended development setbacks to minimise works within aquatic ecosystems (i.e. recommended buffer of at least 35 m for the smaller drainage features; and setback from the wider floodplain adjacent to the larger rivers).	Very Low (5)	High
	Spatial Extent	Site-specific				
	Duration	Short term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Removal of indigenous aquatic vegetation and associated loss of aquatic ecological integrity and functionality	Status	Negative	Very Low (5)	▪ Implement development setbacks to minimise works within aquatic ecosystems (i.e. recommended buffer of at least 35 m for the smaller drainage features; and setback from the wider floodplain adjacent to the larger rivers). ▪ Clearing of indigenous vegetation should not take place within the aquatic features and the recommended buffers. ▪ Rehabilitate disturbed aquatic habitats by revegetating with suitable local indigenous vegetation.	Very Low (5)	High
	Spatial Extent	Site-specific				
	Duration	Medium-term				
	Consequence	Slight				
	Probability	Very Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Water supply for construction and associated stress on available water resources	Status	Negative	Very Low (5)	▪ Water use for construction should be minimised as much as possible. The water should be obtained from an existing water allocation or other viable water sources for construction purposes.	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Extremely Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Road crossing structures may impede flow in the aquatic features	Status	Negative	Very Low (5)	▪ The road crossing structures should be designed to not impede flow in watercourses - low water crossing is preferred. Use existing crossings, as best as possible and where allowable.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Slight				
	Probability	Unlikely				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Reversibility	High		▪ The existing road infrastructure, particularly within the floodplain, should be utilised as far as possible to access new infrastructure to minimise the overall disturbance. It is recommended that any new linear type of infrastructure crossings over watercourses be placed where there are existing structures or road crossings within the watercourse corridors.		
	Irreplaceability	Low				
Alien vegetation infestation may occur within the aquatic features due to disturbance	Status	Negative	Low (4)	▪ Avoid disturbing aquatic habitats. ▪ Construction materials brought onto the site should be free of alien plant seed. Sources of alien seed should be prevented from being brought onto the site with imported materials. ▪ Rehabilitate disturbed aquatic habitats once construction works are complete. ▪ Undertake monitoring for the growth of alien vegetation during the post-construction phase.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Medium or long term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Increased sedimentation and risks of contamination of surface water runoff may result from construction works	Status	Negative	Very Low (5)	▪ Any works within aquatic features should be undertaken in the dry season where possible. ▪ Sediment traps should be used where necessary. ▪ Construction sites and laydown areas should be located within the assessed buildable areas. ▪ Good housekeeping and site management measures must be implemented at the laydown areas and the construction site as per the project Environmental Management Programme (EMPr) and monitored by the appointed Environmental Control Officer (ECO)	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Slight				
	Probability	Likely to Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Ongoing disturbance of aquatic features and associated vegetation along access roads or adjacent to the	Status	Negative	Low (4) / Very Low (5)	▪ The medium sensitivity aquatic habitats should be avoided in the layout design, with only low sensitivity habitats being disturbed during construction.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Slight to moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
infrastructure that needs to be maintained	Probability	Likely to Unlikely		▪ Invasive alien plant growth and signs of erosion should be monitored on an ongoing basis to ensure that the disturbed areas do not become infested with invasive alien plants. ▪ Disturbance of aquatic habitats would only result in a negligible alteration to aquatic ecosystems and processes.		
	Reversibility	Moderate				
	Irreplaceability	Low				
Modified runoff characteristics from hardened surfaces at the substation and along access roads has the potential to result in erosion of adjacent watercourses	Status	Negative	Very Low (5)	▪ Develop a stormwater management plan for the proposed development that addresses the stormwater runoff from the developed areas. ▪ Stormwater run-off infrastructure must be designed to mitigate both the flow and water quality impacts of any stormwater leaving the developed areas. The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate shaping of the road with berms or channels and swales adjacent to hardened surfaces where necessary. Should any erosion features develop, they should be stabilised immediately.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	Moderate				
	Irreplaceability	Low				
Water supply and water quality impacts (e.g. contamination from sewage) as a result of the operation of the site	Status	Negative	Very Low (5)	▪ A sustainable water supply should be sought. Sewage generated within the site should be discharged to a conservancy tank that is properly serviced and regularly evacuated to nearby wastewater treatment works.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	Low				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
Increased disturbance of aquatic habitat due to the increased activity on the site	Status	Negative	Very Low (5)	▪ Minimise works within aquatic ecosystems. If the project layout avoided these areas, the decommissioning works would also be able to avoid aquatic habitats on the property. ▪ Rehabilitate and revegetate disturbed areas, where required. ▪ Mitigation and follow-up monitoring of residual impacts (alien vegetation growth and erosion) may be required. ▪ The road network should be returned to that resembling pre-construction, with all additional roads removed where possible.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
Increased sedimentation and risks of contamination of surface water runoff	Status	Negative	Very Low (5)	▪ Decommissioning activities within aquatic features should be undertaken in the dry season where possible ▪ Sediment traps should be used where necessary. ▪ Laydown areas should be placed within approved PV footprint and layout. ▪ Good housekeeping measures should be implemented as per the project EMPr and monitored by the appointed ECO. This should specifically address on-site stormwater management and prevention of pollution during decommissioning. Any stormwater that does arise within the decommissioning site must be handled appropriately to trap sediments and pollutants.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Increased disturbance of aquatic habitat due to the increased activity in the wider area	Status	Negative	Very Low (5)	▪ Minimise works within aquatic ecosystems as far as possible. Construct in the dry season where possible. ▪ Rehabilitate disturbed areas. ▪ Rationalise infrastructure as far as possible by sharing the infrastructure or using existing disturbed areas. ▪ Manage stormwater impacts.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Degradation of ecological condition of aquatic ecosystems	Status	Negative	Very Low (5)	▪ Monitor and manage for impacts such as alien vegetation growth and erosion. ▪ Limit disturbance and rehabilitate disturbed areas. ▪ Ensure there is sufficient stormwater management to prevent erosion of watercourses. ▪ Ensure road crossing structures are properly designed prevent blockage in the watercourses or erosion. ▪ Limit and monitor water use.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
	Status	Negative	Very Low (5)		Very Low (5)	High

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
Increased disturbance of aquatic habitat due to the increased activity in the wider area	Spatial Extent	Site specific		▪ Decommissioning works near aquatic features should preferably be undertaken in the dry season where possible. ▪ Minimise disturbance and rehabilitate.		
	Duration	Short term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				

6.4 Avifaunal Impacts

The pre-construction avifaunal monitoring programme has followed an adapted Regime 2 protocol as defined in the Birds and Solar Energy best practice guidelines (Jenkins *et al.* 2017) which require a minimum of two surveys over a six-month period. At the time of release of this Scoping Report, both surveys have been conducted (the findings of the second survey does not change the findings of the Scoping Level Avifauna Assessment).

The potential direct impacts on avifauna identified during the Scoping Phase are listed below:

Construction Phase:

- **Displacement due to disturbance and habitat transformation associated with the construction of the solar PV plant and associated infrastructure**. The noise and movement associated with the construction activities at the proposed PV plant will be a source of disturbance which would lead to the displacement of avifauna from the area.

Operational Phase:

- **Displacement due to habitat transformation associated with the presence of the solar PV plant and associated infrastructure**. This impact relates to total or partial displacement of avifauna due to habitat transformation.

- **Collisions with the solar panels**. This impact relates to the bird mortalities as a result of potential collisions with the solar panels. A 1 km all infrastructure exclusion zone has been recommended by the Avifauna Specialist to prevent the displacement of the breeding pair of Verreaux's Eagle during the construction phase due to disturbance. In addition, the buffer area will reduce the risk of injury to the juvenile bird due to collision with the solar panels, when it starts flying and practicing its hunting technique around the nest. Note that the specialist has rated this impact as unlikely.

- **Entrapment in perimeter fences**. This impact pertains to the entrapment of medium and large terrestrial birds between the perimeter fences, leading to mortality.

- **Electrocutions in the onsite substation complex**.

Decommissioning Phase:

- **Displacement due to disturbance associated with the decommissioning of the solar PV plant and associated infrastructure**. The noise and movement associated with the potential decommissioning activities will be a source of disturbance which would lead to the displacement of avifauna from the area.

Cumulative Impacts:

- **Construction and Decommissioning Phases**:
  - Displacement due to disturbance and habitat transformation associated with the construction and decommissioning of the solar PV plants and associated infrastructure.
- **Operational Phase:**
  - Displacement due to habitat transformation associated with the presence of the solar PV plants and associated infrastructure.
  - Collisions with the solar panels.
  - Entrapment in perimeter fences.
  - Electrocutions in the onsite substation complexes.

Refer to the Avifauna Scoping Level Assessment in Appendix G.4 of this Scoping Report for additional information on the potential impacts identified and high-level mitigation measures recommended. Table 6.4 provides a summary of the Scoping Level impact assessment for this study.

Table 6.4: Scoping level assessment of the potential Avifauna risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure	Status	Negative	Moderate (3)	▪ Activity should as far as possible be restricted to the footprint of the infrastructure. ▪ Measures to control noise and dust should be applied according to best practice in the industry at the time. ▪ Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. ▪ Access to the rest of the property must be restricted. ▪ The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned. ▪ A 1 km all infrastructure exclusion zone around the Verreaux's Eagle nest (at -30.227660°; 24.329773°) is recommended to provide unhindered access to the nest.	Low (4)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Total or partial displacement of avifauna due to habitat transformation associated with the presence of the solar PV plant and associated infrastructure.	Status	Negative	High (2)	▪ The recommendations of the botanical specialist must be strictly implemented, especially as far as limiting the vegetation clearance to what is absolutely necessary, and rehabilitation of transformed areas are concerned. ▪ Where possible, surface water (pans, dams and water troughs) must be buffered by a minimum of 50 m to ensure unhindered access of priority species to the water. No PV panels should be constructed in this zone. As noted in the Scoping Level Avifauna Assessment (Appendix G.4 of this Scoping Report) and Chapter 3 of this Scoping Report, this buffer does not apply the water points that might be removed. The removal of some of the water points will not be a significant impact, as the Applicant has	Moderate (3)	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Severe				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
				agreed to retain some water points which will be buffered by a minimum circular solar panel exclusion zone of 50 m.		
Bird mortality and injury as a result of collisions with the solar panels.	Status	Negative	Very Low (5)	▪ No mitigation is required due to the very low significance	Very Low (5)	Medium
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Slight				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Entrapment of medium and large terrestrial birds between the perimeter fences, leading to mortality.	Status	Negative	Low (4)	▪ A single perimeter fence should be used.	Very Low (5)	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				
Electrocution of priority species in the onsite substation complex	Status	Negative	Moderate (3)	▪ The hardware within the proposed substation yards is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation and be electrocuted.	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Long term				
	Consequence	Severe				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
The noise and movement associated with the activities at the Study Area will be a source of disturbance which would lead to the displacement of avifauna from the area.	Status	Negative	Moderate (3)	▪ Activity should as far as possible be restricted to the footprint of the infrastructure. ▪ Measures to control noise and dust should be applied according to best practice in the industry at the time. ▪ Maximum use should be made of existing access roads during the decommissioning phase and the construction of new roads should be kept to a minimum as far as practical.	Low (4)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
				▪ The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned.		
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Displacement due to disturbance associated with the construction of the solar PV plant and associated infrastructure	Status	Negative	Moderate (3)	▪ Activity should as far as possible be restricted to the footprint of the infrastructure. ▪ Measures to control noise and dust should be applied according to best practice in the industry at the time. ▪ Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. ▪ Access to the rest of the property must be restricted. ▪ The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned. ▪ Appropriate buffer zones must be implemented around Species of Conservation Concern (SCC) nests.	Low (4)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Habitat transformation, collisions with the solar panels, entrapment in fences, and electrocution in onsite substation complexes	Status	Negative	High (2)	▪ The recommendations of the botanical specialist must be strictly implemented, especially as far as limiting the vegetation clearance to what is absolutely necessary, and rehabilitation of transformed areas are concerned. ▪ Where possible, solar panel-free buffers must be maintained around the pans, dams and water troughs. ▪ A single perimeter fence should be used. ▪ The hardware within the proposed substation yards is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation and be electrocuted.	Moderate (3)	High
	Spatial Extent	Regional				
	Duration	Long term				
	Consequence	Severe				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DECOMMISSIONING PHASE						
The noise and movement associated with the activities at the Study Area will be a source of disturbance which would lead to the displacement of avifauna from the area	Status	Negative	Moderate (3)	▪ Activity should as far as possible be restricted to the footprint of the infrastructure. ▪ Measures to control noise and dust should be applied according to best practice in the industry at the time. ▪ Maximum use should be made of existing access roads and the construction of new roads during the decommissioning phase should be kept to a minimum as far as practical. ▪ The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the activity footprint is concerned.	Low (4)	High
	Spatial Extent	Site specific				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	High				
	Irreplaceability	Low				

6.5 Visual Impacts

The potential direct impacts on visually sensitive and landscape receptors identified during the Scoping Phase are listed below:

Construction Phase:

- Potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on nearby farmsteads and visitors to the area.
- Potential visual effect of haul roads, access roads, stockpiles and construction camps in the visually exposed landscape.

Operational Phase:

- Potential visual intrusion of solar arrays and related infra-structure on receptors including glint and glare.
- Potential visual impact of an industrial type activity on the pastoral / rural character and sense of place of the area.

Decommissioning Phase:

- Potential visual effect of any remaining structures, platforms and disused roads on the landscape.

Cumulative Impacts:

- **Construction, Operational and Decommissioning Phases:**
  - Potential combined visual effect of proposed 12 solar PV facilities, in the study area, seen together during construction, operational and decommissioning phases.

Refer to the Visual Scoping Level Assessment in Appendix G.5 of this Scoping Report for additional information on the potential impacts identified and high-level mitigation measures recommended. Table 6.5 provides a summary of the Scoping Level impact assessment for this study.

Table 6.5: Scoping level assessment of the potential Visual risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on nearby farmsteads and visitors to the area.	Status	Negative	Low (4)	▪ Locate construction camps, batching plants and stockpiles in visually unobtrusive areas, away from public roads. ▪ Implement the Environmental Management Programme (EMPr) with the Environmental Control Officer (ECO) during construction.	Low (4)	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Low				
Potential visual effect of haul roads, access roads, stockpiles and construction camps in the visually exposed landscape.	Status	Negative	Low (4)	▪ The mitigation measures recommended are as per the above.	Low (4)	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Potential visual intrusion of solar arrays and related infrastructure on receptors, including glint and glare.	Status	Negative	Moderate (3)	▪ Substation and Battery Energy Storage System (BESS) to be located in an unobtrusive low-lying area, away from public roads. ▪ Muted natural colours and non-reflective finishes to be used for structures generally. ▪ Internal access roads to be as narrow as possible, and existing roads or tracks used as far as possible. ▪ Outdoor/security lighting to be fitted with reflectors to obscure the light source, and to minimise light spillage. ▪ Internal powerlines (i.e. 22 kV or 33 kV) to be located underground where possible.	Moderate (3)	High
	Spatial Extent	Local				
	Duration	Long Term				
	Consequence	Substantial				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
				▪ Outdoor signage to be discrete and commercial / billboard signage avoided.		
Potential visual impact of an industrial type of activity on the pastoral / rural character and sense of place of the area.	Status	Negative	Moderate (3)	▪ The mitigation measures recommended are as per the above.	Moderate (3)	High
	Spatial Extent	Local				
	Duration	Long Term				
	Consequence	Substantial				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
Potential visual effect of any remaining structures, platforms and disused roads on the landscape.	Status	Negative	Low (4)	▪ Solar arrays and infra-structure to be removed and recycled. ▪ Access roads no longer required to be ripped and regraded. ▪ Exposed or disturbed areas to be revegetated to blend with the surroundings.	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Low				
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Potential combined visual effect of proposed 12 solar PV facilities seen together during construction phase.	Status	Negative	Low (4)	▪ The mitigation measures recommended are as per those for the construction phase.	Low (4)	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Potential combined visual effect of proposed 12 solar PV facilities	Status	Negative	Moderate (3)	▪ The mitigation measures recommended are as per those for the operational phase.	Moderate (3)	High
	Spatial Extent	Local				
	Duration	Long Term				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
seen together during operational phase.	Consequence	Substantial				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
Potential combined visual effect of proposed 12 solar PV facilities seen together during decommissioning phase.	Status	Negative	Low (4)	▪ The mitigation measures recommended are as per those for the decommissioning phase.	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Low				

6.6 Heritage (including Archaeology and Cultural Landscape)

The potential direct impacts on heritage features identified during the Scoping Phase are listed below:

Construction Phase:

- **Damage to or destruction of archaeological materials**: Archaeological materials may be affected during construction when equipment is brought onto site and grubbing, and excavation takes place.
- **Damage to or destruction of graves**: Graves could be impacted almost anywhere but the probability of this occurring is extremely unlikely.
- **Alteration of the cultural landscape**: The landscape will be affected if the proposed project goes ahead, however it has a relatively low cultural significance.

Operational Phase:

- **Alteration of the cultural landscape**: The impact would definitely occur during the operational phase; however, the landscape has a relatively low cultural significance.

Decommissioning Phase:

- **Alteration of the cultural landscape**: In the event of decommissioning, the landscape will be affected, however the landscape has a relatively low cultural significance.

Cumulative Impacts:

- **Construction and Decommissioning Phases:**
  - Potential impacts on archaeology.
  - Potential impacts on graves.
- **Operational Phase:**
  - Potential impacts on the cultural landscape.

Refer to the Heritage Scoping Level Assessment in Appendix G.6 of this Scoping Report for additional information on the potential impacts identified and high-level mitigation measures recommended. Table 6.6 provides a summary of the Scoping Level impact assessment for this study.

Table 6.6: Scoping level assessment of the potential Heritage risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Damage to or destruction of archaeological materials	Status	Negative	Very Low (5)	▪ None suggested, however report any chance finds to the South African Heritage Resources Agency (SAHRA) and/or an archaeologist.	Very Low (5)	High
	Spatial Extent	Site				
	Duration	Permanent				
	Consequence	Moderate				
	Probability	Extremely unlikely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
Damage to or destruction of graves	Status	Negative	Very Low (5)	▪ None suggested, but report any chance finds to the SAHRA and/or an archaeologist.	Very Low (5)	High
	Spatial Extent	Site				
	Duration	Permanent				
	Consequence	Extreme				
	Probability	Extremely unlikely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
Alteration of the cultural landscape	Status	Negative	Low (4)	▪ Minimise the disturbance footprint. ▪ Rehabilitate all areas not needed during operation.	Low (4)	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Replaceable				
OPERATIONAL PHASE						
Alteration of the cultural landscape	Status	Negative	Low (4)	▪ None suggested.	Low (4)	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	High				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
	Irreplaceability	Replaceable				
DECOMMISSIONING PHASE						
Alteration of the cultural landscape	Status	Negative	Low (4)	▪ Rehabilitate all areas following the approved rehabilitation plan.	Low (4)	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	High				
	Irreplaceability	Replaceable				
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Impacts to archaeology, graves and the cultural landscape	Status	Negative	Low (4)	▪ Avoid or mitigate sites as proposed in the specialist reports. ▪ Report any chance finds to the SAHRA and/or an archaeologist. ▪ Follow the recommendations of the Visual Specialist.	Low (4)	High
	Spatial Extent	Site				
	Duration	Permanent				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
OPERATIONAL PHASE						
Alteration of the cultural landscape	Status	Negative	Low (4)	▪ None suggested	Low (4)	High
	Spatial Extent	Site specific				
	Duration	Long term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	Non-reversible				
	Irreplaceability	High				
DECOMMISSIONING PHASE						
Impacts to archaeology, graves and the cultural landscape	Status	Negative	Low (4)	▪ Ensure full rehabilitation is undertaken following approved plans.	Low (4)	High
	Spatial Extent	Site specific				
	Duration	Permanent				
	Consequence	Moderate				
	Probability	Very Likely				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Ranking (Post-mitigation)	Confidence Level
	Reversibility	Non-reversible				
	Irreplaceability	High				

6.7 Palaeontology

Refer to the Palaeontology Site Sensitivity Verification (SSV) in Appendix G.7 of this Scoping Report for additional information on the palaeontology within the study area, as well as feedback on the motivation for no further palaeontology assessments being required for the proposed project.

Based on a palaeontological site visit and several previous field-based and desktop Palaeontology Impact Assessment (PIA) studies in the broader De Aar – Kimberley region, the specialist concluded that the proposed project is in fact of Low to Very Low palaeosensitivity. However, the potential for rare, largely unpredictable fossil sites of High palaeosensitivity associated with older alluvial and pan deposits hidden in the subsurface cannot be discounted. Most such fossil sites would probably be protected during construction by environmental buffer zones along drainage lines.

If any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol outlined in the Palaeontology SSV should be fully implemented. These recommendations will also be included in the Environmental Management Programmes (EMPrs) for the proposed project during the EIA Phase.

Pending the discovery of significant new fossil finds before or during construction, no further specialist palaeontological studies, reporting, monitoring or mitigation are recommended for the Kudu Solar Facilities.

Based on the above, an impact assessment is not required.

6.8 Socio-Economic

The potential socio-economic impacts identified during the Scoping Phase are listed below:

Construction Phase:

Positive Impacts:
- Creation of employment and business opportunities, and opportunity for skills development and on-site training.

Negative Impacts:
- Impacts associated with the presence of construction workers on local communities;
- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles; and
- Impact on productive farmland.

Operational Phase:

Positive Impacts:
- The establishment of infrastructure to improve energy security and support the renewable sector;
- Creation of employment opportunities;
- Benefits to the affected landowners; and
- Benefits associated with the socio-economic contributions to community development;

Negative Impacts:
- Visual impacts and associated impacts on sense of place;
- Impact on property values; and
- Impact on tourism.

Decommissioning Phase:

- Social impacts associated with retrenchment including loss of jobs, and source of income. Decommissioning will also create temporary employment opportunities, which would represent a positive temporary impact.

Cumulative Impacts:

- Visual impacts associated with the establishment of more than one Solar Facility and the potential impact on the rural sense of place of the area and character of the landscape;
- The establishment of a number of renewable energy facilities and associated projects, such as the proposed project, in the Renosterberg Local Municipality (RLM) has the potential to place pressure on local services, specifically medical, education and accommodation.
- The establishment of renewable energy facilities and associated projects, such as the proposed project, in the RLM will create employment, skills development and training opportunities, and creation of downstream business opportunities.

Refer to the Socio-Economic Scoping Level Assessment in Appendix G.8 of this Scoping Report for additional information on the potential impacts identified and high-level mitigation measures recommended. Table 6.7 provides a summary of the Scoping Level impact assessment for this study.

Table 6.7: Scoping level assessment of the potential Socio-Economic risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT/INDIRECT IMPACTS						
CONSTRUCTION PHASE						
Creation of employment and business opportunities	Status	Positive	Low (4)	**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 Renosterberg Local Municipality (RLM) and Emthanjeni Local Municipality (ELM) 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.	Moderate (3)	High
	Spatial Extent	Regional				
	Duration	Medium Term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	N/A				
	Irreplaceability	N/A				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
				Business ▪ The proponent should liaise with the RLM and ELM 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.		
Potential impacts on family structures and social networks associated with the presence of construction workers	Status Spatial Extent Duration Consequence Probability Reversibility Irreplaceability	Negative Regional Medium Term Slight Unlikely Moderate Low	Very Low (5)	▪ Preparation and implementation of a 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 should consider the option of establishing a Monitoring Committee (MC) for the construction phase that include representatives from local landowners, farming associations, and the local municipality. This MC should be established prior to commencement of the construction phase and form part of the SEP. ▪ The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. The CoC should be signed by the proponent and the	Very Low (5)	High

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
				contractors before the contractors move onto site. The CoC should form part of the CHSSP. ▪ The proponent and the contractor should implement an HIV/AIDS, COVID-19 and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP. ▪ 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. ▪ 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. ▪ No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.		
Potential impacts on family structures, social networks and community services associated with the influx of job seekers	Status Spatial Extent Duration Consequence Probability Reversibility Irreplaceability	Negative Regional Medium Term Slight Unlikely Moderate Low	Very Low (5)	▪ The proponent should ensure that the employment criteria favour residents from the area. ▪ Preparation and implementation of a SEP prior to and during the construction phase. ▪ Preparation and implementation of a CHSSP prior to and during the construction phase. ▪ The proponent, in consultation with the RLM, should investigate the option of establishing a MC to monitor and identify potential problems that may arise due to the influx of job seekers to the area. ▪ The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities. ▪ The proponent should implement a policy that no employment will be available at the gate.	Very Low (5)	High
Potential risk to farmers and farm workers, livestock and damage to	Status Spatial Extent Duration	Negative Local Medium Term	Moderate (3)	▪ Preparation and implementation of a SEP prior to and during the construction phase.	Low (4)	High

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
farm infrastructure associated with the presence and activities of construction workers on site	Consequence	Substantial		▪ Preparation and implementation of a CHSSP prior to and during 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. ▪ All farm gates must be closed after passing through. ▪ Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. ▪ The proponent should establish a MC and CoC for workers (see above). ▪ The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the CoC to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below). ▪ The proponent should implement a Grievance Mechanism that provides local farmers with an effective and efficient mechanism to address issues related to report issues related to damage to farm infrastructure, stock theft and poaching etc. ▪ The Environmental Management Programme (EMPr) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. ▪ Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the CoC, specifically consequences of stock theft and trespassing on adjacent farms.		
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
				▪ Contractors appointed by the proponent must ensure that construction workers who are found guilty (by the Courts) of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the CoC. All dismissals must be in accordance with South African labour legislation. ▪ It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.		
Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires	Status Spatial Extent Duration Consequence Probability Reversibility Irreplaceability	Negative Local Medium Term Substantial Unlikely High Replaceable	Moderate (3)	▪ Preparation and implementation of a SEP prior to and during the construction phase. ▪ Preparation and implementation of a CHSSP prior to and during 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. ▪ 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 should ensure that construction related activities that pose a potential fire risk, such as welding, are properly 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 summer months. ▪ Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle and fire extinguishers placed at designated locations across the site. ▪ Contractor should provide fire-fighting training to selected construction staff.	Low (4)	High

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
				▪ 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 event 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.		
Potential noise, dust and safety impacts associated with construction related activities	Status	Negative	Moderate (3)	▪ Preparation and implementation of a SEP prior to and during the construction phase. ▪ Preparation and implementation of a CHSSP prior to and during the construction phase. ▪ Timing of construction activities should be planned to avoid / minimise impact on key farming activities. ▪ The proponent should establish a MC to monitor the construction phase and the implementation of the recommended mitigation measures. The MC should be established before the construction phase commences, and should include key stakeholders, including representatives from local farmers and the contractor(s). The MC should also address issues associated with damage to roads and other construction related impacts. ▪ Ongoing communication with landowners and road users during construction period. This should be outlined in the SEP. ▪ The proponent should implement a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads. ▪ Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads are maintained in a good condition and repaired once the construction phase is completed.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Substantial				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
				▪ Repair of all affected road portions at the end of construction period where required. ▪ Dust suppression measures must 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.		
The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the project etc. will damage farmlands and result in a loss of farmlands for grazing.	Status Spatial Extent Duration Consequence Probability Reversibility Irreplaceability	Negative Local Medium Term Substantial Likely High Replaceable	Moderate (3)	▪ The loss of high-quality agricultural land should be avoided and/or minimised by careful planning of the final layout of the proposed Solar Facility. The recommendations of the agricultural / soil assessment should be implemented. ▪ Affected landowners should be consulted about the timing of construction related activities in advance. ▪ The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised. ▪ An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase. ▪ All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. ▪ The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be included in the EMPr. ▪ The implementation of the Rehabilitation Programme should be monitored by the ECO.	Low (4)	High
OPERATIONAL PHASE						
Development of infrastructure to improve energy security and	Status Spatial Extent Duration	Positive National Long Term	Moderate (3)	▪ Maximise the number of employment opportunities for local community members.	Moderate (3)	High

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
support renewable sector	Consequence	Substantial		▪ Implement training and skills development programs for members from the local community. ▪ Maximise opportunities for local content and procurement.		
	Probability	Very Likely				
	Reversibility	N/A				
	Irreplaceability	N/A				
Creation of employment and business opportunities associated with the operational phase	Status	Positive	Low (4)	▪ Employment and Business: The mitigation measures are the same as those recommended for the Construction Phase. ▪ In addition, the proponent should investigate providing training and skills development to enable locally based service providers to provide the required services for the operational phase.	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long Term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	N/A				
	Irreplaceability	N/A				
Benefits associated with support for local communities from Socio-Economic Development (SED) contributions.	Status	Positive	Moderate (3)	▪ The RLM or PKSDM should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the RLM or PKSDM that should be consulted include the Municipal Managers Office, IDP Manager and Local Economic Development (LED) Manager, where possible. ▪ Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community. ▪ Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the proposed Solar Facility.	High (4)	High
	Spatial Extent	Regional				
	Duration	Long Term				
	Consequence	Substantial				
	Probability	Very Likely				
	Reversibility	N/A				
	Irreplaceability	N/A				
The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep	Status	Positive	Low (4)	▪ Implement agreements with affected landowners. ▪ The loss of high-quality agricultural land should be avoided and/or minimised by careful planning in the final layout of the proposed PV Solar Facility. The recommendations of the agricultural / soil assessment should be implemented.	Moderate (3)	High
	Spatial Extent	Local				
	Duration	Long Term				
	Consequence	Moderate				
	Probability	Very Likely				
	Reversibility	N/A				
	Irreplaceability	N/A				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
and farming inputs, such as feed etc.						
Visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.	Status Spatial Extent Duration Consequence Probability Reversibility Irreplaceability	Negative Regional Long Term Moderate Unlikely High Low	Low (4)	▪ The recommendations contained in the Visual Impact Assessment should be implemented.	Low (4)	High
Potential impact of the Solar Facility on property values. This is usually linked to the visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.	Status Spatial Extent Duration Consequence Probability Reversibility Irreplaceability	Negative Regional Long Term Moderate Very Unlikely High Low	Low (4)	▪ The recommendations contained in the Visual Impact Assessment should be implemented.	Low (4)	High
Potential impact of Solar Facility on local tourism. This is usually linked to the visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place.	Status Spatial Extent Duration Consequence Probability Reversibility Irreplaceability	Negative Regional Long Term Moderate Very Unlikely High Low	Low (4)	▪ The recommendations contained in the Visual Impact Assessment should be implemented.	Low (4)	High
DECOMMISSIONING PHASE						
Social impacts associated with	Status Spatial Extent	Negative Local	Moderate (3)		Low (4)	High

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
retrenchment including loss of jobs, and source of income. Decommissioning will also create temporary employment opportunities, which would represent a positive temporary impact.	Duration	Short Term		▪ The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned. ▪ All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning. ▪ Revenue generated from the sale of scrap metal during decommissioning should be allocated to aid in funding closure and rehabilitation of disturbed areas.		
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				
CUMULATIVE IMPACTS						
Visual impacts associated with the establishment of more than one Solar Facility and the potential impact on the area's rural sense of place and character of the landscape.	Status	Negative	Low (4)	▪ The recommendations contained in the Visual Impact Assessment should be implemented.	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long Term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
The establishment of a number of renewable energy facilities and associated projects, such as the proposed Solar Facility, in the RLM has the potential to place pressure on local services, specifically medical, education and accommodation.	Status	Negative	Low (4)	▪ The proponent should liaise with the RLM to address potential impacts on local services.	Low (4)	High
	Spatial Extent	Regional				
	Duration	Long Term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
The establishment of renewable energy	Status	Positive	Moderate (3)	▪ The proponent should liaise with the RLM to identify potential opportunities for the local economy and businesses.	Moderate (3)	High
	Spatial Extent	Regional				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures / enhancement measures	Significance Raking (Post-mitigation)	Confidence Level
facilities and associated projects, such as the Solar Facility, in the RLM will create employment, skills development and training opportunities, creation of downstream business opportunities.	Duration	Long Term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				

6.9 Traffic

The potential traffic related issues identified during the Scoping Phase include:

Construction Phase:

- Potential congestion and delays on the surrounding road network;
- Potential impact on traffic safety and increase in accidents with other vehicles or animals;
- Potential change in the quality of the surface condition of the roads; and
- Potential noise and dust pollution.

Operational Phase:

- The traffic generated during the operational phase are mainly related to the staff that will be transported to and from the sites and are not anticipated to have a significant traffic impact on the surrounding road network.

Decommissioning Phase:

- Potential congestion and delays on the surrounding road network;
- Potential impact on traffic safety and increase in accidents with other vehicles or animals;
- Potential change in the quality of the surface condition of the roads; and
- Potential noise and dust pollution.

Cumulative Impacts:

- Congestion and delays on the surrounding road network;
- Impact on traffic safety and increase in accidents with other vehicles or animals;
- Change in the quality of the surface condition of the roads; and
- Noise and dust pollution.

Refer to the Traffic Scoping Level Assessment in Appendix G.9 of this Scoping Report for additional information on the potential impacts identified and high-level mitigation measures recommended. Table 6.8 provides a summary of the Scoping Level impact assessment for this study.

Table 6.8: Scoping level assessment of the potential Traffic risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Congestion and delays on road network	Status	Neutral	Very Low (5)	▪ Stagger delivery trips and schedule trips, including staff trips outside of peak hours where possible.	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Replaceable				
Potential impact on traffic safety and increase in accidents with other vehicles and animals	Status	Negative	Moderate (3)	▪ Implement speed control by means of a stop and go system and speed limit road signage within the construction site. ▪ Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	High				
Condition of road surface	Status	Neutral	Very Low (5)	▪ Regular maintenance of internal farm access roads by the contractor. ▪ Ensure private access roads that are impacted on by the proposed development are restored to original pre-construction road condition.	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Replaceable				
Dust Pollution	Status	Neutral	Low (4)	▪ Implement dust control on gravel roads within the construction site. ▪ Implement speed control by means of a stop and go system and speed limit road signage within the construction site.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Irreplaceability	Replaceable				
Noise Pollution	Status	Neutral	Low (4)	▪ Stagger delivery trips.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Replaceable				
OPERATIONAL PHASE						
The traffic generated during the operational phase will not have a significant impact on the surrounding road network.						
DECOMMISSIONING PHASE						
Congestion and delays on road network	Status	Neutral	Very Low (5)	▪ Stagger delivery trips and schedule trips, including staff trips outside of peak hours where possible.	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Replaceable				
Potential impact on traffic safety and increase in accidents with other vehicles and animals	Status	Negative	Moderate (3)	▪ Implement speed control by means of a stop and go system and speed limit road signage within the construction site. ▪ Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Low				
	Irreplaceability	High				
Condition of road surface	Status	Neutral	Very Low (5)	▪ Regular maintenance of internal farm access roads by the contractor. ▪ Ensure private access roads that are impacted on by the proposed development are restored to original pre-construction road condition.	Very Low (5)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Replaceable				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
Dust Pollution	Status	Neutral	Low (4)	▪ Implement dust control on gravel roads within the construction site. ▪ Implement speed control by means of a stop and go system and speed limit road signage within the construction site.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Replaceable				
Noise Pollution	Status	Neutral	Low (4)	▪ Stagger delivery trips.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Replaceable				
CUMULATIVE IMPACTS						
CONSTRUCTION AND DECOMMISSIONING PHASE						
Congestion and delays on road network	Status	Neutral	Moderate (3)	▪ Stagger delivery trips and schedule trips, including staff trips outside of peak hours where possible.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Substantial				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				
Potential impact on traffic safety and increase in accidents with other vehicles and animals	Status	Negative	Moderate (3)	▪ Implement speed control by means of a stop and go system and speed limit road signage within the construction site. ▪ Ensure all vehicles are roadworthy, visible, adequately marked, and operated by an appropriately licenced operator.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Substantial				
	Probability	Unlikely				
	Reversibility	Low				
	Irreplaceability	High				
Condition of road surface	Status	Neutral	Moderate (3)	▪ Regular maintenance of internal farm access roads by the contractor.	Very Low (5)	High
	Spatial Extent	Local				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Duration	Medium Term		▪ Ensure private access roads that are impacted on by the proposed development are restored to original pre-construction road condition.		
	Consequence	Substantial				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				
Dust Pollution	Status	Neutral	Low (4)	▪ Implement dust control on gravel roads within the construction site. ▪ Implement speed control by means of a stop and go system and speed limit road signage within the construction site.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				
Noise Pollution	Status	Neutral	Low (4)	▪ Stagger delivery trips.	Low (4)	High
	Spatial Extent	Local				
	Duration	Medium Term				
	Consequence	Moderate				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Replaceable				

6.10 Battery Energy Storage System (BESS) Risk Assessment

A high-level Safety, Health and Environment (SHE) Risk Assessment was commissioned for the Battery Energy Storage System (BESS) proposed as part of the Kudu Solar Facility. The main issues identified in the desktop Risk Assessment at the Scoping Phase is discussed in this section.

The BESS SHE Risk Assessment is not expected to raise any unacceptably high-risk issues, i.e. the BESS facility of either technology type is not likely to be a No-Go option. The study area is considered an extremely isolated arid area, and there are no commercial locations of interest; however, the location of isolated farmsteads and watering holes are noted.

The safety and health risks associated with redox flow batteries (e.g. vanadium) will likely be lower than for the lithium-ion battery type for both employees and members of the public outside the facility. Lithium batteries pose a higher fire and explosion risk as well as the possibility of generating noxious smoke under these circumstances. However, they are easier to install, i.e. containers as opposed to formal brick and mortar structures, and probably will not require as many permanent staff as redox flow utility scale operations.

The environmental risks of surface aquatic features and groundwater contamination with the redox flow type batteries will likely be higher than for solid state batteries, due to the presence of liquids and electrolyte. Suitable secondary spill containment is recommended for the volumes of electrolytes required.

Refer to the BESS SHE Risk Assessment (Scoping Level) in Appendix G.10 of this Scoping Report for additional information on the potential issues identified and high-level recommendations. The BESS SHE Risk Assessment is a technical study, and therefore a Scoping Level impact assessment is not required.

6.11 Geohydrology

The potential geohydrology related issues identified during the Scoping Phase include:

Construction Phase:

- **Potential lowering of the groundwater level** due to abstraction during the construction phase for construction related activities.
- **Potential impact on groundwater quality** as a result of accidental oil spillages or fuel leakages.

Operational Phase:

- **Potential lowering of the groundwater level** due to abstraction during the operational phase for operational related activities, such as panel cleaning.

- **Potential impact on groundwater quality** as a result of using cleaning agents for cleaning the solar panels.

- **Potential impact on groundwater quality** as a result of electrolyte that will be used for the BESS.

Decommissioning Phase:

- **Potential impact on groundwater quality** as a result of accidental oil spillages or fuel leakages.

Cumulative Impacts:

- Potential lowering of groundwater level during the construction and operational phases for all 12 Kudu Solar Facilities;
- Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages from the construction and decommissioning phases for all 12 Kudu Solar Facilities;
- Potential of impact on groundwater quality as a result of using cleaning agents for cleaning the solar panels during the operational phase for all 12 Kudu Solar Facilities;
- Potential impact on groundwater quality as a result of electrolyte that will be used for the BESS; and
- Other wind and solar projects within a 30 km radius of the study area.

Refer to the Geohydrology Scoping Level Assessment in Appendix G.11 of this Scoping Report for additional information on the potential impacts identified and high-level mitigation measures recommended. Table 6.9 provides a summary of the Scoping Level impact assessment for this study.

Table 6.9: Scoping level assessment of the potential Geohydrology risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Lowering of groundwater levels as a result of over-abstraction	Status	Negative	Moderate (3)	▪ Adhere to the borehole's safe yield and to monitor water levels and flow. ▪ Boreholes must be correctly yield tested according to the National Standard (SANS 10299-4:2003, Part 4 – Test pumping of water boreholes). This includes a Step Test, Constant Discharge Test and recovery monitoring	Low (4)	High
	Spatial Extent	Local				
	Duration	Short Term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	High				
	Irreplaceability	Low				
Accidental oil spillage / fuel leakage	Status	Negative	Very Low (5)	▪ Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. ▪ Any engines that stand in one place for an excessive length of time must have drip trays. ▪ Diesel fuel storage tanks, if required, should be above ground on an impermeable surface in a bunded area. ▪ Vehicles and equipment should also be refuelled on an impermeable surface. A designated area should be established at the construction site camp for this purpose if off-site refuelling is not possible. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.	Very Low (5)	High
	Spatial Extent	Site Specific				
	Duration	Short Term				
	Consequence	Slight				
	Probability	Extremely Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
OPERATIONAL PHASE						
Lowering of groundwater levels as a result of over-abstraction	Status	Negative	Moderate (3)	▪ Adhere to the borehole's safe yield and to monitor water levels and flow. ▪ Boreholes must be correctly yield tested according to the National Standard (SANS 10299-4:2003, Part 4 – Test	Low (4)	High
	Spatial Extent	Local				
	Duration	Long Term				
	Consequence	Substantial				
	Probability	Likely				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Reversibility	High		pumping of water boreholes). This includes a Step Test, Constant Discharge Test and recovery monitoring.		
	Irreplaceability	Low				
Potential impact on groundwater quality as a result of using cleaning agents	Status	Negative	Very Low (5)	▪ Use environmentally safe cleaning agents that breakdown naturally and do not cause adverse effects.	Very Low (5)	High
	Spatial Extent	Site Specific				
	Duration	Long Term				
	Consequence	Slight				
	Probability	Extremely Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
Potential impact on groundwater quality as a result of electrolyte that will be used for the BESS	Status	Negative	Moderate (3)	▪ Ensure that all electrolyte or chemicals stored or used on site have secondary containments systems in place with reliable leak detection, annunciation in place. ▪ Ensure that all chemicals are handled on concrete bunded surfaces and not on bare soil. ▪ Any waste products produced from the BESS systems should be removed and disposed of appropriately. ▪ Waste water produced by fire hydrants should not be allowed to runoff into the environment. ▪ It is recommended that all BESS are placed a minimum of 50 m from any borehole.	Low (4)	High
	Spatial Extent	Site Specific				
	Duration	Long Term				
	Consequence	Substantial				
	Probability	Unlikely				
	Reversibility	High				
	Irreplaceability	Low				
DECOMMISSIONING PHASE						
Accidental oil spillage / fuel leakage	Status	Negative	Very Low (5)	▪ Vehicles must be regularly serviced and maintained to check and ensure there are no leakages. ▪ Any engines that stand in one place for an excessive length of time must have drip trays. ▪ Diesel fuel storage tanks, if required, should be above ground on an impermeable surface in a bunded area. Vehicles and equipment should also be refuelled on an impermeable surface. A designated area should be established at the site camp for this purpose, if off-site refuelling is not possible. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures	Very Low (5)	High
	Spatial Extent	Site Specific				
	Duration	Short Term				
	Consequence	Slight				
	Probability	Extremely Unlikely				
	Reversibility	High				
	Irreplaceability	Low				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
				of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.		
CUMULATIVE IMPACTS						
The cumulative impact includes all the potential impacts discussed above and the impacts of other wind and solar projects within a 30 km radius of the study area. Impact assessment tables will be provided during the EIA Phase.						

6.12 Geotechnical

Potential impacts on the geotechnical conditions as a consequence of the proposed development are as follows for the construction, operation and decommissioning phases:

- **Displacement of geologic materials**. This is related to increased unnatural hard surfaces that will yield increased runoff, potentially increasing erosion. Removal of rocks and other geologic materials for site levelling and grading during construction and decommissioning, resulting in loss of geologic materials, e.g. topsoil removal/loss, and potentially the destruction of habitats of endemic species.

- **Contamination of subsoils and loss of topsoil**. This includes contamination of geologic materials as a consequence of the construction and decommissioning activities by earthworks machinery and other apparatus; as well as through typical maintenance activities during the operation phase, such as washing of solar panels, or spillages associated with the BESS.

Refer to the Geotechnical Scoping Level Assessment in Appendix G.12 of this Scoping Report for additional information on the potential impacts identified and high-level mitigation measures recommended. Table 6.10 provides a summary of the Scoping Level impact assessment for this study.

Table 6.10: Scoping level assessment of the potential Geotechnical risks and impacts of the proposed project

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
DIRECT IMPACTS						
CONSTRUCTION PHASE						
Displacement of geologic materials	Status	Negative	Low (4)	▪ Favour dolerite as an aggregate (as opposed to Karoo sandstones and mudstones). Subject to investigation. ▪ Any road cuttings should be designed by an appropriately qualified professional. ▪ Drainage in the region should be designed and managed appropriately. ▪ Investigate and confirm the geotechnical suitability of each structure (or other appropriate level of investigation) prior to construction (i.e. determine that soil with an adequate bearing capacity is obtained beneath each footing). Such investigations would not be required to fulfil the requirements of the EIA process. However, it would be necessary prior to construction. ▪ Only strip vegetation necessary for the next phase of construction. ▪ Install temporary drainage to divert stormwater away from active construction activities, where required. ▪ Stormwater Management Plan must be developed in the preconstruction phase. It should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flow directly into any natural systems (in consultation with suitably qualified professionals). Effective stormwater management must include effective stabilisation (e.g. gabions and Reno mattresses) of exposed soil. ▪ Suitable stormwater management systems must be installed along roads and other areas and be monitored during the first few months of use. Any erosion/sedimentation must be resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.).	Very Low (5)	Medium
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
				▪ Where impacted through construction-related activities, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled. ▪ Sloped areas stabilised using designed structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly. ▪ Any rehabilitation should be scheduled to ensure rehabilitation can take place at the optimal time for vegetation establishment. ▪ Where earthwork is being undertaken near any watercourses, slopes must be stabilised using suitable materials, e.g. sandbags or geotextile fabric, to prevent sand and rock from entering the channel. ▪ Appropriate rehabilitation and re-vegetation measures for any disturbed watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.		
Contamination of geologic materials	Status	Negative	Low (4)	▪ During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented, e.g. including ensuring that construction equipment is well maintained. ▪ Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. ▪ Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilt material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.	Very Low (5)	Medium
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
OPERATIONAL PHASE						
Displacement of geologic materials	Status	Negative	Low (4)	▪ Install drainage to divert stormwater away from activities, roads/tracks, structures, where required. ▪ Generic management for typical infrastructure of the proposed development, including: o Stormwater Management Plan must be developed in the preconstruction phase and should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems, where possible and lawful. Effective stormwater management must include effective stabilisation (e.g. gabions and Reno mattresses) of exposed soil etc. o Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.). o Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. o No regular maintenance activities to take place outside of the authorised footprint and all vehicles to remain on authorised roads and tracks.	Very Low (5)	Medium
	Spatial Extent	Local				
	Duration	Long				
	Consequence	Moderate				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Low (4)	▪ During the execution of the operations, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained. ▪ Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover/bunding.	Very Low (5)	Medium
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Moderate				
	Probability	Very likely				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Reversibility	Moderate		Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. ▪ Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.		
	Irreplaceability	Moderate				
DECOMMISSIONING PHASE						
Displacement of geologic materials	Status	Negative	Very Low (5)	▪ Only drive and park vehicles where necessary. ▪ Land rehabilitation to near natural state, i.e. removal of foundations and backfilling of any resultant voids within the soil, as well as removal of hard surfaced areas. Replacement soil should be sourced locally to ensure homogeneity. ▪ Reinstate natural topography where cut-to-fill embankments have been constructed. ▪ Implement generic environmental management procedures for infrastructure.	Very Low (5)	Medium
	Spatial Extent	Local				
	Duration	Short				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Very Low (5)	▪ During the execution of the decommissioning, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that equipment is well maintained. ▪ Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained. ▪ Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used. ▪ If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the	Very Low (5)	Medium
	Spatial Extent	Local				
	Duration	Short				
	Consequence	Slight				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
				spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.		
CUMULATIVE IMPACTS						
CONSTRUCTION PHASE						
Displacement of geologic materials	Status	Negative	Moderate (3)	▪ The mitigation measures are the same as those recommended for the Construction Phase.	Low (4)	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Moderate (3)	▪ The mitigation measures are the same as those recommended for the Construction Phase.	Low (4)	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
OPERATIONAL PHASE						
Displacement of geologic materials	Status	Negative	Moderate (3)	▪ The mitigation measures are the same as those recommended for the Operational Phase.	Low (4)	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Moderate (3)	▪ The mitigation measures are the same as those recommended for the Operational Phase.	Low (4)	Medium
	Spatial Extent	Regional				
	Duration	Medium-term				

Impact	Impact Criteria		Significance Ranking (Pre-mitigation)	Potential mitigation measures	Significance Raking (Post-mitigation)	Confidence Level
	Consequence	Substantial				
	Probability	Very likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
DECOMMISSIONING PHASE						
Displacement of geologic materials	Status	Negative	Moderate (3)	▪ The mitigation measures are the same as those recommended for the Decommissioning Phase.	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				
Contamination of geologic materials	Status	Negative	Moderate (3)	▪ The mitigation measures are the same as those recommended for the Construction, Operational and Decommissioning Phases (as relevant).	Low (4)	Medium
	Spatial Extent	Local				
	Duration	Short term				
	Consequence	Substantial				
	Probability	Likely				
	Reversibility	Moderate				
	Irreplaceability	Moderate				

6.13 Civil Aviation

As indicated in Chapter 3 and Chapter 4 of this Scoping Report, the National Web-Based Environmental Screening Tool (Screening Tool) has indicated that the study area falls within an area of low sensitivity from a Civil Aviation perspective. The low sensitivity was verified and confirmed via a site visit. An SSV is provided in Appendix G.13 of this Scoping Report. Based on the requirements of GN 320, if a site is verified as low sensitivity, there are no further requirements. Therefore, no impact assessment is required in this regard.

6.14 Defence

As indicated in Chapter 3 and Chapter 4 of this Scoping Report, the Screening Tool has indicated that the study area falls within an area of low sensitivity from a Defence perspective. The low sensitivity was verified and confirmed via a site visit. An SSV is provided in Appendix G.14 of this Scoping Report. Based on the requirements of GN 320, if a site is verified as low sensitivity, there are no further requirements. Therefore, no impact assessment is required in this regard.

6.15 Conclusion

Table 6.11 below provides a summary of the overall impact significance assessed by the relevant specialists at the Scoping Level. It includes the overall impact significance, based on the implementation of mitigation measures for each phase of the proposed project, including direct and cumulative impacts. Where information is not provided, it means that the impacts were insignificant or not predicted for that phase. All impacts provided in the table are negative in nature, except for the Socio-Economic Assessment. Additional positive impacts will be unpacked during the EIA Phase.

Overall, based on Table 6.11 it can be deduced that the effect of potential impacts can be limited or reduced to acceptable levels through avoidance, minimisation and the implementation of appropriate mitigation measures and management actions during the construction, operational and decommissioning phases. Therefore, based on the scoping level specialist input, potential negative impacts associated with the proposed project are anticipated to mainly be of **low to very low significance after mitigation**, whilst some positive socio-economic impacts of moderate significance are expected.

Table 6.11: Overall Impact Significance with the Implementation of Mitigation Measures for Direct and Cumulative Negative and Positive Impacts for the proposed project

Phase → / Specialist Study ↓		Construction		Operational		Decommissioning	
Direct Impacts							
Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species		Moderate		Low		Low	
Aquatic Biodiversity and Species		Very Low		Very Low		Very Low	
Avifauna Assessment		Low		Very Low	Low	Low	
Visual Impact Assessment		Low		Moderate		Very Low	
Heritage Impact Assessment (Archaeology and Cultural Heritage)		Low		Low		Low	
Socio-Economic Assessment	Negative	Low		Low		Low	
	Positive	Moderate		Moderate			
Traffic Impact Assessment		Low	Very Low			Low	Very Low
Geohydrology Assessment		Low	Very Low	Low	Very Low	Very Low	
Geotechnical Assessment		Very Low		Very Low		Very Low	
Cumulative Impacts							
Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species		Moderate		Low		Low	
Aquatic Biodiversity and Species		Very Low		Very Low		Very Low	
Avifauna Assessment		Low		Moderate		Low	
Visual Impact Assessment		Low		Moderate		Very Low	
Heritage Impact Assessment (Archaeology and Cultural Heritage)		Low		Low		Low	
Socio-Economic Assessment	Negative	Moderate	Low	Moderate	Low	Moderate	Low
	Positive	Moderate		Moderate		Moderate	
Traffic Impact Assessment		Low	Very Low			Low	Very Low
Geohydrology Assessment							
Geotechnical Assessment		Low		Low		Low	

CHAPTER 7:

Plan of Study for EIA

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TABLES

FIGURES

7. PLAN OF STUDY FOR THE EIA

This chapter presents the Plan of Study for the Environmental Impact Assessment (PSEIA), which sets out the process to be followed in the Environmental Impact Assessment (EIA) Phase as required by the 2014 National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) EIA Regulations, as amended. The PSEIA is based on the outcomes of the Scoping Phase (to date i.e. until submission of the Final Scoping Report) and provides the Terms of Reference (ToR) for the specialist assessments that have been identified, the alternatives that will be considered and assessed, as well as the public participation process (PPP) that will be undertaken during the EIA Phase. This chapter deals with Kudu Solar Facility 2 (hereafter referred to as the "Kudu Solar Facility" or "proposed project").

7.1 Purpose of EIA and Requirements of the EIA Regulations

As captured in Section 2 of Appendix 3 of the 2014 NEMA EIA Regulations (as amended), which specifies the content requirements for EIA Reports, "the purpose of the EIA Phase is to, through a consultative process:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted scoping report;
- Identify the location of the development footprint within the approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the:
    - nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    - degree to which these impacts:
        (aa) can be reversed;
        (bb) may cause irreplaceable loss of resources, and
        (cc) can be avoided, managed or mitigated;
- Identify the most ideal location for the activity within the development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess and rank the potential impacts that the activity will impose on the development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts; and
- Identify residual risks that need to be managed and monitored."

The EIA Phase consists of three parallel and overlapping processes:

- Central assessment process through which inputs are integrated and presented in an EIA Report that is submitted for approval to the National Department of Forestry, Fisheries and the Environment (DFFE) and other commenting authorities (Sections 7.2, 7.3 and 7.4 of this chapter);
- Undertaking of a PPP whereby findings of the EIA Phase are communicated and discussed with Interested and Affected Parties (I&APs) and responses are documented (Section 7.3 of this chapter); and
- Undertaking of specialist assessments that provide additional information or assessments required to address the issues raised in the Scoping Phase (Sections 7.5, 7.6 and 7.8 of this chapter).

Table 7.1 below shows the requirements for the PSEIA in accordance with Appendix 2 (2) (1) (h) of the 2014 NEMA EIA Regulations (as amended).

Table 7.1: Requirements for the Plan of Study for EIA in accordance with the 2014 NEMA EIA Regulations (as amended)

Section of the EIA Regulations: Appendix 2 (2) (1) (h)	Requirements for a PSEIA in the Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations, as amended (Government Notice (GN) R326)	Section of this Chapter of the PSEIA in which the required information is discussed
h	A plan of study for undertaking the EIA process to be undertaken, including –	
i	a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;	Section 7.7
ii	a description of the aspects to be assessed as part of the environmental impact assessment process;	Sections 7.5 to 7.8
iii	aspects to be assessed by specialists;	Sections 7.5 to 7.8
iv	a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;	Section 7.5
v	a description of the proposed method of assessing duration and significance;	Section 7.5
vi	an indication of the stages at which the Competent Authority will be consulted;	Section 7.3 and Section 7.4
vii	particulars of the public participation process that will be conducted during the environmental impact assessment process;	Section 7.3
viii	a description of the tasks that will be undertaken as part of the environmental impact assessment process; and	Section 7.2, Section 7.3, Section 7.4, Section 7.5 and Section 7.8
ix	identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	Section 7.8 (note that Chapter 6 includes high-level management actions identified during the Scoping Phase. Section 7.8 of this

Section of the EIA Regulations: Appendix 2 (2) (1) (h)	Requirements for a PSEIA in the Scoping Report in terms of Appendix 2 of the 2014 NEMA EIA Regulations, as amended (Government Notice (GN) R326)	Section of this Chapter of the PSEIA in which the required information is discussed
		chapter highlights which specialist studies will include such measures)

7.2 Overview of Approach to Preparing the EIA Report and EMPr

The specialist studies are being undertaken based on compliance with relevant legislation and based on the ToR indicated in Section 7.8 of this chapter. The results of the specialist assessments and other relevant project information and research undertaken for this proposed project will be integrated into the Draft EIA Report. As indicated in previous chapters, a request for approval from the DFFE (in terms of Regulation 11 and Regulations 25 (1) and (2) of the 2014 NEMA EIA Regulations (as amended)) to submit a combined report for the proposed project was refused. Refer to Appendix F.6 of this Scoping Report for a copy of the correspondence[1] from the DFFE. Therefore, a separate Draft EIA Report will be complied for each of the 12 Kudu Solar Facilities. The Draft EIA Report will be released for a 30-day I&AP and authority comment period, as outlined in Sections 7.3 and 7.4 of this chapter. I&APs registered on the project database will be notified in writing of the release of the Draft EIA Report for comment.

Comments raised, through written correspondence (emails and letters) will be captured in a Comments and Responses Report for inclusion in the Final EIA Report that will be submitted to the DFFE for decision-making. Refer to Section 7.3.2 of this chapter for additional information regarding this process.

The Draft and Final EIA Reports will include an Environmental Management Programme (EMPr), which will be prepared in compliance with the relevant regulations. The content of an EMPr must either contain the information set out in Appendix 4 of the 2014 NEMA EIA Regulations (as amended) or must be a Generic EMPr relevant to an application as identified and gazetted by the Minister in a Government Notice (GN). As part of the 2016 Electricity Grid Infrastructure (EGI) Strategic Environmental Assessment (SEA), a Generic EMPr was compiled for the development and expansion of (a) overhead electricity transmission and distribution infrastructure; and (b) substation infrastructure for the transmission and distribution of electricity. On 2 March 2018, these two Generic EMPrs were gazetted in Government Gazette (GG) 41473, GN 162 and GN 163, for public comment for a period of 45 days. On 22 March 2019, these two Generic EMPrs were gazetted for implementation, in GG 42323, GN 435. The EMPrs to be compiled for this proposed project will therefore separately comply with Appendix 4 of the 2014 NEMA EIA Regulations (as amended) for the proposed Solar PV facility and associated infrastructure, as well as the requirements of the gazetted EMPr for substation infrastructure (Gazette 42323, GN 435), for the

[1] Note that the same applies to the proposed Electricity Grid Infrastructure projects (Projects 13 to 26) and that each project will be subjected to its own separate Basic Assessment process and/or adoption of the Standard for the development and expansion of power lines and substations within the gazetted Strategic Transmission Corridors (Government Gazette 47095; Government Notice 2313 dated 27 July 2022).

Independent Power Producer (IPP) Substation (as Activity 11 of Listing Notice 1 is included in this application).

The Generic EMPr for power lines only applies to aboveground power lines and those that have a capacity of more than 33 kV (i.e. triggering Listed Activity 11 of GN 327 or Listed Activity 9 of GN 325). Therefore, it is understood that the Generic EMPr for the development and expansion of (a) overhead electricity transmission and distribution infrastructure will not apply to any of the proposed projects, as the medium-voltage power lines within the footprint of the Solar PV Facility are planned to have a capacity of 22 or 33 kV (i.e. below the capacity threshold of the relevant listed activity).

The Generic EMPrs will also apply to the Kudu EGI Projects (Projects 13 to 26), which will be assessed as part of separate Basic Assessment (BA) Processes and/or adoption of the Standard for the development and expansion of power lines and substations within the gazetted Strategic Transmission Corridors (GG 47095; GN 2313, dated 27 July 2022). As indicated in previous chapters of this Scoping Report, the Kudu EGI Projects (Projects 13 to 26) are separate and not included in the EIA Processes for the Kudu Solar Facilities. This PSEIA only applies to the Kudu Solar Facility 2 project.

The EMPrs will be based broadly on the environmental management philosophy presented in the ISO 14001 standard, which embodies an approach of continual improvement. Actions in the EMPr will be drawn primarily from the impact management actions in the specialist assessments for the construction and operational phases of the project. If the project components are decommissioned or re-developed this will need to be done in accordance with the relevant environmental standards and clean-up/remediation requirements applicable at the time. However, general management actions for the decommissioning phase will be provided.

7.3 Public Participation Process

The PPP in the EIA Phase will be undertaken in compliance with Chapter 6 of the 2014 NEMA EIA Regulations (as amended).

The need for a Public Participation Plan was originally stipulated in the directives published in GG 43412, GN R650 on 5 June 2020, regarding measures to address, prevent and combat the spread of COVID-19 relating to national environmental management permits and licences. GN 650 was applicable to Alert Level 3 and was repealed by GN 970 which was published on 9 September 2020 and applied for the period of the national state of disaster. However, GN R650 and GN R970 were repealed on 22 March 2022 by GG 46075, GN 1914. The proposed Public Participation Plan was discussed at the Pre-Application Meeting on 26 April 2022, and the plan was submitted via email to the assigned DFFE Case Officers on 6 May 2022. However, the DFFE confirmed via email on 16 May 2022 that Public Participation Plans are no longer required for Applications for EA. Refer to Appendix E.1 of this Scoping Report for a copy of this email correspondence, confirming that no Public Participation Plan is required for the proposed project.

The key steps in the PPP for the EIA Phase are described below. The PPP for the Scoping Phase is described in detail in Chapter 4 of this Scoping Report.

As discussed in Chapter 1 and Chapter 4 of this Scoping Report, an integrated PPP is being undertaken for the proposed Kudu Solar Facilities 1 to 12, and for the EGI (Projects 13 to 26), where relevant, which will entail that all public participation documents will serve to notify the I&APs and Organs of State of the joint availability of the reports for the aforementioned projects, and will provide I&APs with an opportunity to comment on the reports.

7.3.1 Task 1 – I&AP Review of the EIA Report and EMPr

The first stage in the process will entail the release of the Draft EIA Report for a 30-day I&AP and stakeholder comment period. Relevant stakeholders, Organs of State and I&APs will be informed of the review period in the following manner:

- **Database Maintenance:** In line with Regulation 42 of GN R326, an initial database of potential I&APs (including key stakeholders and Organs of State) was developed for the Scoping and EIA processes and will be updated throughout the process. Appendix D of this Scoping Report includes a copy of the I&AP database, which indicates interaction with I&APs, key stakeholders and all I&APs that have been added to the electronic project database, to date. While I&APs have been encouraged to register their interest in the project from the start of the process, following the public announcements, the identification and registration of I&APs is ongoing for the duration of the study. As a result, I&AP details will be captured and automatically updated as and when information is distributed to or received from I&APs. I&APs will only be removed or de-registered from the database, upon request. The updated database will be used to provide written notification of the release of the Draft EIA Report for comment.

- **Protection of Personal Information:** In accordance with the Protection of Personal Information Act (Act 4 of 2013), the CSIR will conduct itself responsibly when collecting, processing, storing and sharing any personal information collected for the purposes of PPP in terms of the 2014 NEMA EIA Regulations (as amended). By registering as an I&AP and/or submitting information and comments, the stakeholder essentially consents to the collection, collation, processing, and storing of such information and the use and disclosure of such information for the aforementioned purpose[2]. This was explained to I&APs in the correspondence issued for the release of the BID, and will be maintained on all remaining correspondence sent throughout the EIA Process. The stakeholders have also been given an opportunity to send an email to the EAP if they wish to opt out of communications on the proposed project.

- **Advertisements to Register Interest:** An advertisement will be placed in Afrikaans and English in at least one local newspaper, at the commencement of the 30-day comment period for the Draft EIA Report. A copy of the content of the advertisement will be included as an Appendix in the Draft EIA Report, along with proof of placement included in the Final EIA Report.

- **Letter 4[3] to I&APs (Outcome of decision-making on Final Scoping Report (FSR) and commencement of EIA Phase for Kudu Solar Facility 1 to 12**): Written notification of the outcome of decision-making on the FSR and the commencement of the EIA Phase (i.e. Letter

[2] CSIR Privacy Notice. Website: https://www.csir.co.za/csir-privacy-notice
[3] Note that Letters 1, 2, and 3 are addressed in Chapter 4 of this Scoping Report and apply to the Scoping Phase.

4) will be sent to all I&APs and Organs of State included on the updated project database via email, where email addresses are available. This letter will be sent once the outcome of decision making on the FSR is received by the CA (i.e. at most 43 days after acknowledgment of receipt of the FSR by the DFFE). Letter 4 will include notification of the commencement of the EIA Phase for the proposed projects, and it will be written in English. Copies of Letter 4 and emails sent will be included in the Draft EIA Report that will be released for a 30-day review period.

- **Letter 5 to I&APs (Availability of the Draft EIA Reports for Kudu Solar Facility 1 to 12 for public comment):** Written notification of the availability of the Draft EIA Reports (i.e. Letter 5) will be sent to all I&APs, Stakeholders and Organs of State included on the updated project database via email, where email addresses are available. This letter will be sent at the commencement of the 30-day review period on the Draft EIA Report, and will include information on the proposed projects and notification of the release and availability of the reports. Letter 5 will be written in English. Proof of email, as well as copies of the Letter 5, will be included in the Final EIA Reports that will be submitted to the DFFE for decision-making.

- **Text Messaging:** SMS texts will also be sent to all I&APs on the updated project database, where cell phone numbers are available, to inform them of the proposed projects and how to access the Draft EIA Reports.

- **Local Networks**: Where possible, communication will be made with the relevant Municipal Ward Councillor and/or similar community forums to request that they send notifications of the proposed projects, report availability and executive summaries via their local networks (such as WhatsApp groups, Neighbourhood Watch groups, other social media mechanisms etc.). However, since the Renosterberg Local Municipality is under administration, communication with Councillors is proving difficult.

- **30-day Comment Period:** As noted above, potential I&APs, including authorities and Organs of State, will be notified via Letter 5, of the 30-day comment and registration period within which to submit comments on the Draft EIA Reports and/or to register on the I&AP database.

- **Executive Summaries**: Executive summaries of the Draft EIA Reports will also be emailed to I&APs on the database, where email addresses are available, together with Letter 5, and uploaded to the project website and alternative web-platforms.

- **Availability of Information:** The Draft EIA Reports will be uploaded to the project website (i.e. https://www.csir.co.za/environmental-impact-assessment) for I&APs to access it. As a supplementary mechanism, the Draft EIA Reports will also be uploaded to other alternative web-platforms such as Dropbox or Google Drive. If an I&AP cannot access the reports via the project website, via the alternative web-platforms such as Dropbox or Google Drive, and if additional information is required (other than what is provided in the Executive Summaries), then the I&AP can contact the EAP, who will then make an electronic copy available (where feasibly possible).

7.3.2 Task 2 – Comments and Responses Report

A key component of the EIA process is documenting and responding to the comments received from I&APs and the authorities. Copies of all written comments received during the review of the Draft EIA Reports will be compiled into a Comments and Responses Report for inclusion in an appendix to the Final EIA Reports that will be submitted to the DFFE for decision-making. The Comments and Responses Report will indicate the nature of the comment, as well as when and who raised the comment. The comments received will be considered by the EIA team and appropriate responses provided by the relevant member of the EIA team, the Project Developer and/or specialists. The response provided will indicate how the comment received has been dealt with in the EIA Process and considered in the Final EIA Reports, the project design or EMPrs. Should the comment received fall beyond the scope of this EIA, clear reasoning will be provided.

7.3.3 Task 3 – Compilation of the Final EIA Reports for Submission to DFFE

Following the 30-day commenting period on the Draft EIA Reports and incorporation of the comments received into the reports, the Final EIA Reports will be submitted to the DFFE for decision-making in line with Regulation 23 (1) (a) of the 2014 NEMA EIA Regulations (as amended). The report will be submitted electronically to the DFFE via the Novell S-Filer system, as recommended by the DFFE since June 2020.

In line with best practice, I&APs on the project database will be notified via **Letter 6** via email (where email addresses are available) of the submission of the Final EIA Reports to the DFFE for decision-making. To ensure ongoing access to information, copies of the Final EIA Reports that have been submitted for decision-making and the Comments and Response Reports (detailing comments received during the EIA Phase and responses thereto) will be placed on the project website (i.e. https://www.csir.co.za/environmental-impact-assessment). As a supplementary mechanism, the Final EIA Reports will also be uploaded to other alternative web-platforms such as Dropbox or Google Drive.

The Final EIA Reports, which will be submitted for decision-making to the DFFE, will include proof of the PPP that was undertaken to inform Organs of State, Stakeholders and I&APs of the availability of the Draft EIA Reports for the 30-day comment period (as explained above).

The DFFE will have 107 days (from receipt of the Final EIA Reports) to either grant or refuse EA (in line with Regulation 24 (1) of the 2014 NEMA EIA Regulations, as amended).

7.3.4 Task 4 – Environmental Authorisation (EA) and Appeal Process

Subsequent to the decision-making phase, if EAs are granted by the DFFE for the proposed projects, all registered I&APs, Organs of State and Stakeholders on the project database will receive notification of the issuing of the EAs and the associated appeal period. The 2014 NEMA EIA Regulations (as amended) (i.e. Regulation 4 (1)) states that after the Competent Authority has reached a decision, it must inform the Project Applicant of the decision, in writing, within 5 days of such decision. Regulation 4 (2) of the 2014 NEMA EIA Regulations (as amended) stipulates that

I&APs need to be informed of the EA and associated appeal period within 14 days of the date of the decision.

The distribution of the EAs (should such authorisations be granted by the DFFE), as well as the notification of the appeal period, will include a letter (i.e. **Letter 7** (Release of EAs and Notification of Opportunity to Appeal)) to be sent via email to all registered I&APs, Stakeholders and Organs of State on the project database, where email addresses are available. The letter will include information on the appeal period, as well as details regarding where to obtain a copy of the EAs. The EAs will be uploaded to the project website (i.e. https://www.csir.co.za/environmental-impact-assessment). SMS texts will also be sent to all I&APs on the database, where cell phone numbers are available, to inform them of the EAs (should they be granted).

7.4 Authority Consultation during the EIA Phase

Authority consultation is integrated into the PPP, with meetings or discussions held on online platforms with the lead authorities, where necessary. It is proposed that the Competent Authority (DFFE) as well as other lead authorities will be consulted at various stages during the EIA Process, if required. At this stage, the following authorities have been identified for the purpose of this EIA Process (additional authorities might be added to this list as the EIA Process progresses):

- Air Traffic Navigation Services (ATNS)
- AgriSA;
- Birdlife South Africa;
- Department of Transport;
- Department of Water and Sanitation;
- DFFE Integrated Environmental Authorisations Directorate;
- DFFE Biodiversity and Conservation Directorate;
- DFFE Protected Areas Directorate;
- Endangered Wildlife Trust;
- Eskom SOC Ltd;
- National Energy Regulator of South Africa (NERSA);
- Ngwao Boswa Kapa Bokoni (Heritage Northern Cape);
- Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR);
- Pixley Ka Seme District Municipality;
- Renosterberg Local Municipality;
- South African Civil Aviation Authority (CAA);
- South African Heritage Resources Agency (SAHRA)
- South African Local Government Association (SALGA) (Northern Cape)
- South African National Parks (SANParks);
- South African National Roads Authority (SANRAL);
- South African Radio Astronomy Observatory (SARAO);
- South African Weather Services;
- Wildlife and Environmental Society of South Africa (WESSA); and
- World Wildlife Fund (WWF).

The authority consultation process for the EIA Phase is outlined in Table 7.2 below.

Table 7.2: Authority Communication Schedule

STAGE IN EIA PHASE	FORM OF CONSULTATION
During the EIA Process	Site visit with authorities (including DFFE), if required.
During preparation of EIA Report	Communication (via email or online platforms (i.e. Microsoft Teams) with the DFFE on the outcome of Specialist Studies, if required.
On submission of EIA Report for comment	Online meetings with dedicated departments, if requested by the DFFE, with jurisdiction over particular aspects of the project (e.g. Local Authority).

7.5 Approach to the Impact Assessment Methodology and Specialist Assessments

This section outlines the assessment methodology and legal context for specialist assessments, as recommended by the then Department of Environmental Affairs (DEA) 2006 Guideline on Assessment of Impacts.

7.5.1 Impact Assessment Methodology

The Impact Assessment Methodology has been aligned with the requirements for EIA Reports as stipulated in Appendix 3 (3) (1) (j) of the 2014 NEMA EIA Regulations (as amended) which states the following:

“An environmental impact assessment report must contain the information that is necessary for the Competent Authority to consider and come to a decision on the application, and must include 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 mitigated”.

The identification of potential impacts includes impacts that may occur during the construction, operational and decommissioning phases of the development. The assessment of impacts includes direct, indirect as well as cumulative impacts. In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed project is well understood so that the impacts associated with the project can be assessed. The process of identification and assessment of impacts will include:

- Determining the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determining future changes to the environment that will occur if the activity does not proceed;
- Develop an understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts, which are likely to occur if the activity is undertaken.

The following principles underpin the application of this methodology:

- Transparent and repeatable process - specialists are to describe the thresholds and limits they apply in their assessment, wherever possible.
- Adapt parameters to context (where justified) – the methodology proposes some thresholds (e.g. for spatial extent, in Step 3 below), however, if the nature of the impact requires a different definition of the categories of spatial extent, then this can be provided and described by the specialist.
- Combination of a quantitative and qualitative assessment – where possible, specialists are to provide quantitative assessments (e.g. areas of habitat affected, number of jobs), however, it is recognised that not all impacts can be quantified, and then qualitative assessments are to be provided.

As per the then Department of Environmental Affairs and Tourism (DEAT) Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks will be rated in terms of direct, indirect and cumulative impacts:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of 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 as a result of the activity.

- **Cumulative impacts** are 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. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

In addition to the above, the Impact Assessment Methodology includes the following aspects:

- **Step 1: Nature of impact/risk** - this reviews the type of effect that a proposed activity will have on the environment and includes "what will be affected and how?" The term environment has a broad interpretation that includes both the natural (biophysical) environment and the socio-economic environment. The term socio-ecological system is also used to describe the natural and socio-economic environment and the interactions amongst these components.

- **Step 2: Status** - Whether the impact/risk on the overall environment (social, biophysical and economic) will be:

    - Positive - environment overall will benefit from the impact/risk;
    - Negative - environment overall will be adversely affected by the impact/risk; or
    - Neutral - environment overall will not be affected.
    - Note: The significance of a negative impact may be called a risk, and the significance of a positive impact may be called an opportunity.

- **Step 3**: Qualitative determination of the consequence of the impact/risk by identifying the a) spatial extent; b) duration; c) reversibility; and d) irreplaceability.

    - **A) Spatial extent** – The size of the area that will be affected by the impact/risk:
        - Site specific;
        - Local (<10 km from site);
        - Regional (<100 km of site / within the district municipality);
        - National; or
        - International (e.g. Greenhouse Gas emissions or migrant birds).

    - **B) Duration** – The timeframe during which the impact/risk will be experienced:
        - Very short term (instantaneous);
        - Short term (less than 1 year);
        - Medium term (1 to 10 years);
        - Long term (the impact will cease after the operational life of the activity (i.e. the impact or risk will occur for the project duration)); or
        - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient (i.e. the impact will occur beyond the project decommissioning)).

    - **C) Reversibility** of the Impacts - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase):
        - High reversibility of impacts (impact is highly reversible at end of project life i.e. this is the most favourable assessment for the environment);
        - Moderate reversibility of impacts;
        - Low reversibility of impacts; or
        - Impacts are non-reversible (impact is permanent, i.e. this is the least favourable assessment for the environment).

- **D) Irreplaceability** of Receiving Environment/Resource Loss caused by impacts/risks – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (decommissioning phase):
  - High irreplaceability of resources (project will destroy unique resources that cannot be replaced, i.e. this is the least favourable assessment for the environment);
  - Moderate irreplaceability of resources;
  - Low irreplaceability of resources; or
  - Resources are replaceable (the affected resource is easy to replace/rehabilitate, i.e. this is the most favourable assessment for the environment).

These criteria are then combined in a qualitative manner to determine the **consequence**. The consequence terms ranging from slight to extreme (as described below) will be calibrated per Specialist Study, where required, so that there is transparency and consistency in the way a risk/impact is measured.

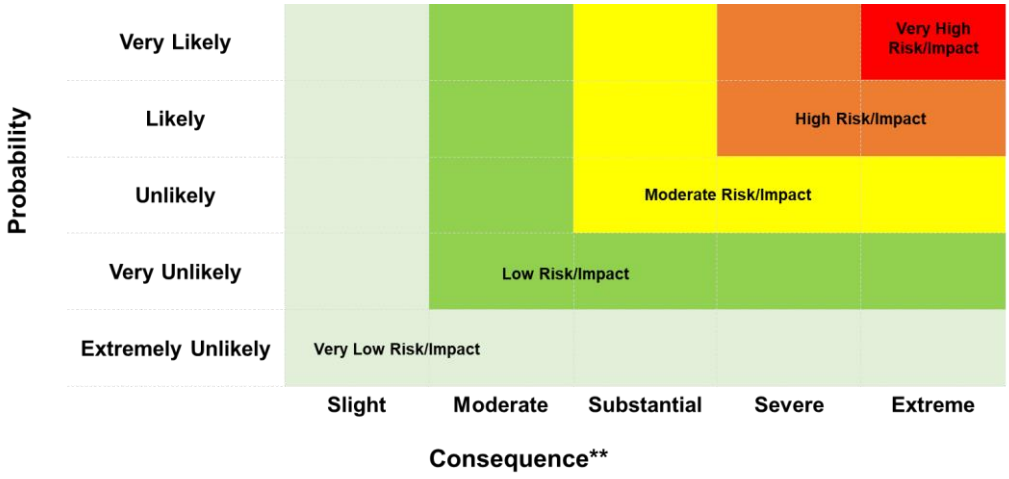
- **Consequence** – The anticipated consequence of the risk/impact is generally defined as follows:
  - Extreme (extreme alteration of natural or socio-economic systems, patterns or processes, i.e. where environmental or socio-economic functions and processes are altered such that they permanently cease);
  - Severe (severe alteration of natural or socio-economic systems, patterns or processes, i.e. where environmental or socio-economic functions and processes are altered such that they temporarily or permanently cease);
  - Substantial (substantial alteration of natural or socio-economic systems, patterns or processes, i.e. where environmental or socio-economic functions and processes are altered such that they temporarily or permanently cease;
  - Moderate (notable alteration of natural or socio-economic systems, patterns or processes, i.e. where the natural or socio-economic environment continues to function but in a modified manner; or
  - Slight (negligible and transient alteration of natural or socio-economic systems, patterns or processes, i.e. where natural systems/environmental or socio-economic functions, patterns, or processes are not affected in a measurable manner, or if affected, that effect is transient and the system recovers).

- **Step 4**: The **probability** of the impact/risk must be rated using the criteria below:

  - **Probability** – The probability of the impact/risk occurring:
    - Extremely unlikely (little to no chance of occurring);
    - Very unlikely (<30% chance of occurring);
    - Unlikely (30-50% chance of occurring)
    - Likely (51 – 90% chance of occurring); or
    - Very Likely (>90% chance of occurring regardless of prevention measures).

- **Step 5**: Determination of the **significance** of the identified impact/risk using both the **consequence** and **probability** (qualitatively as shown in Figure 7.1). The approach incorporates internationally recognised methods from the Intergovernmental Panel on Climate

Change (IPCC) (2014) assessment of the effects of climate change and is based on an interpretation of existing information in relation to the proposed activity, to generate an integrated picture of the risks related to a specified activity in a given location, with and without mitigation. Risk is assessed for each significant stressor (e.g. physical disturbance), on each different type of receiving entity (e.g. the municipal capacity, a sensitive wetland), qualitatively (very low, low, moderate, high, very high) against a predefined set of criteria. Significance definitions and rankings are provided below:



[Qualitatively determined based on Spatial Extent, Duration, Reversibility and Irreplaceability]

Figure 7.1: Guide to assessing risk/impact significance as a result of consequence and probability

- **Significance** – Will the impact cause a notable alteration of the environment?
  - Very low (the risk/impact may result in very minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
  - Low (the risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);
  - Moderate (the risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated);
  - High (the risk/impact will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making); and
  - Very high (the risk/impact will result in very major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making (i.e. the project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating)).

With the implementation of mitigation measures, the residual impacts/risks are ranked as follows in terms of significance:

- Very low = 5;
- Low = 4;
- Moderate = 3;
- High = 2; and
- Very high = 1.

- **Step 6**: Determine the **Confidence Level** – The degree of confidence in predictions based on available information and specialist knowledge:
    - Low;
    - Medium; or
    - High.

Other aspects to be taken into consideration in the assessment of impact significance are:

- Impacts are to be evaluated for the construction, operational and decommissioning phases of the development. The assessment of impacts for the decommissioning phase will be brief, as there is limited understanding at this stage of what this might entail. The relevant rehabilitation guidelines and legal requirements applicable at the time will need to be applied;
- Impacts will be evaluated with and without mitigation in order to determine the effectiveness of mitigation measures on reducing the significance of a particular impact;
- The impact evaluation will, where possible, take into consideration the cumulative effects associated with this and other Wind and Solar PV projects which are either developed or in the process of being developed in the local area (i.e. within 30 km from the proposed Kudu Solar Facilities). Refer to Section 7.5.2 for a description of the cumulative impact assessment methodology; and
- The impact assessment will attempt to quantify the magnitude of potential impacts (direct, indirect and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

Impacts will then be collated into the EMPr and these will include the following:

- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness;
- Identifying negative impacts and prescribing mitigation measures to avoid or reduce negative impacts. Where no mitigatory measures are possible this will be stated; and
- Positive impacts will be identified and augmentation measures will be identified to potentially enhance positive impacts where possible.

Table 7.3 below will be used by the specialists for the rating of impacts, and repeated for the Construction, Operational and Decommissioning Phases.

Table 7.3: Example of Table for Assessment of Impacts/Risks

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential mitigation measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE						
Habitat and species loss as a result of clearance of vegetation for the PV Facility	***Status***	*Negative*	*Moderate (3)*	*Plant search and rescue (EMPr)*	*Low (4)*	*Medium*
	Spatial Extent	*Site Specific*				
	Duration	*Long-term*				
	Consequence	*Substantial*				
	Probability	*Very likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Moderate*				

7.5.2 Cumulative Impact Assessment Methodology

The cumulative impact assessment will include other renewable energy projects (i.e. Wind and Solar PV) projects within a 30 km radius that are in different stages of planning and/or development (e.g. have received an EA, BA/EIA in progress at the commencement of this Scoping and EIA Process, or has been constructed); including the 12 proposed Kudu Solar Facilities and 14 Kudu EGI developments. The information has been sourced from the National DFFE Renewable Energy EIA Application (REEA) database; as well as from the South African Heritage Resources Information System (SAHRIS). Table 7.4 provides more details, whilst Figure 7.2 provides an illustration of the projects that will be considered in the cumulative impact assessment. All withdrawn or lapsed projects will not be considered.

Table 7.4: Proposed renewable energy projects, located within 30 km of the proposed Kudu Solar Facilities, that will be considered in the Cumulative Impact Assessment (in addition to the Kudu Solar Facilities and EGI Projects) (Source: DFFE REEA, Quarter 3, 2022; and SAHRIS)

CSIR NUMBER	DFFE REFERENCE	TECHNOLOGY	MW/KV	STATUS	PROJECT TITLE	EIA REGULATIONS	ASSESSMENT PROCESS	APPLICANT	EAP
1	• 12/12/20/2258 • 12/12/20/2258/1	Solar PV	Unknown	Approved and Preferred Bidder (Operational)	• The Proposed Establishment of Photovoltaic (Solar Power) Farms in the Northern Cape Province - Kalkbult	2010	Scoping and EIA	Scatec Solar SA Pty Ltd	Sustainable Development Projects cc
2	• 12/12/20/2463/1 • 12/12/20/2463/1/2 • 12/12/20/2463/1/A2 • 12/12/20/2463/1/AM3 • 12/12/20/2463/1/AM4 • 12/12/20/2463/1/AM5	Onshore Wind	96/193	Approved and Preferred Bidder (Operational)	• Longyuan Mulilo De Aar 2 North Wind Energy Facility • Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility • The Wind Energy Facility (North and South) situated on the Plateau Near De Aar, Northern Cape Province	2010 and 2014	Scoping and EIA and Amendment	Longyuan Mulilo De Aar 2 South (Pty)	Aurecon South Africa (Pty) Ltd and Holland and Associates Environmental Consultants
3	• 12/12/20/2463/2 • 12/12/20/2463/2/AM2	Onshore Wind	0	Approved and Preferred Bidder (Operational)	• Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility • The Wind Energy Facility (North and South) Situated On The Plateau Near De Aar, Northern Cape Province	2010 and 2014	Scoping and EIA and Amendment	Mulilo Renewable Energy (Pty) Ltd	Aurecon South Africa (Pty) Ltd
4	• 14/12/16/3/3/1/1166 14/12/16/3/3/1/1166/AM3 14/12/16/3/3/1/1166/AM4	Transmission line	132	Approved	• Basic Assessment for the proposed construction of a 132 kV transmission line corridor adjacent to the existing Eskom transmission line from Longyuan Mulilo De Aar 2 North Wind Energy Facility (WEF) to the Hydra Substation in De Aar, Northern Cape	2010 and 2014	Basic Assessment	Longyuan Mulilo De Aar 2 North (Pty) Ltd	Aurecon South Africa (Pty) Ltd
5	• 14/12/16/3/3/1/785	Transmission line	132	Approved	• Proposed construction of two 132kV transmission lines from the South & North Wind Energy Facilities on the Eastern Plateau (De Aar 2) near De Aar, Northern Cape.	2010	Basic Assessment	Mulilo Renewable Energy (Pty) Ltd	Aurecon South Africa (Pty) Ltd
6	• 14/12/16/3/3/2/278 • 14/12/16/3/3/2/278/1 • 14/12/16/3/3/2/278/2	Onshore Wind	118	Approved	• Proposed Castle Wind Energy Facility Project, located near De Aar, Northern Cape	2010 and 2014	Scoping and EIA	Castle Wind Farm (Pty) Ltd	Aurecon South Africa (Pty) Ltd; and Savannah Environmental Consultants (Pty) Ltd
7 and 9	• 14/12/16/3/3/2/564 • 14/12/16/3/3/2/564/AM1 • 14/12/16/3/3/2/564/AM2	Solar PV	75	To be confirmed	• Proposed Swartwater 75MW solar PV power facility in Petrusville within Renosterburg Local Municipality, Northern Cape	2010 and 2014	Scoping and EIA and Amendment	AE-AMD Renewable Energy (Pty) Ltd	USK Environmental and Waste Engineering (Pty) Ltd
8	• 14/12/16/3/3/2/740	Solar PV	300	Approved	• Proposed 300MW Solar Power Plant in Phillipstown area in Renosterberg Local Municipality	2010	Scoping and EIA	To be confirmed	Tshikovha Environmental and Communication Consultants
10	• 14/12/16/3/3/2/744	Solar PV	0	Approved	• Proposed PV facility on farm Jakhalsfontein near De Aar	2010	Scoping and EIA	Solar Capital (Pty) Ltd	Eco Compliance (Pty) Ltd
11	• 14/12/16/3/3/2/612	No Technology	0	Withdrawn/ Lapsed	• Proposed renewable energy farm on portion 5 of farm Kleinplaas No. 193, Phillipstown within Renosterberg Local Municipality, Northern Cape	2010	Scoping and EIA	NK Energie (Pty) Ltd	EnviroAfrica Environmental Consultants (Pty) Ltd
12	• 14/12/16/3/3/2/739	Solar PV	70 - 100	To be confirmed	• Proposed 70 - 100 MW Solar Power Plant in Petrusville	2010	Scoping and EIA	To be confirmed	Tshikovha Environmental and Communication Consultants

CSIR NUMBER	DFFE REFERENCE	TECHNOLOGY	MW/KV	STATUS	PROJECT TITLE	EIA REGULATIONS	ASSESSMENT PROCESS	APPLICANT	EAP
13	• Not issued yet (it is understood that the project is still within the pre-application stage)	Solar PV	800 (Maximum)	Pre-Application	• The Proposed Keren Energy Odyssey Solar PV Facilities (Odyssey Solar 1, Odyssey Solar 2, Odyssey Solar 3, Odyssey Solar 4, Odyssey Solar 5, Odyssey Solar 6, Odyssey Solar 7 And Odyssey Solar 8)	2014	Scoping and EIA	Keren Energy Group Holdings	EnviroAfrica cc
14[4]	• To be confirmed	Solar PV	3050	Scoping	• The Proposed Development of the Crossroads (formally referred to as the Hydra B) Green Energy Cluster of Renewable Energy Facilities and Grid Connection Infrastructure, Pixley Ka Seme District Municipality, Northern Cape Province. The Cluster entails the development of up to 21 solar energy facilities, with the Scoping and EIA Processes consisting of three phases. Phases 1, 2 and 3 consist of 9, 6 and 6 solar facilities, respectively. The Phase 1 Scoping and EIA Processes were launched in January 2023.	2014	Scoping and EIA	Akuo Energy Afrique	Savannah Environmental Consultants (Pty) Ltd
Not shown on map	• 14/12/16/3/3/2/280	Onshore Wind	0	Withdrawn/ Lapsed	• Proposed Zingesele wind energy facility project, located near De Aar, Northern Cape	2010	Scoping and EIA	Zingesele Wind Farm (Pty) Ltd	Savannah Environmental Consultants (Pty) Ltd
Not shown on map	• 14/12/16/3/3/2/310	Onshore Wind	0	Withdrawn/ Lapsed	• Proposed Naumanni Wind Energy Facility project located near De Aar in Northern Cape	2010	Scoping and EIA	To be confirmed	Aurecon South Africa (Pty) Ltd
Not shown on map	• 14/12/16/3/3/2/403	Solar	150	Withdrawn/ Lapsed	• Proposed Construction of a Solar Photovoltaic (PV) Power Plant near De Aar, Northern Cape Province of South Africa	2010	Scoping and EIA	Renosterberg Wind Energy Corporation (RWEC) in partnership with the Industrial Development Corporation (IDC)	Sivest Environmental Division
Not shown on map	• 14/12/16/3/3/2/404	Onshore Wind	250	Withdrawn/ Lapsed	• Proposed Wind Farm Facility for Renosterberg Wind Energy Company (RWEC) near Petrusville, Northern Cape Province	2010	Scoping and EIA	Renosterberg Wind Energy Corporation (RWEC) in partnership with the Industrial Development Corporation (IDC)	Sivest Environmental Division
Not shown on map	• 14/12/16/3/3/2/431	Solar PV	21	Withdrawn/ Lapsed	• Proposed Keren Holdings Renosterfontein Solar plant on remainder of Farm Renosterfontein NR194, Renosterberg Local Municipality, Northern Cape	2010	Scoping and EIA	To be confirmed	EnviroAfrica Environmental Consultants (Pty) Ltd

[4] At the time of finalization of this Scoping Report for the proposed Kudu Solar Facility, the mapping files for the proposed Cross Roads Green Energy Cluster were provided for Phase 1 of the development only. Hence Phase 2 and Phase 3 are not spatially shown on Figure 7.2.

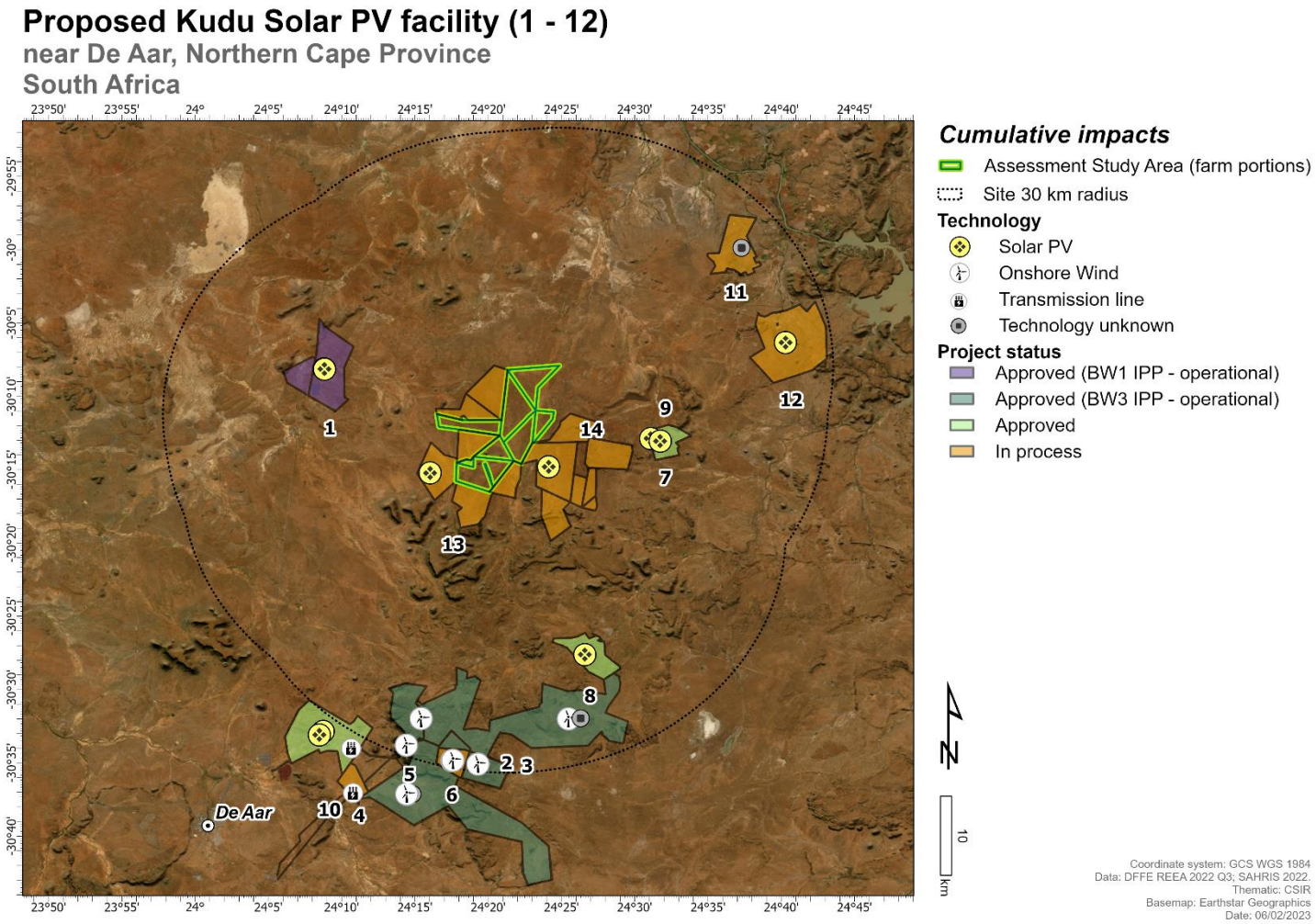


Figure 7.2: Renewable Energy projects within the 30 km radius considered for the Cumulative Impact Assessment (Source: DFFE REEA Quarter 3, 2022; and SAHRIS).

7.6 Issues or impacts to be assessed as part of the EIA Process

The issues and impacts presented in this section have been identified based on scoping level assessment input from specialists that form part of the EIA project team. These issues and impacts will be assessed in further detail during the EIA Phase through the specialist assessments and are included in Chapter 6 of this Scoping Report; however, they have been summarised below in Table 7.5 for ease of reference. Issues raised by stakeholders during the 30-day review period on the Draft Scoping Report were in line with the potential issues identified below for further assessment in the EIA Phase. The issues raised by stakeholders are included in Issues and Responses Trail in Appendix E.11 of this Final Scoping Report. It is emphasised that the Scoping Report in general provides preliminary impacts, sensitivities and impact significance ratings which will be updated and finalised, as relevant, and presented in more detail in the detailed Specialist Studies and in the EIA Report.

Table 7.5: Summary of Issues to be addressed during the EIA Phase as part of the specialist assessments / input

Specialist Assessment / Input	Key issues to be addressed
Agriculture and Soils Compliance Statement	▪ **Negative potential impacts:** o Construction Phase: Loss of agricultural potential by occupation of land. o Construction and Decommissioning Phases: Loss of agricultural potential by soil degradation. o Construction and Decommissioning Phases: Loss of agricultural potential by dust generation. ▪ **Positive potential impacts** (Construction, Operation and Decommissioning Phases): o Increased financial security for farming operations. o Improved security against stock theft and other crime due to the presence of security infrastructure and security personnel at the energy facility.
Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species	**Construction Phase:** ▪ Habitat loss and fragmentation. ▪ Loss of protected species. ▪ Increased alien invasive species. ▪ Increased erosion and soil compaction. ▪ Littering and general pollution. **Operational Phase:** ▪ Loss of species composition and diversity. ▪ Increased alien invasive species. ▪ Littering and general pollution. **Decommissioning Phase** ▪ Loss of habitat. ▪ Increased alien invasive species.

Specialist Assessment / Input	Key issues to be addressed
	Cumulative Impact ▪ Habitat loss and fragmentation.
Aquatic Biodiversity Impact Assessment	**Construction Phase:** ▪ Disturbance of aquatic habitat and the associated impact to sensitive aquatic biota. ▪ Removal of indigenous aquatic vegetation and associated loss of aquatic ecological integrity and functionality. ▪ Water supply for construction and associated stress on available water resources. ▪ Road crossing structures may impede flow in the aquatic features. ▪ Alien vegetation infestation may occur within the aquatic features due to disturbance. ▪ Increased sedimentation and risks of contamination of surface water runoff may result from construction works. **Operational Phase:** ▪ Ongoing disturbance of aquatic features and associated vegetation along access roads or adjacent to the infrastructure that needs to be maintained. ▪ Modified runoff characteristics from hardened surfaces at the substation and along access roads has the potential to result in erosion of adjacent watercourses. ▪ Water supply and water quality impacts (e.g. contamination from sewage) as a result of the operation of the site. **Decommissioning Phase:** ▪ Increased disturbance of aquatic habitat due to the increased activity on the site. ▪ Increased sedimentation and risks of contamination of surface water runoff. **Cumulative Impacts:** ▪ Construction and Decommissioning Phases: Increased disturbance of aquatic habitat due to the increased activity in the wider area. ▪ Operational Phase: Degradation of ecological condition of aquatic ecosystems.
Avifauna Impact Assessment	**Construction Phase:** ▪ Displacement due to disturbance and habitat transformation associated with the construction of the solar PV plant and associated infrastructure. **Operational Phase:** ▪ Displacement due to habitat transformation associated with the presence of the solar PV plant and associated infrastructure. ▪ Collisions with the solar panels. ▪ Entrapment in perimeter fences. ▪ Electrocutions in the onsite substation complex.

Specialist Assessment / Input	Key issues to be addressed

	Decommissioning Phase:
	▪ Displacement due to disturbance associated with the decommissioning of the solar PV plant and associated infrastructure.
	
	Cumulative Impacts:
	▪ Construction and Decommissioning Phases:
	  ○ Displacement due to disturbance and habitat transformation associated with the construction and decommissioning of the solar PV plant and associated infrastructure.
	▪ Operational Phase:
	  ○ Displacement due to habitat transformation associated with the presence of the solar PV plant and associated infrastructure.
	  ○ Collisions with the solar panels.
	  ○ Entrapment in perimeter fences.
	▪ Electrocutions in the onsite substation complex.

Visual Impact Assessment	**Construction Phase:** ▪ Potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on nearby farmsteads and visitors to the area. ▪ Potential visual effect of haul roads, access roads, stockpiles and construction camps in the visually exposed landscape. **Operational Phase:** ▪ Potential visual intrusion of solar arrays and related infrastructure on receptors including glint and glare ▪ Potential visual impact of an industrial type of activity on the pastoral / rural character and sense of place of the area **Decommissioning Phase:** ▪ Potential visual effect of any remaining structures, platforms and disused roads on the landscape. **Cumulative Impacts:** ▪ Potential combined visual effect of proposed 12 solar PV facilities seen together during construction phase ▪ Potential combined visual effect of proposed 12 solar PV facilities seen together during operational phase. ▪ Potential combined visual effect of proposed 12 solar PV facilities seen together during decommissioning phase.
Heritage Impact Assessment (Archaeology and Cultural Landscape)	**Construction Phase:** ▪ Potential impacts on archaeology ▪ Potential impacts on graves ▪ Potential impacts on the cultural landscape **Operational Phase:** ▪ Potential impacts on the cultural landscape

Specialist Assessment / Input	Key issues to be addressed
	Decommissioning Phase: ▪ Potential impacts on the cultural landscape **Cumulative Impacts:** ▪ Construction and Decommissioning Phases: o Potential impacts on archaeology. o Potential impacts on graves. ▪ Operational Phase: o Potential impacts on the cultural landscape.
Palaeontology Site Sensitivity Verification Report	▪ The study area has been confirmed as low to very low palaeo-sensitivity. Provided that the Chance Fossil Finds Protocol is incorporated into the Environmental Management Programmes (EMPrs) and fully implemented during the construction phase of the solar PV facility, there are no objections on palaeontological heritage grounds to authorisation of the proposed project. Pending the discovery of significant new fossil finds before or during construction, no further specialist palaeontological studies, reporting, monitoring or mitigation are recommended for the proposed project.
Socio-Economic Impact Assessment	**Construction Phase:** ▪ **Potential positive impacts:** o Creation of employment and business opportunities, and opportunity for skills development and on-site training. ▪ **Potential negative impacts:** o Impacts associated with the presence of construction workers on local communities. o Impacts related to the potential influx of job-seekers. o Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site. o Increased risk of grass fires associated with construction related activities. o Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles. o Impact on productive farmland. **Operational Phase:** ▪ **Potential positive impacts:** o The establishment of infrastructure to improve energy security and support the renewable sector. o Creation of employment opportunities. o Benefits to the affected landowners. o Benefits associated with the socio-economic contributions to community development.

Specialist Assessment / Input	Key issues to be addressed
	▪ **Potential negative impacts:** o Visual impacts and associated impacts on sense of place. o Impact on property values. o Impact on tourism. **Decommissioning Phase:** ▪ **Potential negative impacts:** o Social impacts associated with retrenchment including loss of jobs, and source of income. **Cumulative Impacts:** ▪ **Potential positive impacts:** o Cumulative impact on local economies. ▪ **Potential negative impacts:** o Cumulative impact on sense of place. o Cumulative impact on services.
Traffic Impact Assessment	**Construction Phase:** ▪ Potential congestion and delays on the surrounding road network. ▪ Potential impact on traffic safety and increase in accidents with other vehicles or animals. ▪ Potential change in the quality of the surface condition of the roads. ▪ Potential noise and dust pollution. **Operational Phase:** ▪ The traffic generated during the operational phase are mainly related to the staff that will be transported to and from the sites and are not anticipated to have a significant traffic impact on the surrounding road network. **Decommissioning Phase:** ▪ Potential congestion and delays on the surrounding road network. ▪ Potential impact on traffic safety and increase in accidents with other vehicles or animals. ▪ Potential change in the quality of the surface condition of the roads. ▪ Potential noise and dust pollution. **Cumulative Impacts** ▪ Congestion and delays on the surrounding road network. ▪ Impact on traffic safety and increase in accidents with other vehicles or animals. ▪ Change in the quality of the surface condition of the roads. ▪ Noise and dust pollution.

Specialist Assessment / Input	Key issues to be addressed
Battery Storage High Level Safety, Health and Environment Risk Assessment	▪ **Lithium-ion Battery Energy Storage System (BESS):** o Noxious smoke from potential fires. o Risk of fires or explosions. ▪ **Redox flow BESS:** o Risk of spills due to the large volume of electrolyte handled.
Geohydrology Assessment	**Construction Phase:** ▪ Potential lowering of the groundwater level due to abstraction for construction related activities. ▪ Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages **Operational Phase:** ▪ Potential lowering of the groundwater level due to abstraction for operational related activities such as panel cleaning. ▪ Potential impact on groundwater quality as a result of using cleaning agents for cleaning the solar panels. ▪ Potential impact on groundwater quality as a result of electrolyte that will be used for the BESS. **Decommissioning Phase:** ▪ Potential impact on groundwater quality as a result of accidental oil spillages or fuel leakages. **Cumulative Impacts:** ▪ Potential lowering of groundwater level during the construction and operational phase for all 12 of the Kudu Solar Facilities. ▪ Accidental oil spillages or fuel leakages from the construction and the decommissioning phase for all the 12 Kudu Solar Facilities. ▪ Potential of impact on groundwater quality as a result of using cleaning agents for cleaning the solar panels during the operational phase for all the 12 Kudu Solar Facilities. ▪ Potential impact on groundwater quality as a result of electrolyte that will be used for the BESS. ▪ Other wind and solar projects within a 30 km radius.
Geotechnical Assessment	**Construction, Operational and Decommissioning Phases**: ▪ Displacement of geologic materials. This is related to increased unnatural hard surfaces that will yield increased runoff, potentially increasing erosion. Removal of rocks and other geologic materials for site levelling and grading during construction and decommissioning, resulting in loss of geologic materials, e.g. topsoil removal/loss, and potentially the destruction of habitats of endemic species. ▪ Contamination of subsoils and loss of topsoil. This includes contamination of geologic materials as a consequence of the construction and decommissioning activities by earthworks

Specialist Assessment / Input	Key issues to be addressed
	machinery and other apparatus; as well as through typical maintenance activities during the operation phase, such as washing of solar panels, or spillages associated with the BESS.
Civil Aviation Site Sensitivity Verification Report	▪ A Civil Aviation Site Sensitivity Verification was undertaken, which confirmed that the study area does not include any civil aviation installations, and therefore the low sensitivity is confirmed. No further requirements need to be fulfilled in terms of the Assessment Protocols of March 2020 (GN R320).
Defence Site Sensitivity Verification Report	▪ A Defence Site Sensitivity Verification was undertaken, which confirmed that the study area does not include any defence installations, and therefore the low sensitivity is confirmed. No further requirements need to be fulfilled in terms of the Assessment Protocols of March 2020 (GN R320).

7.7 Alternatives to be assessed in the EIA Phase

A description of the alternatives that will be assessed or considered during the EIA Phase is provided in Chapter 5 of this Scoping Report. However, they have been summarised below for ease of reference, also highlighting which alternatives are deemed unfeasible for further assessment as per the motivation provided in Chapter 5:

- **No-go Alternative:**
  - The no-go alternative assumes that the proposed project will not go ahead i.e. it is the option of not constructing the proposed Kudu Solar Facility. This alternative would result in no environmental impacts (positive and negative) on the preferred site or surrounding local area, as a result of the proposed project. It will provide a baseline against which other alternatives will be compared and considered during the EIA Phase. The no-go alternative will be assessed in detail by all the specialists on the project team.

- **Land Use Alternative:**
  - The current land-use is agriculture, specifically low density small stock grazing. There is no cultivation in the area. The study area has low to medium agricultural sensitivity and is **not deemed feasible to assess further during the EIA Phase**. The proposed project offers some positive impact on agriculture by way of improved financial security for farming operations, as well as wider, societal benefits. The development of the proposed project at the preferred site is more favourable than the agricultural land-use alternative.

- **Type of Activity Alternative:**
  - This relates to the generation of electricity from a renewable energy source, and in this particular case, from solar resources. The **generation of electricity from a renewable energy source was the only activity considered** by the Applicant, and thus considered in this Scoping Report. **No other activity types were considered or deemed appropriate** based on the expertise of the Applicant.

- **Renewable Energy Alternatives:**
  - Given the above, the development of Solar PV is the preferred and only renewable energy technology to be developed on site because the site has a **very good solar resource availability** (i.e. Global Horizontal Irradiation of 2 000 to 2 200 kWh/m^2 in terms of the long-term yearly total) and the **local conditions are favourable**.
  - In addition, **Hydro Power and Biomass Energy** are deemed **unsuitable**.
  - The study area does have wind resources (i.e. 301 – 500 W/m^2), however other sites might have better wind resources. In addition, based on the findings of the Avifauna Scoping Level Assessment, the presence of certain bird species would make wind energy development and associated impacts **more difficult to manage and there would be limited space available based on the Very High and High sensitivities**.

- **Preferred Site and Development Footprint within the site:**
  - The preferred site for all the proposed Kudu Solar Facilities comprises the following farm portions which cover a combined footprint of 8 150 ha, which serves as the study area for this Scoping and EIA Process:
    - Remaining Extent of the Farm Bas Berg No. 88;
    - Remaining Extent of Portion 3 of the Farm Bas Berg No. 88;
    - Portion 4 (Portion of Portion 3) of the Farm Bas Berg No. 88;
    - Remaining Extent of Portion 2 (Middel Plaats) (a Portion of Portion 1) of the Farm Grasspan No. 40;
    - Remaining Extent of the Farm Annex Wolve Kuil No. 41;
    - Portion 1 (Wolve Kuil West) of the Farm Annex Wolve Kuil No. 41;
    - Portion 2 of the Farm Wolve Kuil No. 43; and
    - Remaining Extent of the Farm Wolve Kuilen No. 42.
  - This led to the identification of the Original Scoping Buildable Areas / development footprints within the preferred site. Furthermore, a screening and site verification exercise of the study area was undertaken by the specialist team during this Scoping Phase. The Scoping Level Specialist Assessments are included in Appendix G of this Scoping Report. The findings of the Scoping Level Specialist Assessments were used to determine the Revised Scoping Buildable Areas / development footprints. The Revised Scoping Buildable Areas / development footprints largely avoid the no-go sensitivities identified by the specialists.
  - The preferred project layout will be confirmed following the input from the various specialists during the EIA Phase. A preliminary layout plan has been included in Section 7.9 of this chapter.

- **Technology Alternatives:**
  - Only the PV solar panel type will be considered in this Scoping and EIA Process, along with various mounting options that will be considered in the design.
  - The following types of Battery Energy Storage System (BESS) technologies will be assessed in the EIA Phase and, as discussed with the DFFE at the Pre-Application Meeting on 26 April 2022, both options will be assessed in the EIA, and both will be motivated for approval in the EA should they be considered suitable:
    - Lithium-ion BESS; and
    - RFB.

It is important to note that where alternatives are not feasible or will not be assessed, a motivation has been provided in Chapter 5 of this Scoping Report. The preferred alternatives will be assessed during the EIA Phase.

7.8 Terms of Reference for the Specialist Assessments

The ToRs for the Specialist Assessments will essentially consist of the generic assessment requirements and the specific issues identified for each discipline. The ToRs did not require an update following the 30-day commenting period of the Scoping Report.

The following Specialist Assessments have been identified following consultation with the Screening Tool[5] to determine a baseline description of the prevalent environmental sensitivities within the proposed project site and based on an understanding of potential issues associated with Solar PV projects. The ToR for each Specialist Assessment is discussed in detail below. The Specialist Assessments and associated Specialists are indicated in Table 7.6 below. Additional Specialist Assessments could possibly be commissioned as a result of concerns raised during the Scoping Phase.

Table 7.6: Specialist Assssments and associated Specialist Consultants commissioned to assess the environmental sensitivites in the EIA Phase

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Specialists		
Johann Lanz (*Pr.Sci.Nat.)*	Private	Agriculture and Soils Compliance Statement
Corne Niemandt *(Pr.Sci.Nat.)* Samuel Laurence *(Pr.Sci.Nat.)*	Enviro-Insight cc	Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species
Toni Belcher *(Pr.Sci.Nat.)* Dana Grobler *(Pr.Sci.Nat)*	Private	Aquatic Biodiversity Impact Assessment
Chris van Rooyen Albert Froneman (*Pr.Sci.Nat.)*	Chris van Rooyen Consulting	Avifauna Impact Assessment
Quinton Lawson (*SACAP, 3686*) Bernard Oberholzer (*SACLAP, 87018*)	QARC and BOLA	Visual Impact Assessment
Dr Jayson Orton (*APHP: Member 43; ASAPA CRM Section: Member 233*)	ASHA Consulting (Pty) Ltd	Heritage Impact Assessment (Archaeology and Cultural Landscape)
Dr John Almond *(PSSA and APHP Member)*	Natura Viva cc	Palaeontology Site Sensitivity Verification Report
Tony Barbour	Private	Socio-Economic Impact Assessment
Annebet Krige *(Pr Eng)*	Sturgeon Consulting	Traffic Impact Assessment
Debbie Mitchell *(Pr Eng)*	Ishecon cc	Battery Storage High Level Safety, Health and Environment Risk Assessment
Dale Barrow (*Pr.Sci.Nat.)* Christel van Staden (*Cand.Sci.Nat.)* Shane Teek (*Cand.Sci.Nat.)* Julian Conrad	GEOSS South Africa (PTY) Ltd	Geohydrology Assessment
Shane Teek (*Cand.Sci.Nat.)* Michael Baleta (*Pr.Sci.Nat.)* Julian Conrad	GEOSS South Africa (PTY) Ltd	Desktop Geotechnical Assessment
Rohaida Abed *(Pr.Sci.Nat.* and *Registered EAP (2021/4067))* Helen Antonopoulos	CSIR	Civil Aviation Site Sensitivity Verification

[5] The National Screening Tool can be accessed at https://screening.environment.gov.za/screeningtool/#/pages/welcome

NAME	ORGANISATION	ROLE/STUDY TO BE UNDERTAKEN
Lizande Kellerman *(Pr.Sci.Nat.)*		
Rohaida Abed *(Pr.Sci.Nat.* and *Registered EAP (2021/4067))* Helen Antonopoulos Lizande Kellerman *(Pr.Sci.Nat.)*	CSIR	Defence Site Sensitivity Verification

The requirements for Specialist Assessments are specified in Appendix 6 of the 2014 NEMA EIA Regulations (as amended), and, where relevant, the Assessment Protocols that were published on 20 March 2020, in GG 43110, GN R320; and on 30 October 2020 in GG 43855, GN R1150. These protocols stipulate the procedures for the assessment and Minimum Reporting Criteria for identified environmental themes in terms of Sections 24 (5) (a) and (h) and Section 44 of the NEMA when applying for EA.

The Assessment Protocols in GN R320 include the following sections:

- **Part A**: This includes the Site Sensitivity Verification requirements where a Specialist Assessment is required but no Specific Assessment Protocol has been prescribed. This is applicable to the following specialist assessments for this project: Visual Impact Assessment; Heritage Impact Assessment; Palaeontology Assessment; Socio-Economic Assessment; Traffic Impact Assessment; Geohydrology Assessment; and Geotechnical Assessment. The current use of the land and the environmental sensitivity of the site under consideration identified by the Screening Tool, where determined, must be verified and confirmed by undertaking a Site Sensitivity Verification. A Site Sensitivity Verification must be compiled. Where there are no sensitivity layers on the Screening Tool for a particular Specialist Assessment, then this must be stated in the actual Specialist Assessment. For example, as of December 2022, there are no sensitivity layers on the Screening Tool for Socio-Economic, Traffic, Geohydrology, and Geotechnical features. These relevant Specialist Assessments must comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended).
- **Part B**: This includes the Site Sensitivity Verification requirements and the Assessment and Minimum Reporting Criteria where a Specialist Assessment is required, and a specific Assessment Protocol has been prescribed. The following prescribed protocols are relevant to this proposed project:
    - **Agriculture**: Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all onshore wind and/or solar PV energy activities requiring EA;
    - **Terrestrial Biodiversity**: Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all relevant activities requiring EA (based on the classification identified by the Screening Tool);
    - **Aquatic Biodiversity**: Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all relevant activities requiring EA (based on the classification identified by the Screening Tool);
    - **Civil Aviation**: Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all relevant activities requiring EA (based on the classification identified by the Screening Tool); and
    - **Defence**: Site Sensitivity Verification Report required and specific Assessment Protocol to be followed. This applies to all relevant activities requiring EA (based on the classification identified by the Screening Tool).

GN 1150 prescribes protocols in respect of specific environmental themes for the assessment of, as well as the minimum report content requirements on, the environmental impacts for activities requiring EA. GN 1150 includes a protocol for the specialist assessment and minimum report content requirements for environmental impacts on a) **terrestrial animal species** and b) **terrestrial plant species**. The requirements of these protocols apply from the date of publication (i.e. from 30 October 2020). **Therefore, these protocols are applicable to the project**.

As noted above, the specialist assessments will comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), or the Assessment Protocols published in GN R320 on March 2020; or the Assessment Protocols published in GN R1150 on October 2020. The BESS Risk Assessment will serve as a technical report, and the aforementioned legislation will thus not be applicable.

7.8.1 Agricultural Compliance Statement

The Agricultural Compliance Statement must comply with the Assessment Protocols that were published on 20 March 2020, in GG 43110, GN R320. This specifically includes the Agriculture Protocol that applies to all onshore wind and/or solar PV energy activities requiring EA. This protocol replaces the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended).

The Agricultural Compliance Statement will include the following:

- Specification of development setbacks or buffers required (if any), and clear motivations for these recommendations;
- A map showing the proposed development footprint (including supporting infrastructure) with a 50m buffered development envelope, overlaid on the agricultural sensitivity map generated by the Screening Tool;
- Calculations of the physical development footprint area for each land parcel as well as the total physical development footprint area of the proposed development including supporting infrastructure;
- Confirmation that the development footprint is in line with the allowable development limits contained in GN R320;
- Identification of the direct, indirect and cumulative impacts associated with the proposed development, where possible, (although an assessment and rating of impacts is not strictly required for a Compliance Statement stipulated in GN R320):
- Cumulative impacts to be identified by considering other renewable energy projects within 30 km of the proposed projects (refer to Table 7.4 above);
- Confirmation that all reasonable measures have been taken through micro-siting to avoid or minimise fragmentation and disturbance of agricultural activities;
- A substantiated statement indicating the level of acceptability of the proposed development and a recommendation if the development should go ahead or not; as well as any conditions to which this statement is subjected;
- A description of assumptions, any uncertainties or gaps in knowledge or data, and limitations;
- The compliance statement must be applicable to the preferred site and proposed development footprint; confirm that the site is of “low” or “medium” sensitivity for agriculture; and indicate whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site.

- A signed specialist statement of independence and details and relevant expertise as well as the South African Council for Natural Scientific Professions (SACNASP) registration number of the specialist, including a Curriculum Vitae;
- Where required, provide recommendations with regards to proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr, which will be appended to the Draft and Final EIA Reports; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr. If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.2 Terrestrial Biodiversity and Species Impact Assessment

The Terrestrial Biodiversity Specialist is required to compile a Specialist Assessment in adherence to the following gazetted Environmental Assessment Protocols, which replace the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended):

- Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Terrestrial Biodiversity (GG 43110 / GN R320, 20 March 2020);
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (GG 43855 / GN R1150, 30 October 2020); and
- Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant Species (GG 43855 / GN R1150, 30 October 2020).

Based on the findings of the site visit and the Site Sensitivity Verification undertaken by the specialist, and the Terrestrial Biodiversity and Species Scoping Level Specialist Assessment (included in Appendix G.2 of this Scoping Report), it was confirmed that a Terrestrial Biodiversity Specialist Assessment Report, Terrestrial Plant Species Specialist Assessment Report, and Terrestrial Animal Species Compliance Statement are required during the EIA Phase.

The Terrestrial Biodiversity and Plant Species Specialist Assessment, and Terrestrial Animal Species Compliance Statement, will be based on existing information, national and provincial databases, and professional experience and fieldwork conducted by the specialist, as considered necessary and in accordance with relevant legislated requirements. The Assessment Report and Compliance Statement must also be in adherence to any additional relevant legislation and guidelines that may be deemed necessary. One combined report will be provided to address the Terrestrial Biodiversity, Terrestrial Plant Species and Terrestrial Animal Species Protocols. Note that the Avifauna Assessment is undertaken separately, in compliance with the Terrestrial Animal Species (GG 43855 / GN R1150, 30 October 2020).

The Terrestrial Biodiversity and Plant Species Specialist Assessment will include the following:

- Contact details of the specialist, SACNASP registration number, field of expertise, relevant experience, and a Curriculum Vitae;
- A signed statement of independence by the specialist;
- Liaison with the South African National Biodiversity Institute (SANBI) to obtain information on any sensitive species flagged in the Screening Tool (where species names are obscured / only numbered);
- A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;
- Description of the terrestrial ecology and ecosystem features of the project site, with focus on features that are to be potentially impacted by the proposed project. The description will include the major habitat forms within the study area, giving due consideration to terrestrial fauna and flora;
- A motivation must be provided if there were development footprints identified that were identified as having a “low” terrestrial biodiversity sensitivity and that were not considered appropriate;
- A motivation must be provided if there were any development footprints identified that were identified as having “low” or “medium” terrestrial plant species sensitivity and were not considered appropriate;
- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area. Specification of development setbacks or buffers required, and clear motivations for these recommendations. Include a description of the extent of disturbance and transformation of the site;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);
- Consideration of seasonal changes and long-term trends, such as due to climate change;
- Identification of any species of conservation concern (SCC) or protected species found on site or those suspected to occur on site (e.g. protected tree and provincially protected species);
- The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;
- Assessment of local and regional biodiversity conservation planning relevant to the project area;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed developments on terrestrial biodiversity and species:
    - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects (refer to Table 7.4 above).
    - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter, and must include the degree to which impacts and risks can be mitigated; reversed; and can cause loss of irreplaceable resources.

- A substantiated statement indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not; and any conditions to which this statement is subjected;
- A description of assumptions and limitations in the report and any uncertainties or gaps in knowledge or data;
- A statement of the timing and intensity of site inspection observations (linked to GN R320);
- A description of the mean density of observations/number of sample sites per unit area of site inspection observations, where possible, as noted in the Species Environmental Assessment Guideline;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Assessment of the project alternatives and identification of a preferred alternative with motivation for this selection;
- Provision of recommendations with regards to potential monitoring programmes; and
- Determine mitigation, impact management actions and outcomes, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Terrestrial Animal Species Compliance Statement will be prepared by a specialist registered with SACNASP and will include the following:

- The compliance statement will be applicable to the study area; confirm that the study area, is of “low” sensitivity for terrestrial animal species; and indicate whether or not the proposed development will have any impact SCC.
- Contact details and relevant experience as well as the SACNASP registration number of the specialist, including a Curriculum Vitae;
- Signed statement of independence by the specialist;
- Statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- A description of the methodology used to undertake the site survey and to prepare the compliance statement, including equipment and modelling used where relevant;
- The mean density of observations/number of samples sites per unit area, where possible, as noted in the Species Environmental Assessment Guideline;
- Where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr, which will be appended to the Draft and Final EIA Reports;
- A description of the assumptions made and any uncertainties or gaps in knowledge or data; and
- Any conditions to which the compliance statement is subjected.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-

specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.3 Aquatic Biodiversity and Species Impact Assessment

The Aquatic Biodiversity Specialist is required to compile a Specialist Assessment in adherence to the gazetted Environmental Assessment Protocols, specifically the "Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Aquatic Biodiversity" (GG 43110 / GN R320, 20 March 2020). This protocol replaces the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended).

Based on the findings of the site visit and the Site Sensitivity Verification undertaken by the specialist, and the Aquatic Biodiversity and Species Scoping Level Specialist Assessment (included in Appendix G.3 of this Scoping Report), an Aquatic Biodiversity Specialist Assessment Report is required during the EIA Phase.

The Aquatic Biodiversity and Species Impact Assessment is to be based on existing information, national and provincial databases, and professional experience and fieldwork conducted by the Specialist, as considered necessary and in accordance with relevant legislated requirements (e.g. GN R320). The Impact Assessment Report must also be in adherence to any additional relevant legislation and guidelines that may be deemed necessary.

The Aquatic Biodiversity and Species Impact Assessment will include the following:

- Contact details of the specialist, SACNASP registration number, field of expertise, relevant experience, and a Curriculum Vitae;
- A signed statement of independence by the specialist;
- A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;
- Description of the aquatic biodiversity and ecosystems of the project site, with focus on features that are to be potentially impacted by the proposed project. The description should include the aquatic ecosystem types, presence of aquatic species, the major habitat forms giving due consideration to the composition of aquatic species communities, their habitat, distribution and movement patterns within the study area;
- Describe the extent of disturbance and transformation of the site, as necessary;
- Indication of the historic ecological condition (reference) and the Present Ecological State (PES) of identified aquatic features (in- stream, riparian and floodplain habitat), and on site that are to be potentially impacted by the proposed project i.e. possible changes to the channel and flow regime (surface and groundwater); and comment on the recommended ecological condition of aquatic habitats to be achieved within the project area;
- A map (if possible) describing the ecosystem processes that operate in relation to the aquatic ecosystems on and immediately adjacent to the project site (e.g. movement of surface and subsurface water, recharge, discharge, sediment transport, etc.);
- Identify and delineate wetlands that may occur on the sites, using the relevant protocols established;

- An indication of the national and provincial priority status of the aquatic ecosystem, including a description of the criteria for the given status (i.e. if the site includes a wetland or a river freshwater ecosystem priority area or sub catchment, a strategic water source area, whether or not they are free-flowing rivers, wetland clusters, a critical biodiversity or ecologically sensitive area);
- Consideration of seasonal changes and long-term trends, such as due to climate change;
- Identify any SCC or protected species on site;
- Compilation of a Risk Matrix (Appendix A to GN R309 of 2016) and determining whether an application for Water Use Authorisation (e.g. General Authorisation or Water Use License) is required and if so, determining the requirements thereof;
- Assessment of local and regional biodiversity conservation planning relevant to the project area;
- A motivation must be provided if there were development footprints identified that were identified as having a “low” aquatic biodiversity sensitivity and that were not considered appropriate;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Assessment of the project alternatives and identification of a preferred alternative with motivation for this selection;
- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area. Specification of development setbacks or suitable construction and operational buffers for the aquatic ecosystem, using the accepted methodologies, and clear motivations for these recommendations including a description of the location of areas not suitable for development and to be avoided during construction and operation, where relevant;
- A section indicating how the Screening Tool was interrogated and whether classification of the site is accurate or not. If not, it must be motivated why the classification is not accurate;
- The threat status of the ecosystem and species as identified by the Screening Tool;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed developments on aquatic biodiversity and species:
    - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects (refer to Table 7.4 above).
    - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter, and must include the degree to which impacts and risks can be mitigated; reversed; and can cause loss of irreplaceable resources.
- A substantiated statement indicating the acceptability of the proposed development and a recommendation if the development should receive approval or not; and any conditions to which this statement is subjected;
- A description of assumptions and limitations in the report and any uncertainties or gaps in knowledge or data;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Provision of recommendations with regards to potential monitoring programmes; and
- Determine mitigation, impact management actions and outcomes, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring

requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.4 Avifauna Impact Assessment

The Avifauna Specialist is required to compile a Specialist Assessment in adherence to the protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (GG 43855 / GN R1150, 30 October 2020). This protocol replaces the requirements of Appendix 6 of the 2014 NEMA EIA Regulations (as amended). The Avifauna Assessment will also be undertaken in terms of the following:

- Guidelines for the Implementation of the Terrestrial Flora and Terrestrial Fauna Species Protocols for EIAs in South Africa produced by the SANBI on behalf of the Department of Environment, Forestry and Fisheries (2020); and
- The BirdLife South Africa (BLSA) Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa[6] to determine the level of survey effort that is required.

The pre-construction avifaunal monitoring programme is following an adapted Regime 2 protocol as defined in the Birds and Solar Energy best practice guidelines (Jenkins et al. 2017) which require a minimum of two surveys over a six-month period. At the time of release of this Scoping Report, both surveys have been conducted (the findings of the second survey does not change the findings of the Scoping Level Avifauna Assessment).

Based on the findings of the site visit and the Site Sensitivity Verification undertaken by the specialist, and the Avifauna Scoping Level Specialist Assessment (included in Appendix G.4 of this Scoping Report), it was confirmed that a full assessment is required during the EIA Phase.

The Avifauna Specialist Assessment will be based on existing information, national and provincial databases, and professional experience and fieldwork conducted by the Specialist, as considered necessary and in accordance with relevant legislated requirements. The Assessment Report must also be in adherence to any additional relevant legislation and guidelines that may be deemed necessary.

[6] Jenkins, A.R., Ralston-Patton, Smit-Robinson, A.H. 2017. Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa. BirdLife South Africa. BirdLife South Africa by Jenkins, A.R., Ralston-Patton, Smit- Robinson, A.H. 2017.

The Avifauna Impact Assessment will include the following:

- Contact details of the specialist, SACNASP registration number, field of expertise, relevant experience, and a Curriculum Vitae;
- A signed statement of independence by the specialist;
- A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- A description of the methodology used to undertake the Site Sensitivity Verification, impact assessment and site inspection, including equipment and modelling used where relevant;
- A description of the mean density of observations/number of sample sites per unit area of site inspection observations, where possible, as noted in the Species Environmental Assessment Guideline;
- Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;
- Finalisation of the findings and outcomes of the pre-construction avifaunal monitoring programme that was conducted over a period of six months in accordance with the BLSA guideline for Solar PV developments (i.e. Regime 2);
- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area in terms of avifaunal features such as habitat use, roosting, feeding and nesting/breeding;
- Specification of development setbacks or buffers required, and provide clear motivations for these recommendations, including a description of the location of areas not suitable for development and to be avoided during construction and operation, where relevant;
- A motivation must be provided if there were any development footprints identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate.
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Assessment of the project alternatives and identification of a preferred alternative with motivation for this selection;
- Describe the affected environment from an avifaunal perspective, including consideration of the surrounding habitats and avifaunal features (e.g. Ramsar sites, Important Bird Areas, wetlands, migration routes, feeding, roosting and nesting areas, etc.);
- Describe and map bird habitats on the site, based on on-site monitoring, desk-top review, collation of available information, studies in the local area and previous experience. The assessment must also consider the maps generated by the Screening Tool;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed development on birds:
    - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects (refer to Table 7.4 above).
    - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter and must include the degree to which impacts and risks can be mitigated; reversed; and can cause loss of irreplaceable resources.
- A reasoned opinion, based on the findings of the specialist assessment, indicating the acceptability of the proposed development and a recommendation if the development should receive approval or not; and any conditions to which the opinion is subjected if relevant;

- A description of the assumptions made, any uncertainties or gaps in knowledge or data, and limitations in the report;
- A section indicating how the Screening Tool was interrogated and whether classification of the site is accurate or not. If not, it must be motivated why the classification is not accurate;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Recommendations for mitigation of impacts to acceptable levels (where possible) and potential monitoring programmes;
- Determine mitigation, impact management actions and outcomes, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.5 Visual Impact Assessment

The Visual Specialist is required to undertake a Specialist Assessment in adherence with “Part A - General Protocol for the Site Sensitivity Verification and Minimum Report Content Requirements where a Specialist Assessment is required but no specific Environmental Theme Protocol has been prescribed” (GG 43110 / GNR 320, 20 March 2020).

The Visual Impact Assessment (VIA) Report must be compiled in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Visual Impact Assessment must include the following:

- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area. Specify set-backs or buffers, and provide clear reasons for these recommendations;
- Description of the visual character and visual absorption capacity of the local area. Any significant visual features or visual disturbances must be identified and mapped, as well as any sensitive visual receptors within the proposed project area or within viewsheds of the proposed project;
- Assessment of the preferred project layout following the Site Sensitivity Verification and layout identification;

- Viewshed for various elements of the proposed development must be calculated, defined and presented, and the varying sensitivities of these viewsheds must be highlighted;
- Mapping of visual sensitivity of the site taking into consideration visual receptors outside the site, and sensitivity to development on the site for potentially affected visual receptors of "very high" sensitivity;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a visual perspective;
    - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects (refer to Table 7.4 above).
    - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- Maps depicting viewsheds or line of sight across the sites should be generated and included in the VIA Report. These maps must indicate current viewsheds/visual landscape/obstructions, as well as expected visual impacts during the construction, operational and decommissioning phases of the proposed project, as relevant.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- A section indicating how the Screening Tool was interrogated and whether classification of the site is accurate or not. If not, it must be motivated why the classification is not accurate;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.6 Heritage Impact Assessment

The Heritage Specialist is required to undertake a Specialist Assessment in adherence to "Part A - General Protocol for the Site Sensitivity Verification and Minimum Report Content Requirements where a Specialist Assessment is required but no specific Environmental Theme Protocol has been prescribed" (GG 43110 / GNR 320, 20 March 2020).

The Heritage Impact Assessment (HIA) Report will be compiled in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended). The HIA must also comply with the requirements of SAHRA and the National Heritage Resources Act (Act 25 of 1999). The HIA must also be in adherence to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Heritage Impact Assessment must include the following:

- Description and assessment of the heritage features of the sites and surrounding area. This is to be based on desktop reviews, fieldwork, available databases and findings from other heritage studies in the area, where relevant. Reference to the grade of heritage feature and any heritage status the feature may have been awarded will be included (where possible);
- Specification of development setbacks or buffers required, and clear motivations for these recommendations;
- Map the heritage sensitivity for the study area, clearly showing any "no-go" areas in terms of heritage (i.e. "very high" sensitivity).
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed developments on the full scope of heritage features, including archaeology and the cultural-historical landscape, as required by heritage legislation:
    - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects (refer to Table 7.4 above).
    - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- Liaison with the relevant authorities (i.e. SAHRA) in order to obtain a letter of approval, comments or a Permit in terms of the National Heritage Resources Act (Act 25 of 1999), including Regulations issued thereunder, as necessary. This also includes meeting the reporting requirements of SAHRA.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- A section indicating how the Screening Tool was interrogated and whether classification of the site is accurate or not. If not, it must be motivated why the classification is not accurate;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Assessment of the project alternatives and identification of a preferred alternative with motivation for this selection;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and

- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.7 Palaeontology Assessment

The appointed Palaeontologist is required to undertake a Site Sensitivity Verification in adherence to with “Part A - General Protocol for the Site Sensitivity Verification and Minimum Report Content Requirements where a Specialist Assessment is required but no specific Environmental Theme Protocol has been prescribed” (GG 43110 / GNR 320, 20 March 2020).

The Palaeontologist conducted a site visit and field surveys in April 2022 in order to identify the level of sensitivity assigned to the project area, and to verify and confirm this sensitivity and land use as per the Screening Tool. The Palaeontology Site Sensitivity Verification is included in Appendix G.7 of this Scoping Report. According to the Screening Tool, the majority of the study area is of Medium to High palaeo-sensitivity. This provisional assessment has been contested by the specialist, based on a 2-day palaeontological site visit and several previous field-based and desktop Palaeontology Impact Assessment (PIA) studies in the broader De Aar – Kimberley region. It is concluded that the study area is of low to very low palaeo-sensitivity in general. If any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol included in Appendix G.7 should be fully implemented. Provided that the Chance Fossil Finds Protocol is incorporated into the EMPr and fully implemented during the construction phase, the specialist has confirmed that there are no objections on palaeontological heritage grounds to authorisation of the proposed project, and that no further specialist palaeontological studies, reporting, monitoring or mitigation are recommended (pending the discovery of significant new fossil finds before or during construction).

7.8.8 Socio-Economic Impact Assessment

The Socio-Economic Specialist is required to undertake a Specialist Assessment in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Screening Tool does not include any sensitivity layers relating to socio-economic information (as of December 2022); therefore, a Site Sensitivity Verification is technically not possible. Scoping level inputs provided by the Socio-Economic Specialist is included as Appendix G.8 of this Scoping Report.

The Socio-Economic Impact Assessment must include the following:

- Describe the socio-economic context of the study area, focusing on aspects that are potentially affected by the proposed project, and taking into consideration the current situation as well as the local trends, the local planning (Integrated Development Plans and Spatial Development Frameworks), and other developments in the area. The economic aspect of the assessment is anticipated to include aspects such as direct employment figures, feedback on the Gross Domestic Product (GDP) etc., and is not expected to require a detailed economic analysis;
- Identify the potential social and economic impacts (including benefits) associated with the proposed project, including inter alia impacts associated with loss of farmland (grazing), contribution to economic growth and job creation, training and skills development opportunities, quality of life, local community income and influx of workers / job seekers;
- Consider social issues such as potential in-migration of job seekers, opportunities offered by training and skills development, phasing of employment over the duration of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), cumulative effects with other REIPPPP projects in the local area, implications for local planning and resource use;
- Apply a variety of appropriate options for sourcing information, such as review of analogous studies, available databases and social indicators, use of interviews with key stakeholders such as local communities, local landowners and government officials (local and regional), etc., where possible, to inform the assessment. Undertake the collection of both primary and secondary data;
- Evaluate the implications of the social investment programme associated with REIPPPP projects on the local socio-economic context;
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a socio-economic perspective:
    - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects (refer to Table 7.4 above).
    - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- Identification of additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof, if any;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and

- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making.
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.9 Traffic Impact Assessment

The Traffic Specialist is required to undertake a Specialist Assessment in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Screening Tool does not include any sensitivity layers relating to traffic information (as of December 2022); therefore, a Site Sensitivity Verification is technically not possible. Scoping level inputs provided by the Traffic Specialist is included as Appendix G.9 of this Scoping Report.

The Traffic Impact Assessment must include the following tasks:

- Undertake a site visit to gather relevant information in terms of access, road conditions etc. and provide feedback following the site visit confirming if there are any aspects that need to be considered in the layout planning;
- Describe the traffic and transportation context of the study area, focusing on aspects that are potentially affected by the proposed project;
- Determine and describe the baseline transport and traffic condition of the study area;
- Consider traffic issues such as impact on the road network, congestion etc.;
- Description of the identified traffic features including the surrounding road network and potential traffic disturbances of the local area;
- Assessment of the preferred project layout and how it relates to traffic impact;
- Determine the national and local haulage routes between port of entry/manufacturer and site;
- Assessment of proposed internal roads and site access points;
- Assessment of freight requirements and permitting needed for abnormal loads;
- Identification and assessment of the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a traffic perspective;
    - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects (refer to Table 7.4 above).

  - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- A description of assumptions and limitations in the report;
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- Identification of any additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making; and
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.10 High Level Safety, Health, and Environment Risk Assessment for the Battery Energy Storage Systems

As indicated in the previous chapters, a High Level Safety, Health, and Environment Risk Assessment will be undertaken to study the risks associated with the proposed BESS. The Risk Assessment serves as a **technical report**, and thus Appendix 6 of the 2014 NEMA EIA Regulations (as amended) will thus **not** be applicable.

The ToR for the desktop assessment that will be completed during the EIA Phase of the project include:

- A description of the region and local features;
- A study of the battery technologies to be used;
- Identification of sensitive receptors in the area;
- Identifying the potential impacts on the health and safety of employees, contractors and public persons;
- Identification of relevant legislation and legal requirements; and
- Providing recommendations on possible preventative and mitigation measures for inclusion in the EMPr.

Refer to Appendix G.10 of this Scoping Report for the Scoping High Level BESS Safety, Health, and Environment Risk Assessment, which describes the proposed methodology for the assessment during the EIA Phase.

7.8.11 Geohydrology Assessment

The Geohydrology Specialist is required to undertake a Specialist Assessment in adherence to Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as to any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The Screening Tool does not include any sensitivity layers relating to geohydrology information (as of December 2022); therefore, a Site Sensitivity Verification is technically not possible. Scoping level inputs provided by the Geohydrology Specialist is included as Appendix G.11 of this Scoping Report.

The Geohydrology Assessment must include the following:

- Obtain data for the PV site (i.e. obtain data from the National Groundwater Archive (and associated groundwater use databases) and internal GEOSS database (which includes information relevant to the site)). Obtain data from the local Department of Water and Sanitation (DWS) monitoring boreholes. Obtain relevant geological maps and geohydrological maps, as well as relevant groundwater reports;
- Undertake a site visit in order to identify the level of sensitivity relating to geohydrology, and to complete a hydrocensus (i.e. visit boreholes in the area and measure yields and water quality);
- Analyse the hydrocensus data using geohydrological and spatial analysis methods to address the project objectives;
- Determination, description and mapping of the baseline environmental condition and sensitivity of the study area relating to geohydrology (including hydrogeological characterisation of aquifers (types, sensitivity, vulnerability), and groundwater (quality, quantity, use, potential for industrial or domestic use) in the area surrounding the proposed development;
- Specification of set-backs or buffers, and provide clear reasons for these recommendations;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;
- Identify significant features or disturbances within the study area and define any environmental risks in terms of geohydrology and the proposed project infrastructure;
- Confirm what type of authorisation or licence is required to make use of the ground water;
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a geohydrology perspective:
    - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects (refer to Table 7.4 above).
    - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- Identification of additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof, if any;

- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making.
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.12 Desktop Geotechnical Assessment

A Desktop Geotechnical Assessment will be undertaken in the EIA phase and will be included in the Draft and Final EIA Reports. The primary objective of the desktop assessment is to summarise the geology of the area, including the likely distribution of potential geotechnical challenges related to the underlying geology for the proposed project.

The study will comply with Appendix 6 of the 2014 NEMA EIA Regulations (as amended), as well as any other additional relevant legislation and guidelines that may be deemed necessary, if applicable.

The ToR for the desktop assessment that will be completed during the EIA Phase of the project include:

- Determine whether problem soils are likely to be encountered within the study area;
- Describe the geology and anticipated soil conditions;
- Include a general discussion of possible and likely engineering characteristics of the respective geological materials;
- Identify possible development constraints that may be present across the study area, e.g., topographical constraints, major discontinuities, or shallow groundwater conditions (permanent or non-permanent);
- Evaluation of the seismic potential of the area based on available published literature;
- Provide commentary on any potentially sensitive areas across the study area, such as ridges, outcrops and exposures.
- Provide broad recommendations that may be used to guide the geotechnical design and plan future investigations within the study area;
- Specification of set-backs or buffers, and provide clear reasons for these recommendations;
- Provide review input on the preferred infrastructure layout following the sensitivity analysis and layout identification;

- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a geotechnical perspective:
    - Cumulative impacts to be assessed by considering other renewable energy and EGI projects within 30 km of the proposed projects (refer to Table 7.4 above).
    - Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology to be followed is contained in Section 7.5.1 of this Chapter.
- A reasoned opinion indicating the acceptability of the proposed development and a recommendation if the development should go ahead or not;
- A description of assumptions and limitations in the report;
- Identification of additional protocols, licensing and/or permitting requirements that are relevant to the project and the implications thereof, if any;
- Specialist Declaration of Independence and Curriculum Vitae;
- Provide recommendations with regards to potential monitoring programmes; and
- Determine mitigation and/or management measures, which could be implemented to as far as possible, reduce the effect of negative impacts and enhance the effect of positive impacts. Also, identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This will be included in the EMPr, which will be appended to the Draft and Final EIA Reports.

The Specialist is also required to:

- Incorporate and address relevant comments and concerns raised by the stakeholders, commenting authorities and I&APs prior to submitting the Final EIA Report to the Competent Authority for decision-making.
- Review the Generic EMPr for Substations (GN R435) and confirm if there are any specific environmental sensitivities or attributes present on the project site and any resultant site-specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, a list of the required specific impact management outcomes and actions must be provided.

7.8.13 Civil Aviation

Civil Aviation Assessments are required to comply with the “Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Civil Aviation Installations” (GG 43110 / GN R320, 20 March 2020). As indicated in Chapter 3, Chapter 4, and Appendix G.13 of this Scoping Report, the entire study area is classified as low sensitivity on the Screening Tool. Therefore, in line with GN R320, only a Site Sensitivity Verification is necessary to confirm the site as a low sensitivity. This has been verified and confirmed by means of a site visit. Therefore, there are no further requirements as per GN R320.

7.8.14 Defence

Defence Assessments are required to comply with the "Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Defence Installations" (GG 43110 / GN R320, 20 March 2020). As indicated in Chapter 3, Chapter 4, and Appendix G.14 of this Scoping Report, the entire study area is classified as low sensitivity on the Screening Tool. Therefore, in line with GN R320, only a Site Sensitivity Verification is necessary to confirm the site as a low sensitivity. This has been verified and confirmed by means of a site visit. Therefore, there are no further requirements as per GN R320.

7.9 Project Layout to be Assessed/Refined during the EIA Phase

As noted in previous chapters, the study area / preferred site for all the proposed Kudu Solar Facilities is the full extent of the eight affected farm properties on which the proposed PV Facilities are planned to be constructed.

The full extent of these properties has been assessed by the specialists to identify environmental sensitivities and no-go areas. The total study area / preferred site for all the Kudu Solar Facilities is approximately 8 150 ha.

At the commencement of this Scoping and EIA Process, the Original Scoping Buildable Areas / development footprint which fall within the study area were identified following the completion of high-level environmental screening based on the Screening Tool.

As part of this Scoping Phase, the specialists assessed and considered the entire site / study area, and thus all identified buildable areas / development footprints.

Following the identification of sensitivities by the specialists during the Scoping Phase, the Project Developer took such sensitivities, and other considerations, into account and formulated the Revised Scoping Buildable Areas or development footprints.

The Revised Scoping Buildable Areas will be used to inform the design of the layout and will be further assessed during the EIA Phase in order to finalise the location of the development footprint within the study area of the eight affected farm properties (i.e. the preferred site). A preliminary layout has been developed based on the above approach.

Figure 7.3 illustrates a preliminary layout, based on the mapping requirements of the DFFE, where possible, and Figure 7.4 has been overlain with the identified environmental sensitivities. The no-go environmental sensitivities have been avoided. This serves as a combined layout and sensitivity map (Figure 7.4), to be refined as part of the EIA Phase, where necessary. Figure 7.5 is a combined cumulative impacts and environmental sensitivity map (based on the sensitivities identified by the specialists).

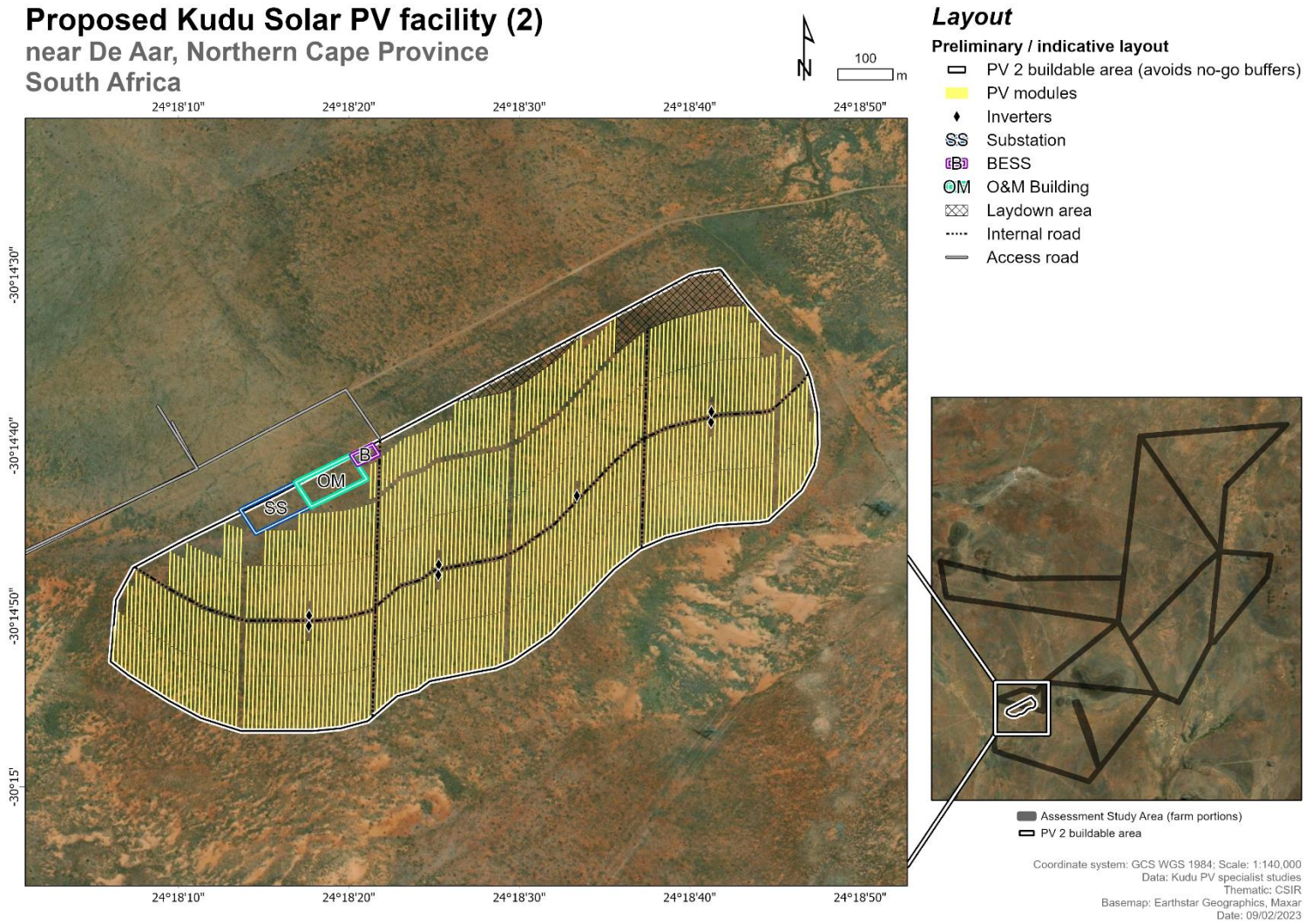


Figure 7.3: Preliminary Project Layout Map.

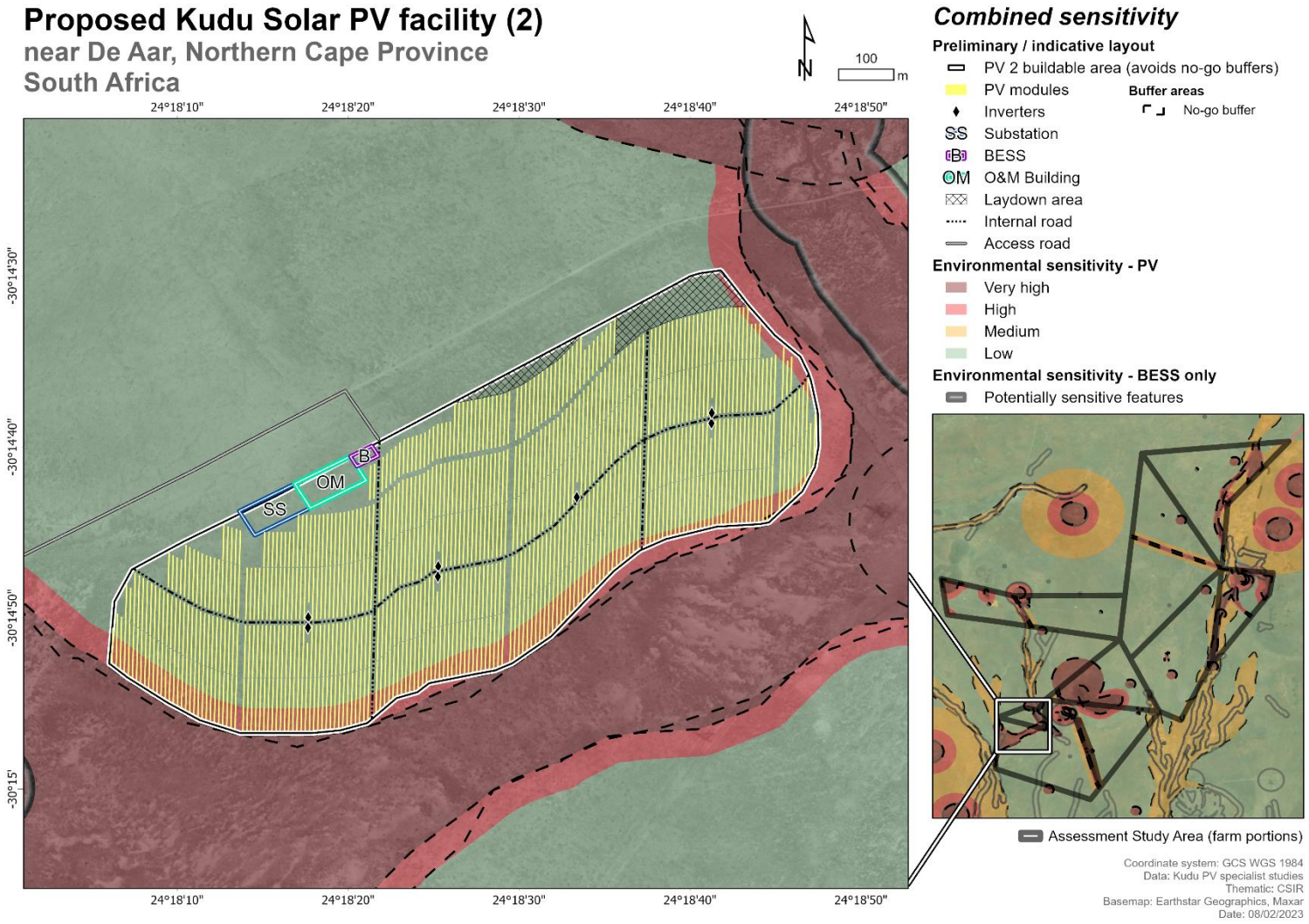


Figure 7.4: Combined Preliminary Project Layout and Environmental Sensitivity Map.

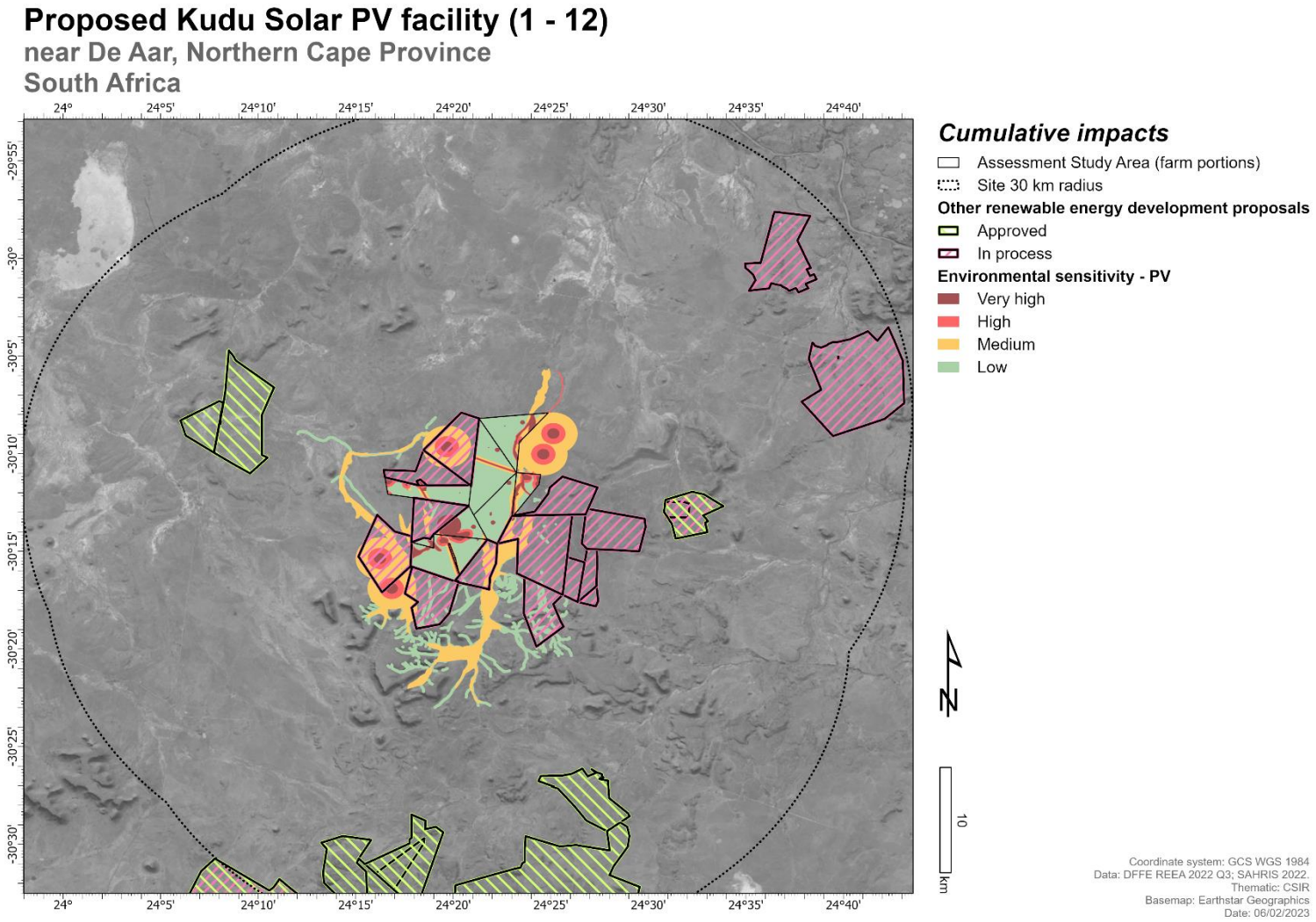


Figure 7.5: Combined Environmental Sensitivity and Cumulative Impact Map.