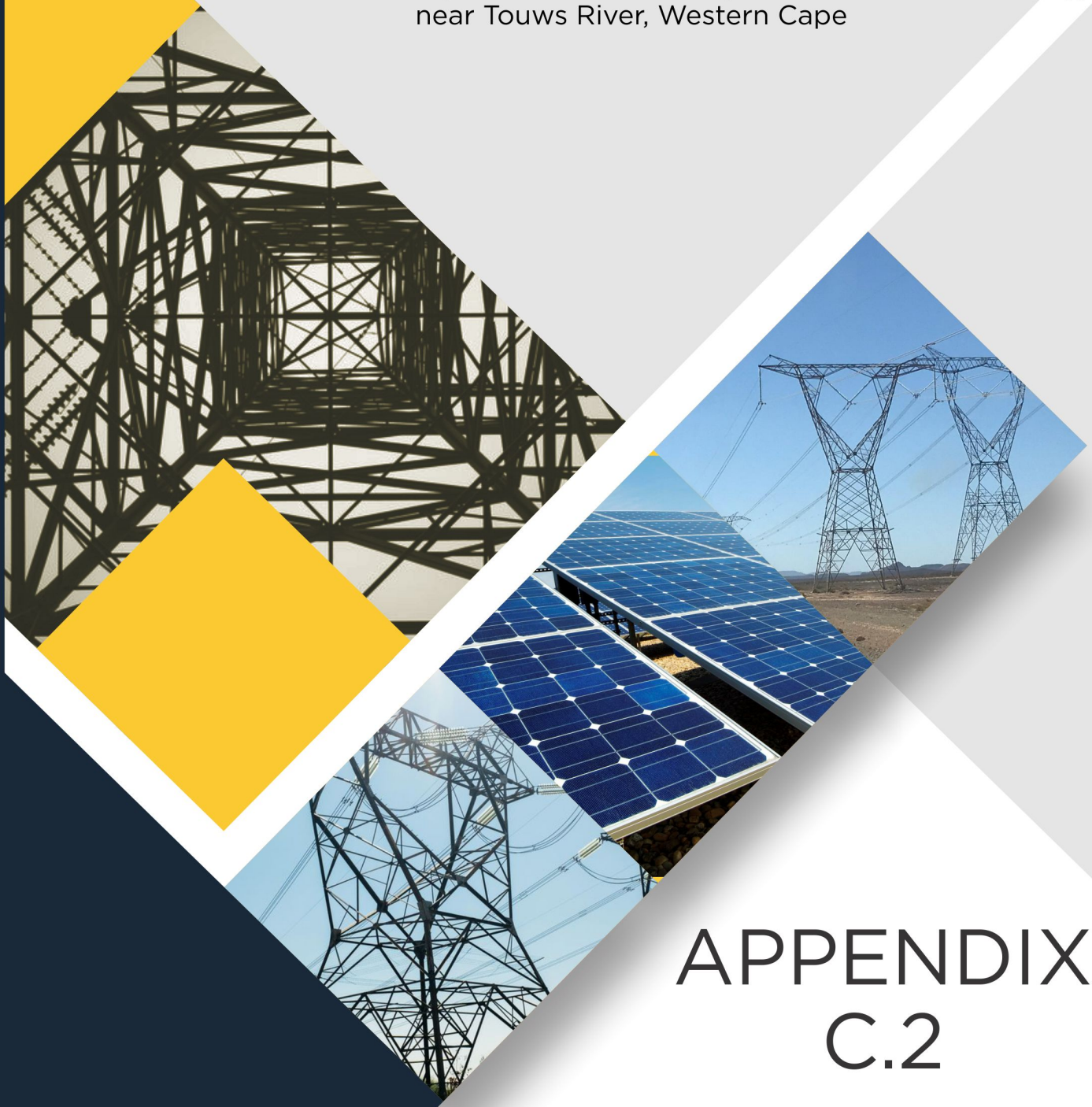
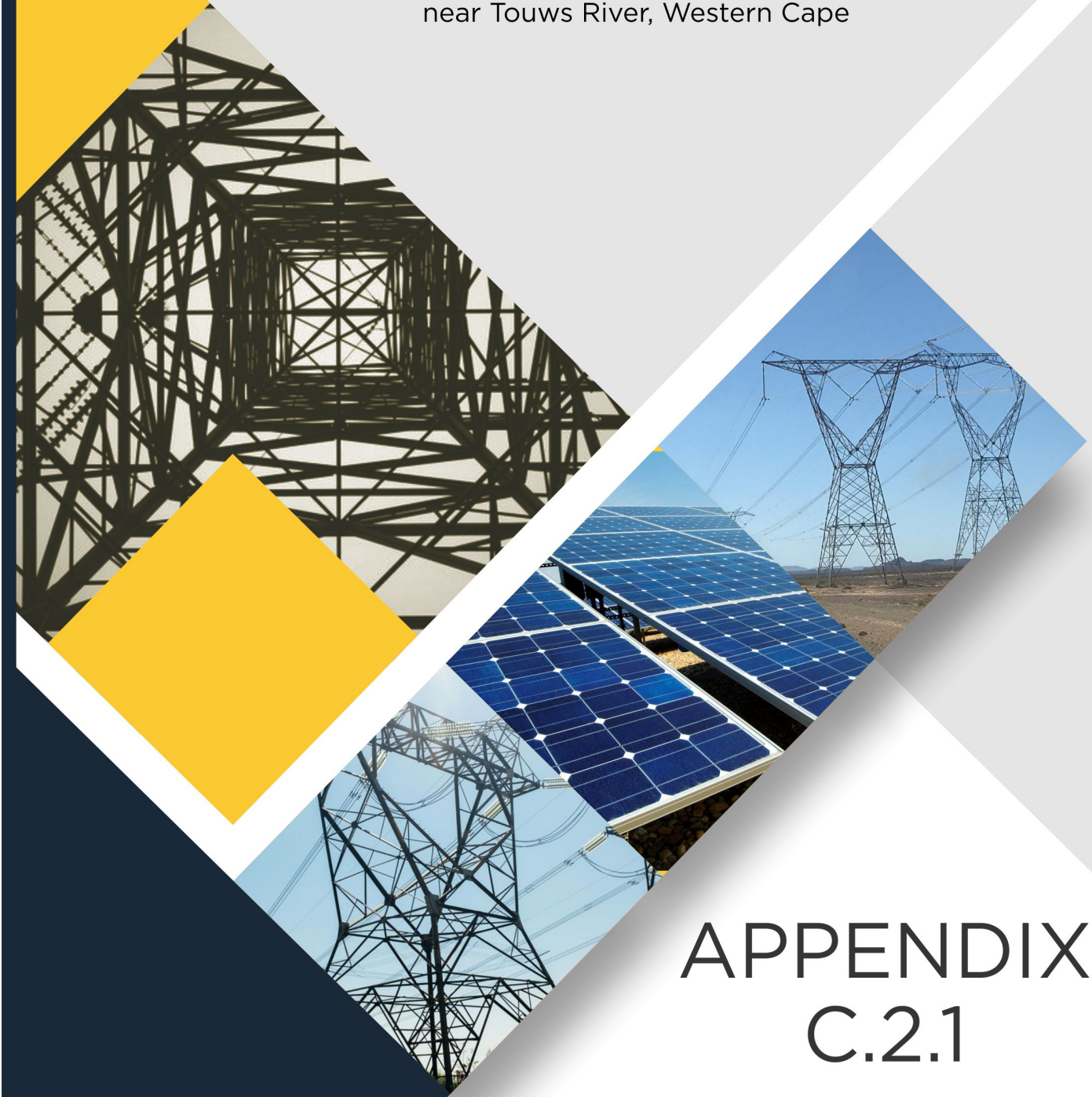
Basic Assessment for the Proposed Development of Electrical Grid Infrastructure to support the proposed nine 175 MW Solar Photovoltaic Facilities and associated Infrastructure (i.e. Witte Wall PV 1, Witte Wall PV 2, Grootfontein PV 1, Grootfontein PV 2, Grootfontein PV 3, Hoek Doornen PV 1, Hoek Doornen PV 2, Hoek Doornen PV 3, and Hoek Doornen PV 4), near Touws River, Western Cape



APPENDIX C.2

Visual Impact Assessment

Basic Assessment for the Proposed Development of Electrical Grid Infrastructure to support the proposed nine 175 MW Solar Photovoltaic Facilities and associated Infrastructure (i.e. Witte Wall PV 1, Witte Wall PV 2, Grootfontein PV 1, Grootfontein PV 2, Grootfontein PV 3, Hoek Doornen PV 1, Hoek Doornen PV 2, Hoek Doornen PV 3, and Hoek Doornen PV 4), near Touws River, Western Cape



APPENDIX C.2.1

Visual Impact Assessment for Witte Wall

VISUAL SPECIALIST ASSESSMENT: Report 1

Visual Impact Assessment for the Proposed Development of two 175 MW Solar Photovoltaic Facilities (Witte Wall PV 1 and Witte Wall PV 2), and associated Electrical Grid Infrastructure near Touws River, Western Cape

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Report prepared for:	*Report prepared by:*
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Version 1: October 2020
Version 2: November 2020

Executive Summary

The proposed cluster of Witte Wall solar Photovoltaic (PV) facilities (PV 1 and PV 2) form part of a larger solar energy project, which includes the Grootfontein and Hoek Doornen solar PV clusters. These fall within the Komsberg Renewable Energy Development Zone (REDZ), and would form part of a larger group of proposed and existing renewable energy facilities concentrated near the existing ESKOM Kappa substation.

The generally flat terrain is visually exposed with the result that structures and pylons can be seen for several kilometres. However, there are no major scenic features of note, and the main receptors, being surrounding farmsteads, are spread fairly far apart, mostly more than 5km distance from the proposed solar facilities and connecting powerlines. This means that visibility of the proposed Solar Energy Facility (SEFs) and powerlines is low, (hardly visible to not visible from the farmsteads).

Taking into account the relatively low structures and the local scale of the proposed solar facilities and related infrastructure located in a fairly remote area, the visual impact significance was considered to be **low** before and after mitigation, as well as **low** before and after mitigation for the connecting powerlines (for the construction and operational phases). The visual landscape could be restored after potential decommissioning which means that the visual significance would be **very low** with mitigation for this phase, (see tables below).

The potential cumulative visual impact for the cluster of two solar PV facilities (i.e. Witte Wall PV 1 and Witte Wall PV 2), in combination with the proposed Grootfontein and Hoek Doornen solar PV clusters (respectively composed of three and four PV facilities), as well as the existing Perdekraal Wind Energy Facility (WEF) would increase to **moderate** significance, both before and after mitigation for the operational phase, as the landscape becomes more semi-industrialised. The fact that the ESKOM Kappa substation and power lines already occur in the area needs to be taken into account.

The potential cumulative visual impact for the electrical grid infrastructure of all the clusters (Witte Wall (PV 1 and PV 2), Grootfontein (PV 1, PV 2 and PV 3), and Hoek Doornen (PV 1, PV 2, PV 3 and PV 4)), could be **moderate** if four connecting power lines to the Kappa substation are built, but would reduce to **low** if the connecting power line is shared (for the operational phase).

Therefore, given the fairly contained footprint of the proposed cluster solar PV facilities, the limited viewshed and the localised visual effects in a remote area, the overall visual impact significance for both the PV facilities and the power lines was found to be **low risk** with the implementation of mitigation measures, and **very low risk** after mitigation in the long term if the solar facilities are decommissioned.

Overall Impact Significance for Solar PV facilities and Related Buildings (post mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Moderate (level 3)
Cumulative - Decommissioning	Very low (level 5)

Overall Impact Significance for Substations and Connecting Powerlines (Post Mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Low (level 4)
Cumulative - Decommissioning	Very low (level 5)

Key visual management actions include locating the substations and other buildings, as well as construction camps, in unobtrusive positions in the landscape away from public roads. The Karoo landscape is particularly fragile and therefore new access roads and disturbance should be kept to a minimum for both the proposed solar facilities and connecting power lines. Connecting power lines should be shared where possible, to avoid a plethora of power lines in the exposed landscape. (It is understood that separate power lines to Kappa have to be assessed due to the bidding requirements and uncertainties).

There are no fatal flaws from a visual perspective arising from the proposed projects, and given the marginal nature of agriculture in the area, the solar energy projects are probably an inherently suitable land use that should receive authorisation from a visual perspective, provided the mitigation measures are implemented as a condition of approval.

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List of Abbreviations

BA	Basic Assessment
BAR	Basic Assessment Report
CAA	Civil Aviation Authority
DEFF	Department of Environment, Forestry and Fisheries
DEM	Digital Elevation Model
EIA	Environmental Impact Assessment
EGI	Electricity Grid Infrastructure
EMPr	Environmental Management Programme
GN	Government Notice
GPS	Global Positioning System
NEMA	National Environmental Management Act (Act 107 of 1998, as amended)
NFEPA	National Freshwater Ecosystem Priority Areas
O&M	Operations and maintenance
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
REEA	Renewable Energy EIA Application Database
SACAA	South African Civil Aviation Authority
SACAD	South African Conservation Areas Database
SACAP	South African Council for the Architectural Profession
SACLAP	South African Council for the Landscape Architectural Profession
SAPAD	South African National Protected Areas Database
SEA	Strategic Environmental Assessment
SEF	Solar energy facility
SRTM	Shuttle Radar Topography Mission
VIA	Visual Impact Assessment
WEF	Wind energy facility

Glossary

Definitions	
Receptor	Individuals, groups or communities who are subject to the visual influence of a particular project
Viewpoint	A selected point in the landscape from which views of the project are ascertained
Viewshed	The outer boundary defining a view catchment area, used to determine the zone of visual influence.
View shadow	An area within the view catchment visually obscured from the project, usually by topography.
Visual absorption capacity	The ability of an area to visually absorb development by means of screening topography, vegetation or buildings.

1. Introduction

1.1. Scope, Purpose and Objectives of the Visual Specialist Report

The Visual Impact Assessment (VIA) is one of several specialist studies being carried out as part of the Basic Assessments (BAs) for the proposed development of two Solar Photovoltaic (PV) Facilities and associated Electrical Grid Infrastructure (i.e. Witte Wall PV 1 and PV 2), near Touws River, Western Cape.

The Applicant is proposing to develop nine solar PV facilities and nine power lines and associated infrastructure to link the PV facilities to the Eskom Kappa Substation. Two PV facilities are being proposed on the farm Witte Wall 171; three PV Facilities are being proposed on the farm Grootfontein 149; and four PV Facilities will be constructed on the Farm Hoek Doornen 172. This VIA deals with the Witte Wall projects.

The VIA includes an assessment of potential visual impacts and risks associated with the proposed solar energy facilities (SEFs) and provides recommended mitigations to minimise potential visual impacts. These are used to inform the siting and layout of the project.

The VIA also includes related infrastructure, such as the power line grid connections and substations, which form part of the BAs.

1.2. Details of the Visual Specialists

The visual specialist assessment has been undertaken by Quinton Lawson, Architect, registered with the South African Council for the Architectural Profession (SACAP), reg. no. 3686, and by Bernard Oberholzer, Landscape Architect, registered with the SA Council for the Landscape Architectural Profession (SACLAP), reg. no. 87018.

Curriculum vitae are included in Appendix A of this specialist assessment, and a signed specialist statement of independence is included in Appendix B.

1.3. Terms of Reference

- Determine Site Sensitivity Verification Requirements in terms of Government Gazette 43110, Government Notice (GN) 320, and provide a Site Sensitivity Verification Report, including a site visit in order to identify the level of sensitivity assigned to the project area on the Screening Tool, and to verify and confirm this sensitivity and land-use.
- Prepare a description and mapping baseline of the visual and scenic resources and sensitivity of the study area, including viewsheds and recommended buffers, in GIS format.
- Provide review input on the preferred infrastructure layout following the sensitivity analysis.
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a visual perspective, both without and with mitigation, for the construction, operational and decommissioning phases of the project.
- Prepare schematic portrayals of the potential visual impact of the proposed project infrastructure.
- Identify any protocols, legal and permit requirements that are relevant to this project and the implications thereof.
- Provide recommendations with regards to potential monitoring programmes.
- Determine mitigation and/or management measures which could be implemented to reduce the effect of negative impacts and enhance the effect of positive impacts.
- Identify best practice management actions, monitoring requirements, and rehabilitation guidelines to be included in the Environmental Management Programme (EMPr).

- Incorporate and address visual issues and concerns raised by Stakeholders, Competent Authorities, Interested and Affected Parties (I&APs) and the public during the Public Participation Process.

2. Approach and Methodology

The methodology involved a number of standard procedures including those in the 'Guideline for Involving Visual and Aesthetic Specialists' (Oberholzer, B. 2005), including the following steps:

- A baseline survey of existing scenic resources and visual characteristics of the study area was made, including desktop work and field observations.
- A photographic survey included views from potentially sensitive receptor locations. A number of cameras were used to record features and determine the Global Positioning System (GPS) coordinates and compass direction of viewpoints.
- View corridors / routes and important viewpoints / receptors were mapped in relation to the proposed SEFs.
- Distance radii from the proposed SEFs were mapped to determine its potential visibility from the identified viewpoints.
- The viewsheds of the proposed SEFs and connecting powerlines were mapped to determine their zones of visual influence as well as those areas in a view shadow.
- Photomontages were constructed from selected viewpoints using panoramic photographs taken in the field, along with digital terrain modelling and superimposing a 3D model of the proposed SEFs. The montages gave a realistic impression of the proposed SEFs from the identified viewpoints at a range of distances.
- The potential visibility, zone of visual influence and photomontages of the proposed SEFs provided a quantitative measure of visual impact intensity.
- Existing vegetation cover, land uses, topographic features and general intactness of the landscape, along with the overall 'sense of place' provided a qualitative measure of visual impact intensity.
- Potential impacts identified in the visual specialist study have been assessed based on the criteria and methodology outlined in Appendix D.
- The site inspection was carried out over a full day on 27 August 2020 by two principal visual specialists. The season was not a consideration, nor had any effect on carrying out a visual assessment. Clear visibility was required for the photographic survey.

2.1. Information Sources

Base data used in the visual assessment is listed in Table 1 below. Although some of the information has not been updated for a few years, the quality of the data was considered adequate for the purpose of this assessment.

Table 1: Information Sources

Data / Information	Source	Date	Type	Description
Topo-Cadastral information	Chief Directorate: National Geospatial Information	Various dates	1:250 000 raster maps	Used for base mapping.
Topographic information	Chief Directorate: National Geospatial Information	Various dates	1:50 000 raster maps	Used for base mapping.
Elevational Data	Chief Directorate: National Geospatial Information	Various dates	Spatial Vector Dataset	RSA 5m Contour Data
Geological information	Council for Geoscience	2011	Spatial Vector Dataset	1:1 000 000 Geological Map of South Africa
Digital Elevation Model	Shuttle Radar	2014	Elevational	1 arcSEC 30m

Data / Information	Source	Date	Type	Description
(DEM)	Topography Mission (SRTM)		information (Raster)	
South African National Protected Areas Database (SAPAD),	Department of Environment, Forestry and Fisheries (DEFF)	2020, Q2	Spatial Vector Dataset	Spatial delineation of protected areas in RSA. Updated quarterly.
South African Conservation Areas Database (SACAD)	DEFF	2020, Q2	Spatial Vector Dataset	Spatial delineation of conservation areas in RSA. Updated quarterly.
Renewable Energy EIA Application Database (REEA)	DEFF	2020, Q2	Spatial Vector Dataset	Location of wind and solar renewable energy applications.
National Freshwater Ecosystem Priority Areas (NFEPA)	SANBI	2017	Spatial Vector Dataset	Spatial delineation of rivers and wetlands.
National Heritage Sites Inventory Database	SAHRA	2017	Spatial Vector Dataset	Location of classified heritage sites in SA.
Electricity Grid Infrastructure (EGI) Dataset	ESKOM	2018	Spatial Vector Dataset	Transmission line routes and Substations in RSA.
Airport, Airfields and Obstacle Datasets	Civil Aviation Authority (CAA)	2018	Spatial Vector Dataset	Location of airfields in RSA.

2.2. Assumptions, Knowledge Gaps and Limitations

Other projects in the surrounding area (within a 30km radius) that have been considered for cumulative impact assessment, are indicated on Map 1, believed to be the latest information.

No detailed layouts, heights or type of solar PV arrays were available during the preparation of the visual assessment, but a worst-case scenario of 10 m height for the arrays and similarly for the battery storage systems was used in the visual modelling. The internal layout is not considered a visual concern.

No details of building finishes, or the location of construction camps, were available at this stage, and provided the mitigation measures are adhered to, this should not have any effect on the visual significance ratings.

2.3. Consultation Processes Undertaken

No consultation has taken place for this visual assessment to date and it is anticipated that any visual issues will be identified in the Socio-Economic Impact Assessment and the Public Participation Process, and that these will be addressed in the final BA Report.

3. Description of Project Aspects relevant to the Visual Assessment

The Project Applicant is proposing to design, construct and operate the Witte Wall solar PV cluster, consisting of two solar PV power generation facilities, north of Touws River in the Western Cape Province. Two other adjacent PV clusters, (Grootfontein with 3 facilities and Hoek Doornen with 4 facilities), are also being assessed. Each solar PV facility will have associated infrastructure, including an on-site substation and will connect to the Eskom Kappa Substation to the south via a dedicated 132 kV power line, (see Maps 1 and 2).

Each Solar PV plant will have a footprint of about 250 hectares, along with an approximately 300 m wide corridor for the power lines. Visual sensitivity maps, prepared during the Screening Phase, were used to identify the best locations for the 250 hectare PV areas and related infrastructure. Facilities that could have visual implications are listed in Table 2 below. It must be noted that the specifications provided in Table 2 apply to a single PV facility and are the same for Witte Wall PV 1 and Witte Wall PV 2, unless where specified. A general layout of the project and route taken during the field trip, are indicated on Map 2.

Table 2: Description of Proposed Witte Wall PV Cluster with two SEFs

Facility	Extent/Footprint	Height	Comments
SEF project area	Maximum 250 ha, incl. internal roads for each PV project. However, with access roads leading to the PV site, the total footprint will be approximately 260 ha.	n/a	175 MW capacity
Solar PV arrays	Single axis, fixed axis, dual axis, fixed tilt options or bifacial panels.	Max. 10m	Galvanised steel and aluminium mounting structures.
Offices	1 000m^2	Max. 7m	
Operations and maintenance control centre	500m^2	Max. 7m	
Warehouse/workshop	500m^2	Max. 7m	
Ablution facilities	50m^2	Max. 7m	
Converter/inverter stations	2 500m^2	2,5 - 7m	
Onsite substation and/or switching station for each PV plant	20 000m^2	Max. 7m	Pylons up to 30m high
Battery energy storage system (BESS) for each of the 2 solar projects	Up to 8 ha within the laydown area	5 – 10m	Lithium ion battery containers
Guard house	40m^2	Max. 3m	
Internal powerlines	33kV	9m	Above ground/ underground. If underground, they will have a maximum depth of about 1.6 m.
Internal service roads and service road below power line	4m wide	n/a	Gravel surface.
Access roads	4 - 8m wide	n/a	Gravel surface.
Water storage tanks	10 000 litre tanks x20	3m?	At O&M buildings during the operational phase
Security fencing	Perimeter and internal security fencing.	2 - 3m	Either palisade, mesh or fully electrified. Game fences will also be constructed around each PV facility on the farm Witte Wall.
Security Lighting	To be determined		Only at substation, O&M buildings and BESS.
132kV overhead powerline to Kappa Substation	33m wide servitude.	22,5 – 30m	Corridor approximately 300m wide and 16 - 23km long.
Construction phase laydown area	Approximately 13 ha		Temporary construction camp and area for construction materials.

The potential visual effect of the SEFs and the associated electrical grid infrastructure could include the following:

- The visibility of the SEFs from a number of surrounding farms and routes in the area, given the relatively flat and open nature of the Karoo landscape.
- The industrial character of the SEFs, which would have an effect on the prevailing pastoral sense of place of the local region, typified by its general remoteness and wildness.
- The potential effect on tourism in the area, particularly where guest accommodation or hunting facilities are offered.
- The additional visual clutter of power lines across the landscape, adding to the existing ESKOM power lines to the south.

4. Baseline Environmental Description

4.1. General Description

The general character and landscape features of the receiving environment are described below, and in the photographic illustrations. The descriptions in this Section apply to both solar PV facilities, being the Witte Wall PV 1 and PV 2 facilities, associated infrastructure and electrical grid infrastructure.

4.2. Project Specific Description

Location (Map 1)
The project site for all two proposed SEFs lies at the southern end of the Tanqua Karoo, also known in this section as the Ceres Karoo. Touws River and Ceres are the nearest towns, both being about 60km away by road. Access to the site is via the R356 gravel road and smaller farm gravel roads. The ESKOM Kappa Main Substation is located on the district road to the south, with existing powerlines running parallel with the road.

Geology (Map 3)
The geology of the project site consists of shale of the Tierberg Formation, which forms part of the Ecca Group of rocks within the Karoo Sequence (Council for Geoscience). The soft shales of the Tierberg Formation have been eroded by the Doring, Groot and Droëlaagte Rivers to form a broad, flat valley. More resistant sandstones give rise to the surrounding mountains, while alluvium occurs along the drainage courses. The larger study area to the south (where the proposed powerlines will run) consists of Dwyka Formation tillite, sandstone and mudstone. The geology determines the topography and therefore the scenic characteristics of the site and surroundings. (See Figures 1, 2 and 3 below).

Physical Landscape (Maps 4 and 5)
The site is surrounded to the west by the Swartruggens mountains, to the south by the Bontberg and to the north-east by the prominent Roosterberg. The relatively flat eroded plain is a semi-arid landscape, being in the rain-shadow of the surrounding mountains. The relatively even topography presents few physical constraints for development, the only major feature being the broad dry drainage course of the Groot River.

Vegetation
The vegetation type of the arid plains is classified as *Tanqua Karoo (SKv5)*, consisting of sparse low succulent shrubland on the Dwyka tillite and Ecca shales. The *Tanqua Wash Riviere* type (AZi7) is also a sparse vegetation occurring on the alluvial deposits of the sheet-wash plains, (Mucina and Rutherford, 2006). Acacia thorn trees are confined to the drainage courses, which are dry for most of the year. Copses of mainly exotic trees, provide shelter (and visual screening) around farmsteads. Succulent vygies were in flower during the site visit in late August.

Land Use

The relatively low rainfall and sparse vegetation limit the agricultural potential to mainly extensive grazing, including sheep, interspersed with game farms. Crops are confined to the minor patches of deeper soils along drainage courses or where irrigation is available.

Farms tend to be large in area in order to be viable for sheep or game farming, with farmsteads being on average 5 to 10km apart. Inverdoorn, which has tourist accommodation, and Klaserie Private Nature Reserve are about 10km from the site. Wittewal is a game farm used for hunting, while Sadawa (Doringrivier farm) offers guest accommodation. These and other receptors are indicated on Map 2.

The ESKOM Kappa substation is located about 12km to the south of the site. The substation and ESKOM 400kV power lines, together with the existing Perdekraal wind farm to the south-west have already resulted in visual intrusions in the local area.

Figure 1: Witte Wall landscape looking south with low hills in background

Figure 2: Wittewal entrance gate to game farm

Figure 3: Gemsbok on Wittewal game farm

4.3. Identification of Environmental Sensitivities

4.3.1. Sensitivities identified by the National Web-Based Environmental Screening Tool

The visual sensitivities identified in this Section apply to the cluster of all two solar facilities proposed for Witte Wall, associated buildings and electrical grid infrastructure.

A screening report was compiled by the CSIR (20/8/2020) using the Department of Environment, Forestry and Fisheries (DEFF) Screening Tool based on the assessed area for all nine solar PV facilities and electrical grid infrastructure. The Screening Report includes a 'Map of Relative Landscape (Solar) Theme Sensitivity', indicated in Figure 4 below. This would have been based on mapping prepared for the Wind and Solar Strategic Environmental Assessment (SEA) by the CSIR for DEFF in 2015 (DEA, 2015). The Screening Tool shows that the site for the proposed Witte Wall PV 1 and PV 2 facilities does not have any landscape sensitivities; and that the corridor for the power lines contains sensitivities ranging from medium to very high. The study area falls within the Komsberg Renewable Energy Development Zone (REDZ).

The current visual sensitivity mapping undertaken in this VIA is in greater detail at the site scale for the proposed solar PV facilities and electrical grid infrastructure, and takes into account detailed viewshed mapping and local site conditions, as indicated on Figure 5.

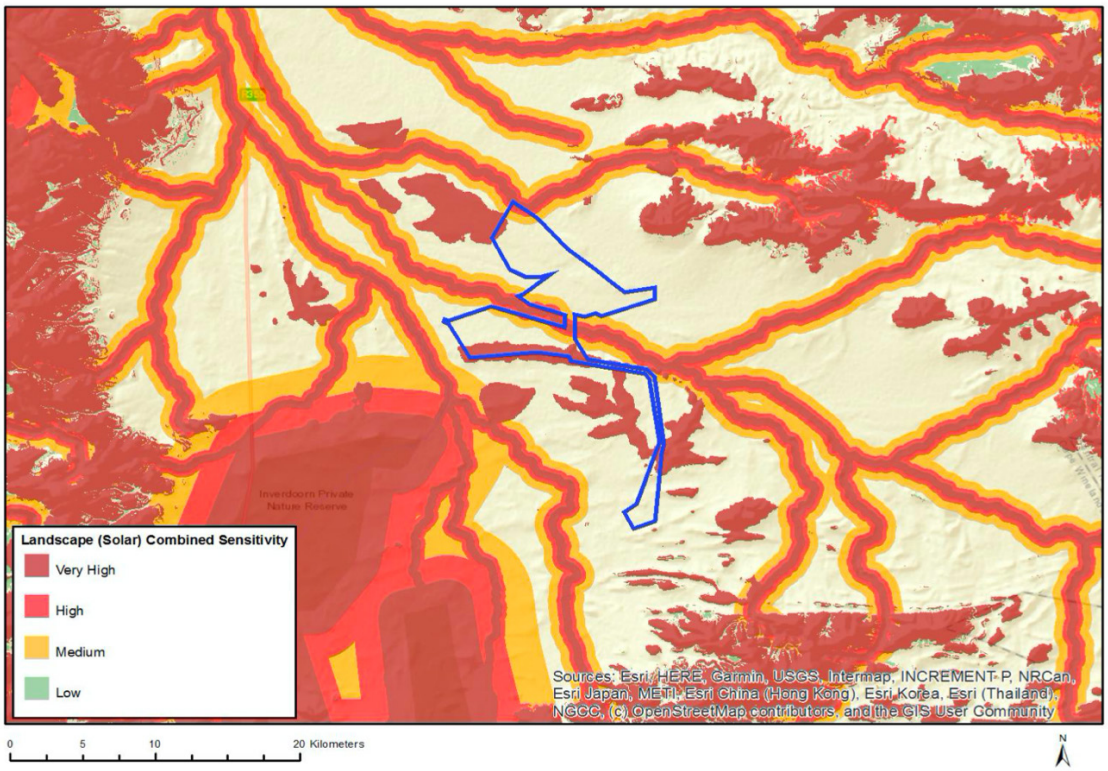


Figure 4: DEFF Screening Tool for the Landscape Theme

4.3.2. **Specialist Sensitivity Analysis and Verification**

The specific sensitivity of the site related to the two Witte Wall PV facilities, associated structures and electrical grid infrastructure are identified in this section. Areas to be avoided (including buffers) are identified, including areas not suitable for development or construction activities.

A four-tier sensitivity map of the study area (which shows very high, high, medium and low sensitivities) has been provided, with the PV facilities and associated infrastructure superimposed on the visual sensitivity map, (see Figure 5 and Maps 8 and 9).

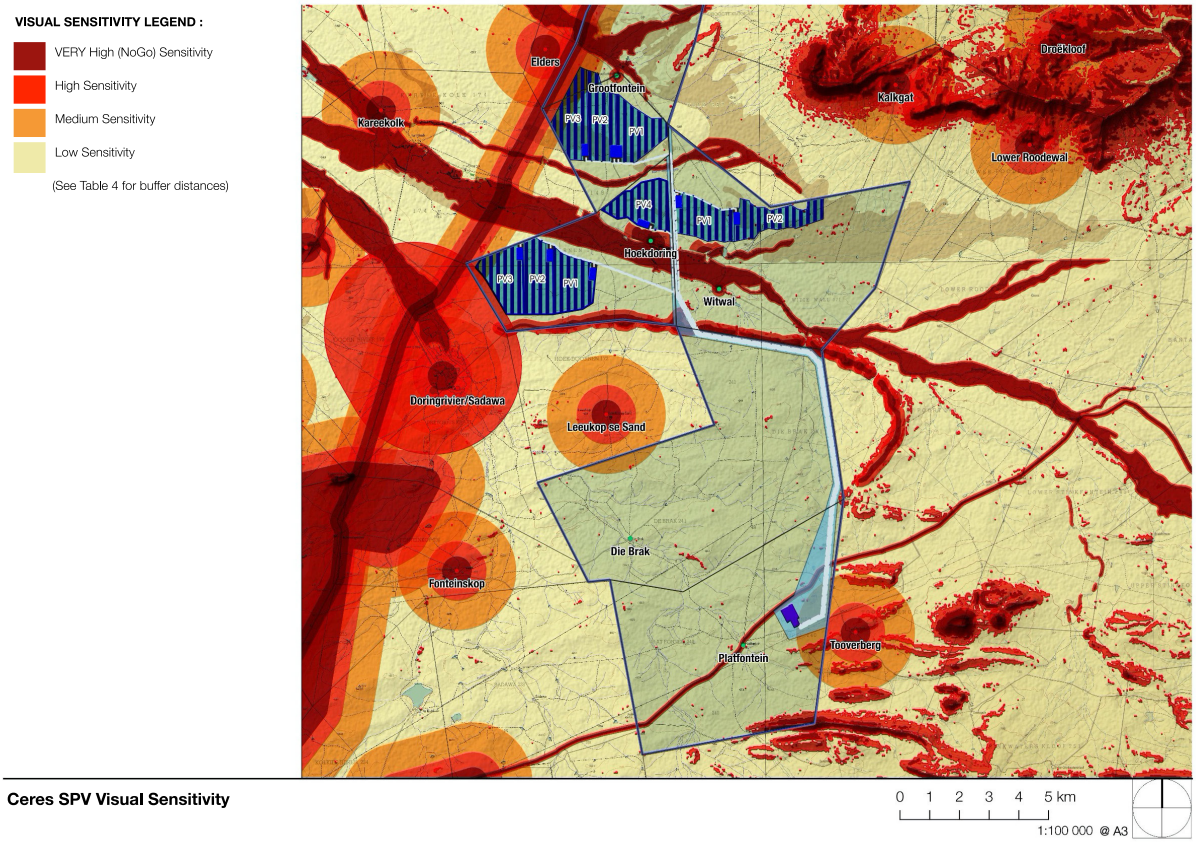


Figure 5: Detailed Visual Sensitivity Mapping for the Study Area

The Environmental Sensitivities are indicated for the two PV Facilities and Electrical Grid Infrastructure on Maps 8 and 9. A summary of visual features and sensitive receptors, and the rationale for these, is given in Table 3 below.

Table 3: Visual Features and Sensitive Receptors

Scenic Resource	**Landscape features within or adjacent to the development site.**
Topographic features	Landscape features in the area, such as hills, *koppies* and outcrops contribute to scenic and natural heritage value, providing visual interest or contrast in the landscape.
Water Features	In places, rivers have been carved into the softer Ecca shales, such as the Droëlaagte Rivier, Grootrivier and Doringrivier, which traverse the study area. In the arid landscape, drainage features with riverine thicket and dams provide scenic and amenity value.
Cultural landscapes	Intact wilderness or rural landscapes contribute to scenic value and sense of place, along with green patches of cultivated land and tree copses around farmsteads. Cultural landscapes include archaeological and historical sites identified in the Heritage Assessment.
	Receptors adjacent to the site or in the local surroundings.
Protected	The Tanqua Karoo National Park is more than 30km to the north-west of the study

Areas	area, and would not be affected by the proposed SEF projects. The Touw Local Nature Reserve is about 15km from the site, in a view shadow behind the Bontberg Mountains.
Private nature reserves, game farms	Private nature reserves and game farms in the area, some of which have guest accommodation, are important for the local tourism economy, and tend to be sensitive to loss or degradation of scenic quality. The Inverdoorn Private Nature Reserve facilities to the south-west are about 10km from the project site. The Klaserie Private Nature Reserve to the south is a similar distance from the site and both are unlikely to be visually affected by the proposed SEFs. Sadawa (Doringrivier) is a game farm, about 8.5km from the project site, with guest accommodation.
Human settlements, farmsteads	Surrounding farmsteads are widely spread and tend to be 5km or more from the project site. It is assumed that farms that form part of the leased development site are less visually sensitive.
Scenic / arterial routes	The R355, which runs north to the Tanqua Karoo and Calvinia, and which is some 12km away, would not be in the viewshed of the proposed SEF projects. The R356 runs north-east in the direction of Sutherland and abuts the study area for several kilometres. This stretch would probably not be considered a scenic route, but would require a nominal visual buffer.
Cultural and heritage sites	These form part of the heritage study, but could have visual implications.

Identification of Environmental Sensitivities

Given the relatively featureless nature of the study area, described above, the only sensitive visual features are the drainage courses, neighbouring farmsteads, and game farms, which are some distance away. Heritage features, documented by the Heritage Specialists, may have visual significance.

Other local features in the landscape, such as the existing ESKOM Kappa Substation and power lines are visual intrusions that have already altered the landscape character of the area to the south.

Visual sensitivity mapping at the broad regional scale for the Phase 1 Wind and Solar SEA (DEA, 2015) indicated a 'Low' visual sensitivity for the study area.

Visual buffers indicated in the Phase 1 Wind and Solar SEA (DEA, 2015) are listed in Table 4 below. This was for mapping at a regional scale and was used as a guide. Visual sensitivity categories and related buffers at the site scale are listed in Tables 5 and 6. Buffers for visual features and receptors are indicated on Map 8 for the proposed solar facilities, and on Map 9 for the proposed connecting powerlines.

Table 4: Visual buffers for Solar PV Facilities at the Regional Scale

Landscape features/criteria	**Wind and Solar SEA (DEA, 2015)**	**Comments relating to proposed Witte Wall PV facilities**
Project area boundary	-	Farm boundary setback usually 30m.
Ephemeral streams/ tributaries	-	Subject to Biodiversity Assessment.
Steep slopes (gradient)	>1:4 (very high sensitivity) 1:4 -1:10 (high sensitivity)	None on the proposed SEF sites.
Prominent ridgelines, peaks and rock outcrops	250m (very high sensitivity)	None on the proposed SEF sites.
Arterial / district gravel roads	0-250m (very high sensitivity) 250m-1 km (mod. sensitivity)	The R355 is about 12km to the west of the site and the R356 about 5km to the west.
Scenic routes, passes	0-500m (very high sensitivity)	None in the immediate area.
Protected Areas	0-1,5 km (very high sensitivity) 1,5-2 km (high sensitivity) 2-3 km (mod. sensitivity)	None in the immediate area.
Private reserves/ game farms/ guest farms.	0-1 km (very high sensitivity) 1-2 km (high sensitivity) 2-3 km (mod. sensitivity)	Two private nature reserves are about 10km from the proposed site. Sadawa guest farm is about 9km from the site.
Farmsteads	0-250m (high sensitivity) 250-500m (mod. sensitivity)	The Elders homestead is 6.5km distance. Other farmsteads are 5km or more from the SEF sites.

Table 5: Visual Sensitivity Mapping Categories for the Proposed Solar Facilities

Scenic Resources	**Very high sensitivity (No-go)**	**High visual sensitivity**	**Medium visual sensitivity**	**Low visual sensitivity**
Topographic features	Feature	Within 150-250m	-	-
Steep slopes	Slopes > 1:4	Slopes > 1:10	-	-
Drainage courses	Feature	Within 50m	-	-
Cultural landscapes/ cropland	within 250m	within 500m	-	
Protected Landscapes / Sensitive Receptors				
Private reserves / game farms	within 500m	within 1 km	within 2 km	-
Farmsteads outside site	within 500m	within 1 km	within 2 km	-
Farmsteads inside site	within 250m	within 500m	-	
Arterial routes	within 250m	within 500m	within 1km	-

Table 6: Visual Sensitivity Mapping Categories for Proposed 132kV Connecting Power Line

Scenic Resources	Very high sensitivity (No-go)	High visual sensitivity	Medium visual sensitivity	Low visual sensitivity
Topographic features	Feature*	Within 150m	-	-
Steep slopes	-	Slopes > 1:4	Slopes > 1:10	-
Drainage courses	Feature*	Within 50m	-	-
Cultural landscapes/ cropland	within 100m	within 150m	Within 250m	-
Protected Landscapes / Sensitive Receptors				
Private reserves / game farms	Feature	within 250m	within 500m	-
Farmsteads outside site	within 50m	within 100m	-	-
Farmsteads inside site	within 50m	within 100m	-	-
Arterial / district routes	within 50m	within 100m	-	-

Note: *The power lines could cross these features at right angles.

4.3.3. Sensitivity Analysis Summary Statement

The visual sensitivities described above and in Maps 8 and 9 correspond roughly with the screening tool sensitivities, the former being more detailed and specific to the study area. These formed the basis of the Screening Phase layout. (The site sensitivity verification is included in Appendix C).

5. Issues, Risks and Impacts

5.1. Identification of Potential Impacts/Risks

The potential visual impacts resulting from the proposed Witte Wall PV and electrical grid infrastructure development on landscape features and receptors identified above are listed below for each of the project phases, including cumulative impacts. The potential visual impacts would be identical for each of the proposed PV facilities and electrical grid infrastructure. The impacts identified are direct and cumulative impacts. No indirect impacts have been identified.

Witte Wall PV 1 and PV 2 Solar Facilities and Associated Buildings

Construction Phase

- Potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on residents and visitors to the area, particularly users of the main arterial route (R356), to the site.
- Potential visual effect of haul roads, access roads, stockpiles and construction camps in the exposed landscape.

Operational Phase

- Potential visual intrusion of solar arrays and related infrastructure and the impact on receptors, including residents and visitors, as well as game farms in the area.
- Potential visual impact of an industrial type activity on the rural or wilderness character 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 the two solar PV facilities with the similarly proposed Grootfontein and Hoek Doornen solar facilities in the study area, as well as with other nearby existing and proposed renewable energy farms in the area.

Witte Wall PV 1 and PV 2 Electrical Grid Infrastructure and Substations

Construction Phase

- Potential effect of dust and noise from construction machinery during the construction of the substation and pylons, and the effect of this on residents and visitors to the area.
- Potential visual effect of access roads, stockpiles and construction camps in the exposed landscape.

Operational Phase

- Potential visual intrusion of substations and powerlines, and the impact on receptors, particularly where powerlines cross roads.
- Potential visual impact of industrial type activities on the rural or wilderness character of the area.

Decommissioning Phase

- Potential visual effect of any remaining electrical grid structures and disused roads on the landscape.

Cumulative Impacts

- Potential combined visual effect of the two Witte Wall substations and two connecting powerlines with those of Grootfontein and Hoek Doornen solar PV facilities within the study area, as well as the nearby existing Perdekraal WEF. This would potentially result in the visual effect of nine connecting powerlines to the ESKOM Kappa substation.

5.2. Summary of Issues identified during the Public Consultation Phase

Comments will be received when the Draft BAR is released for public participation. This section will therefore be updated once the information is available.

6. Impact Assessment

This section provides an assessment of the potential visual impacts of the Witte Wall cluster of two solar PV facilities and associated buildings, as well as the electrical grid infrastructure. Comment on the no-go alternative and the overall findings are provided.

As the two solar facilities within the cluster are very similar, and because visual no-go areas have been avoided during the screening phase, only one set of assessment tables were deemed necessary.

Criteria for determining visual impact included the following:

Visibility:

Estimated degrees of visibility based on the scale of the facilities and related infrastructure, and on distance from various viewpoints are indicated in Table 7 below:

Table 7: Degrees of Visibility of Proposed SEFs and Related Infrastructure

	Very high visibility	0-500m	Prominent feature within the observer's view frame
	High visibility	500m-1km	Relatively prominent within observer's view frame
	Moderate visibility	1-2km	Only prominent as part of the wider landscape
	Low visibility	2-4km	Visible as a minor element in the landscape
	Very low visibility	>4km	Hardly visible with the naked eye in the distance

The height of the solar PV arrays is relatively low (up to 10m), while the substation and power line pylons are higher. Possible degrees of visibility from a number of viewpoints are indicated in Table 8 below. (See also photomontages). Visibility of lights at night would not be significant because of the localised need for lighting and the distance of receptors. Visibility of the proposed powerline connection would also not be generally significant, except where it crosses roads.

Table 8: Witte Wall PV and Electrical Grid Infrastructure Viewing Distances and Visibility from Receptors

Viewpoint	Latitude	Longitude	Distance to PV arrays	Distance to powerline	Potential Visibility
S1 Elders Gate	32.937334ºS	19.929514ºE	5.88 km	-	not visible - in view shadow
S2 R356 Grootfontein Gate	32.932353ºS	19.934539ºE	5.97 km	-	not visible - in view shadow
S3 Kareekolk Gate	32.973741ºS	19.907129ºE	5.80 km	-	beyond effective visibility range
S4 Sadawa Gate	32.030539ºS	19.879571ºE	9.50 km	-	not visible - in view shadow
S5 Kalkgat	32.946363ºS	20.049133ºE	4.51 km	-	No Access - not visible - in view shadow
P1 District Road	33.091035ºS	20.025678ºE	-	195 m	highly visible
P2 Witwal Gate	33.025376ºS	20.015431ºE	-	116 m	highly visible
P3 Tooverberg	33.110072ºS	20.032875ºE	-	1.18 km	No Access - marginally visible
P4 Platfontein	33.115838ºS	19.992370ºE	-	1.99 km	visibility obscured by foreground of the Kappa substation
P5 Leeukop se Sand	33.045424ºS	19.943761ºE	-	4.10 km	No Access - marginally visible in distance

Scenic Resources / Sensitive Receptors: (Map 8)

Except for river courses, there are no topographic or scenic features of note in the study area. The general area is sparsely populated, the farmsteads being far apart, and mostly a considerable distance from the proposed SEF projects. Visual sensitivity is therefore low.

Visual Exposure: (Maps 6 and 7)

The viewshed, or zone of visual influence, potentially extends for some 5km, but is partly restricted by low hills to the south, where parts of the surrounding area are in a view shadow. The viewshed (or zone of visual influence) of the proposed solar facilities and power lines tends to be fairly limited.

Landscape Integrity:

The natural landscape intactness of the area has been altered to some extent by the ESKOM Kappa Substation and power lines to the south. Further alteration of the surrounding landscape has taken place through the Perdekraal WEF to the south-east. The clustering of proposed solar facilities would help to minimise visual intrusion in the larger landscape.

Visual Absorption Capacity:

The area around the proposed site is generally flat to gently undulating, with low grass and scrub vegetation and therefore visually exposed, with low visual absorption capacity, i.e. low potential to screen any proposed structures.

The above visual criteria are summarised in Table 9 below in order to determine visual impact **consequence** for the proposed solar facilities, related infrastructure and powerline grid connections. **Significance** is determined by combining consequence with probability as indicated in Figure 6 below.

Table 9: Visual Impact Consequence

Visual Criteria	Comments	Two Solar PV facilities	Related Infrastructure	Two Connecting Powerlines
Visibility of facilities	Distance from receptors is a mitigating factor.	Low	Low	Medium
Visibility of lights at night	Distance from receptors is a mitigating factor.	Low	Low	Low
Visual exposure	Limited viewshed. Some areas in a view shadow.	Medium	Medium	Medium
Scenic resources and receptors	No scenic features of note. Receptors are isolated farmsteads.	Low	Low	Low
Landscape integrity	Rural character, with previous disturbance by powerlines and the existing Perdekraal WEF.	Low	Low	Low
Visual absorption capacity	Visually exposed landscape. Low visual absorption capacity.	Medium	Medium	Medium
Consequence	Summary	**Moderate**	**Moderate**	**Moderate**

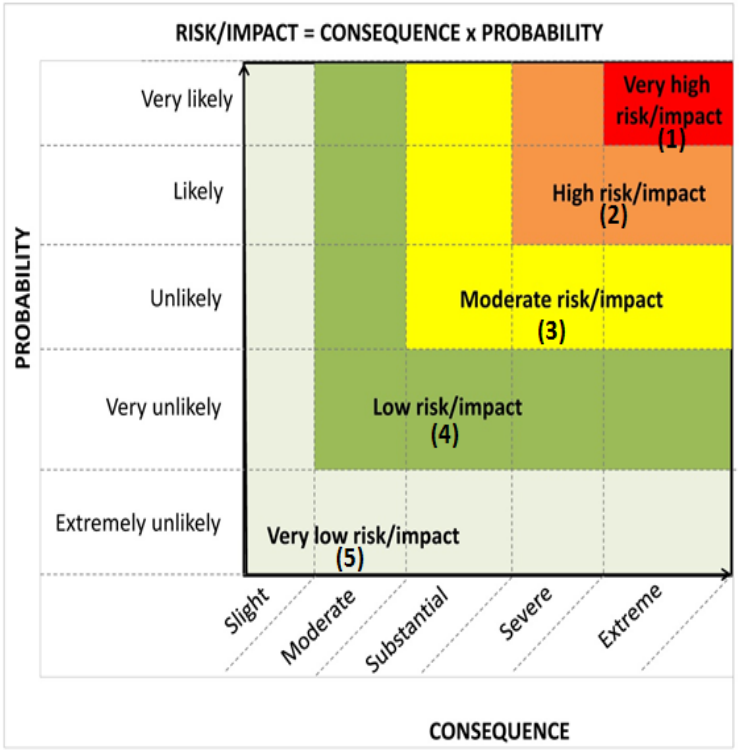


Figure 6: Visual impact Significance in relation to Consequence and Probability

6.1. Witte Wall PV 1 and PV 2 Solar Facilities and Associated Buildings

This section includes an assessment of the potential direct and cumulative impacts identified for the Witte Wall PV 1 and PV 2 Solar Facilities and Associated Buildings for the construction, operational and decommissioning phases.

6.1.1. Potential Impacts during the Construction Phase

6.1.1.1. Impact 1: Potential effect of dust and noise from trucks and construction machinery

This impact relates to the potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on residents and visitors to the area, particularly users of the main arterial route (R356), to the site. This is rated as a negative, direct impact that extends locally and is of a short term duration. The consequence is rated as moderate, and the probability identified as very likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been allocated, such as ensuring the EMPr is implemented during the construction phase via the appointment of an Environmental Control Officer (ECO); and ensuring that construction camp and other facilities are located in visually unobtrusive areas, away from public roads. Section 6.1.1.3 provides an impact summary table.

6.1.1.2. Impact 2: Potential visual effect of haul roads, access roads, stockpiles and construction camps in the exposed landscape.

This impact relates to the potential visual effect of haul roads, access roads, stockpiles and construction camps in the exposed landscape. This is rated as a negative, direct impact with a short term duration and local spatial extent. The consequence and probability are respectively rated as moderate and very likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.1.1.1) apply to Impact 2. Section 6.1.1.3 provides an impact summary table.

6.1.1.3. Impact Summary Table: Construction Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1 and Impact 2 for the construction phase	*Status*	**Negative**	**Low risk (level 4)**	Locate construction camps, batching plants (if required) and stockpiles in visually unobtrusive areas, away from public roads. Implement the EMPr with an ECO during construction.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Moderate**				
	Probability	**Very Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.1.2. Potential Impacts during the Operational Phase

6.1.2.1. Impact 1: Potential visual intrusion of solar arrays and related infrastructure and the impact on receptors, including residents and visitors, as well as game farms in the area.

This impact relates to the potential visual intrusion of solar arrays and related infrastructure and the impact on receptors, including residents and visitors, as well as game farms in the area. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as very likely, resulting in an impact significance of

low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been identified:

- Locate the O&M buildings in unobtrusive low-lying areas, away from public roads, and/or screened with earth berms where necessary.
- Use muted natural colours and non-reflective finishes for buildings and structures generally.
- Keep internal access roads as narrow as possible, and use existing roads or tracks as far as possible.
- Fit outdoor / security lighting with reflectors to minimise light spillage.
- Locate internal powerlines underground where possible.
- Use discrete outdoor signage and prohibit intrusive commercial or billboard signage.

Section 6.1.2.3 provides an impact summary table.

6.1.2.2. Impact 2: Potential visual impact of an industrial type activity on the rural or wilderness character of the area.

This impact relates to the potential visual impact of an industrial type activity on the rural or wilderness character of the area. This is rated as a negative, direct impact with a long term duration and local spatial extent. The consequence and probability are respectively rated as moderate and very likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.1.2.1) apply to Impact 2. Section 6.1.2.3 provides an impact summary table.

6.1.2.3 Impact Summary Table: Operational Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
OPERATIONAL PHASE						
Impact 1 and Impact 2 – Operational Phase	*Status*	**Negative**	**Low risk (level 4)**	Locate the O&M buildings in unobtrusive low-lying areas, away from public roads, and/or screened with earth berms where necessary. Use muted natural colours and non-reflective finishes for buildings and structures generally. Keep internal access roads as narrow as possible, and use existing roads or tracks as far as possible. Fit outdoor / security lighting with reflectors to minimise light spillage. Locate internal powerlines underground where possible. Use discrete outdoor signage and prohibit intrusive commercial or billboard signage.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Very Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.1.3. Potential Impacts during the Decommissioning Phase

6.1.3.1. Impact 1: Potential visual effect of any remaining structures, platforms and disused roads on the landscape.

This impact relates to the potential visual effect of any remaining structures, platforms and disused roads on the landscape. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been allocated, such as ensuring that the solar arrays are removed and building structures are recycled or demolished; and that hardened areas and access roads no longer required are ripped and regraded, and that disturbed areas are revegetated or returned to grazing. Section 6.1.3.2 provides an impact summary table.

6.1.3.2. Impact Summary Table: Decommissioning Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
DECOMMISSIONING PHASE						
Impact 1 – Decommissioning Phase	*Status*	**Negative**	**Low risk (level 4)**	Remove solar PV arrays and demolish or recycle building structures for new uses. Rip and regrade hardened platform areas and access roads no longer required. Revegetate or return to grazing exposed or disturbed areas to blend with the surroundings.	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.1.4. Cumulative Impacts

6.1.4.1. Impact 1: Potential combined visual effect of the two Witte Wall solar PV facilities with those of Grootfontein (i.e. three) and Hoek Doornen (i.e. four) within the study area, and other nearby existing and proposed renewable energy farms in the area.

This impact relates to the potential combined visual effect of the nine proposed solar PV facilities within the study area (i.e. two for Witte Wall, three for Grootfontein and four for Hoek Doornen), and other nearby existing and proposed renewable energy farms in the area. This is rated as a negative, cumulative impact for the construction, operational and decommissioning phases. The duration for the impact is rated as short term for the construction and decommissioning phases; and long term for the operational phase. The impacts have been rated with a local spatial extent. The consequence of the impact has been rated as substantial for the operational and decommissioning phases and moderate for the construction phase; and the probability has been rated as likely for the three phases. Without the implementation of mitigation measures, the impact is rated as low significance for the construction phase, and moderate significance for the operational and decommissioning phases. With the implementation of mitigation measures, the significance of this impact is rated as low, moderate and very low significance for the construction, operational, and decommissioning phases, respectively. The mitigation measures are noted in Section 6.1.4.2 below.

6.1.4.2. Impact Summary Tables: Cumulative Impacts

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1	*Status*	**Negative**	**Low risk (level 4)**	Observe EMPr requirements	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
OPERATIONAL PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Observe mitigations in 6.1.2.3 above	**Moderate risk (level 3)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
DECOMMISSIONING PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Observe mitigations in 6.1.3.2 above	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.2. Witte Wall PV 1 and PV 2 Electrical Grid Infrastructure and Substations

This section includes an assessment of the potential direct and cumulative impacts identified for the Witte Wall PV 1 and PV 2 Electrical Grid Infrastructure and Substations for the construction, operational and decommissioning phases.

6.2.1. Potential Impacts during the Construction Phase

6.2.1.1. Impact 1: Potential effect of dust and noise from construction machinery during the construction of the substation and pylons, and the effect of this on residents and visitors to the area.

This impact relates to the potential effect of dust and noise from construction machinery during the construction of the substation and pylons, and the effect of this on residents and visitors to the area. This is rated as a negative, direct impact that extends locally and is of a short term duration. The consequence is rated as moderate, and the probability identified as very likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been allocated, such as ensuring the EMPr is implemented during the construction phase; and ensuring that construction camps and other facilities are located in visually unobtrusive areas, away from public roads. Section 6.2.1.3 provides an impact summary table.

6.2.1.2. Impact 2: Potential visual effect of access roads, stockpiles and construction camps in the exposed landscape.

This impact relates to the potential visual effect of access roads, stockpiles and construction camps in the exposed landscape. This is rated as a negative, direct impact with a short term duration and local spatial extent. The consequence and probability are respectively rated as moderate and very likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.2.1.1) apply to Impact 2. Section 6.1.1.3 provides an impact summary table.

6.2.1.3. Impact Summary Tables: Construction Phase

Impacts 1 and 2	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1 and Impact 2 for the construction phase	*Status*	**Negative**	**Low risk (level 4)**	Locate construction camps and stockpiles in visually unobtrusive areas, away from public roads. Implement the EMPr requirements.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Moderate**				
	Probability	**Very Likely**				
	Reversibility	**Medium**				
	Irreplaceability	**Low**				

6.2.2. Potential Impacts during the Operational Phase

6.2.2.1. Impact 1: Potential visual intrusion of substations and powerlines, and the impact on receptors, particularly where powerlines cross roads.

This impact relates to the potential visual intrusion of substations and powerlines, and the impact on receptors, particularly where powerlines cross roads. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been identified:

- Locate substations in un-obtrusive low-lying areas, away from public roads.
- Avoid powerlines on hillcrests and ridge skylines where possible.
- Use monopoles in preference to lattice pylons.
- Keep maintenance / access roads as narrow as possible, and use existing roads or tracks as far as possible.
- Fit outdoor / security lighting at substations with reflectors to minimise light spillage.

Section 6.2.2.3 provides an impact summary table.

6.2.2.2. Impact 2: Potential visual impact of industrial type activities on the rural or wilderness character of the area.

This impact relates to the potential visual impact of industrial type activities on the rural or wilderness character of the area. This is rated as a negative, direct impact with a long term duration and local spatial extent. The consequence and probability are respectively rated as moderate and likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.2.2.1) apply to Impact 2. Section 6.2.2.3 provides an impact summary table.

6.2.2.3. Impact Summary Tables: Operational Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
OPERATIONAL PHASE						
Impact 1 and Impact 2 – Operational Phase	*Status*	**Negative**	**Low risk (level 4)**	Locate substations in un-obtrusive low-lying areas, away from public roads. Avoid powerlines on hillcrests and ridge skylines where possible. Use monopoles in preference to lattice pylons. Keep maintenance / access roads as narrow as possible, and use existing roads or tracks as far as possible. Fit outdoor / security lighting at substations with reflectors to minimise light spillage.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.2.3. Potential Impacts during the Decommissioning Phase

6.2.3.1. Impact 1: Potential visual effect of any remaining electrical grid structures and disused roads on the landscape.

This impact relates to the potential visual effect of any remaining electrical grid structures and disused roads on the landscape. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is rated as very low significance. Various mitigation measures have been allocated, such as ensuring that the pylons and substation structures are removed and recycled; and that access roads no longer required are ripped and regraded, and that disturbed areas are revegetated or returned to pasture. Section 6.2.3.2 provides an impact summary table.

6.2.3.2. Impact Summary Tables: Decommissioning Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
DECOMMISSIONING PHASE						
Impact 1 – Decommissioning Phase	*Status*	**Negative**	**Low risk (level 4)**	Remove or recycle electrical grid substation and pylons. Rip and regrade access roads no longer required. Revegetate or return to pasture exposed or disturbed areas to blend with the surroundings.	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.2.4. Cumulative Impacts

6.2.4.1. Impact 1: Potential combined visual effect of the two Witte Wall substations and two connecting powerlines with those of Grootfontein and Hoek Doornen solar PV facilities within the study area, as well as the nearby existing Perdekraal WEF. This would potentially result in the visual effect of nine connecting powerlines to the ESKOM Kappa substation.

This impact relates to the potential combined visual effect of the nine proposed power lines and nine on-site substations within the study area (i.e. two for Witte Wall, three for Grootfontein and four for Hoek Doornen), and other nearby existing and proposed renewable energy farms in the area. It must be noted that it is unlikely that nine power lines will be constructed all the way to the Eskom Kappa Substation. If all nine proposed Ceres PV projects are developed, it is likely that a maximum of four power lines from the project sites (on the farms Witte Wall, Grootfontein and Hoek Doornen) to the Kappa substation will be constructed, realistically (i.e. along Die Brak and Platfontein Farms). However, based on the uncertainties around the future Independent Power Producers bidding process, the requirements of Eskom, and not knowing if and which project will receive preferred bidder status; it is necessary to assess nine power lines to the Kappa Substation so that future lines can be based on this.

The cumulative impact is rated as negative for the construction, operational and decommissioning phases. The duration for the impact is rated as short term for the construction phase; and long term for the operational and decommissioning phases. The impacts have been rated with a local spatial extent. The consequence of the impact has been rated as substantial for the construction, operational and decommissioning phases; and the probability has been rated as likely for all three phases. Without the implementation of mitigation measures, the impact is rated as moderate significance for the construction, operational and decommissioning phases. With the implementation of mitigation measures, the significance of this impact is rated as low for construction and operations, and very low significance for the decommissioning phase. The mitigation measures are noted in Section 6.2.4.2 below.

6.2.4.2. Impact Summary Tables: Cumulative Impact

Impacts	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Combine connecting powerlines from Witte Wall, Grootfontein and Hoek Doornen, where possible. Observe EMPr requirements.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
OPERATIONAL PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Combine connecting powerlines from Witte Wall, Grootfontein and Hoek Doornen, where possible. Observe mitigations in 6.2.2.3 above.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
DECOMMISSIONING PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Observe mitigations in 6.2.3.2 above.	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

7. Impact Assessment Summary

The overall impact significance findings, following the implementation of the proposed mitigation measures, are shown in Table 10 and Table 11 below for the proposed Witte Wall solar PV facilities and for the electrical grid infrastructure.

Table 10: Overall Impact Significance for Solar PV facilities and Related Buildings (post mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Moderate (level 3)
Cumulative - Decommissioning	Very low (level 5)

Table 11: Overall Impact Significance for Substations and Connecting Powerlines (Post Mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Low (level 4)
Cumulative - Decommissioning	Very low (level 5)

No-go Alternative

In the no-go alternative, there would be no SEFs or additional powerlines and therefore no additional visual intrusion on the rural landscape and on surrounding farmsteads. At the same time no renewable energy would be produced at the site for export to the national grid. The visual significance would therefore be neutral, with neither impacts nor benefits occurring.

Findings

Given the fairly contained footprint of the proposed cluster solar PV facilities, the limited viewshed and the localised visual effects in a remote area, the visual impact significance was found to be **low risk**, and **very low risk** after mitigation in the long term if the solar facilities are decommissioned.

The electrical grid infrastructure would also have a **low risk** significance after mitigation, provided the proposed power lines leading to the ESKOM Kappa substation to the south of the study area are consolidated. (Although nine power lines have been assessed, in reality a maximum of four power lines from the project sites to the Kappa Substation would be constructed, depending on the bidding process).

Although the potential cumulative visual impacts, when combined with the proposed Grootfontein and Hoek Doornen solar PV clusters, as well as the existing Perdekraal WEF, could result in a semi-industrialised landscape, the proposed solar PV facilities tend to have less visual significance than the larger scale wind farms. It would be important however for power lines to be shared where possible, to avoid the proliferation of these in the exposed landscape.

8. Legislative and Permit Requirements

The National Environmental Management Act (Act No. 107 of 1998, as amended) (NEMA) and the NEMA Environmental Impact Assessment (EIA) Regulations (2014, as amended) apply as the development of the proposed SEFs and associated infrastructure are a listed activity. As the site falls within a gazetted REDZ, a BA is required. The need for a visual assessment has been identified.

The National Heritage Resources Act (Act No. 25 of 1999) (NHRA), and associated provincial regulations, provide legislative protection for natural, cultural and scenic resources, as well as for archaeological and paleontological sites within the study area. This report deals with visual considerations, including scenic resources, which form part of the National Estate. The Visual Assessment would therefore form part of the Heritage Assessment in terms of obtaining the relevant comments from Heritage Western Cape.

Other than the above legislation, there are no specific policies or guidelines for visual and scenic resources for the Western Cape. The Guideline for Involving Visual and Aesthetic Specialists in EIA Processes, by the Provincial Government of the Western Cape, was used as a general guide.

The South African Civil Aviation Authority (SACAA) has an Obstacle Notice 4/2017 requiring solar project applications to be accompanied by a Glint and Glare Impact Assessment Report with relevance to aviation. There is an airstrip at Sadawa, which is about 9km away (as discussed in the VIA for the Hoek Doornen projects), and it is only occasionally used for small aircraft, therefore no Glint and Glare Impact Assessment is considered necessary.

9. Environmental Management Programme Inputs

Planning and Design Phase

Ensure that visual management measures are included as part of the EMPr, monitored by an ECO, including the siting of the construction camps and material stockpiles in visually unobtrusive positions in the landscape, away from public roads.

Construction Phase Monitoring:

Implement dust suppression and litter control measures, as well as rehabilitation of borrow pits (if required) and haul roads to minimise their visual effect on the surroundings. Ensure regular reporting to an environmental management team by the ECO during the construction phase.

Operation Phase Monitoring:

Ensure that visual mitigation measures are monitored by management on an on-going basis, including the control of signage, lighting and wastes on the site by the appointed Environmental Manager.

Decommissioning Phase Monitoring:

Ensure that procedures for the removal of structures and stockpiles during the decommissioning phase are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard as prescribed in a rehabilitation plan, and signed off by the delegated authority.

10. Final Specialist Statement and Authorisation Recommendation

10.1. Statement and Reasoned Opinion

The proposed cluster of Witte Wall PV 1 and PV 2 solar facilities form part of a larger solar energy project, which includes the Grootfontein and Hoek Doornen clusters. These fall within the Komsberg REDZ, and would form part of a larger group of renewable energy facilities concentrated near the ESKOM Kappa substation.

The generally flat terrain is visually exposed with the result that structures and pylons can be seen for several kilometres. However, there are no major scenic features of note, and the main receptors, being surrounding farmsteads, are spread fairly far apart, and except for the Elders homestead, are mostly more than 5km distance from the proposed solar facilities and connecting powerlines. This means that visibility of the proposed solar facilities and powerlines is generally low, (hardly visible to not visible from the farmsteads).

Taking into account the relatively low structures and the local scale of the proposed solar facilities and related infrastructure located in a fairly remote area, the visual impact significance was considered to be **low** before and after mitigation, and **low** before and after mitigation for the connecting powerlines for the construction and operational phases. The visual landscape could be restored after potential decommissioning of the Solar PV facilities and the power lines which means the visual significance would be **very low** with mitigation for this phase.

The potential cumulative visual impact for the cluster of two solar facilities, in combination with the proposed Grootfontein and Hoek Doornen clusters, as well as the existing Perdekraal WEF, would increase to **moderate** both before and after mitigation during the operational phase, as the landscape becomes more semi-industrialised. The fact that the ESKOM Kappa substation and power lines already occur in the area needs to be taken into account.

The potential cumulative visual impact for the electrical grid infrastructure of all the clusters (Witte Wall, Grootfontein and Hoek Doornen), could be high in the unlikely event that all nine connecting power lines to the Kappa substation are built, but in reality only a maximum of four power lines would be constructed. This would reduce the significance to **moderate** before mitigation and **low** after mitigation if the connecting power lines are shared. (See Figure P3 photomontage).

10.2. EA Condition Recommendations

Key visual management actions include locating the substations and other buildings, as well as construction camps, in unobtrusive (generally low-lying) positions in the landscape away from public roads. The Karoo landscape is particularly fragile and therefore new access roads and disturbance generally should be kept to a minimum for both the proposed solar facilities and connecting power lines. Connecting power lines should be shared where possible, to avoid a plethora of power lines in the exposed landscape.

There are no fatal flaws from a visual perspective arising from the proposed project, and given the marginal nature of agriculture in the area, the solar energy project is probably an inherently suitable land use that should receive authorisation, provided the mitigation measures are implemented as a condition of approval.

References

CSIR, August 2020. Terms of Reference for Specialist Studies for the Basic Assessments for proposed development of Solar Voltaic Facilities and Associated Electrical Grid Infrastructure, near Touws River, Western Cape.

Department of Environmental Affairs, 2015. Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa. CSIR Report Number: CSIR/CAS/EMS/ER/2015/0001/B. Stellenbosch.

Lawson, Q. and Oberholzer, B. 2014. National Wind and Solar PV SEA Specialist Report: Landscape Assessment, with CSIR for Department of Environmental Affairs.

Mucina, L. and Rutherford, M.C. (eds) 2006.The Vegetation of South Africa, Lesotho and Swaziland. *Strelizia* 19. SANBI, Pretoria.

Oberholzer, B. 2005. Guideline for Involving Visual and Aesthetic Specialists in EIA Processes: Edition 1 CSIR Report No. ENV-S-C 2005 053 F. Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning.

Appendix A - Specialist Expertise

Quinton Lawson Architect (qarc)

Qualifications:
Bachelor of Architecture (Univ. of Natal 1977)

Professional registration/membership:
Professional member of the SA Council for the Architectural Profession (SACAP), reg. no. 3686.
Member of the Cape Institute for Architects and SA Institute of Architects.
B-BBEE Status: Level 4.

Quinton has practiced as a professional architect since 1978, specialising in architectural and urban design, environmental design and computer visualisation.

He was one of the founding partners of Meirelles Lawson Architects formed in 1988, initially specialising in economic and sustainable housing. He was a senior partner at MLB Architecture and Urban Design, with specialist expertise in visual modelling and design solutions.

In the past he has been a visiting lecturer at UCT teaching a post-graduate course on Computer Techniques in Landscape Architecture, including visualisation and visual assessment techniques.

Together with BOLA, Quinton has been involved in numerous visual impact assessments over a number of years, and previously served on the Impact Assessment Review Committee of Heritage Western Cape.

Bernard Oberholzer Landscape Architect + Environmental Planner (BOLA)

Qualifications:
Bachelor of Architecture (UCT 1970), Master of Landscape Architecture (U. of Pennsylvania 1975)

Professional registration/membership:
Professional member of the SA Council for the Landscape Architectural Profession (SACLAP), reg. no. 87018.
Fellow of the Institute of Landscape Architects of South Africa.
B-BBEE Status: Level 4.

Bernard has 40 years of experience as a professional landscape architect, specialising in, environmental planning, coastal planning, urban landscape design and visual assessments.

He is currently an independent consultant, and was for 7 years the Convenor of the Master of Landscape Architecture Programme at UCT.

He has presented papers on *Visual and Aesthetic Assessment Techniques*, and provides specialist services as a reviewer of visual impact studies prepared by other firms.

He is the author of *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes,* prepared with the CSIR for the Dept. of Environmental and Development Planning, Provincial Government of the Western Cape, 2005.

Bernard has been involved in numerous land use suitability studies and visual assessments for a wide range of projects, and serves as a member of the Stanford Heritage Committee.

Bernard and Quinton were joint authors of the visual specialist chapters for the National Wind and Solar SEA and National Electricity Grid Infrastructure SEA, with the CSIR, for the Department of Environmental Affairs.

Appendix B - Specialist Statement of Independence

We, Quinton Lawson and Bernard Oberholzer, declare that –

- We act as the independent specialist in this application;
- We will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- We declare that there are no circumstances that may compromise our objectivity in performing such work;
- We have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- We will comply with the Act, Regulations and all other applicable legislation;
- We have no, and will not engage in, conflicting interests in the undertaking of the activity;
- We undertake to disclose to the applicant and the competent authority all material information in our possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by us for submission to the competent authority;
- all the particulars furnished by us in this form are true and correct; and
- We realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialists:

Name of Companies: qarc and bola

Date: 09 October 2020

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Basic Assessments for the Proposed Development of two 175 MW Solar Photovoltaic Facilities and associated Electrical Grid Infrastructure (i.e. Witte Wall 1 and Witte Wall 2), near Touws River, Western Cape

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	BOLA			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	5	Percentage Procurement recognition	
Specialist name:	Bernard Oberholzer			
Specialist Qualifications:	B. Arch. M.L. Arch			
Professional affiliation/registration:	SACLAP			
Physical address:	16 Caledon St. Stanford			
Postal address:	PO Box 471 Stanford			
Postal code:	7210	Cell:	083 513 5696	
Telephone:	028 341 0264	Fax:		
E-mail:	bernard.bola@gmail.com			

2. DECLARATION BY THE SPECIALIST

I, B. Oberholzer, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

BO

Signature of the Specialist

BOLA

Name of Company:

26 Oct 2020

Date

3. **UNDERTAKING UNDER OATH/ AFFIRMATION**

I, B. Oberholzer, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

BO

Signature of the Specialist

BOLA

Name of Company

26 Oct 2020

Date

Signature of the Commissioner of Oaths

26 Oct 2020

Date

COMMISSIONER OF OATHS
KARIN T. SFREDDO
9/1/8/2 PRETORIA (A14)
805 STANZA BOPAPE STR. ARCADIA 0083

Karin Sfreddo

Appendix C: Site Sensitivity Verification

Prior to commencing with the specialist assessment in accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

The details of the site sensitivity verification are noted below:

Date of Site Visit	27 August 2020
Specialist Name	Quinton Lawson and Bernard Oberholzer
Professional Registration Number	SACAP 3686, SACLAP 87018
Specialist Affiliation / Company	qarc and bola

The site sensitivity verification was undertaken using the following means:

(a) desk top analysis, using satellite imagery;
(b) preliminary on-site inspection; and
(c) a range of other available / relevant information included in Section 2.1 of this Report.

A screening report was compiled by the CSIR (20/8/2020) using the DEFF Screening Tool. The Report includes a 'Map of Relative Landscape (Solar) Theme Sensitivity', based on mapping prepared for the Phase 1 Wind and Solar SEA by the CSIR for DEFF in 2015 (DEA, 2015). The study area falls within the Komsberg REDZ.

The current visual sensitivity mapping included in Section 4 of this Visual Impact Assessment is in greater detail (at the site scale) for the proposed solar photovoltaic (PV) and electrical grid infrastructure study area, taking into account detailed viewshed mapping and local site conditions. This mapping largely confirms the mapping contained in the DEFF Screening Tool, but provides more detail. Refer to Section 4 of the Visual Impact Assessment for a motivation and evidence of the verified use of the land and environmental sensitivity.

Appendix D: Impact Assessment Methodology

The following impact assessment methodology was used in this VIA:

The impact assessment includes:

- *the nature, significance and consequences of the impact and risk;*
- *the extent and duration of the impact and risk;*
- *the probability of the impact and risk occurring;*
- *the degree to which impacts and risks can be mitigated;*
- *the degree to which the impacts and risks can be reversed; and*
- *the degree to which the impacts and risks can cause loss of irreplaceable resources.*

As per the DEFF 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 have been rated in terms of the direct, indirect and cumulative:

- *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.*

The impact assessment methodology includes the following aspects:

- *Nature of impact/risk - The type of effect that a proposed activity will have on the environment.*

- *Status - Whether the impact/risk on the overall environment 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 not be affected.*

- *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);*
    - *National; or*
    - *International (e.g. Greenhouse Gas emissions or migrant birds).*

- *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)).*

- *Consequence – The anticipated consequence of the risk/impact:*
    - *Extreme (extreme alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they permanently cease);*
    - *Severe (severe alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*
    - *Substantial (substantial alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*

- *Moderate (notable alteration of natural systems, patterns or processes, i.e. where the environment continues to function but in a modified manner); or*
- *Slight (negligible alteration of natural systems, patterns or processes, i.e. where no natural systems/environmental functions, patterns, or processes are affected).*

- *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).*

- *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).*

Using the criteria above, the impacts have been further assessed in terms of the following:

- *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).*

To determine the significance of the identified impact/risk, the consequence is multiplied by probability (qualitatively as shown in Figure D1).

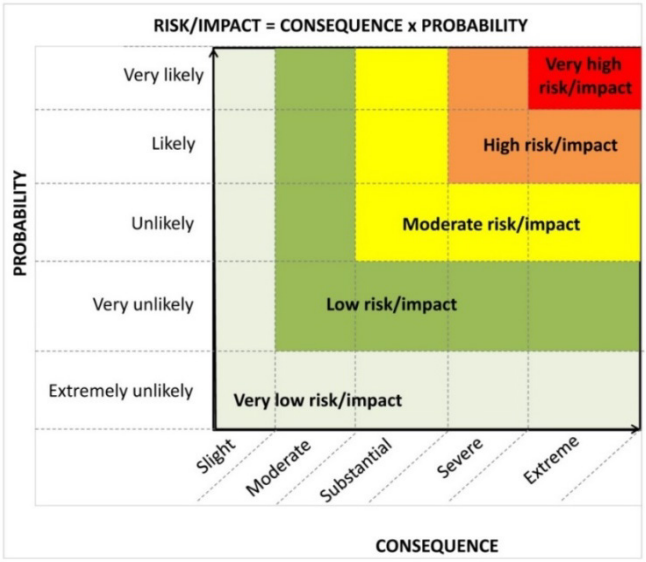


Figure D1. Guide to assessing risk/impact significance as a result of consequence and probability.

- *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.*

Confidence – The degree of confidence in predictions based on available information and specialist knowledge:

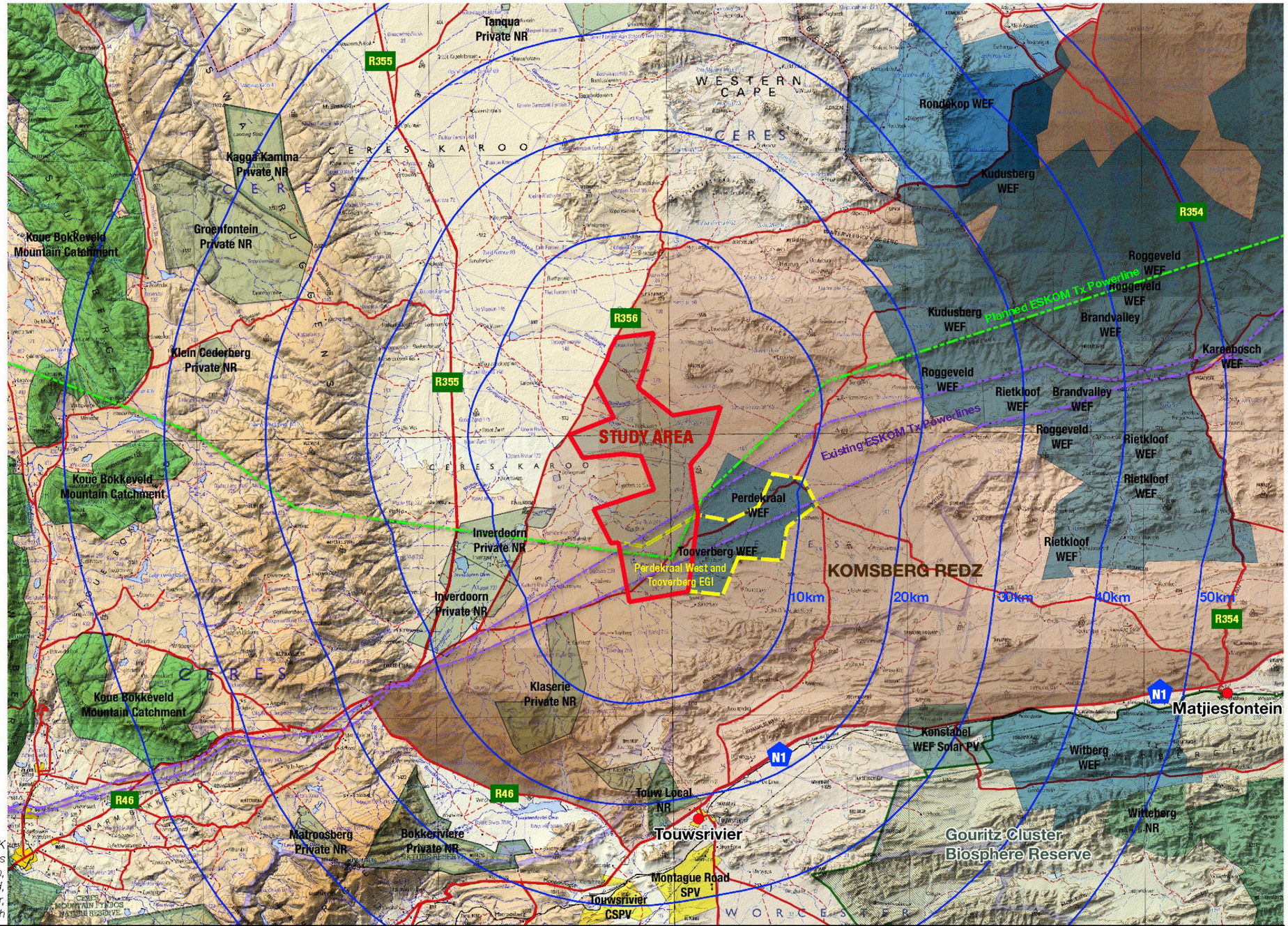
- *Low;*
- *Medium; or*
- *High.*

Appendix E: Compliance with the Appendix 6 of the 2014 EIA Regulations (as amended)

Requirements of Appendix 6 (Specialist Reports) of Government Notice R326 (Environmental Impact Assessment (EIA) Regulations of 2014, as amended)	***Section where this has been addressed in the Specialist Report***
1. (1) A specialist report prepared in terms of these Regulations must contain - *a) details of -* *i. the specialist who prepared the report; and* *ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;*	*Section 1.2 and Appendix A*
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	*Appendix B* *And Attachment*
c) an indication of the scope of, and the purpose for which, the report was prepared;	*Section 1.1 and Section 1.3*
(cA) an indication of the quality and age of base data used for the specialist report;	*Section 2.1*
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	*Section 4 and Section 5*
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	*Section 2*
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	*Section 2*
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	*Section 4.2 and Section 4.3*
g) an identification of any areas to be avoided, including buffers;	*Section 4.2 and Section 4.3*
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	*Maps 8 and 9*
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	*Section 2.2*
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	*Section 6 and Section 7*
k) any mitigation measures for inclusion in the EMPr;	*Section 6 and Section 9*
l) any conditions for inclusion in the environmental authorisation;	*Section 10.2*
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	*Section 6 and Section 9*
n) a reasoned opinion- *i. whether the proposed activity, activities or portions thereof should be authorised;* *(iA) regarding the acceptability of the proposed activity or activities; and* *ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;*	*Section 10*
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	*Section 2.3 and Section 5.2, and Refer to the Draft BAR*
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	*Not applicable at this stage. Report to still be released for public*

Requirements of Appendix 6 (Specialist Reports) of Government Notice R326 (Environmental Impact Assessment (EIA) Regulations of 2014, as amended)	***Section where this has been addressed in the Specialist Report***
	comment. Refer to Draft BAR
q) any other information requested by the competent authority.	*Refer to EAP*
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	*Section 4.3.1 and Appendix C* *Part A of the Assessment Protocols published in GN 320 on 20 March 2020 are applicable.*

MAPS



base map : NGI 1:250K Topo-Cadastral Series
3218 Clanwilliam,
3220 Sutherland,
3319 Worcester,
3320 Ladismith

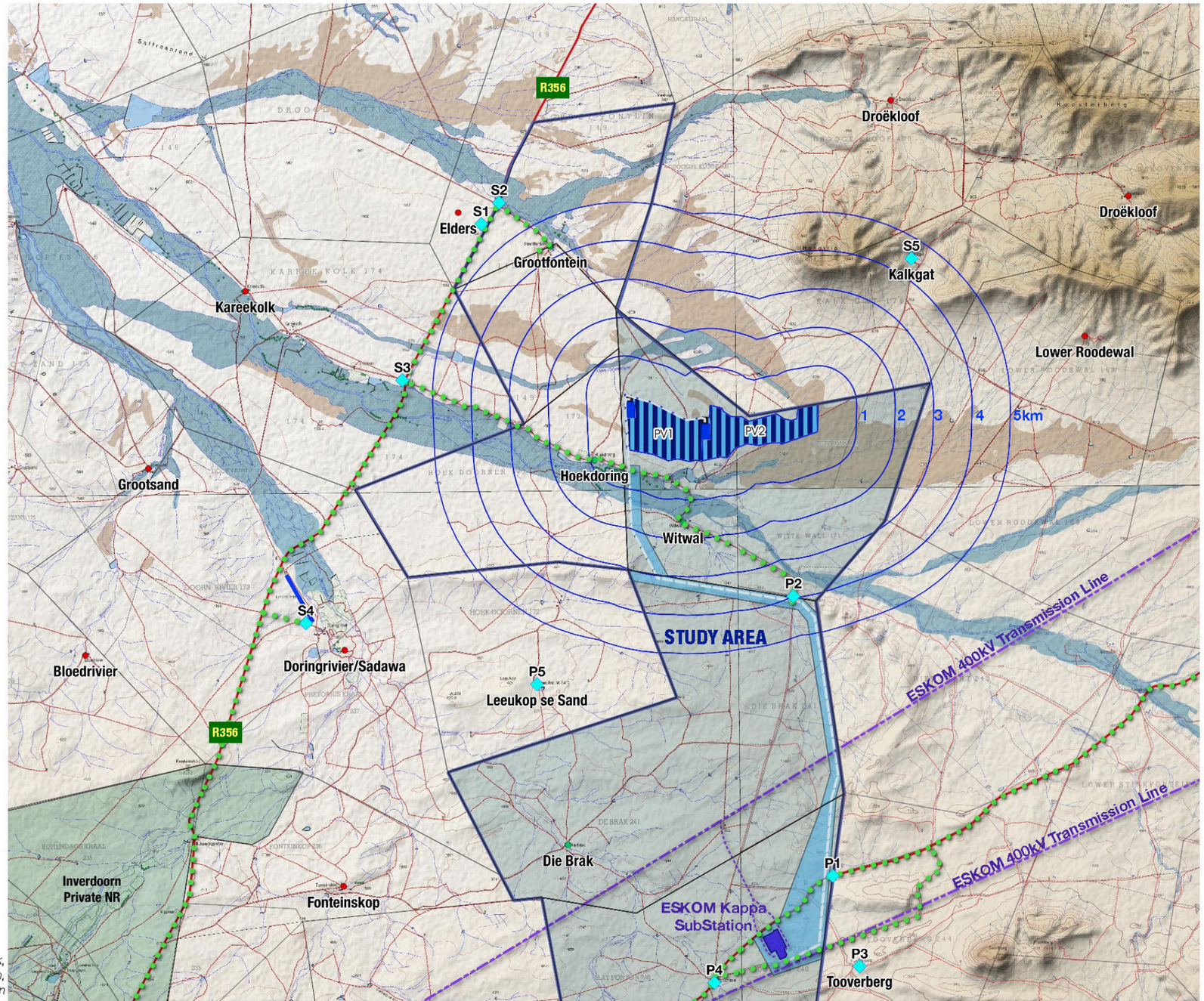
map 1 : Regional Context • Cumulative Renewable Energy Facilities

0 10 20 30 40 50 km

1:350 000 @ A3

LOCAL CONTEXT LEGEND :

- Solar PV Area
- 2x 132kV Powerlines within Corridor
- FieldTrack Route
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 2 : Local Context • Fieldwork, Viewpoints, Existing Infrastructure, ESKOM Transmission Lines

0 1 2 3 4 5 km

1:100 000 @ A3

GEOLOGY LEGEND :

Q : Alluvium

Pa : Beaufort Group, Escourt Formation (mudstone, sandstone)

Pko : Ecca Group, Koedoesberg Formation (sandstone, shale)

Pk : Ecca Group, Kookfontein Formation (shale)

Ps : Ecca Group, Skoorsteen Formation (shale, sandstone)

Pt : Ecca Group, Tierberg Formation (shale)

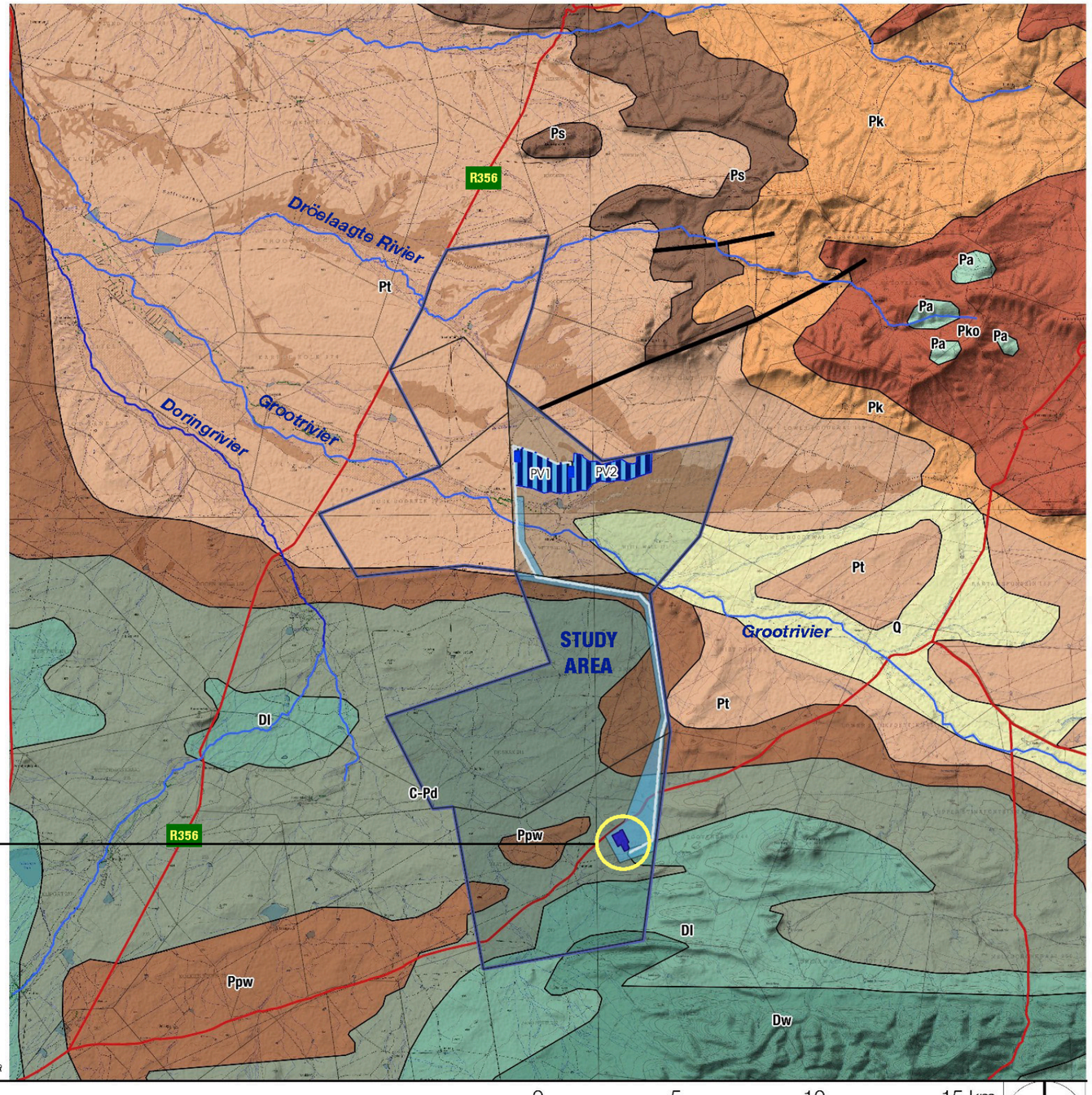
Ppw : Ecca Group, Prince Albert F./ Whitehill F. (shale, carbonaceous shale)

C-Pd : Dwyka Formation (tillite, sandstone, mudstone)

Dl : Witteberg Group, Kommadagga F./ Lake Mentz F. (shale, sandstone)

Dw : Witteberg Group, Witpoort F./ Weltevrede F. (quartzitic sandstone, shale)

ESKOM Kappa SubStation



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB, Inverdoorn, 3320AA Brewelsfontein : Council for Geoscience : RSA 1:1M Geological Spatial Data

map 3 : Geology

LEGEND :

- Witte Wall PV1 and PV2
- FieldTrack Route
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area

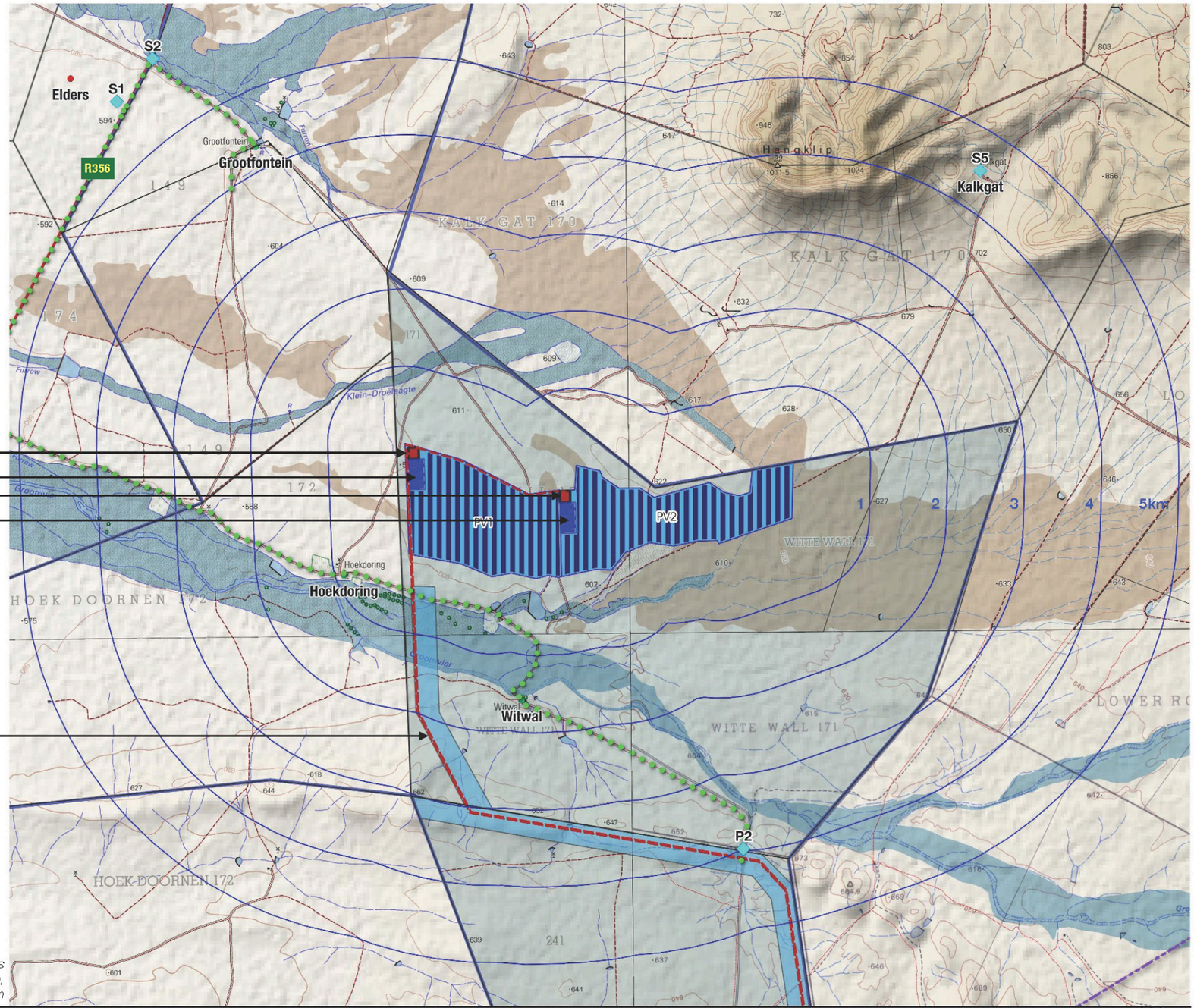
PV1 SubStation

PV1 Battery Energy Storage System

PV2 SubStation

PV2 Battery Energy Storage System

Witte Wall 2x 132kV Overhead Powerlines



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 4 : Project Layout • Witte Wall PV1 and PV2 Solar Arrays max 10m High

0 1 2 3 4 5 km

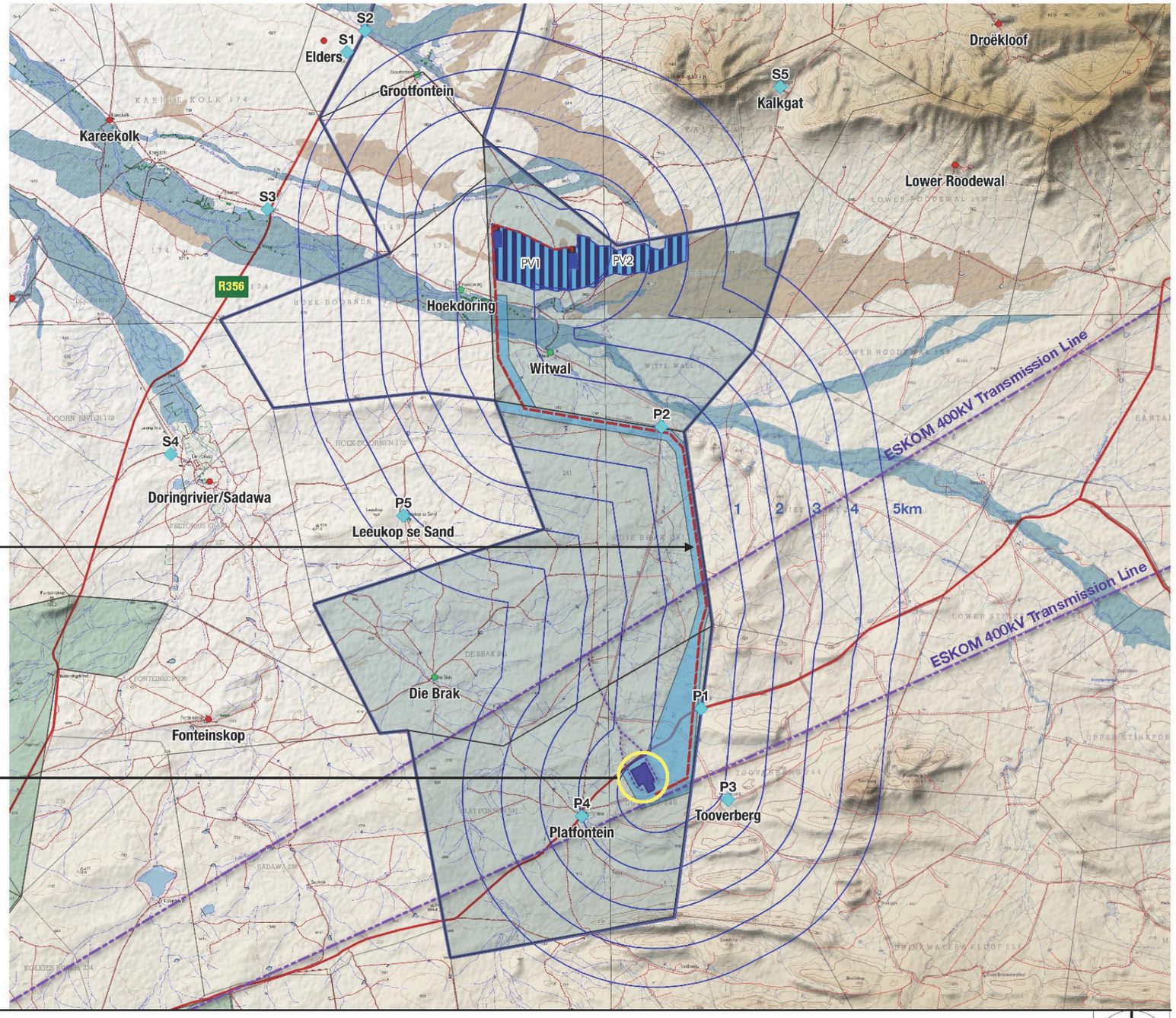
1:50 000 @ A3

LEGEND :

- Witte Wall PV1 and PV2
- FieldTrack Route
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area

Witte Wall 2x 132kV Overhead Powerlines within Servitude Corridor

ESKOM Kappa SubStation



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 5 : Project Layout • Witte Wall PV1 and PV2 132kV Powerlines max 30m High

0 1 2 3 4 5 km

1:100 000 @ A3

Viewshed Legend :

- High Visibility
- Medium Visibility
- Low Visibility
- No Visibility (View Shadow)

PV1 SubStation

PV1 Battery Energy Storage System

PV2 SubStation

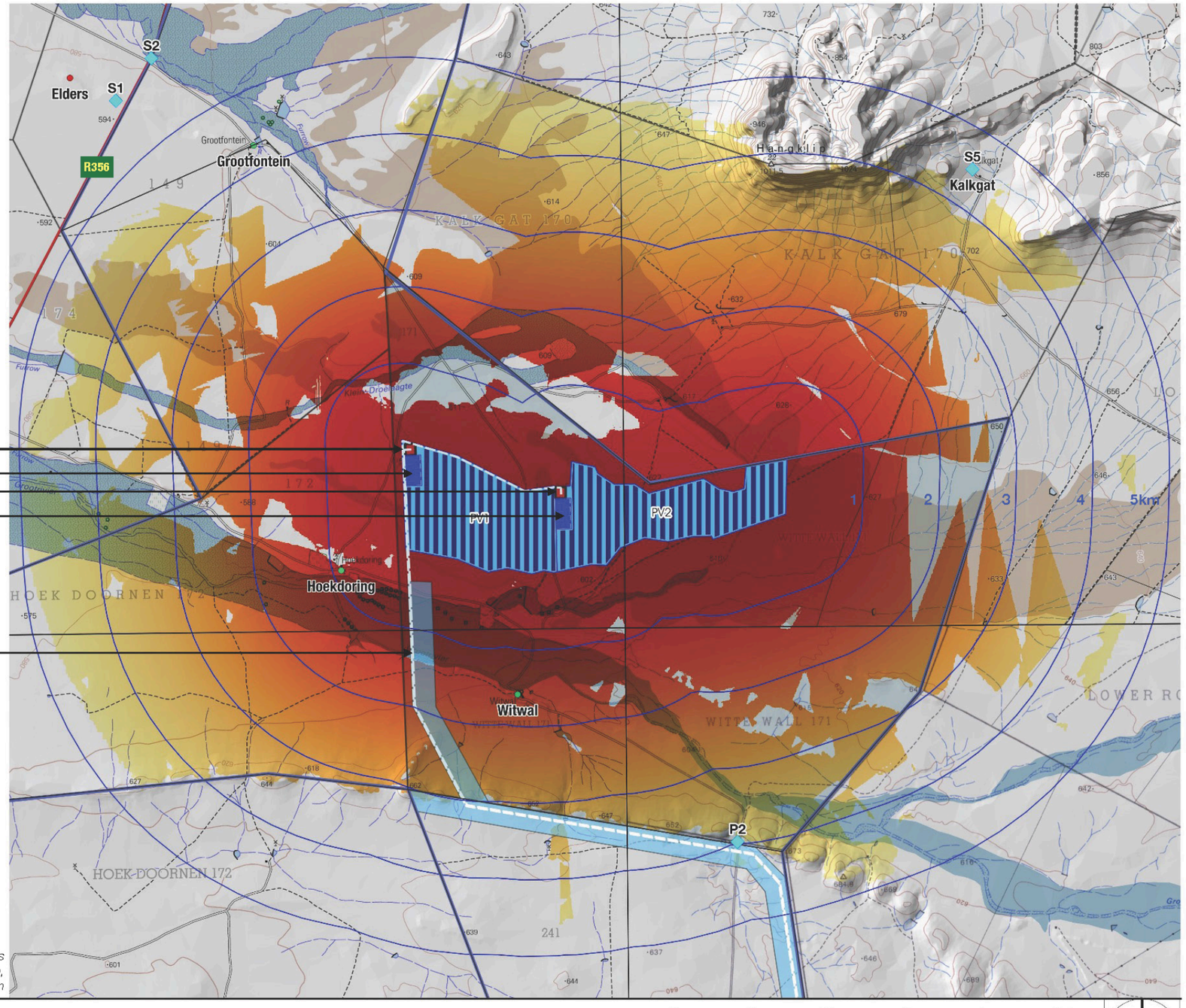
PV2 Battery Energy Storage System

Witte Wall 2x 132kV Overhead Powerlines

LEGEND :

- Witte Wall PV1 and PV2
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area

base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein



map 6 : Viewshed • Witte Wall PV1 and PV2 Solar Arrays max 10m High

0 1 2 3 4 5 km

1:50 000 @ A3

Viewshed Legend :

High Visibility

Medium Visibility

Low Visibility

No Visibility (View Shadow)

LEGEND :

PV1 Witte Wall PV1 and PV2

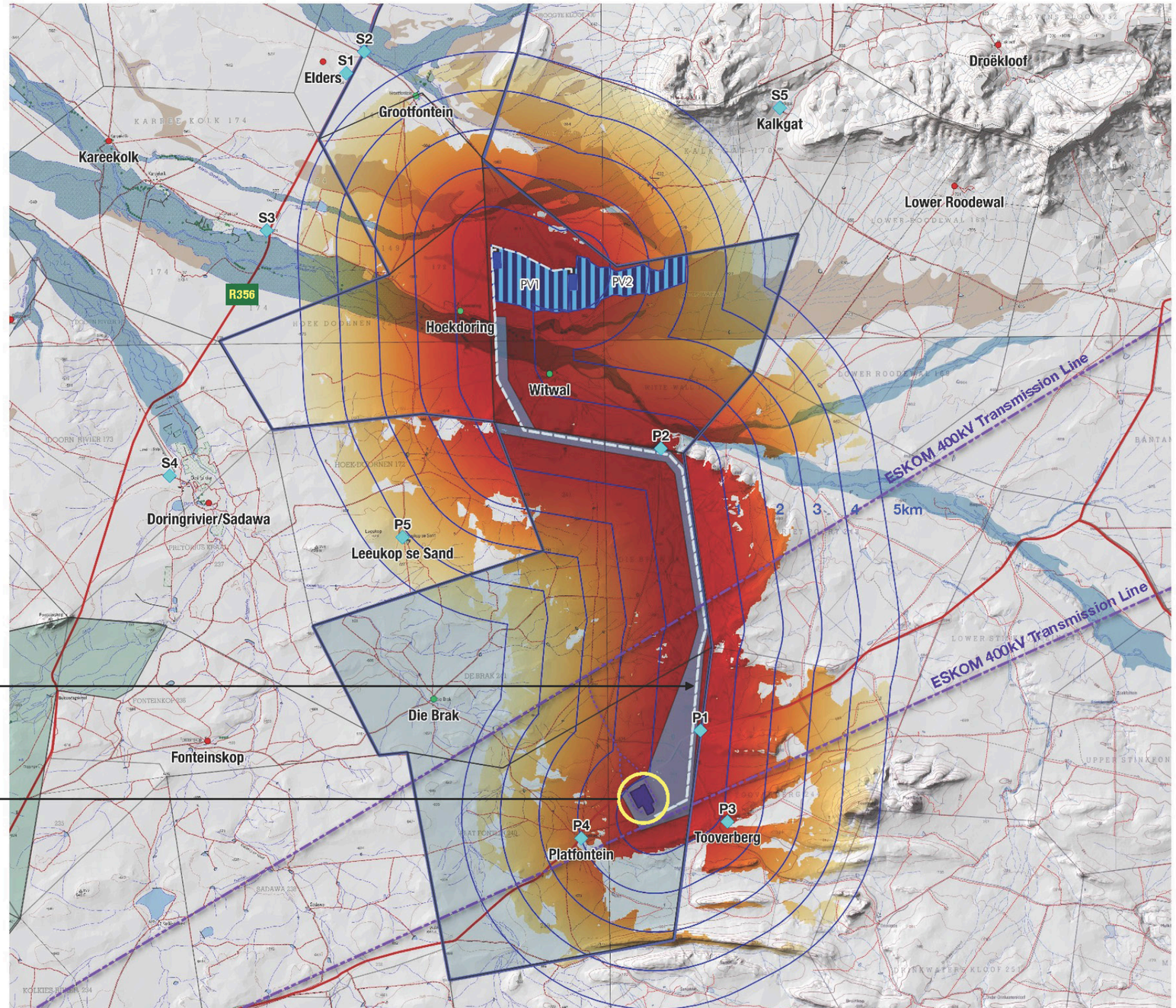
S4 S Viewpoints

Die Brak Farmsteads within Study Area

Elders Farmsteads outside Study Area

Witte Wall 2x 132kV Overhead Powerlines within Servitude Corridor

ESKOM Kappa SubStation



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 7 : Viewshed • Witte Wall PV1 and PV2 132kV Powerlines max 30m High

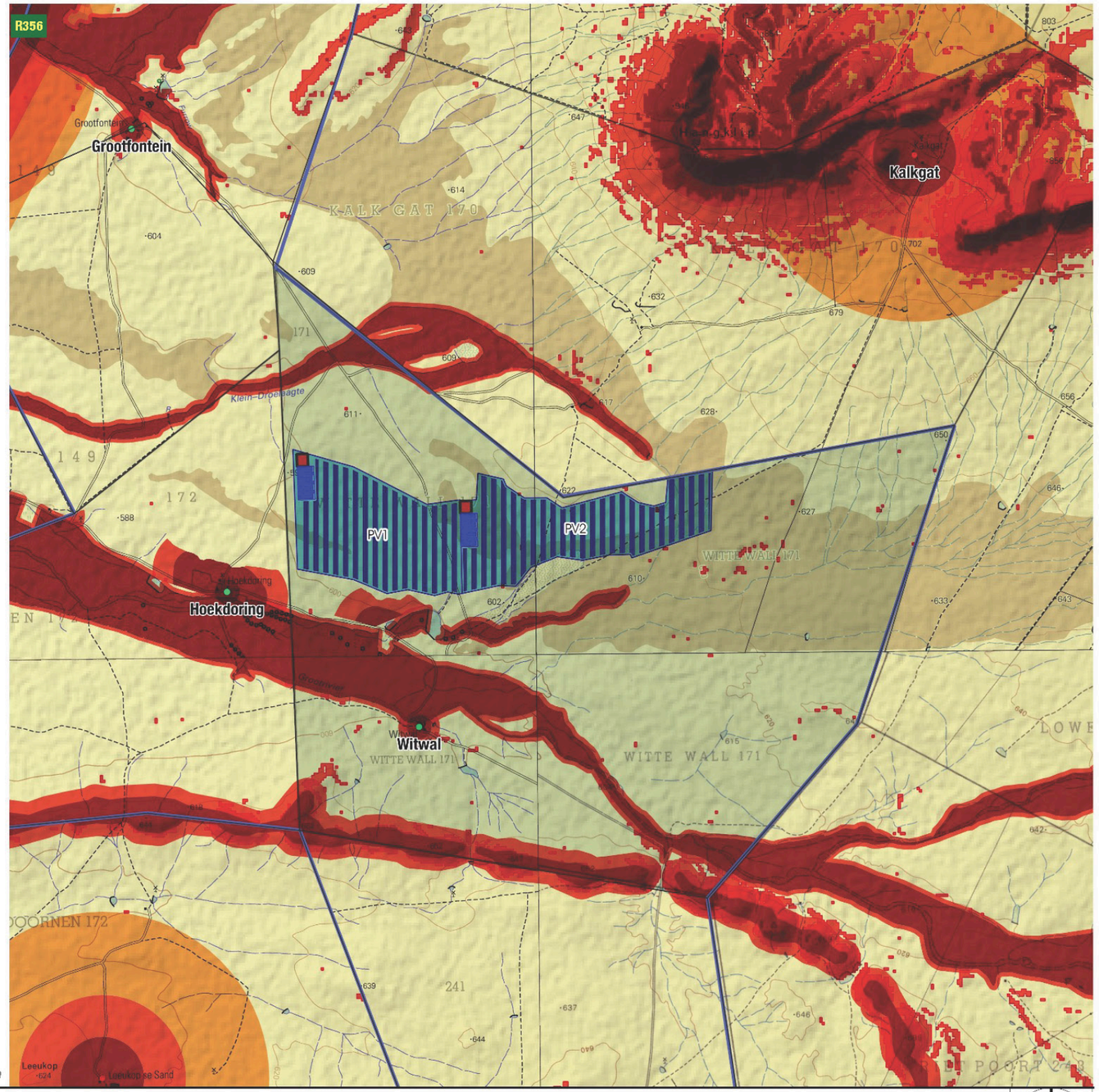
0 1 2 3 4 5 km

1:100 000 @ A3

VISUAL SENSITIVITY LEGEND :

- VERY High (NoGo) Sensitivity
- High Sensitivity
- Medium Sensitivity
- Low Sensitivity

(See Table 5 for buffer distances)



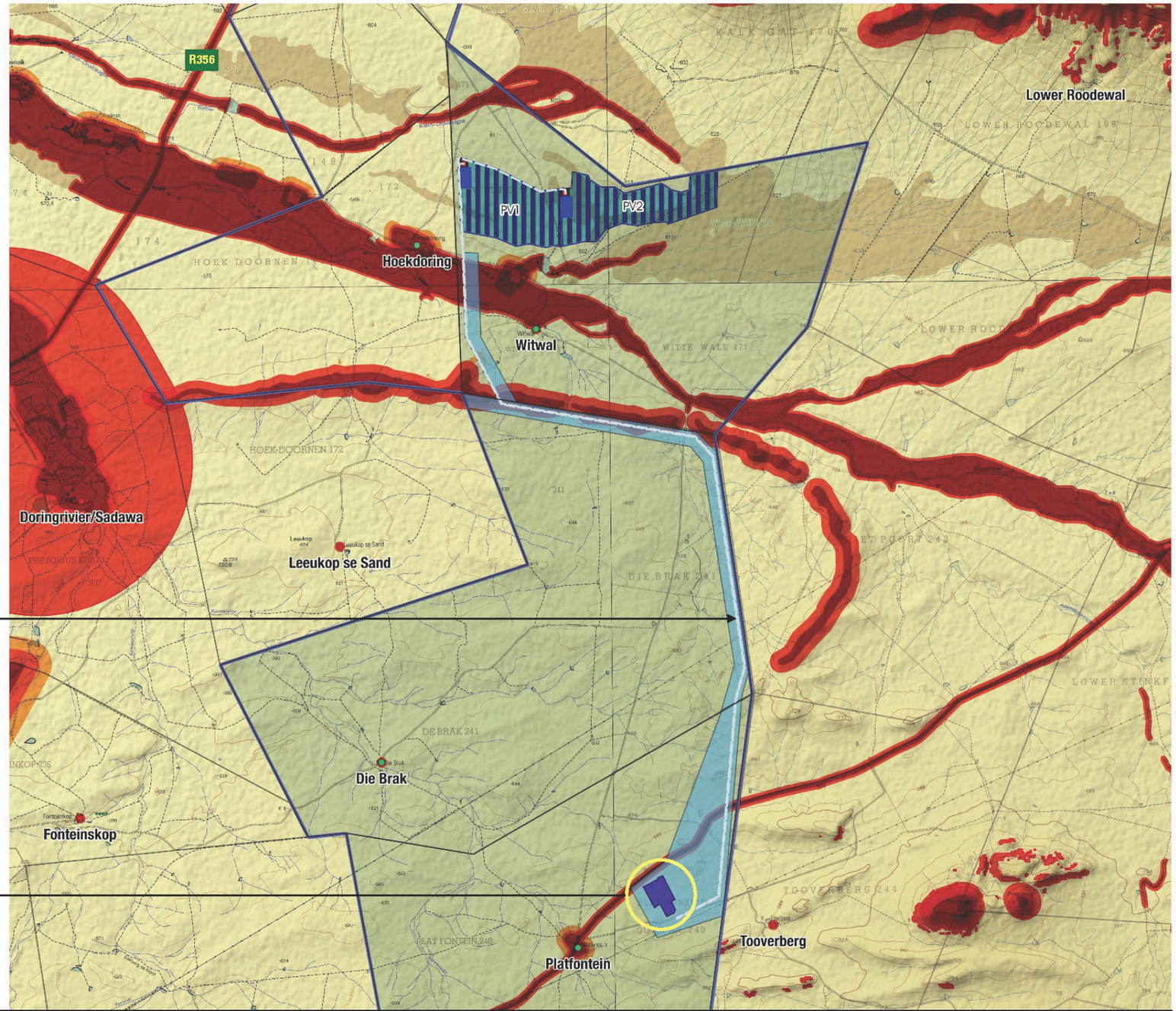
base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 8 : Visual Sensitivity • Witte Wall PV1 and PV2

VISUAL SENSITIVITY LEGEND :

- VERY High (NoGo) Sensitivity
- High Sensitivity
- Medium Sensitivity
- Low Sensitivity

(See Table 6 for buffer distances)



Witte Wall 2x 132kV Overhead Powerlines within Servitude Corridor

ESKOM Kappa SubStation

base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 9 : Visual Sensitivity • Witte Wall Connecting Power Lines 2x 132kV max 30m High

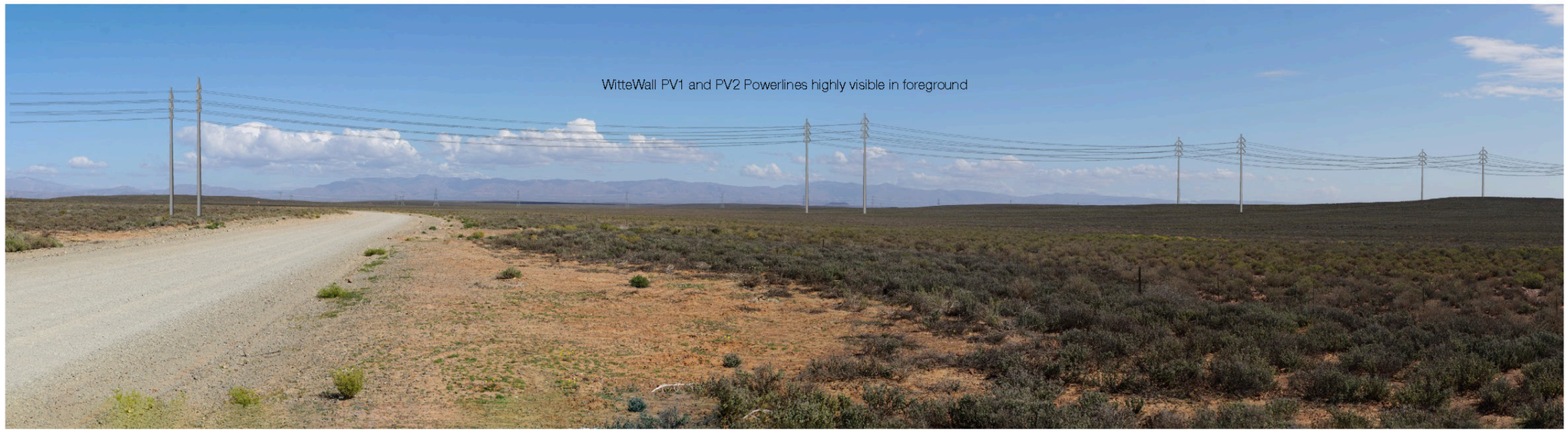
0 1 2 3 4 5 km

1:75 000 @ A3

***Viewpoint S3** : looking South-East from Kareekolk Gate*

Location 32.973741°S 19.907129°E Distance 5.80km

Figure P1 : Photomontages • Witte Wall : SPV Viewpoint S3



***Viewpoint P1** : looking West from District Road at Powerline Crossing*

Location 33.091035°S 20.025678°E Distance 195m

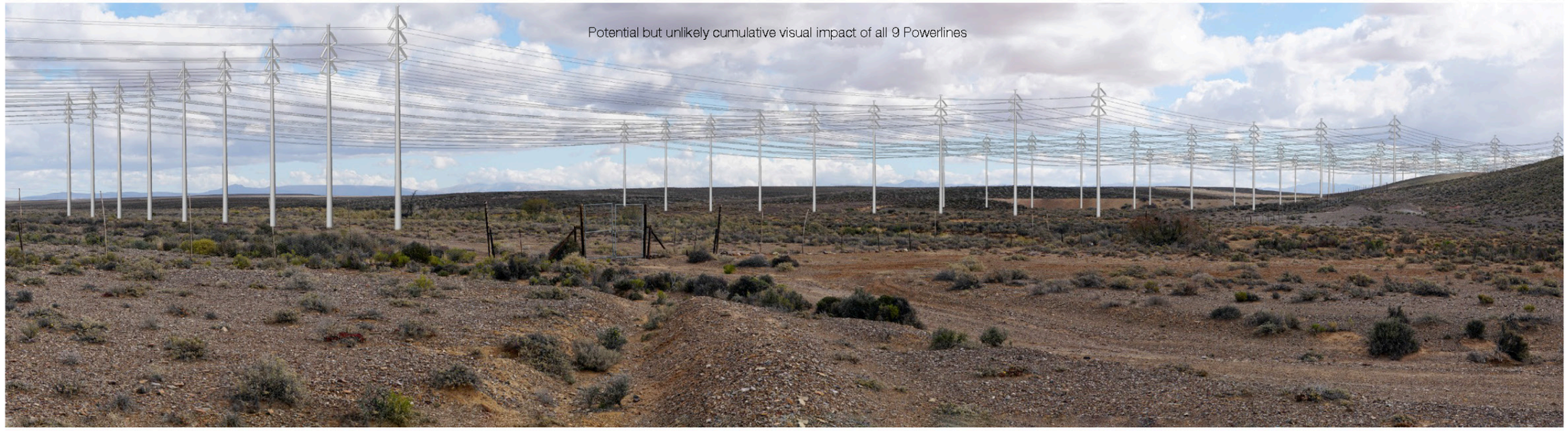
***Viewpoint P2** : looking South-West from Wittewall Gate at Powerline Crossing*

Location 33.025376°S 20.015431°E Distance 116m

Figure P2 : Photomontages • Witte Wall : Powerline Viewpoints P1 and P2

***Viewpoint P1** : looking West from District Road at Powerline Crossing*

Location 33.091035°S 20.025678°E Distance 195m

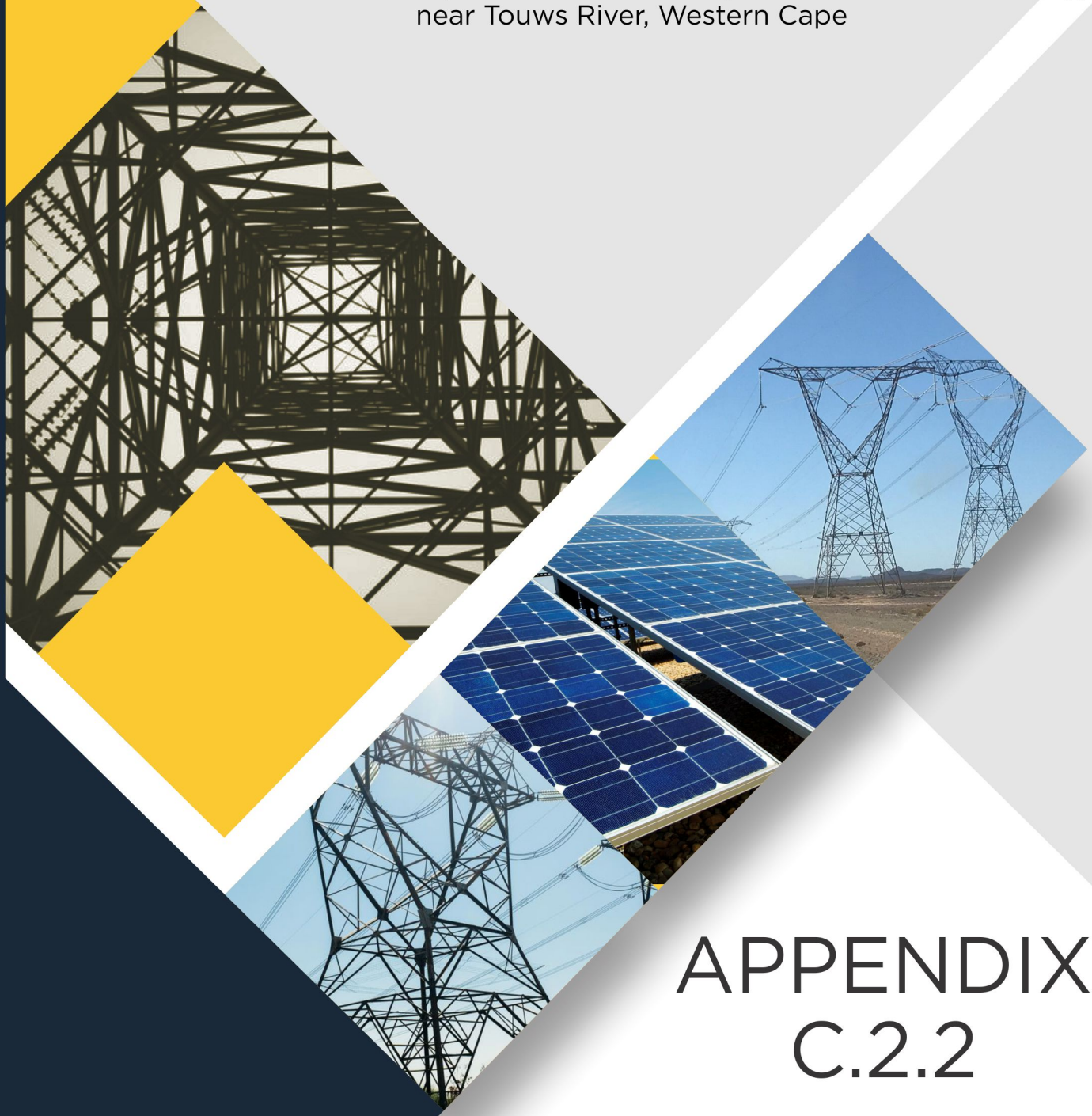


***Viewpoint P2** : looking South-West from Wittewall Gate at Powerline Crossing*

Location 33.025376°S 20.015431°E Distance 116m

Figure P3 : Photomontages • Powerline Viewpoints P1 and P2 showing all 9 potential 132kV powerlines

Basic Assessment for the Proposed Development of Electrical Grid Infrastructure to support the proposed nine 175 MW Solar Photovoltaic Facilities and associated Infrastructure (i.e. Witte Wall PV 1, Witte Wall PV 2, Grootfontein PV 1, Grootfontein PV 2, Grootfontein PV 3, Hoek Doornen PV 1, Hoek Doornen PV 2, Hoek Doornen PV 3, and Hoek Doornen PV 4), near Touws River, Western Cape



APPENDIX C.2.2

Visual Impact Assessment for Grootfontein

VISUAL SPECIALIST ASSESSMENT: Report 2

Visual Impact Assessment for the Proposed Development of three 175 MW Solar Photovoltaic Facilities (Grootfontein PV 1, PV 2 and PV 3), and associated Electrical Grid Infrastructure near Touws River, Western Cape

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Report prepared for:	*Report prepared by:*
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Version 1: October 2020
Version 2: November 2020

Executive Summary

The proposed cluster of Grootfontein solar Photovoltaic (PV) facilities (Grootfontein PV 1, PV 2 and PV 3) form part of a larger solar energy project, which includes the Witte Wall and Hoek Doornen solar PV clusters. These fall within the Komsberg Renewable Energy Development Zone (REDZ), and would form part of a larger group of proposed and existing renewable energy facilities concentrated near the ESKOM Kappa substation.

The generally flat terrain is visually exposed with the result that structures and pylons can be seen for several kilometres. However, there are no major scenic features of note, and the main receptors, being surrounding farmsteads, are spread fairly far apart, mostly more than 5km distance from the proposed solar facilities and connecting powerlines. This means that visibility of the proposed Solar Energy Facilities (SEFs) and powerlines is low, (hardly visible to not visible from the farmsteads).

Taking into account the relatively low structures and the local scale of the proposed solar facilities and related infrastructure located in a fairly remote area, the visual impact significance was considered to be **low** before and after mitigation, as well as **low** before and after mitigation for the connecting powerlines (for the construction and operational phases). The visual landscape could be restored after potential decommissioning which means that the visual significance would be **very low** with mitigation for this phase, (see tables below).

The potential cumulative visual impact for the cluster of three solar facilities (Grootfontein PV 1, PV 2 and PV 3), in combination with the proposed Witte Wall and Hoek Doornen solar PV clusters, as well as the existing Perdekraal Wind Energy Facility (WEF) would increase to **moderate** significance, both before and after mitigation for the operational phase, as the landscape becomes more semi-industrialised. The fact that the ESKOM Kappa substation and power lines already occur in the area needs to be taken into account.

The potential cumulative visual impact for the electrical grid infrastructure of all the clusters (Witte Wall (PV 1 and PV 2) Grootfontein (PV 1, PV 2 and PV 3), and Hoek Doornen (PV 1, PV 2, PV 3 and PV 4), could be **medium** if four connecting power lines to the Kappa substation are built, but would reduce to **low** if the connecting power line is shared (for the operational phase).

Therefore, given the fairly contained footprint of the proposed cluster solar PV facilities, the limited viewshed and the localised visual effects in a remote area, the overall visual impact significance for both the PV facilities and the power lines was found to be **low risk** with the implementation of mitigation measures, and **very low risk** after mitigation in the long term if the solar facilities are decommissioned.

Overall Impact Significance for Solar PV facilities and Related Buildings (post mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Moderate (level 3)
Cumulative - Decommissioning	Very low (level 5)

Overall Impact Significance for Substations and Connecting Powerlines (Post Mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Low (level 4)
Cumulative - Decommissioning	Very low (level 5)

Key visual management actions include locating the substations and other buildings, as well as construction camps, in unobtrusive positions in the landscape away from public roads. The Karoo landscape is particularly fragile and therefore new access roads and disturbance should be kept to a minimum for both the proposed solar facilities and connecting power lines. Connecting power lines should be shared where possible, to avoid a plethora of power lines in the exposed landscape. (It is understood that separate power lines to Kappa have to be assessed due to the bidding requirements and uncertainties).

There are no fatal flaws from a visual perspective arising from the proposed projects, and given the marginal nature of agriculture in the area, the solar energy projects are probably an inherently suitable land use that should receive authorisation from a visual perspective, provided the mitigation measures are implemented as a condition of approval.

Contents

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List of Abbreviations

BA	Basic Assessment
BAR	Basic Assessment Report
CAA	Civil Aviation Authority
DEFF	Department of Environment, Forestry and Fisheries
DEM	Digital Elevation Model
EIA	Environmental Impact Assessment
EGI	Electricity Grid Infrastructure
EMPr	Environmental Management Programme
GN	Government Notice
GPS	Global Positioning System
NEMA	National Environmental Management Act (Act 107 of 1998, as amended)
NFEPA	National Freshwater Ecosystem Priority Areas
O&M	Operations and maintenance
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
REEA	Renewable Energy EIA Application Database
SACAA	South African Civil Aviation Authority
SACAD	South African Conservation Areas Database
SACAP	South African Council for the Architectural Profession
SACLAP	South African Council for the Landscape Architectural Profession
SAPAD	South African National Protected Areas Database
SEA	Strategic Environmental Assessment
SEF	Solar energy facility
SRTM	Shuttle Radar Topography Mission
VIA	Visual Impact Assessment
WEF	Wind energy facility

Glossary

Definitions	
Receptor	Individuals, groups or communities who are subject to the visual influence of a particular project
Viewpoint	A selected point in the landscape from which views of the project are ascertained
Viewshed	The outer boundary defining a view catchment area, used to determine the zone of visual influence.
View shadow	An area within the view catchment visually obscured from the project, usually by topography.
Visual absorption capacity	The ability of an area to visually absorb development by means of screening topography, vegetation or buildings.

1. Introduction

1.1. Scope, Purpose and Objectives of the Visual Specialist Report

The Visual Impact Assessment (VIA) is one of several specialist studies being carried out as part of the Basic Assessments (BAs) for the proposed development of three Solar Photovoltaic (PV) Facilities and associated Electrical Grid Infrastructure (i.e. Grootfontein PV 1, PV 2 and PV 3), near Touws River, Western Cape.

The Applicant is proposing to develop nine solar PV facilities and nine power lines and associated infrastructure to link the PV facilities to the Eskom Kappa Substation. Two PV facilities are being proposed on the farm Witte Wall 171; three PV Facilities are being proposed on the farm Grootfontein 149; and four PV Facilities will be constructed on the Farm Hoek Doornen 172. This VIA deals with the Grootfontein projects.

The VIA includes an assessment of potential visual impacts and risks associated with the proposed solar energy facilities (SEFs) and provides recommended mitigations to minimise potential visual impacts. These are used to inform the siting and layout of the project.

The VIA also includes related infrastructure, such as the powerline grid connections and substations, which form part of the BAs.

1.2. Details of the Visual Specialists

The visual specialist assessment has been undertaken by Quinton Lawson, Architect, registered with the South African Council for the Architectural Profession (SACAP), reg. no. 3686, and by Bernard Oberholzer, Landscape Architect, registered with the SA Council for the Landscape Architectural Profession (SACLAP), reg. no. 87018.

Curriculum vitae are included in Appendix A of this specialist assessment, and a signed specialist statement of independence is included in Appendix B.

1.3. Terms of Reference

- Determine Site Sensitivity Verification Requirements in terms of Government Gazette 43110, Government Notice (GN) 320, and provide a Site Sensitivity Verification Report, including a site visit in order to identify the level of sensitivity assigned to the project area on the Screening Tool, and to verify and confirm this sensitivity and land-use.
- Prepare a description and mapping baseline of the visual and scenic resources and sensitivity of the study area, including viewsheds and recommended buffers, in GIS format.
- Provide review input on the preferred infrastructure layout following the sensitivity analysis.
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a visual perspective, both without and with mitigation, for the construction, operational and decommissioning phases of the project.
- Prepare schematic portrayals of the potential visual impact of the proposed project infrastructure.
- Identify any protocols, legal and permit requirements that are relevant to this project and the implications thereof.
- Provide recommendations with regards to potential monitoring programmes.
- Determine mitigation and/or management measures which could be implemented to reduce the effect of negative impacts and enhance the effect of positive impacts.
- Identify best practice management actions, monitoring requirements, and rehabilitation guidelines to be included in the Environmental Management Programme (EMPr).

- Incorporate and address visual issues and concerns raised by Stakeholders, Competent Authorities, Interested and Affected Parties (I&APs) and the public during the Public Participation Process.

2. Approach and Methodology

The methodology involved a number of standard procedures including those in the 'Guideline for Involving Visual and Aesthetic Specialists' (Oberholzer, B. 2005), including the following steps:

- A baseline survey of existing scenic resources and visual characteristics of the study area was made, including desktop work and field observations.
- A photographic survey included views from potentially sensitive receptor locations. A number of cameras were used to record features and determine the Global Positioning System (GPS) coordinates and compass direction of viewpoints.
- View corridors / routes and important viewpoints / receptors were mapped in relation to the proposed SEFs.
- Distance radii from the proposed SEFs were mapped to determine its potential visibility from the identified viewpoints.
- The viewsheds of the proposed SEFs and connecting powerlines were mapped to determine their zones of visual influence as well as those areas in a view shadow.
- Photomontages were constructed from selected viewpoints using panoramic photographs taken in the field, along with digital terrain modelling and superimposing a 3D model of the proposed SEFs. The montages gave a realistic impression of the proposed SEFs from the identified viewpoints at a range of distances.
- The potential visibility, zone of visual influence and photomontages of the proposed SEFs provided a quantitative measure of visual impact intensity.
- Existing vegetation cover, land uses, topographic features and general intactness of the landscape, along with the overall 'sense of place' provided a qualitative measure of visual impact intensity.
- Potential impacts identified in the visual specialist study have been assessed based on the criteria and methodology outlined in Appendix D.
- The site inspection was carried out over a full day on 27 August 2020 by two principal visual specialists. The season was not a consideration, nor had any effect on carrying out a visual assessment. Clear visibility was required for the photographic survey.

2.1. Information Sources

Base data used in the visual assessment is listed in Table 1 below. Although some of the information has not been updated for a few years, the quality of the data was considered adequate for the purpose of this assessment.

Table 1: Information Sources

Data / Information	Source	Date	Type	Description
Topo-Cadastral information	Chief Directorate: National Geospatial Information	Various dates	1:250 000 raster maps	Used for base mapping.
Topographic information	Chief Directorate: National Geospatial Information	Various dates	1:50 000 raster maps	Used for base mapping.
Elevational Data	Chief Directorate: National Geospatial Information	Various dates	Spatial Vector Dataset	RSA 5m Contour Data

Data / Information	Source	Date	Type	Description
Geological information	Council for Geoscience	2011	Spatial Vector Dataset	1:1 000 000 Geological Map of South Africa
Digital Elevation Model (DEM)	Shuttle Radar Topography Mission (SRTM)	2014	Elevational information (Raster)	1 arcSEC 30m
South African National Protected Areas Database (SAPAD),	Department of Environment, Forestry and Fisheries (DEFF)	2020, Q2	Spatial Vector Dataset	Spatial delineation of protected areas in RSA. Updated quarterly.
South African Conservation Areas Database (SACAD)	DEFF	2020, Q2	Spatial Vector Dataset	Spatial delineation of conservation areas in RSA. Updated quarterly.
Renewable Energy EIA Application Database (REEA)	DEFF	2020, Q2	Spatial Vector Dataset	Location of wind and solar renewable energy applications.
National Freshwater Ecosystem Priority Areas (NFEPA)	SANBI	2017	Spatial Vector Dataset	Spatial delineation of rivers and wetlands.
National Heritage Sites Inventory Database	SAHRA	2017	Spatial Vector Dataset	Location of classified heritage sites in SA.
Electricity Grid Infrastructure (EGI) Dataset	ESKOM	2018	Spatial Vector Dataset	Transmission line routes and Substations in RSA.
Airport, Airfields and Obstacle Datasets	Civil Aviation Authority (CAA)	2018	Spatial Vector Dataset	Location of airfields in RSA.

2.2. Assumptions, Knowledge Gaps and Limitations

Other projects in the surrounding area (within a 30km radius) that have been considered for cumulative impact assessment, are indicated on Map 1, believed to be the latest information.

No detailed layouts, heights or type of solar PV arrays were available during the preparation of the visual assessment, but a worst-case scenario of 10m height for the arrays and similarly for the battery storage systems was used in the visual modelling. The internal layout is not considered a visual concern.

No details of building finishes, or the location of construction camps, were available at this stage, and provided the mitigation measures are adhered to, this should not have any effect on the visual significance ratings.

2.3. Consultation Processes Undertaken

No consultation has taken place for this visual assessment to date and it is anticipated that any visual issues will be identified in the Socio-Economic Impact Assessment and the Public Participation Process, and that these will be addressed in the final BA Report.

3. Description of Project Aspects relevant to the Visual Assessment

The Project Applicant is proposing to design, construct and operate the Grootfontein solar PV cluster, consisting of three solar PV power generation facilities, north of Touws River in the Western Cape Province. Two other adjacent PV clusters, (Witte Wall with 2 facilities and Hoek Doornen with 4 facilities), are also being assessed. Each solar PV facility will have associated infrastructure, including an on-site substation and will connect to the Eskom Kappa Substation to the south via a dedicated 132 kV power line, (see Maps 1 and 2).

Each Solar PV plant will have a footprint of about 250 hectares, along with an approximately 300 m wide corridor for the power lines. Visual sensitivity maps, prepared during the Screening Phase, were used to identify the best locations for the 250 hectare PV areas and related infrastructure. Facilities

that could have visual implications are listed in Table 2 below. It must be noted that the specifications provided in Table 2 apply to a single PV facility and are the same for Grootfontein PV 1, PV 2 and PV 3, unless where specified. A general layout of the project and route taken during the field trip, are indicated on Map 2.

Table 2: Description of Proposed Grootfontein PV Cluster with three SEFs

Facility	Extent/Footprint	Height	Comments
SEF project area	Maximum 250 ha, including internal roads for each PV project. However, with access roads leading to the PV site, the total footprint will be approximately 260 ha.	n/a	175 MW capacity
Solar PV arrays	Single axis, fixed axis, dual axis, fixed tilt options, or bifacial panels.	Max. 10m	Galvanised steel and aluminium mounting structures.
Offices	1 000m^2	Max. 7m	
Operations and maintenance control centre	500m^2	Max. 7m	
Warehouse/workshop	500m^2	Max. 7m	
Ablution facilities	50m^2	Max. 7m	
Converter/inverter stations	2 500m^2	2,5 - 7m	
Onsite substation and/or switching substation for each PV plant	20 000m^2	Max. 7m	Pylons up to 30m high
Battery energy storage system (BESS) for each of the 3 solar projects	Up to 8 ha within the laydown area	5 – 10m	Lithium ion battery containers
Guard house	40m^2	Max. 3m	
Internal powerlines	33kV	9m	Above ground/ underground. If underground, they will have a maximum depth of about 1.6 m.
Internal service roads and service road below power line	4m wide	n/a	Gravel surface.
Access roads	4 - 8m wide	n/a	Gravel surface.
Water storage tanks	10 000 litre tanks x20	3m?	At O&M buildings for the operational phase.
Security fencing	Perimeter and internal security fencing.	2 - 3m	Either palisade, mesh or fully electrified.
Security Lighting	To be determined		Only at substation, O&M buildings and BESS.
132kV overhead powerline to Kappa Substation	33m wide servitude.	22,5 – 30m	Corridor approximately 300m wide and 20 - 23km long.

Construction phase laydown area	Approximately 13 ha		Temporary construction camp and area for construction materials.

The potential visual effect of the SEFs and the associated electrical grid infrastructure could include the following:

- The visibility of the SEFs from a number of surrounding farms and routes in the area, given the relatively flat and open nature of the Karoo landscape.
- The industrial character of the SEFs, which would have an effect on the prevailing pastoral sense of place of the local region, typified by its general remoteness and wildness.
- The potential effect on tourism in the area, particularly where guest accommodation or hunting facilities are offered.
- The additional visual clutter of power lines across the landscape, adding to the existing ESKOM power lines to the south.

4. Baseline Environmental Description

4.1. General Description

The general character and landscape features of the receiving environment are described below, and in the photographic illustrations. The descriptions in this Section apply to all three solar facilities, being the Grootfontein PV 1, PV 2 and PV 3 facilities, associated infrastructure and electrical grid infrastructure.

4.2. Project Specific Description

Location (Map 1)
The project site for all three proposed SEFs lies at the southern end of the Tanqua Karoo, also known in this section as the Ceres Karoo. Touws River and Ceres are the nearest towns, both being about 60km away by road. Access to the site is via the R356 gravel road and smaller farm gravel roads. The ESKOM Kappa Main Substation is located on the district road to the south, with existing powerlines running parallel with the road.

Geology (Map 3)
The geology of the project site consists of shale of the Tierberg Formation, which forms part of the Ecca Group of rocks within the Karoo Sequence (Council for Geoscience). The soft shales of the Tierberg Formation have been eroded by the Doring, Groot and Droëlaagte Rivers to form a broad, flat valley. More resistant sandstones give rise to the surrounding mountains, while alluvium occurs along the drainage courses. The larger study area to the south (where the proposed powerlines will run) consists of Dwyka Formation tillite, sandstone and mudstone. The geology determines the topography and therefore the scenic characteristics of the site and surroundings. (See Figures 1, 2 and 3 below).

Physical Landscape (Maps 4 and 5)
The site is surrounded to the west by the Swartruggens mountains, to the south by the Bontberg and to the north-east by the prominent Roosterberg. The relatively flat eroded plain is a semi-arid landscape, being in the rain-shadow of the surrounding mountains. The relatively even topography presents few physical constraints for development, the only major feature being the broad dry drainage course of the Droëlaagte River.

Vegetation
The vegetation type of the arid plains is classified as *Tanqua Karoo (SKv5)*, consisting of sparse low succulent shrubland on the Dwyka tillite and Ecca shales. The *Tanqua Wash Riviere* type (AZi7) is also a sparse vegetation occurring on the alluvial deposits of the sheet-wash plains, (Mucina and Rutherford,

2006). Acacia thorn trees are confined to the drainage courses, which are dry for most of the year. Copses of mainly exotic trees, provide shelter (and visual screening) around farmsteads. Succulent vygies were in flower during the site visit in late August.

Land Use

The relatively low rainfall and sparse vegetation limit the agricultural potential to mainly extensive grazing, including sheep, interspersed with game farms. Crops are confined to the minor patches of deeper soils along drainage courses or where irrigation is available.

Farms tend to be large in area in order to be viable for sheep or game farming, with farmsteads being on average 5 to 10km apart. Inverdoorn, which has tourist accommodation, and Klaserie Private Nature Reserve are about 10km from the site. Wittewal is a game farm used for hunting, while Sadawa (Doringrivier farm) offers guest accommodation. These and other receptors are indicated on Map 2.

The ESKOM Kappa substation is located about 12km to the south of the site. The substation and ESKOM 400kV power lines, together with the existing Perdekraal wind farm to the south-west have already resulted in visual intrusions in the local area.

Figure 1: Grootfontein landscape looking south-east, with Perdekraal WEF in the distance

Figure 2: Grootfontein homestead in river plain, looking north-east

Figure 3: Dry riverbed of Groot River at the R356 road crossing

4.3. Identification of Environmental Sensitivities

4.3.1. Sensitivities identified by the National Web-Based Environmental Screening Tool

The visual sensitivities identified in this Section apply to the cluster of all three solar facilities proposed for Grootfontein, associated buildings and electrical grid infrastructure.

A screening report was compiled by the CSIR (20/8/2020) using the Department of Environment, Forestry and Fisheries (DEFF) Screening Tool based on the assessed area for all nine solar PV facilities and electrical grid infrastructure. The Screening Report includes a 'Map of Relative Landscape (Solar) Theme Sensitivity', indicated in Figure 4 below. This would have been based on mapping prepared for the Wind and Solar Strategic Environmental Assessment (SEA) by the CSIR for the DEFF in 2015 (DEA, 2015). The Screening Tool shows that the site for the proposed Grootfontein PV 1, PV 2, and PV 3 facilities do not have any landscape sensitivities; and that the corridor for the power lines have sensitivities ranging from medium to very high. The study area falls within the Komsberg Renewable Energy Development Zone (REDZ).

The current visual sensitivity mapping undertaken in this VIA is in greater detail at the site scale for the proposed solar PV facilities and electrical grid infrastructure, and takes into account detailed viewshed mapping and local site conditions, as indicated on Figure 5.

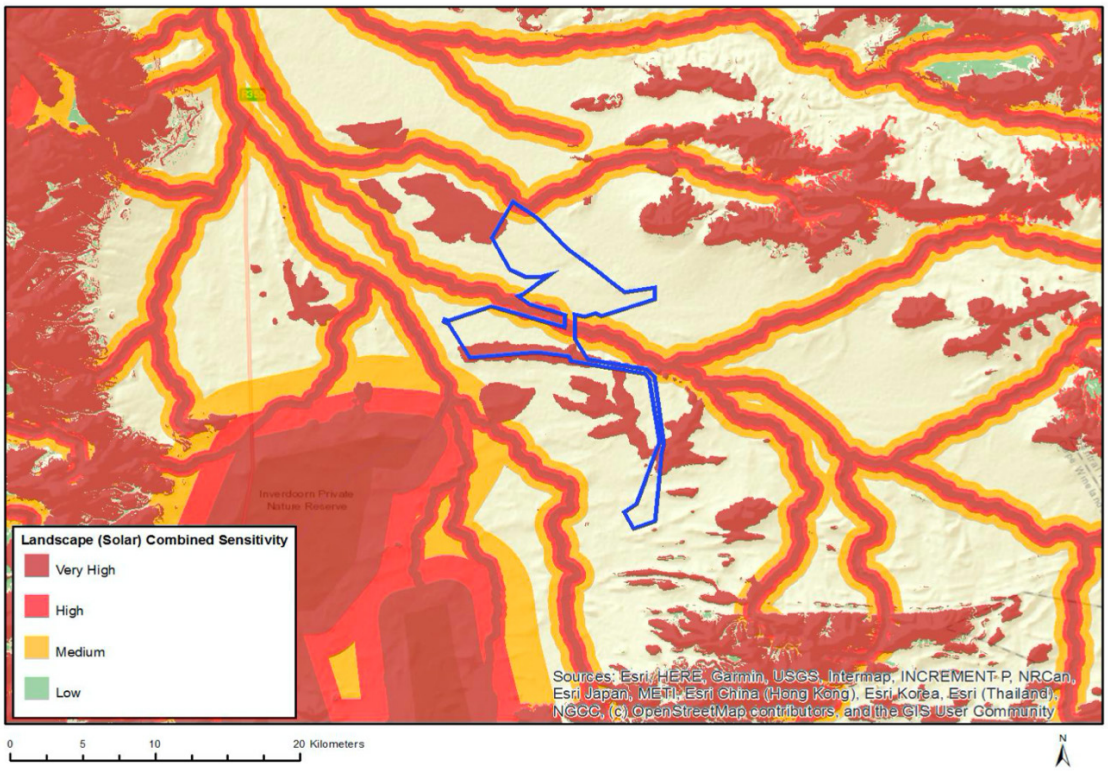


Figure 4: DEFF Screening Tool for the Landscape Theme

4.3.2. Specialist Sensitivity Analysis and Verification

The specific sensitivity of the site related to the three Grootfontein PV facilities, associated structures and electrical grid infrastructure are identified in this section. Areas to be avoided (including buffers) are identified, including areas not suitable for development or construction activities.

A four-tier sensitivity map of the study area (which shows very high, high, medium and low sensitivities) has been provided, with the PV facilities and associated infrastructure superimposed on the visual sensitivity map, (see Figure 5 and Maps 8 and 9).

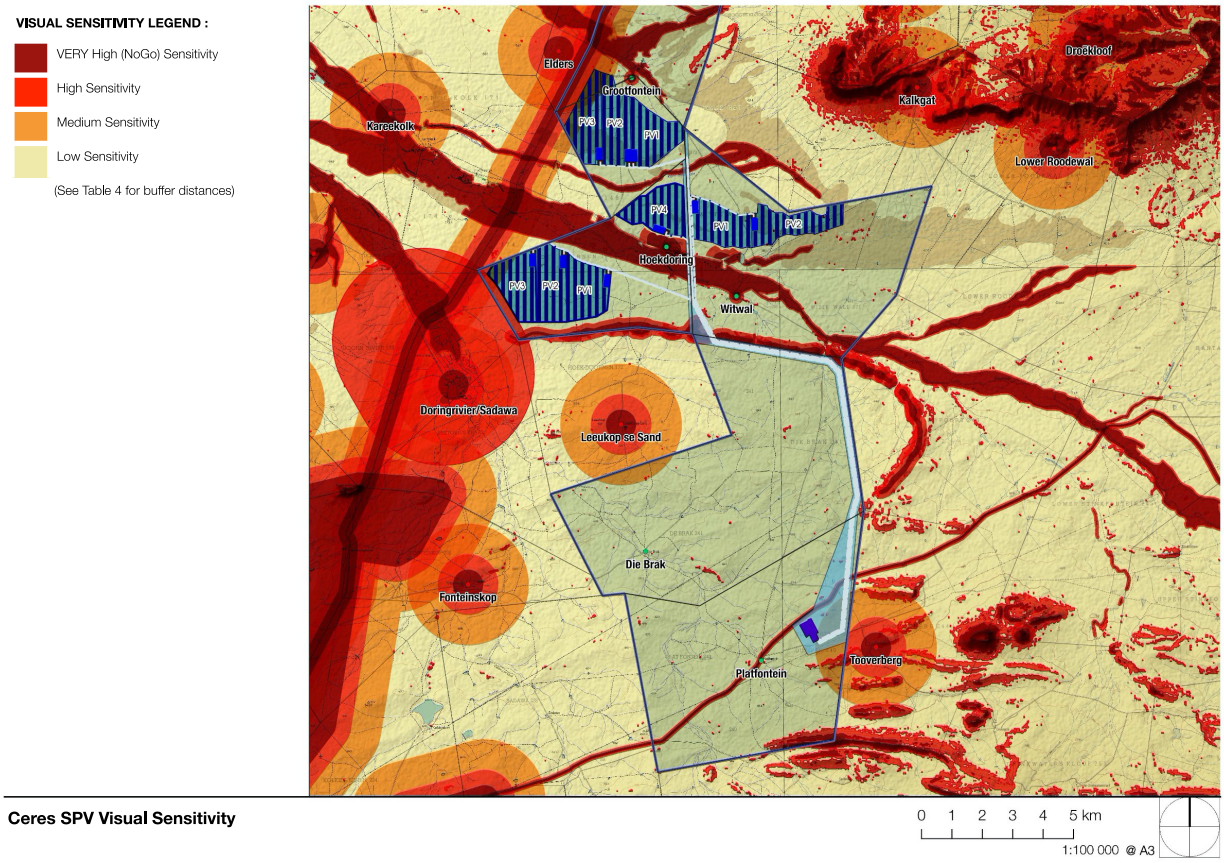


Figure 5: Detailed Visual Sensitivity Mapping for the Study Area

The Environmental Sensitivities are indicated for the three PV Facilities and Electrical Grid Infrastructure on Maps 8 and 9. A summary of visual features and sensitive receptors, and the rationale for these, is given in Table 3 below.

Table 3: Visual Features and Sensitive Receptors

Scenic Resource	**Landscape features within or adjacent to the development site.**
Topographic features	Landscape features in the area, such as hills, *koppies* and outcrops contribute to scenic and natural heritage value, providing visual interest or contrast in the landscape.
Water Features	In places, rivers have been carved into the softer Ecca shales, such as the Droëlaagte Rivier, Grootrivier and Doringrivier, which traverse the study area. In the arid landscape, drainage features with riverine thicket and dams provide scenic and amenity value.
Cultural landscapes	Intact wilderness or rural landscapes contribute to scenic value and sense of place, along with green patches of cultivated land and tree copses around farmsteads. Cultural landscapes include archaeological and historical sites identified in the Heritage Assessment.
	Receptors adjacent to the site or in the local surroundings.
Protected Areas	The Tanqua Karoo National Park is more than 30km to the north-west of the study area, and would not be affected by the proposed SEF projects. The Touw Local Nature

	Reserve is about 15km from the site, in a view shadow behind the Bontberg Mountains.
Private nature reserves, game farms	Private nature reserves and game farms in the area, some of which have guest accommodation, are important for the local tourism economy, and tend to be sensitive to loss or degradation of scenic quality. The Inverdoorn Private Nature Reserve facilities to the south-west are about 10km from the project site. The Klaserie Private Nature Reserve to the south is a similar distance from the site and both are unlikely to be visually affected by the proposed SEFs. Sadawa (Doringrivier) is a game farm with guest accommodation.
Human settlements, farmsteads	Surrounding farmsteads are widely spread and except for Elders, tend to be 5km or more from the project site. It is assumed that farms that form part of the leased development site are less visually sensitive.
Scenic / arterial routes	The R355, which runs north to the Tanqua Karoo and Calvinia, and which is some 12km away, would not be in the viewshed of the proposed SEF projects. The R356 runs north-east in the direction of Sutherland and abuts the study area for several kilometres. This stretch would probably not be considered a scenic route, but would require a nominal visual buffer.
Cultural and heritage sites	These form part of the heritage study, but could have visual implications.

Identification of Environmental Sensitivities

Given the relatively featureless nature of the study area, described above, the only sensitive visual features are the drainage courses, neighbouring farmsteads, and game farms, which are some distance away. Heritage features, documented by the Heritage Specialists, may have visual significance.

Other local features in the landscape, such as the existing ESKOM Kappa Substation and power lines are visual intrusions that have already altered the landscape character of the area to the south.

Visual sensitivity mapping at the broad regional scale for the Phase 1 Wind and Solar SEA (DEA, 2015) indicated a 'Low' visual sensitivity for the study area.

Visual buffers indicated in the Phase 1 Wind and Solar SEA (DEA, 2015) are listed in Table 4 below. This was for mapping at a regional scale and was used as a guide. Visual sensitivity categories and related buffers at the site scale are listed in Tables 5 and 6. Buffers for visual features and receptors are indicated on Map 8 for the proposed solar facilities, and on Map 9 for the proposed connecting powerlines.

Table 4: Visual buffers for Solar PV Facilities at the Regional Scale

Landscape features/criteria	**Wind and Solar SEA (DEA, 2015)**	**Comments relating to proposed Grootfontein PV facilities**
Project area boundary	-	Farm boundary setback usually 30m.
Ephemeral streams/ tributaries	-	Subject to Biodiversity Assessment.
Steep slopes (gradient)	>1:4 (very high sensitivity) 1:4 -1:10 (high sensitivity)	None on the proposed SEF sites.
Prominent ridgelines, peaks and rock outcrops	250m (very high sensitivity)	None on the proposed SEF sites.
Arterial / district gravel roads	0-250m (very high sensitivity) 250m-1 km (mod. sensitivity)	The R355 is 12km to the west of the site and the R356 abuts the project site.
Scenic routes, passes	0-500m (very high sensitivity)	None in the immediate area.
Protected Areas	0-1,5 km (very high sensitivity) 1,5-2 km (high sensitivity) 2-3 km (mod. sensitivity)	None in the immediate area.
Private reserves/ game farms/ guest farms.	0-1 km (very high sensitivity) 1-2 km (high sensitivity) 2-3 km (mod. sensitivity)	Two private nature reserves are about 10km from the proposed site. Sadawa guest farm is about 8.5km from the site.
Farmsteads	0-250m (high sensitivity) 250-500m (mod. sensitivity)	Elders is the nearest homestead at 1.2km distance. Other farmsteads are 5km or more from the SEF sites.

Table 5: Visual Sensitivity Mapping Categories for the Proposed Solar Facilities

Scenic Resources	**Very high sensitivity (No-go)**	**High visual sensitivity**	**Medium visual sensitivity**	**Low visual sensitivity**
Topographic features	Feature	Within 150-250m	-	-
Steep slopes	Slopes > 1:4	Slopes > 1:10	-	-
Drainage courses	Feature	Within 50m	-	-
Cultural landscapes/ cropland	within 250m	within 500m	-	
Protected Landscapes / Sensitive Receptors				
Private reserves / game farms	within 500m	within 1 km	within 2 km	-
Farmsteads outside site	within 500m	within 1 km	within 2 km	-
Farmsteads inside site	within 250m	within 500m	-	
Arterial routes	within 250m	within 500m	within 1km	-

Table 6: Visual Sensitivity Mapping Categories for Proposed 132kV Connecting Power Line

Scenic Resources	Very high sensitivity (No-go)	High visual sensitivity	Medium visual sensitivity	Low visual sensitivity
Topographic features	Feature*	Within 150m	-	-
Steep slopes	-	Slopes > 1:4	Slopes > 1:10	-
Drainage courses	Feature*	Within 50m	-	-
Cultural landscapes/ cropland	within 100m	within 150m	Within 250m	
Protected Landscapes / Sensitive Receptors				
Private reserves / game farms	Feature	within 250m	within 500m	-
Farmsteads outside site	within 50m	within 100m	-	-
Farmsteads inside site	within 50m	within 100m	-	
Arterial / district routes	within 50m	within 100m	-	-

Note: *The power lines could cross these features at right angles.

4.3.3. Sensitivity Analysis Summary Statement

The visual sensitivities described above and in Maps 8 and 9 correspond roughly with the screening tool sensitivities, the former being more detailed and specific to the study area. These formed the basis of the Screening Phase layout. (The site sensitivity verification is included in Appendix C).

5. Issues, Risks and Impacts

5.1. Identification of Potential Impacts/Risks

The potential visual impacts resulting from the proposed Grootfontein PV and electrical grid infrastructure development on landscape features and receptors identified above are listed below for each of the project phases, including cumulative impacts. The potential visual impacts would be identical for each of the proposed PV facilities and electrical grid infrastructure. The impacts identified are direct and cumulative impacts. No indirect impacts have been identified.

- **Grootfontein PV 1, PV 2 and PV 3 Solar Facilities and Associated Buildings**

Construction Phase

- Potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on residents and visitors to the area, particularly users of the main arterial route (R356), to the site.
- Potential visual effect of haul roads, access roads, stockpiles and construction camps in the exposed landscape.

Operational Phase

- Potential visual intrusion of solar arrays and related infrastructure and the impact on receptors, including residents and visitors, as well as game farms in the area.
- Potential visual impact of an industrial type activity on the rural or wilderness character 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 the three solar PV facilities with the similarly proposed Witte Wall and Hoek Doornen solar facilities in the study area, as well as with other nearby existing and proposed renewable energy farms in the area.

- **Grootfontein PV 1, PV 2 and PV 3 Electrical Grid Infrastructure and Substations**

Construction Phase

- Potential effect of dust and noise from construction machinery during the construction of the substation and pylons, and the effect of this on residents and visitors to the area.
- Potential visual effect of access roads, stockpiles and construction camps in the exposed landscape.

Operational Phase

- Potential visual intrusion of substations and powerlines, and the impact on receptors, particularly where powerlines cross roads.
- Potential visual impact of industrial type activities on the rural or wilderness character of the area.

Decommissioning Phase

- Potential visual effect of any remaining electrical grid structures and disused roads on the landscape.

Cumulative Impacts

- Potential combined visual effect of the three Grootfontein substations and three connecting powerlines with those of Witte Wall and Hoek Doornen solar PV facilities within the study area, as well as the nearby existing Perdekraal WEF. This would potentially result in the visual effect of nine connecting powerlines to the ESKOM Kappa substation.

5.1.1. Summary of Issues identified during the Public Consultation Phase

Comments will be received when the Draft BAR is released for public participation. This section will therefore be updated once the information is available.

6. Impact Assessment

This section provides an assessment of the potential visual impacts of the Grootfontein cluster of three solar PV facilities and associated buildings, as well as the electrical grid infrastructure. Comment on the no-go alternative and the overall findings are provided.

As the three solar facilities within the cluster are very similar, and because visual no-go areas have been avoided during the screening phase, only one set of assessment tables were deemed necessary.

Criteria for determining visual impact included the following:

Visibility:

Estimated degrees of visibility based on the scale of the facilities and related infrastructure, and on distance from various viewpoints are indicated in Table 7 below:

Table 7: Degrees of Visibility of Proposed SEFs and Related Infrastructure

	Very high visibility	0-500m	Prominent feature within the observer's view frame
	High visibility	500m-1km	Relatively prominent within observer's view frame
	Moderate visibility	1-2km	Only prominent as part of the wider landscape
	Low visibility	2-4km	Visible as a minor element in the landscape
	Very low visibility	>4km	Hardly visible with the naked eye in the distance

The height of the solar PV arrays is relatively low (up to 10m), while the substation and power line pylons are higher. Possible degrees of visibility from a number of viewpoints are indicated in Table 8 below. (See also photomontages). Visibility of lights at night would not be significant because of the localised need for lighting and the distance of receptors. Visibility of the proposed powerline connection would also not be generally significant, except where it crosses roads.

Table 8: Grootfontein PV and Electrical Grid Infrastructure Viewing Distances and Visibility from Receptors

Viewpoint	Latitude	Longitude	Distance to PV arrays	Distance to powerline	Potential Visibility
S1 Elders Gate	32.937334ºS	19.929514ºE	640 m	-	highly visible
S2 R356 Grootfontein Gate	32.932353ºS	19.934539ºE	855 m	-	highly visible
S3 Kareekolk Gate	32.973741ºS	19.907129ºE	2.28 km	-	moderately visible
S4 Sadawa Gate	32.030539ºS	19.879571ºE	8.44 km	-	beyond effective visibility range
S5 Kalkgat	32.946363ºS	20.049133ºE	7.78 km	-	No Access - not visible - in view shadow
P1 District Road	33.091035ºS	20.025678ºE	-	226 m	highly visible
P2 Witwal Gate	33.025376ºS	20.015431ºE	-	147 m	highly visible
P3 Tooverberg	33.110072ºS	20.032875ºE	-	1.22 km	No Access - marginally visible
P4 Platfontein	33.115838ºS	19.992370ºE	-	1.99 km	visibility obscured by foreground of the Kappa substation
P5 Leeukop se Sand	33.045424ºS	19.943761ºE	-	4.04 km	No Access - marginally visible

Scenic Resources / Sensitive Receptors: (Map 8)

Except for river courses, there are no topographic or scenic features of note in the study area. The general area is sparsely populated, the farmsteads being far apart, and mostly a considerable distance from the proposed SEF projects. Visual sensitivity is therefore low.

Visual Exposure: (Maps 6 and 7)

The viewshed, or zone of visual influence, potentially extends for some 5km, but is partly restricted by low hills to the south, where parts of the surrounding area are in a view shadow. The viewshed (or zone of visual influence) of the proposed solar facilities and power lines tends to be fairly limited.

Landscape Integrity:

The natural landscape intactness of the area has been altered to some extent by the ESKOM Kappa Substation and power lines to the south. Further alteration of the surrounding landscape has taken place through the Perdekraal WEF to the south-east. The clustering of proposed solar facilities would help to minimise visual intrusion in the larger landscape.

Visual Absorption Capacity:

The area around the proposed site is generally flat to gently undulating, with low grass and scrub vegetation and therefore visually exposed, with low visual absorption capacity, i.e. low potential to screen any proposed structures.

The above visual criteria are summarised in Table 9 below in order to determine visual impact **consequence** for the proposed solar facilities, related infrastructure and powerline grid connections. **Significance** is determined by combining consequence with probability as indicated in Figure 6 below.

Table 9: Visual Impact Consequence

Visual Criteria	Comments	Three Solar PV facilities	Related Infrastructure	Three Connecting Powerlines
Visibility of facilities	Distance from receptors is a mitigating factor.	Medium	Medium	Medium
Visibility of lights at night	Distance from receptors is a mitigating factor.	Low	Low	Low
Visual exposure	Limited viewshed. Some areas in a view shadow.	Medium	Medium	Medium
Scenic resources and receptors	No scenic features of note. Receptors are isolated farmsteads.	Low	Low	Low
Landscape integrity	Rural character, with previous disturbance by powerlines and the existing Perdekraal WEF.	Low	Low	Low
Visual absorption capacity	Visually exposed landscape. Low visual absorption capacity.	Medium	Medium	Medium
Consequence	Summary	**Moderate**	**Moderate**	**Moderate**

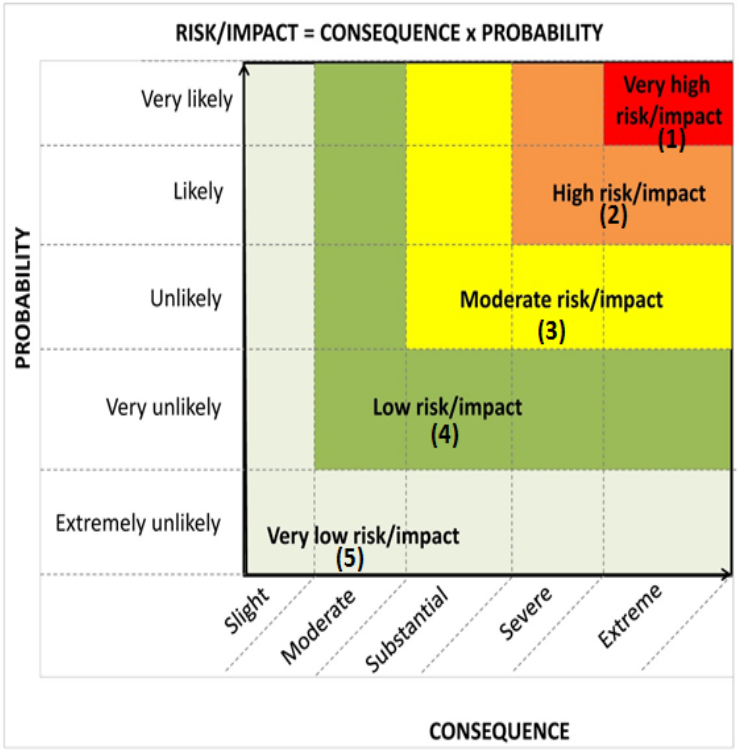


Figure 6: Visual impact Significance in relation to Consequence and Probability

6.1 Grootfontein PV 1, PV 2 and PV 3 Solar Facilities and Associated Buildings

This section includes an assessment of the potential direct and cumulative impacts identified for the Grootfontein PV 1, PV 2 and PV 3 Solar Facilities and Associated Buildings for the construction, operational and decommissioning phases.

6.1.1. Potential Impacts during the Construction Phase

6.1.1.1. Impact 1: Potential effect of dust and noise from trucks and construction machinery during the construction period

This impact relates to the potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on residents and visitors to the area, particularly users of the main arterial route (R356), to the site. This is rated as a negative, direct impact that extends locally and is of a short term duration. The consequence is rated as moderate, and the probability identified as very likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been allocated, such as ensuring the EMPr is implemented during the construction phase via the appointment of an Environmental Control Officer (ECO); and ensuring that construction camp and other facilities are located in visually unobtrusive areas, away from public roads. Section 6.1.1.3 provides an impact summary table.

6.1.1.2. Impact 2: Potential visual effect of haul roads, access roads, stockpiles and construction camps in the exposed landscape.

This impact relates to the potential visual effect of haul roads, access roads, stockpiles and construction camps in the exposed landscape. This is rated as a negative, direct impact with a short term duration and local spatial extent. The consequence and probability are respectively rated as moderate and very likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.1.1.1) apply to Impact 2. Section 6.1.1.3 provides an impact summary table.

6.1.1.3. Impact Summary Table: Construction Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1 and Impact 2 for the construction phase	*Status*	**Negative**	**Low risk (level 4)**	Locate construction camps, batching plants (if required) and stockpiles in visually unobtrusive areas, away from public roads. Implement the EMPr with an ECO during construction.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Moderate**				
	Probability	**Very Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.1.2. Potential Impacts during the Operational Phase

6.1.2.1. Impact 1: Potential visual intrusion of solar arrays and related infrastructure and the impact on receptors, including residents and visitors, as well as game farms in the area.

This impact relates to the potential visual intrusion of solar arrays and related infrastructure and the impact on receptors, including residents and visitors, as well as game farms in the area. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as very likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been identified:

- Locate the O&M buildings in unobtrusive low-lying areas, away from public roads, and/or screened with earth berms where necessary.
- Use muted natural colours and non-reflective finishes for buildings and structures generally.

- Keep internal access roads as narrow as possible, and use existing roads or tracks as far as possible.
- Fit outdoor / security lighting with reflectors to minimise light spillage.
- Locate internal powerlines underground where possible.
- Use discrete outdoor signage and prohibit intrusive commercial or billboard signage.

Section 6.1.2.3 provides an impact summary table.

6.1.2.2. Impact 2: Potential visual impact of an industrial type activity on the rural or wilderness character of the area.

This impact relates to the potential visual impact of an industrial type activity on the rural or wilderness character of the area. This is rated as a negative, direct impact with a long term duration and local spatial extent. The consequence and probability are respectively rated as moderate and very likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.1.2.1) apply to Impact 2. Section 6.1.2.3 provides an impact summary table.

6.1.2.3. Impact Summary Table: Operational Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
OPERATIONAL PHASE						
Impact 1 and Impact 2 – Operational Phase	*Status*	**Negative**	**Low risk (level 4)**	Locate the O&M buildings in unobtrusive low-lying areas, away from public roads, and/or screened with earth berms where necessary. Use muted natural colours and non-reflective finishes for buildings and structures generally. Keep internal access roads as narrow as possible, and use existing roads or tracks as far as possible. Fit outdoor / security lighting with reflectors to minimise light spillage. Locate internal powerlines underground where possible. Use discrete outdoor signage and prohibit intrusive commercial or billboard signage.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Very Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.1.3. Potential Impacts during the Decommissioning Phase

6.1.3.1. Impact 1: Potential visual effect of any remaining structures, platforms and disused roads on the landscape.

This impact relates to the potential visual effect of any remaining structures, platforms and disused roads on the landscape. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been allocated, such as ensuring that the solar arrays are removed

and building structures are recycled or demolished; and that hardened areas and access roads no longer required are ripped and regraded, and that disturbed areas are revegetated or returned to grazing. Section 6.1.3.2 provides an impact summary table.

6.1.3.2. Impact Summary Table: Decommissioning Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
DECOMMISSIONING PHASE						
Impact 1 – Decommissioning Phase	*Status*	**Negative**	**Low risk (level 4)**	Remove solar PV arrays and demolish or recycle building structures for new uses. Rip and regrade hardened platform areas and access roads no longer required. Revegetate or return to grazing exposed or disturbed areas to blend with the surroundings.	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.1.4. Cumulative Impacts

6.1.4.1. Impact 1: Potential combined visual effect of the three Grootfontein solar PV facilities with those of Witte Wall (i.e. two) and Hoek Doornen (i.e. four) within the study area, and other nearby existing and proposed renewable energy farms in the area.

This impact relates to the potential combined visual effect of the nine proposed solar PV facilities within the study area (i.e. two for Witte Wall, three for Grootfontein and four for Hoek Doornen), and other nearby existing and proposed renewable energy farms in the area. This is rated as a negative, cumulative impact for the construction, operational and decommissioning phases. The duration for the impact is rated as short term for the construction and decommissioning phases; and long term for the operational phase. The impacts have been rated with a local spatial extent. The consequence of the impact has been rated as substantial for the operational and decommissioning phases and moderate for the construction phase; and the probability has been rated as likely for the three phases. Without the implementation of mitigation measures, the impact is rated as low significance for the construction phase, and moderate significance for the operational and decommissioning phases. With the implementation of mitigation measures, the significance of this impact is rated as low, moderate and very low significance for the construction, operational, and decommissioning phases, respectively. The mitigation measures are noted in Section 6.1.4.2 below.

6.1.4.2. Impact Summary Tables: Cumulative Impacts

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1	*Status*	**Negative**	**Low risk (level 4)**	Observe EMPr requirements	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
OPERATIONAL PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Observe mitigations in 6.1.2.3 above	**Moderate risk (level 3)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
DECOMMISSIONING PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Observe mitigations in 6.1.3.2 above	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.2. Grootfontein PV 1, PV 2 and PV 3 Electrical Grid Infrastructure and Substations

This section includes an assessment of the potential direct and cumulative impacts identified for the Grootfontein PV 1, PV 2 and PV 3 Electrical Grid Infrastructure and Substations for the construction, operational and decommissioning phases.

6.2.1. Potential Impacts during the Construction Phase

6.2.1.1. Impact 1: Potential effect of dust and noise from construction machinery during the construction of the substation and pylons, and the effect of this on residents and visitors to the area.

This impact relates to the potential effect of dust and noise from construction machinery during the construction of the substation and pylons, and the effect of this on residents and visitors to the area. This is rated as a negative, direct impact that extends locally and is of a short term duration. The consequence is rated as moderate, and the probability identified as very likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been allocated, such as ensuring the EMPr is implemented during the construction phase; and ensuring that construction camps and other facilities are located in visually unobtrusive areas, away from public roads. Section 6.2.1.3 provides an impact summary table.

6.2.1.2. Impact 2: Potential visual effect of access roads, stockpiles and construction camps in the exposed landscape.

This impact relates to the potential visual effect of access roads, stockpiles and construction camps in the exposed landscape. This is rated as a negative, direct impact with a short term duration and local spatial extent. The consequence and probability are respectively rated as moderate and very likely,

rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.2.1.1) apply to Impact 2. Section 6.1.1.3 provides an impact summary table.

6.2.1.3. Impact Summary Tables: Construction Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1 and Impact 2 for the construction phase	*Status*	**Negative**	**Low risk (level 4)**	Locate construction camps and stockpiles in visually unobtrusive areas, away from public roads. Implement the EMPr requirements.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Moderate**				
	Probability	**Very Likely**				
	Reversibility	**Medium**				
	Irreplaceability	**Low**				

6.2.2. Potential Impacts during the Operational Phase

6.2.2.1. Impact 1: Potential visual intrusion of substations and powerlines, and the impact on receptors, particularly where powerlines cross roads.

This impact relates to the potential visual intrusion of substations and powerlines, and the impact on receptors, particularly where powerlines cross roads. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been identified:

- Locate substations in un-obtrusive low-lying areas, away from public roads.
- Avoid powerlines on hillcrests and ridge skylines where possible.
- Use monopoles in preference to lattice pylons.
- Keep maintenance / access roads as narrow as possible, and use existing roads or tracks as far as possible.
- Fit outdoor / security lighting at substations with reflectors to minimise light spillage.

Section 6.2.2.3 provides an impact summary table.

6.2.2.2. Impact 2: Potential visual impact of industrial type activities on the rural or wilderness character of the area.

This impact relates to the potential visual impact of industrial type activities on the rural or wilderness character of the area. This is rated as a negative, direct impact with a long term duration and local spatial extent. The consequence and probability are respectively rated as moderate and likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.2.2.1) apply to Impact 2. Section 6.2.2.3 provides an impact summary table.

6.2.2.3. Impact Summary Tables: Operational Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
OPERATIONAL PHASE						
Impact 1 and Impact 2 – Operational Phase	*Status*	**Negative**	**Low risk (level 4)**	Locate substations in un-obtrusive low-lying areas, away from public roads. Avoid powerlines on hillcrests and ridge skylines where possible. Use monopoles in preference to lattice pylons. Keep maintenance / access roads as narrow as possible, and use existing roads or tracks as far as possible. Fit outdoor / security lighting at substations with reflectors to minimise light spillage.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.2.3. Potential Impacts during the Decommissioning Phase

6.2.3.1. Impact 1: Potential visual effect of any remaining electrical grid structures and disused roads on the landscape.

This impact relates to the potential visual effect of any remaining electrical grid structures and disused roads on the landscape. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is rated as very low significance. Various mitigation measures have been allocated, such as ensuring that the pylons and substation structures are removed and recycled; and that access roads no longer required are ripped and regraded, and that disturbed areas are revegetated or returned to pasture. Section 6.2.3.2 provides an impact summary table.

6.2.3.2. Impact Summary Tables: Decommissioning Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
DECOMMISSIONING PHASE						
Impact 1	*Status*	**negative**	**Low risk (level 4)**	Remove or recycle electrical grid substation and pylons. Rip and regrade access roads no longer required. Revegetate or return to pasture exposed or disturbed areas to blend with the surroundings.	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**local**				
	Duration	**long term**				
	Consequence	**moderate**				
	Probability	**likely**				
	Reversibility	**high**				
	Irreplaceability	**low**				

6.2.4. Cumulative Impacts

6.2.4.1. Impact 1: Potential combined visual effect of the three Grootfontein substations and three connecting powerlines with those of Witte Wall and Hoek Doornen solar PV facilities within the study area, as well as the nearby existing Perdekraal WEF. This would potentially result in the visual effect of nine connecting powerlines to the ESKOM Kappa substation.

This impact relates to the potential combined visual effect of the nine proposed power lines and nine on-site substations within the study area (i.e. two for Witte Wall, three for Grootfontein and four for Hoek Doornen), and other nearby existing and proposed renewable energy farms in the area. It must be noted that it is unlikely that nine power lines will be constructed all the way to the Eskom Kappa Substation. If all nine proposed Ceres PV projects are developed, it is likely that a maximum of four power lines from the project sites (on the farms Witte Wall, Grootfontein and Hoek Doornen) to the Kappa substation will be constructed, realistically (i.e. along Die Brak and Platfontein Farms). However, based on the uncertainties around the future Independent Power Producers bidding process, the requirements of Eskom, and not knowing if and which project will receive preferred bidder status; it is necessary to assess nine power lines to the Kappa Substation so that future lines can be based on this.

The cumulative impact is rated as negative for the construction, operational and decommissioning phases. The duration for the impact is rated as short term for the construction phase; and long term for the operational and decommissioning phases. The impacts have been rated with a local spatial extent. The consequence of the impact has been rated as substantial for the construction, operational decommissioning phases; and the probability has been rated as likely for the three phases. Without the implementation of mitigation measures, the impact is rated as moderate significance for the construction, operational and decommissioning phases. With the implementation of mitigation measures, the significance of this impact is rated as low for construction and operations, and very low significance for the decommissioning phase. The mitigation measures are noted in Section 6.2.4.2 below.

6.2.4.2. Impact Summary Tables: Cumulative Impact

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Combine connecting powerlines from Witte Wall, Grootfontein and Hoek Doornen, where possible. Observe EMPr requirements.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
OPERATIONAL PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Combine connecting powerlines from Witte Wall, Grootfontein and Hoek Doornen, where possible. Observe mitigations in 6.2.2.3 above.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
DECOMMISSIONING PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Observe mitigations in 6.2.3.2 above.	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Long term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

7. Impact Assessment Summary

The overall impact significance findings, following the implementation of the proposed mitigation measures, are shown in Table 10 and Table 11 below for the proposed Grootfontein solar PV facilities and for the electrical grid infrastructure.

Table 10: Overall Impact Significance for Solar PV facilities and Related Buildings (post mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Moderate (level 3)
Cumulative - Decommissioning	Very low (level 5)

Table 11: Overall Impact Significance for Substations and Connecting Powerlines (Post Mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Low (level 4)
Cumulative - Decommissioning	Very low (level 5)

No-go Alternative

In the no-go alternative, there would be no SEFs or additional powerlines and therefore no additional visual intrusion on the rural landscape and on surrounding farmsteads. At the same time no renewable energy would be produced at the site for export to the national grid. The visual significance would therefore be neutral, with neither impacts nor benefits occurring.

Findings

Given the fairly contained footprint of the proposed cluster solar PV facilities, the limited viewshed and the localised visual effects in a remote area, the visual impact significance was found to be **low risk**, and **very low risk** after mitigation in the long term if the solar facilities are decommissioned.

The electrical grid infrastructure would also have a **low risk** significance after mitigation, provided the proposed power lines leading to the ESKOM Kappa Substation to the south of the study area are consolidated. (Although nine power lines have been assessed, in reality a maximum of four power lines from the project sites to the Kappa Substation would be constructed, depending on the bidding process).

Although the potential cumulative visual impacts, when combined with the proposed Witte Wall and Hoek Doornen solar PV clusters, as well as the existing Perdekraal WEF, could result in a semi-industrialised landscape, the proposed solar PV facilities tend to have less visual significance than the larger scale wind farms. It would be important however for power lines to be shared where possible, to avoid the proliferation of these in the exposed landscape.

8. Legislative and Permit Requirements

The National Environmental Management Act (Act No. 107 of 1998, as amended). (NEMA) and the NEMA Environmental Impact Assessment (EIA) Regulations (2014, as amended) apply as the development of the proposed SEFs and associated infrastructure are a listed activity. As the site falls within a gazetted REDZ, a BA is required. The need for a visual assessment has been identified.

The National Heritage Resources Act (Act No. 25 of 1999) (NHRA), and associated provincial regulations, provide legislative protection for natural, cultural and scenic resources, as well as for archaeological and paleontological sites within the study area. This report deals with visual considerations, including scenic resources, which form part of the National Estate. The Visual Assessment would therefore form part of the Heritage Assessment in terms of obtaining the relevant comments from Heritage Western Cape.

Other than the above legislation, there are no specific policies or guidelines for visual and scenic resources for the Western Cape. The Guideline for Involving Visual and Aesthetic Specialists in EIA Processes, by the Provincial Government of the Western Cape, was used as a general guide.

The South African Civil Aviation Authority (SACAA) has an Obstacle Notice 4/2017 requiring solar project applications to be accompanied by a Glint and Glare Impact Assessment Report with relevance to aviation. There is an airstrip at Sadawa, which is about 8.5km away (as discussed in the VIA for the Hoekdoornen projects), and it is only occasionally used for small aircraft, therefore no Glint and Glare Impact Assessment is considered necessary.

9. Environmental Management Programme Inputs

Planning and Design Phase

Ensure that visual management measures are included as part of the EMPr, monitored by an ECO, including the siting of the construction camps and material stockpiles in visually unobtrusive positions in the landscape, away from public roads.

Construction Phase Monitoring:

Implement dust suppression and litter control measures, as well as rehabilitation of borrow pits (if required) and haul roads to minimise their visual effect on the surroundings. Ensure regular reporting to an environmental management team by the ECO during the construction phase.

Operation Phase Monitoring:

Ensure that visual mitigation measures are monitored by management on an on-going basis, including the control of signage, lighting and wastes on the site by the appointed Environmental Manager.

Decommissioning Phase Monitoring:

Ensure that procedures for the removal of structures and stockpiles during the decommissioning phase are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard as prescribed in a rehabilitation plan, and signed off by the delegated authority.

10. Final Specialist Statement and Authorisation Recommendation

10.1. Statement and Reasoned Opinion

The proposed cluster of Grootfontein PV 1, PV 2 and PV 3 solar facilities form part of a larger solar energy project, which includes the Witte Wall and Hoek Doornen clusters. These fall within the Komsberg REDZ, and would form part of a larger group of renewable energy facilities concentrated near the ESKOM Kappa substation.

The generally flat terrain is visually exposed with the result that structures and pylons can be seen for several kilometres. However, there are no major scenic features of note, and the main receptors, being surrounding farmsteads, are spread fairly far apart, and except for the Elders homestead, are mostly more than 5km distance from the proposed solar facilities and connecting powerlines. This means that visibility of the proposed solar facilities and powerlines is generally low, (hardly visible to not visible from the farmsteads).

Taking into account the relatively low structures and the local scale of the proposed solar facilities and related infrastructure located in a fairly remote area, the visual impact significance was considered to be **low** before and after mitigation, and **low** before and after mitigation for the connecting powerlines

for the construction and operational phases. The visual landscape could be restored after potential decommissioning of the Solar PV facilities and the power lines which means the visual significance would be **very low** with mitigation for this phase.

The potential cumulative visual impact for the cluster of three solar facilities, in combination with the proposed Witte Wall and Hoek Doornen clusters, as well as the existing Perdekraal WEF would increase to **moderate** both before and after mitigation during the operational phase, as the landscape becomes more semi-industrialised. The fact that the ESKOM Kappa substation and power lines already occur in the area needs to be taken into account.

The potential cumulative visual impact for the electrical grid infrastructure of all the clusters (Witte Wall, Grootfontein and Hoek Doornen), could be high in the unlikely event that all nine connecting power lines to the Kappa substation are built, but in reality only a maximum of four power lines would be constructed. This would reduce the significance to **moderate** before mitigation and **low** after mitigation if the connecting power lines are shared. (See Figure P4 photomontage).

10.2. EA Condition Recommendations

Key visual management actions include locating the substations and other buildings, as well as construction camps, in unobtrusive (generally low-lying) positions in the landscape away from public roads. The Karoo landscape is particularly fragile and therefore new access roads and disturbance generally should be kept to a minimum for both the proposed solar facilities and connecting power lines. Connecting power lines should be shared where possible, to avoid a plethora of power lines in the exposed landscape.

There are no fatal flaws from a visual perspective arising from the proposed project, and given the marginal nature of agriculture in the area, the solar energy project is probably an inherently suitable land use that should receive authorisation, provided the mitigation measures are implemented as a condition of approval.

References

CSIR, August 2020. Terms of Reference for Specialist Studies for the Basic Assessments for proposed development of Solar Voltaic Facilities and Associated Electrical Grid Infrastructure, near Touws River, Western Cape.

Department of Environmental Affairs, 2015. Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa. CSIR Report Number: CSIR/CAS/EMS/ER/2015/0001/B. Stellenbosch.

Lawson, Q. and Oberholzer, B. 2014. National Wind and Solar PV SEA Specialist Report: Landscape Assessment, with CSIR for Department of Environmental Affairs.

Mucina, L. and Rutherford, M.C. (eds) 2006.The Vegetation of South Africa, Lesotho and Swaziland. *Strelizia* 19. SANBI, Pretoria.

Oberholzer, B. 2005. Guideline for Involving Visual and Aesthetic Specialists in EIA Processes: Edition 1 CSIR Report No. ENV-S-C 2005 053 F. Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning.

Appendix A - Specialist Expertise

Quinton Lawson Architect (qarc)

Qualifications:
Bachelor of Architecture (Univ. of Natal 1977)

Professional registration/membership:
Professional member of the SA Council for the Architectural Profession (SACAP), reg. no. 3686.
Member of the Cape Institute for Architects and SA Institute of Architects.
B-BBEE Status: Level 4.

Quinton has practiced as a professional architect since 1978, specialising in architectural and urban design, environmental design and computer visualisation.

He was one of the founding partners of Meirelles Lawson Architects formed in 1988, initially specialising in economic and sustainable housing. He was a senior partner at MLB Architecture and Urban Design, with specialist expertise in visual modelling and design solutions.

In the past he has been a visiting lecturer at UCT teaching a post-graduate course on Computer Techniques in Landscape Architecture, including visualisation and visual assessment techniques.

Together with BOLA, Quinton has been involved in numerous visual impact assessments over a number of years, and previously served on the Impact Assessment Review Committee of Heritage Western Cape.

Bernard Oberholzer Landscape Architect + Environmental Planner (BOLA)

Qualifications:
Bachelor of Architecture (UCT 1970), Master of Landscape Architecture (U. of Pennsylvania 1975)

Professional registration/membership:
Professional member of the SA Council for the Landscape Architectural Profession (SACLAP), reg. no. 87018.
Fellow of the Institute of Landscape Architects of South Africa.
B-BBEE Status: Level 4.

Bernard has 40 years of experience as a professional landscape architect, specialising in, environmental planning, coastal planning, urban landscape design and visual assessments.

He is currently an independent consultant, and was for 7 years the Convenor of the Master of Landscape Architecture Programme at UCT.

He has presented papers on *Visual and Aesthetic Assessment Techniques*, and provides specialist services as a reviewer of visual impact studies prepared by other firms.

He is the author of *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes,* prepared with the CSIR for the Dept. of Environmental and Development Planning, Provincial Government of the Western Cape, 2005.

Bernard has been involved in numerous land use suitability studies and visual assessments for a wide range of projects, and serves as a member of the Stanford Heritage Committee.

Bernard and Quinton were joint authors of the visual specialist chapters for the National Wind and Solar SEA and National Electricity Grid Infrastructure SEA, with the CSIR, for the Department of Environmental Affairs.

Appendix B - Specialist Statement of Independence

We, Quinton Lawson and Bernard Oberholzer, declare that –

- We act as the independent specialist in this application;
- We will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- We declare that there are no circumstances that may compromise our objectivity in performing such work;
- We have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- We will comply with the Act, Regulations and all other applicable legislation;
- We have no, and will not engage in, conflicting interests in the undertaking of the activity;
- We undertake to disclose to the applicant and the competent authority all material information in our possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by us for submission to the competent authority;
- all the particulars furnished by us in this form are true and correct; and
- We realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialists:

Name of Companies: qarc and bola

Date: 09 October 2020

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Basic Assessments for the Proposed Development of three 175 MW Solar Photovoltaic Facilities and associated Electrical Grid Infrastructure (i.e. Grootfontein 1; Grootfontein 2; and Grootfontein 3), near Touws River, Western Cape

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	BOLA			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	5	Percentage Procurement recognition	
Specialist name:	Bernard Oberholzer			
Specialist Qualifications:	BArch MLArch			
Professional affiliation/registration:	SACAP			
Physical address:	16 Caledon St, Stanford			
Postal address:	PO Box 471 Stanford			
Postal code:	7210	Cell:	028 341 0264	
Telephone:	083 513 5696	Fax:		
E-mail:	bernard.bola@gmail.com			

2. DECLARATION BY THE SPECIALIST

I, B. Oberholzer, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

BO

Signature of the Specialist

BOLA

Name of Company:

26/04/2020

Date

3. **UNDERTAKING UNDER OATH/ AFFIRMATION**

I, B. Oberholzer, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

BJO

Signature of the Specialist

BOLA

Name of Company

26 Oct 2020

Date

Signature of the Commissioner of Oaths

26 Oct 2020

Date

COMMISSIONER OF OATHS
KARIN T. SFREDDO
9/1/8/2 PRETORIA (A14)
805 STANZA BOPAPE STR. ARCADIA 0083

Karin Sfreddo

Appendix C: Site Sensitivity Verification

Prior to commencing with the specialist assessment in accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

The details of the site sensitivity verification are noted below:

Date of Site Visit	27 August 2020
Specialist Name	Quinton Lawson and Bernard Oberholzer
Professional Registration Number	SACAP 3686, SACLAP 87018
Specialist Affiliation / Company	qarc and bola

The site sensitivity verification was undertaken using the following means:

(a) desk top analysis, using satellite imagery;
(b) preliminary on-site inspection; and
(c) a range of other available / relevant information included in Section 2.1 of this Report.

A screening report was compiled by the CSIR (20/8/2020) using the DEFF Screening Tool. The Report includes a 'Map of Relative Landscape (Solar) Theme Sensitivity', based on mapping prepared for the Phase 1 Wind and Solar SEA by the CSIR for DEFF in 2015 (DEA, 2015). The study area falls within the Komsberg REDZ.

The current visual sensitivity mapping included in Section 4 of this Visual Impact Assessment is in greater detail (at the site scale) for the proposed solar photovoltaic (PV) and electrical grid infrastructure study area, taking into account detailed viewshed mapping and local site conditions. This mapping largely confirms the mapping contained in the DEFF Screening Tool, but provides more detail. Refer to Section 4 of the Visual Impact Assessment for a motivation and evidence of the verified use of the land and environmental sensitivity.

Appendix D: Impact Assessment Methodology

The following impact assessment methodology was used in this VIA:

The impact assessment includes:

- *the nature, significance and consequences of the impact and risk;*
- *the extent and duration of the impact and risk;*
- *the probability of the impact and risk occurring;*
- *the degree to which impacts and risks can be mitigated;*
- *the degree to which the impacts and risks can be reversed; and*
- *the degree to which the impacts and risks can cause loss of irreplaceable resources.*

As per the DEFFT 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 have been rated in terms of the direct, indirect and cumulative:

- *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.*

The impact assessment methodology includes the following aspects:

- *Nature of impact/risk - The type of effect that a proposed activity will have on the environment.*

- *Status - Whether the impact/risk on the overall environment 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 not be affected.*

- *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);*
    - *National; or*
    - *International (e.g. Greenhouse Gas emissions or migrant birds).*

- *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)).*

- *Consequence – The anticipated consequence of the risk/impact:*
    - *Extreme (extreme alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they permanently cease);*
    - *Severe (severe alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*
    - *Substantial (substantial alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*
    - *Moderate (notable alteration of natural systems, patterns or processes, i.e. where the environment continues to function but in a modified manner); or*

- *Slight (negligible alteration of natural systems, patterns or processes, i.e. where no natural systems/environmental functions, patterns, or processes are affected).*

- *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).*

- *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).*

Using the criteria above, the impacts have been further assessed in terms of the following:

- *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).*

To determine the significance of the identified impact/risk, the consequence is multiplied by probability (qualitatively as shown in Figure D1).

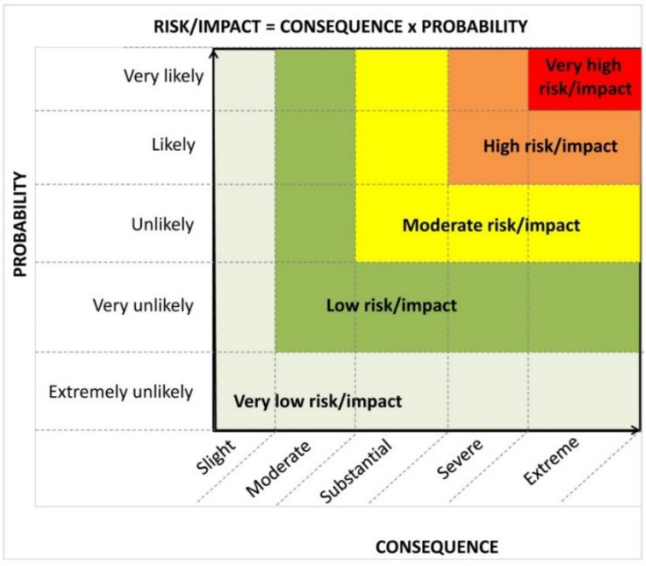


Figure D1. Guide to assessing risk/impact significance as a result of consequence and probability.

- *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.*

Confidence – The degree of confidence in predictions based on available information and specialist knowledge:

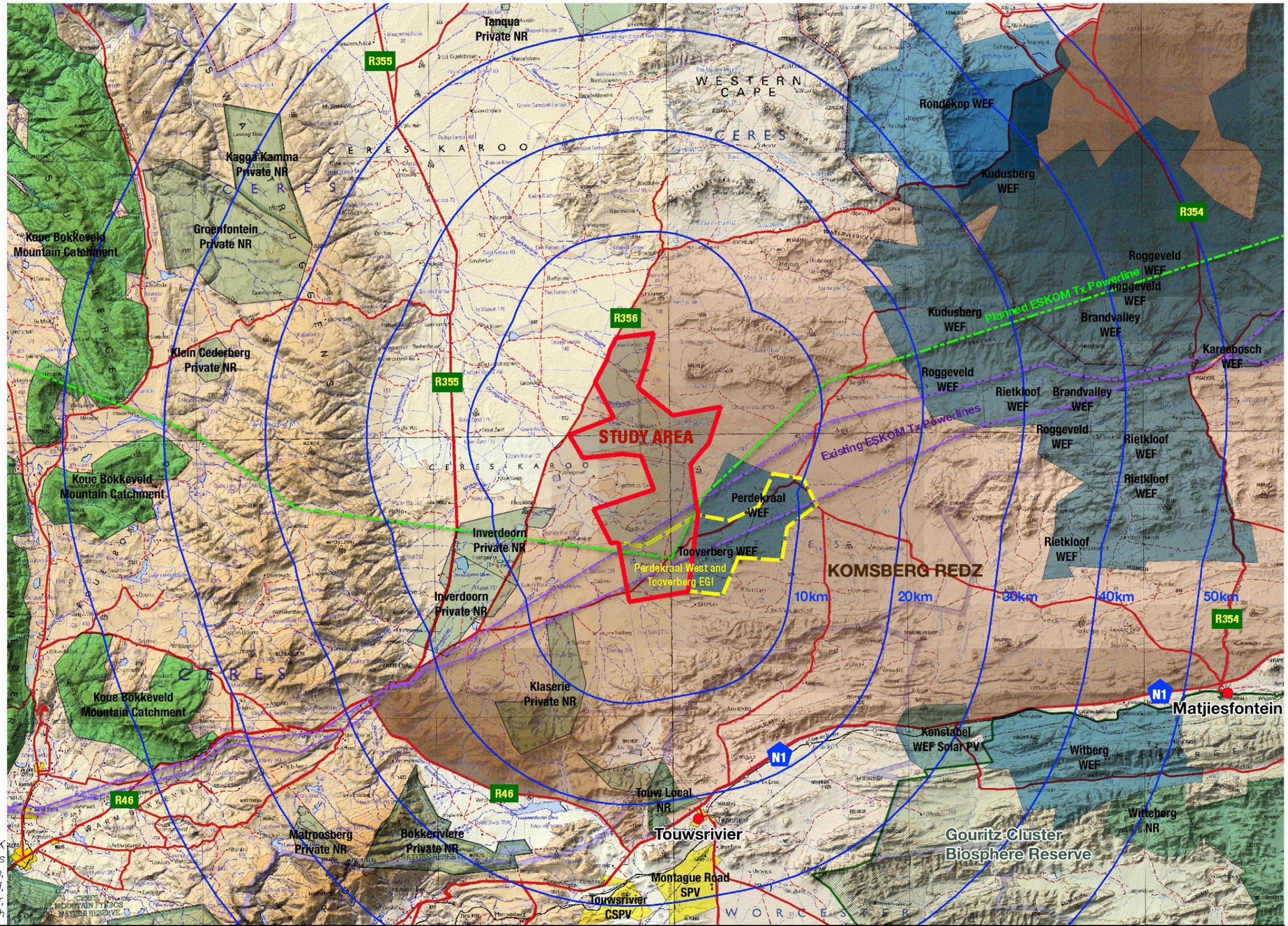
- *Low;*
- *Medium; or*
- *High.*

Appendix E: Compliance with the Appendix 6 of the 2014 EIA Regulations (as amended)

Requirements of Appendix 6 (Specialist Reports) of Government Notice R326 (Environmental Impact Assessment (EIA) Regulations of 2014, as amended)	***Section where this has been addressed in the Specialist Report***
1. (1) A specialist report prepared in terms of these Regulations must contain - *a) details of -* *i. the specialist who prepared the report; and* *ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;*	*Section 1.2 and Appendix A*
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	*Appendix B* *And Attachment*
c) an indication of the scope of, and the purpose for which, the report was prepared;	*Section 1.1 and Section 1.3*
(cA) an indication of the quality and age of base data used for the specialist report;	*Section 2.1*
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	*Section 4 and Section 5*
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	*Section 2*
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	*Section 2*
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	*Section 4.2 and Section 4.3*
g) an identification of any areas to be avoided, including buffers;	*Section 4.2 and Section 4.3*
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	*Maps 8 and 9*
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	*Section 2.2*
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	*Section 6 and Section 7*
k) any mitigation measures for inclusion in the EMPr;	*Section 6 and Section 9*
l) any conditions for inclusion in the environmental authorisation;	*Section 10.2*
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	*Section 6 and Section 9*
n) a reasoned opinion- *i. whether the proposed activity, activities or portions thereof should be authorised;* *(iA) regarding the acceptability of the proposed activity or activities; and* *ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;*	*Section 10*
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	*Section 2.3 and Section 5.2, and Refer to the Draft BAR*
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	*Not applicable at this stage. Report to still be released for public comment. Refer to Draft BAR*
q) any other information requested by the competent authority.	*Refer to EAP*
(2) Where a government notice by the Minister provides for any protocol or	*Section 4.3.1. and Appendix*

Requirements of Appendix 6 (Specialist Reports) of Government Notice R326 (Environmental Impact Assessment (EIA) Regulations of 2014, as amended)	***Section where this has been addressed in the Specialist Report***
minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	*C* *Part A of the Assessment Protocols published in GN 320 on 20 March 2020 are applicable.*

MAPS



base map : NGI 1:250K Topo-Cadastral Series 3218 Clanwilliam, 3220 Sutherland, 3319 Worcester, 3320 Ladismith

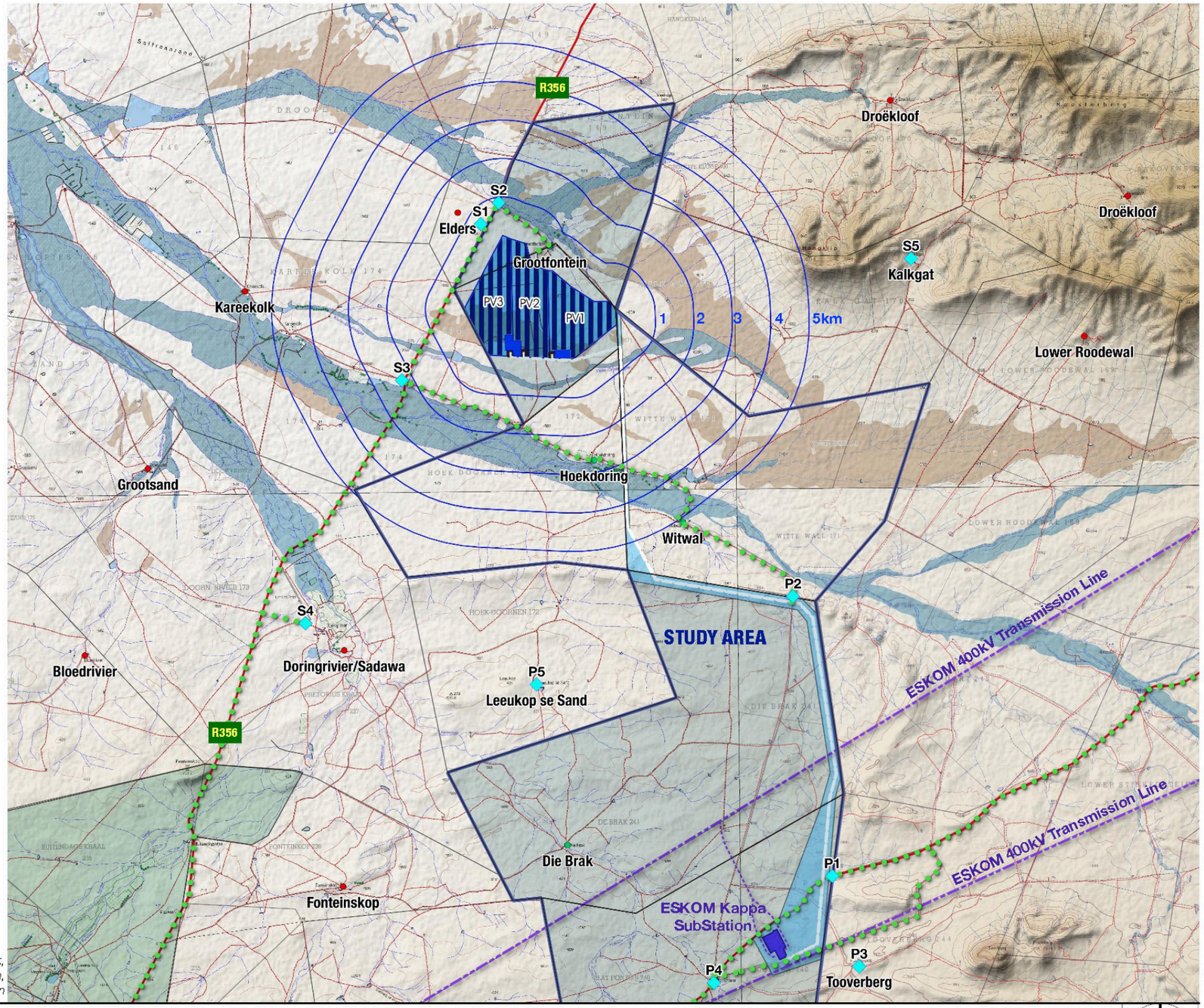
map 1 : Regional Context • Cumulative Renewable Energy Facilities

0 10 20 30 40 50 km

1:350 000 @ A3

LOCAL CONTEXT LEGEND :

- Solar PV Area
- 3x 132kV Powerlines within Corridor
- FieldTrack Route
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 2 : Local Context • Fieldwork, Viewpoints, Existing Infrastructure, ESKOM Transmission Lines

0 1 2 3 4 5 km

1:100 000 @ A3

GEOLOGY LEGEND :

Q : Alluvium

Pa : Beaufort Group, Escourt Formation (mudstone, sandstone)

Pko : Ecca Group, Koedoesberg Formation (sandstone, shale)

Pk : Ecca Group, Kookfontein Formation (shale)

Ps : Ecca Group, Skoorsteen Formation (shale, sandstone)

Pt : Ecca Group, Tierberg Formation (shale)

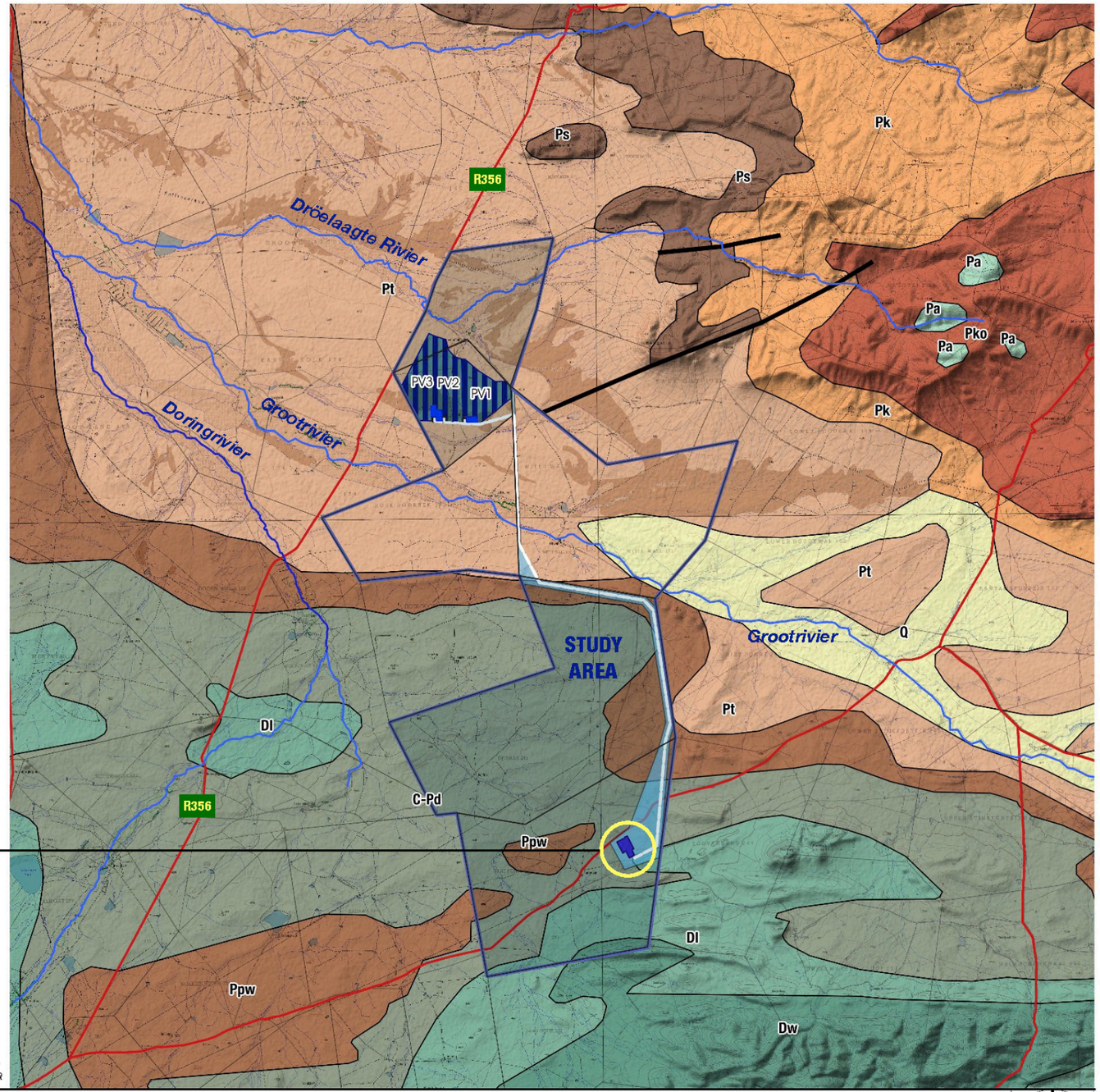
Ppw : Ecca Group, Prince Albert F./ Whitehill F. (shale, carbonaceous shale)

C-Pd : Dwyka Formation (tillite, sandstone, mudstone)

Dl : Witteberg Group, Kommadagga F./ Lake Mentz F. (shale, sandstone)

Dw : Witteberg Group, Witpoort F./ Weltevrede F. (quartzitic sandstone, shale)

ESKOM Kappa SubStation



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB, Inverdoorn, 3320AA Brewelsfontein : Council for Geoscience : RSA 1:1M Geological Spatial Data

map 3 : Geology

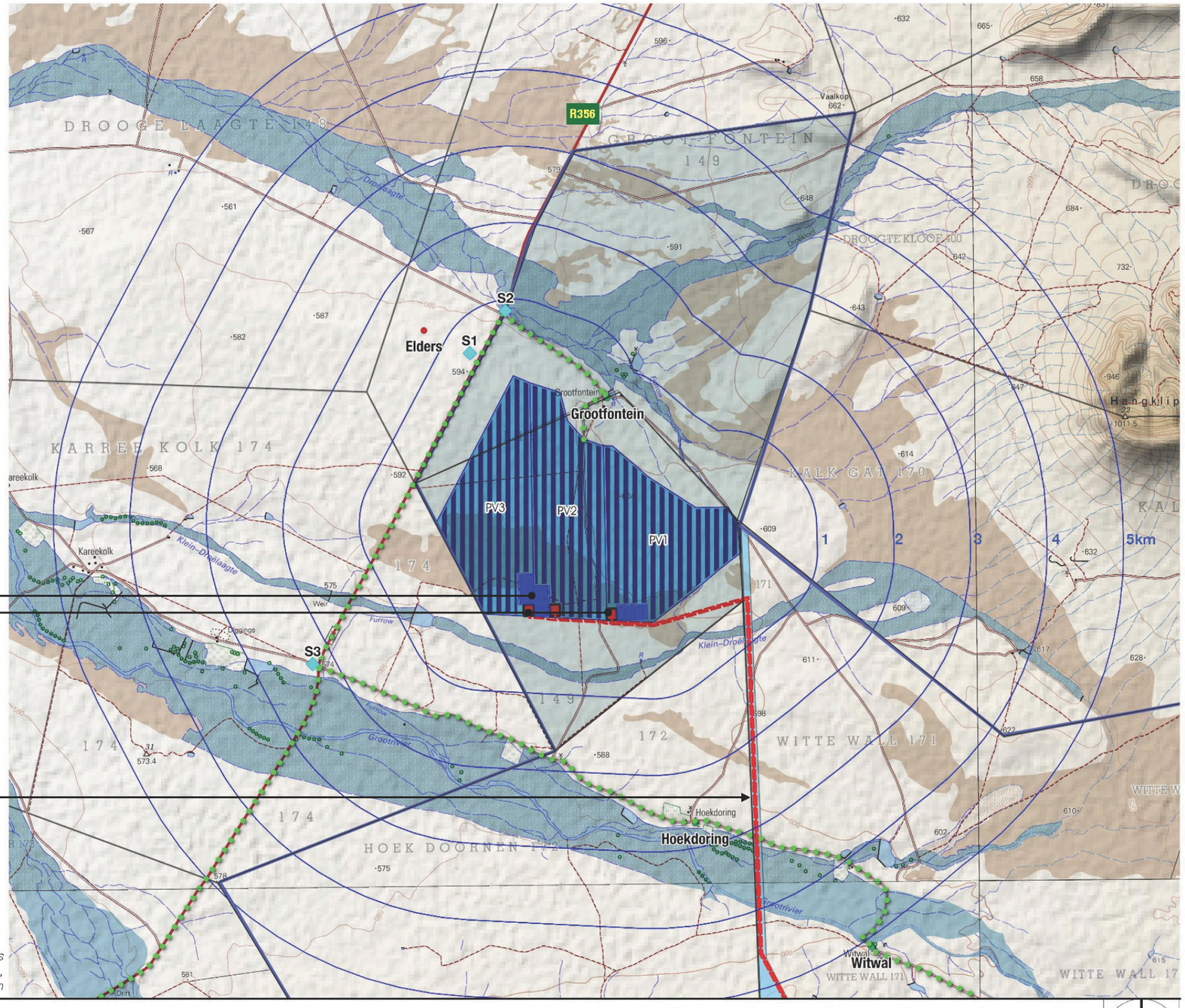
LEGEND :

- Grootfontein PV1, PV2 and PV3
- FieldTrack Route
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area

Battery Energy Storage Systems

PV3, 2 and 1 SubStations

Grootfontein 3x 132kV Overhead Powerlines



base map : NGI 1:50K Topographic Series
3219DD Kareekolk, 3220CC Pienaarsfontein,
3319BB Inverdoorn, 3320AA Brewelsfontein

map 4 : Project Layout • Grootfontein PV1, PV2 and PV3 Solar Arrays max 10m High

0 1 2 3 4 5 km

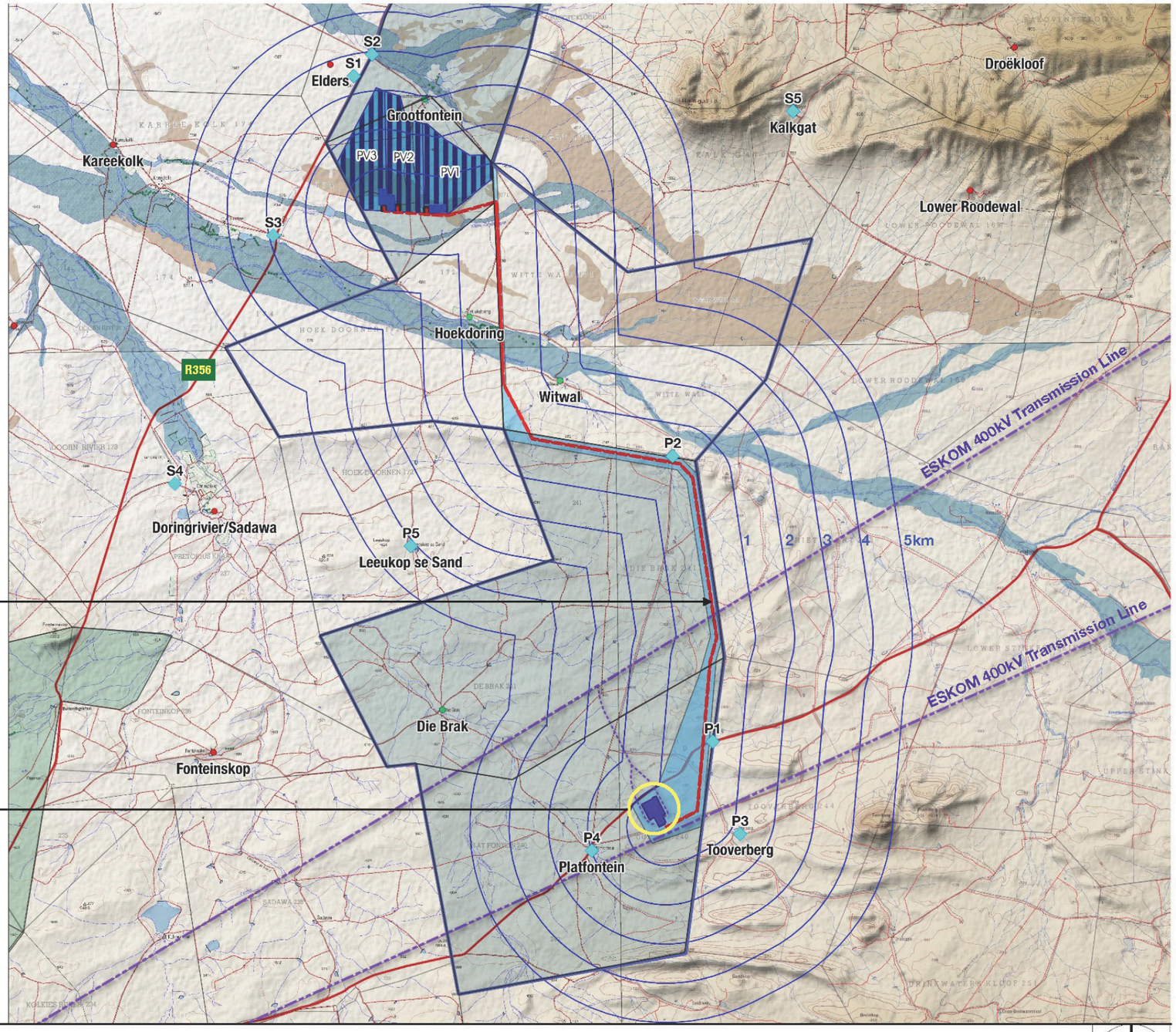
1:50 000 @ A3

LEGEND :

- Grootfontein PV1, PV2 and PV3
- FieldTrack Route
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area

Grootfontein 3x 132kV Overhead Powerlines within Servitude Corridor

ESKOM Kappa SubStation



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 5 : Project Layout • Grootfontein PV1, PV2 and PV3 132kV Powerlines max 30m High

0 1 2 3 4 5 km
1:100 000 @ A3

Viewshed Legend :

High Visibility

Medium Visibility

Low Visibility

No Visibility (View Shadow)

LEGEND :

PV1 Grootfontein PV1, PV2 and PV3

S4 S Viewpoints

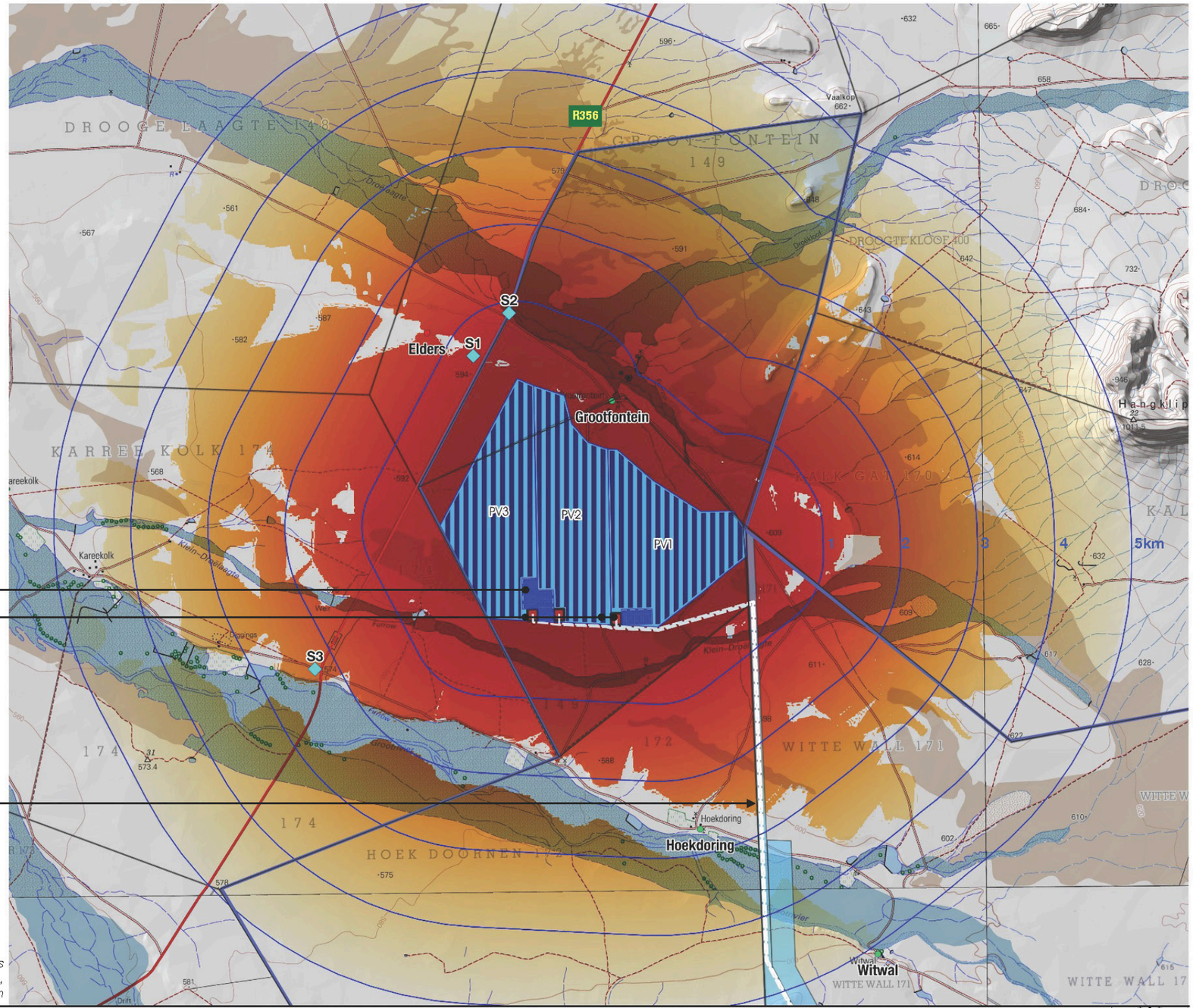
Die Brak Farmsteads within Study Area

Elders Farmsteads outside Study Area

Battery Energy Storage Systems

PV3, 2 and 1 SubStations

Grootfontein 3x 132kV Overhead Powerlines



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 6 : Viewshed • Grootfontein PV1, PV2 and PV3 Solar Arrays max 10m High

0 1 2 3 4 5 km

1:50 000 @ A3

Viewshed Legend :

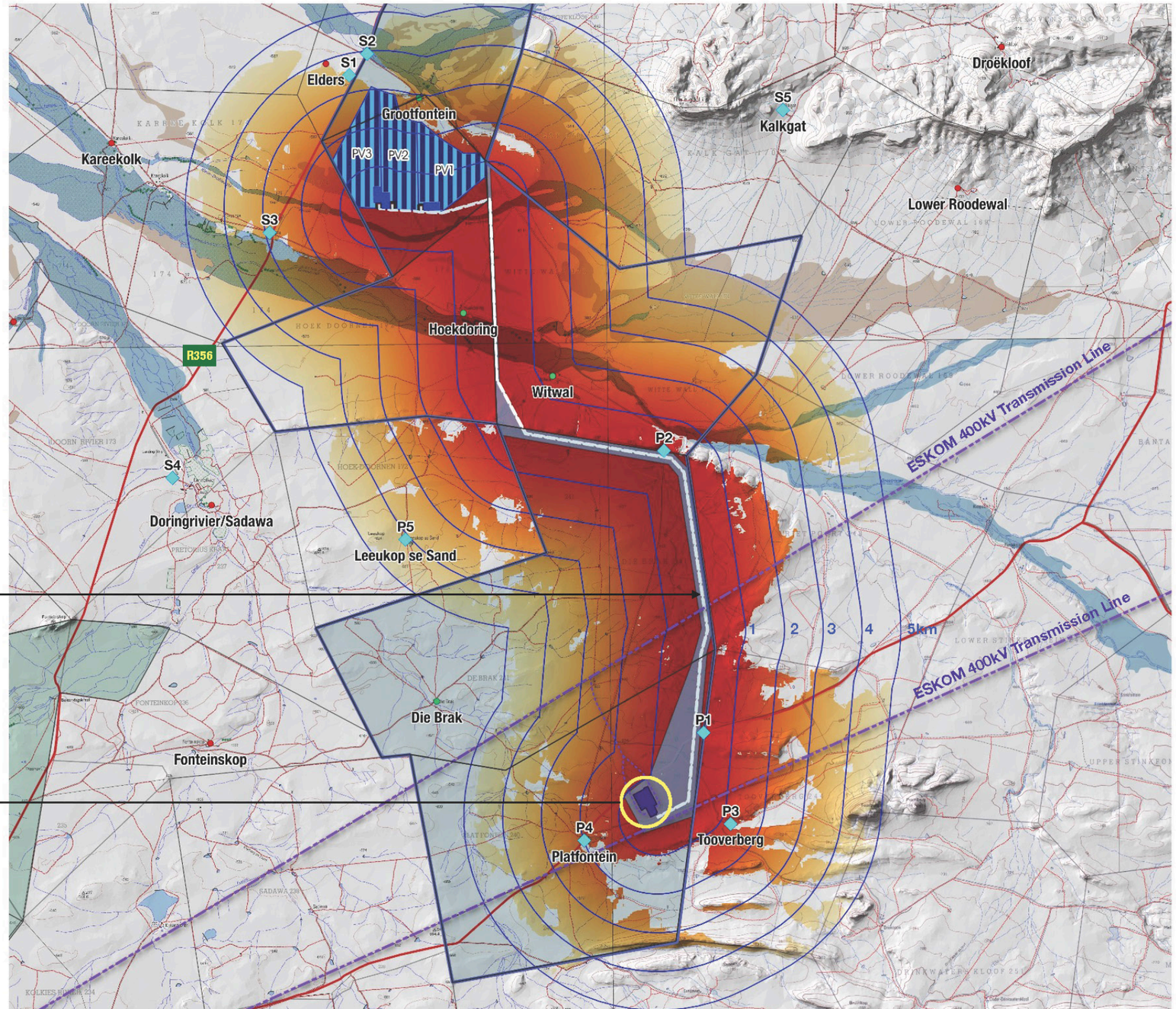
- High Visibility
- Medium Visibility
- Low Visibility
- No Visibility (View Shadow)

LEGEND :

- PV1 — Grootfontein PV1, PV2 and PV3
- S4 S — Viewpoints
- Die Brak — Farmsteads within Study Area
- Elders — Farmsteads outside Study Area

Grootfontein 3x 132kV Overhead Powerlines within Servitude Corridor

ESKOM Kappa SubStation



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

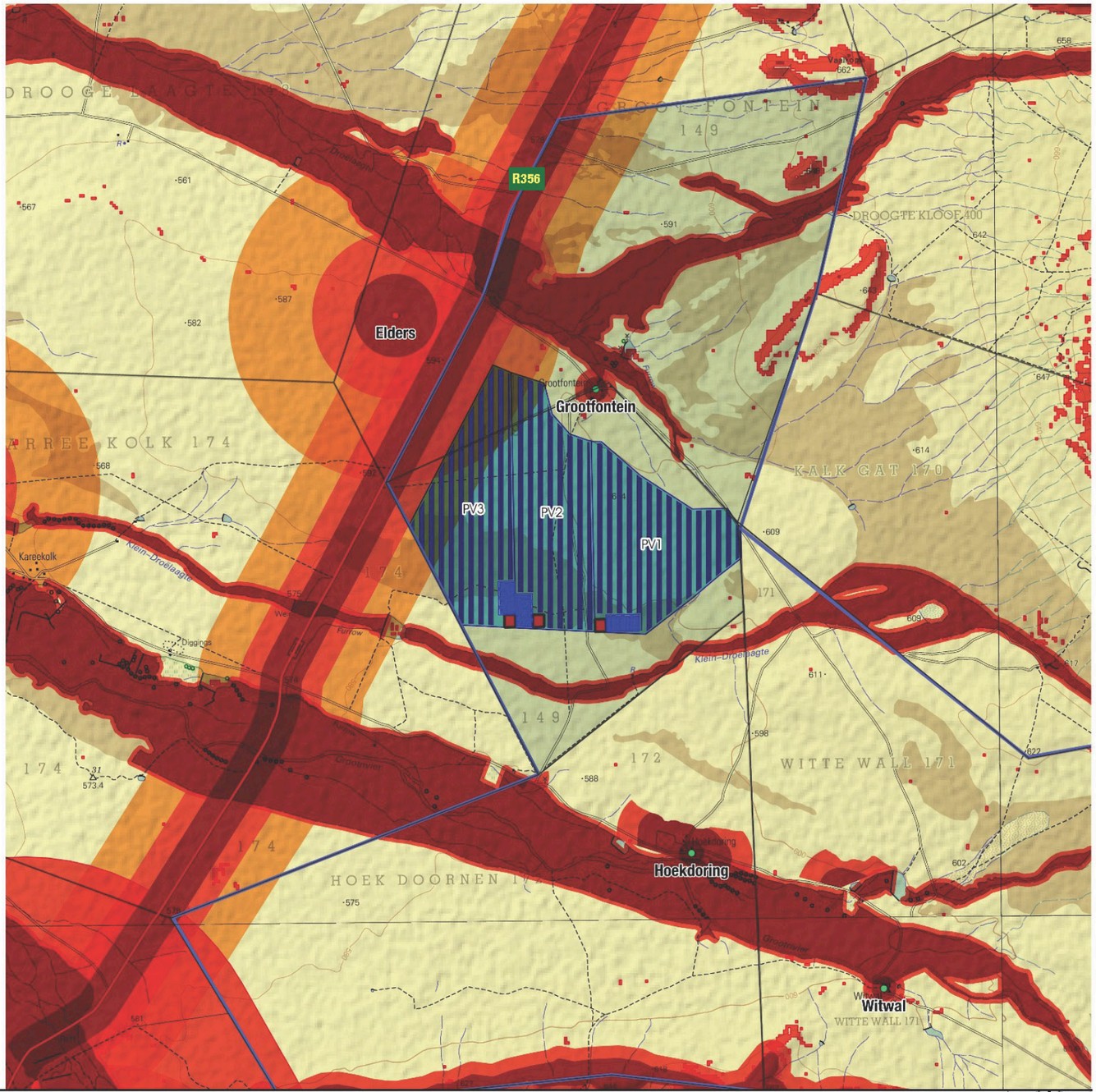
map 7 : Viewshed • Grootfontein PV1, PV2 and PV3 132kV Powerlines max 30m High

0 1 2 3 4 5 km
1:100 000 @ A3

VISUAL SENSITIVITY LEGEND :

- VERY High (NoGo) Sensitivity
- High Sensitivity
- Medium Sensitivity
- Low Sensitivity

(See Table 5 for buffer distances)



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 8 : Visual Sensitivity • Grootfontein PV1, PV2 and PV3

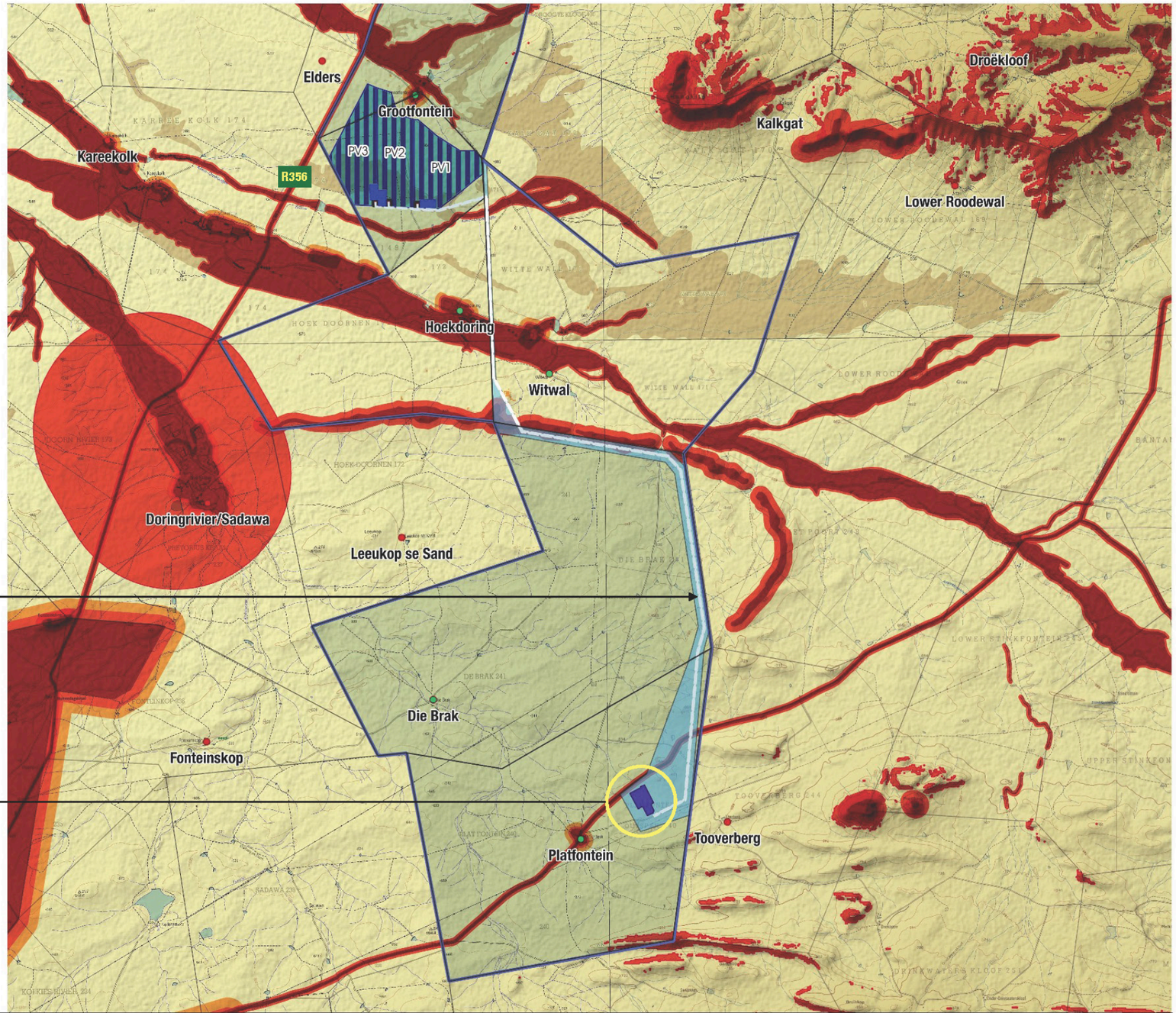
0 2.5 5 7.5 10 km

1:50 000 @ A3

VISUAL SENSITIVITY LEGEND :

- VERY High (NoGo) Sensitivity
- High Sensitivity
- Medium Sensitivity
- Low Sensitivity

(See Table 6 for buffer distances)



Grootfontein 3x 132kV Overhead Powerlines within Servitude Corridor

ESKOM Kappa SubStation

base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

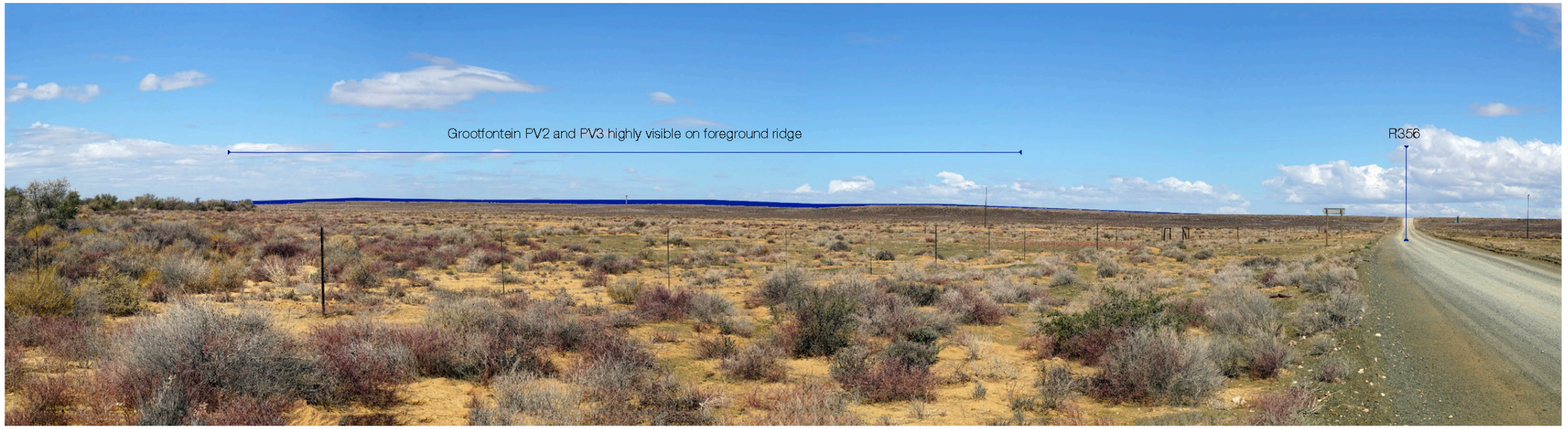
map 9 : Visual Sensitivity • Grootfontein Connecting Power Lines 3x 132kV max 30m High

0 1 2 3 4 5 km

1:100 000 @ A3

***Viewpoint S1** : looking East from Elders Farm Gate*

Location 32.937334°S 19.929514°E Distance 640m



***Viewpoint S1** : looking South-East from R356 at Grootfontein Boundary*

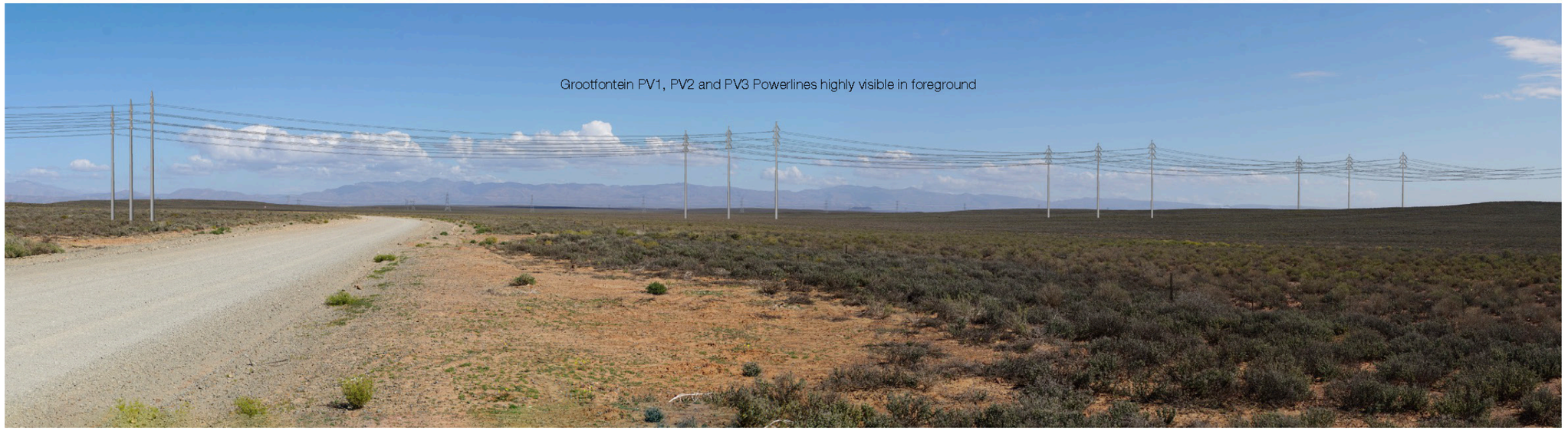
Location 32.932353°S 19.934539°E Distance 855m

Figure P1 : Photomontages • Grootfontein PV1, PV2 and PV3 : SPV Viewpoints

***Viewpoint S3** : looking North-East from Kareekolk Gate*

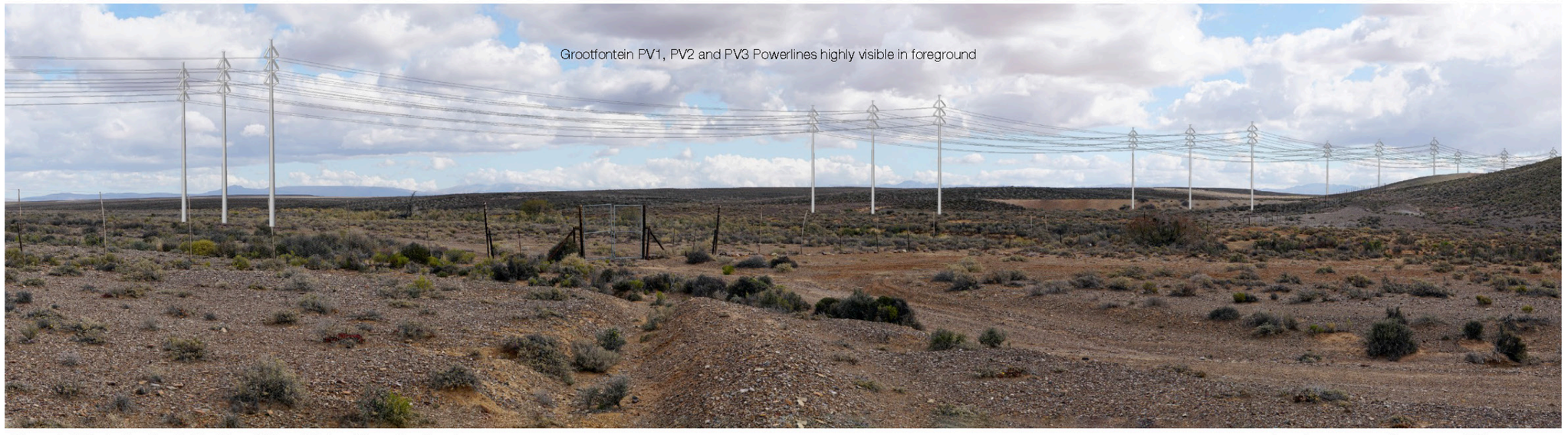
Location 32.973741°S 19.907129°E Distance 2.28km

Figure P2 : Photomontages • Grootfontein PV1, PV2 and PV3 : SPV Viewpoints



***Viewpoint P1** : looking West from District Road at Powerline Crossing*

Location 33.091035°S 20.025678°E Distance 226m



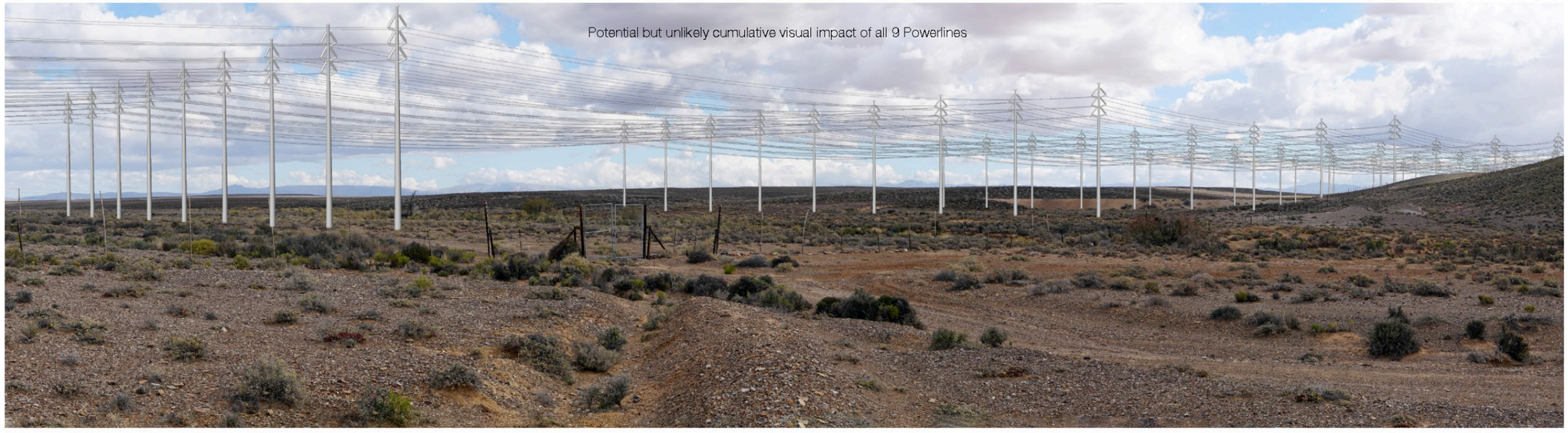
***Viewpoint P2** : looking South-West from Wittewall Gate at Powerline Crossing*

Location 33.025376°S 20.015431°E Distance 147m

Figure P3 : Photomontages • Grootfontein : Powerline Viewpoints P1 and P2

***Viewpoint P1** : looking West from District Road at Powerline Crossing*

Location 33.091035°S 20.025678°E Distance 195m

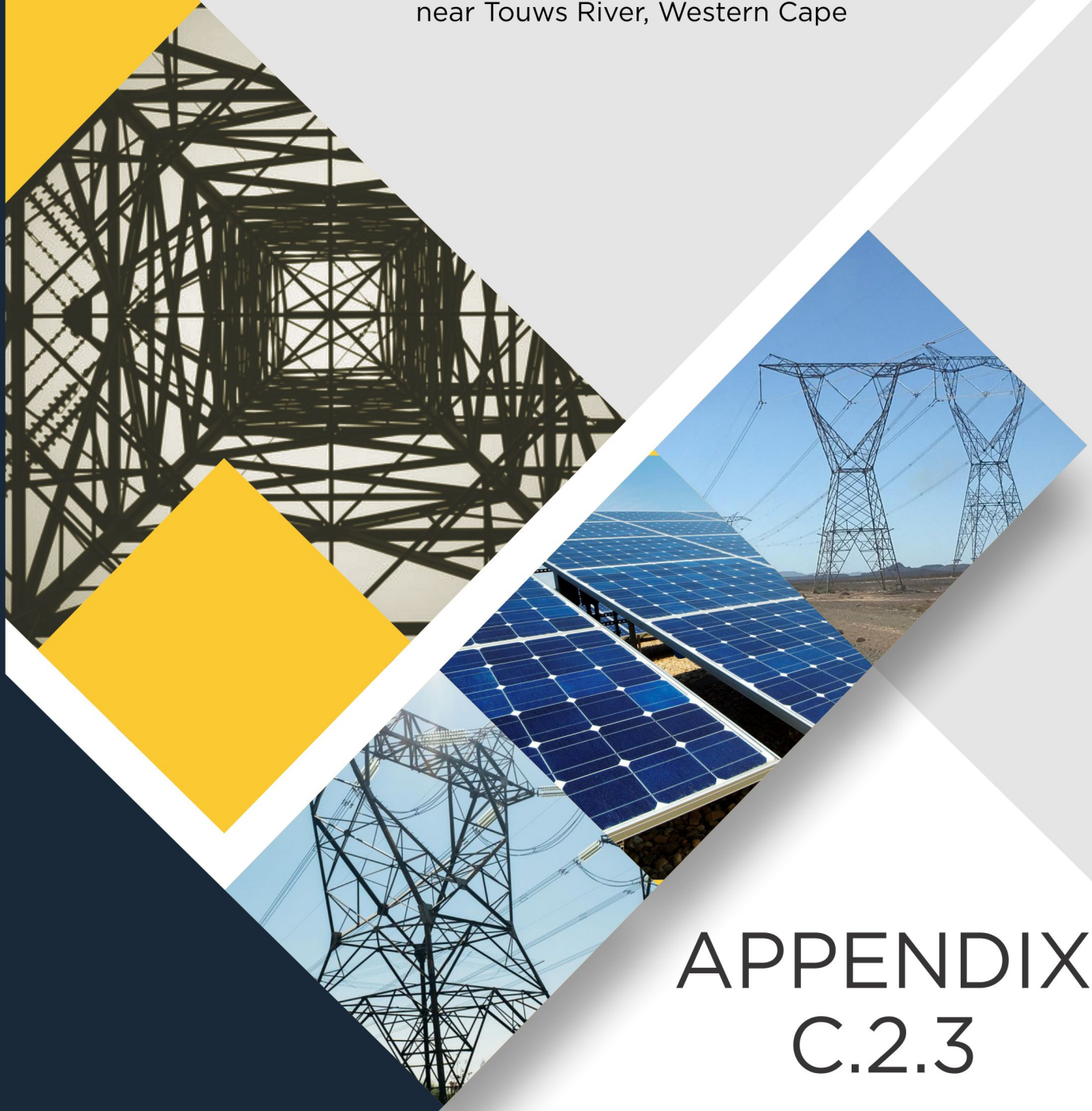


***Viewpoint P2** : looking South-West from Wittewall Gate at Powerline Crossing*

Location 33.025376°S 20.015431°E Distance 116m

Figure P4 : Photomontages • Powerline Viewpoints P1 and P2 showing all 9 potential 132kV powerlines

Basic Assessment for the Proposed Development of Electrical Grid Infrastructure to support the proposed nine 175 MW Solar Photovoltaic Facilities and associated Infrastructure (i.e. Witte Wall PV 1, Witte Wall PV 2, Grootfontein PV 1, Grootfontein PV 2, Grootfontein PV 3, Hoek Doornen PV 1, Hoek Doornen PV 2, Hoek Doornen PV 3, and Hoek Doornen PV 4), near Touws River, Western Cape



APPENDIX C.2.3

Visual Impact Assessment for Hoek Doornen

VISUAL SPECIALIST ASSESSMENT: Report 3

Visual Impact Assessment for the Proposed Development of four 175 MW Solar Photovoltaic Facilities (Hoek Doornen PV 1, PV 2, PV 3 and PV 4), and associated Electrical Grid Infrastructure near Touws River, Western Cape

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Report prepared for:	*Report prepared by:*
CSIR – Environmental Management Services	Quinton Lawson and Bernard Oberholzer
P O Box 320 Stellenbosch 7599 South Africa	8 Blackwood Drive, Hout Bay 7806 PO Box 471 Stanford 7210 Western Cape South Africa

Version 1: October 2020
Version 2: November 2020

Executive Summary

The proposed cluster of Hoek Doornen solar Photovoltaic (PV) facilities (PV 1, PV 2, PV 3 and PV 4) form part of a larger solar energy project, which includes the Grootfontein and Witte Wall solar PV clusters. These fall within the Komsberg Renewable Energy Development Zone (REDZ), and would form part of a larger group of proposed and existing renewable energy facilities concentrated near the existing ESKOM Kappa substation.

The generally flat terrain is visually exposed with the result that structures and pylons can be seen for several kilometres. However, there are no major scenic features of note, and the main receptors, being surrounding farmsteads, are spread fairly far apart, mostly more than 5km distance from the proposed solar facilities and connecting powerline. This means that visibility of the proposed Solar Energy Facilities (SEFs) and powerlines is low, (hardly visible to not visible from the farmsteads).

Taking into account the relatively low structures and the local scale of the proposed solar facilities and related infrastructure located in a fairly remote area, the visual impact significance was considered to be **low** before and after mitigation, as well as **low** before and after mitigation for the connecting powerlines (for the construction and operational phases). The visual landscape could be restored after potential decommissioning which means that the visual significance would be **very low** with mitigation for this phase, (see tables below).

The potential cumulative visual impact for the cluster of four solar PV facilities (Hoek Doornen PV 1, PV 2, PV 3 and PV 4), in combination with the proposed Witte Wall and Grootfontein solar PV clusters (respectively composed of two and three PV facilities), as well as the existing Perdekraal Wind Energy Facility (WEF) would increase to **moderate** significance, both before and after mitigation for the operational phase, as the landscape becomes more semi-industrialised. The fact that the ESKOM Kappa substation and power lines already occur in the area needs to be taken into account.

The potential cumulative visual impact for the electrical grid infrastructure of all the clusters (Witte Wall (PV 1 and PV 2) Grootfontein (PV 1, PV 2 and PV 3), and Hoek Doornen (PV 1, PV 2, PV 3 and PV 4), could be **moderate** if four connecting power lines to the Kappa substation are built, but would reduce to **low** if the connecting power line is shared (for the operational phase).

Therefore, given the fairly contained footprint of the proposed cluster solar PV facilities, the limited viewshed and the localised visual effects in a remote area, the overall visual impact significance for both the PV facilities and the power lines was found to be **low risk** with the implementation of mitigation measures, and **very low risk** after mitigation in the long term if the solar facilities are decommissioned.

Overall Impact Significance for Solar PV facilities and Related Buildings (post mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Moderate (level 3)
Cumulative - Decommissioning	Very low (level 5)

Overall Impact Significance for Substations and Connecting Powerlines (Post Mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Low (level 4)
Cumulative - Decommissioning	Very low (level 5)

Key visual management actions include locating the substations and other buildings, as well as construction camps, in unobtrusive positions in the landscape away from public roads. The Karoo landscape is particularly fragile and therefore new access roads and disturbance should be kept to a minimum for both the proposed solar facilities and connecting power lines. Connecting power lines should be shared where possible, to avoid a plethora of power lines in the exposed landscape. (It is understood that separate power lines to Kappa have to be assessed due to the bidding requirements and uncertainties).

There are no fatal flaws from a visual perspective arising from the proposed projects, and given the marginal nature of agriculture in the area, the solar energy projects are probably an inherently suitable land use that should receive authorisation from a visual perspective, provided the mitigation measures are implemented as a condition of approval.

Contents

List of Figures

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List of Abbreviations

BA	Basic Assessment
BAR	Basic Assessment Report
CAA	Civil Aviation Authority
DEFF	Department of Environment, Forestry and Fisheries
DEM	Digital Elevation Model
EIA	Environmental Impact Assessment
EGI	Electricity Grid Infrastructure
EMPr	Environmental Management Programme
GN	Government Notice
GPS	Global Positioning System
NEMA	National Environmental Management Act (Act 107 of 1998, as amended)
NFEPA	National Freshwater Ecosystem Priority Areas
O&M	Operations and maintenance
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
REEA	Renewable Energy EIA Application Database
SACAA	South African Civil Aviation Authority
SACAD	South African Conservation Areas Database
SACAP	South African Council for the Architectural Profession
SACLAP	South African Council for the Landscape Architectural Profession
SAPAD	South African National Protected Areas Database
SEA	Strategic Environmental Assessment
SEF	Solar energy facility
SRTM	Shuttle Radar Topography Mission
VIA	Visual Impact Assessment
WEF	Wind energy facility

Glossary

Definitions	
Receptor	Individuals, groups or communities who are subject to the visual influence of a particular project
Viewpoint	A selected point in the landscape from which views of the project are ascertained
Viewshed	The outer boundary defining a view catchment area, used to determine the zone of visual influence.
View shadow	An area within the view catchment visually obscured from the project, usually by topography.
Visual absorption capacity	The ability of an area to visually absorb development by means of screening topography, vegetation or buildings.

1. Introduction

1.1. Scope, Purpose and Objectives of the Visual Specialist Report

The Visual Impact Assessment (VIA) is one of several specialist studies being carried out as part of the Basic Assessments (BAs) for the proposed development of four Solar Photovoltaic (PV) Facilities and associated Electrical Grid Infrastructure (i.e. Hoek Doornen PV 1, PV 2, PV 3 and PV 4), near Touws River, Western Cape.

The Applicant is proposing to develop nine solar PV facilities and nine power lines and associated infrastructure to link the PV facilities to the Eskom Kappa Substation. Two PV facilities are being proposed on the farm Witte Wall 171; three PV Facilities are being proposed on the farm Grootfontein 149; and four PV Facilities will be constructed on the Farm Hoek Doornen 172. This VIA deals with the Hoek Doornen projects.

The VIA includes an assessment of potential visual impacts and risks associated with the proposed solar energy facilities (SEFs) and provides recommended mitigations to minimise potential visual impacts. These are used to inform the siting and layout of the project. The VIA also includes related infrastructure, such as the powerline grid connections and substations, which form part of the BAs.

1.2. Details of the Visual Specialists

The visual specialist assessment has been undertaken by Quinton Lawson, Architect, registered with the South African Council for the Architectural Profession (SACAP), reg. no. 3686, and by Bernard Oberholzer, Landscape Architect, registered with the SA Council for the Landscape Architectural Profession (SACLAP), reg. no. 87018.

Curriculum vitae are included in Appendix A of this specialist assessment, and a signed specialist statement of independence is included in Appendix B.

1.3. Terms of Reference

- Determine Site Sensitivity Verification Requirements in terms of Government Gazette 43110, Government Notice (GN) 320, and provide a Site Sensitivity Verification Report, including a site visit in order to identify the level of sensitivity assigned to the project area on the Screening Tool, and to verify and confirm this sensitivity and land-use.
- Prepare a description and mapping baseline of the visual and scenic resources and sensitivity of the study area, including viewsheds and recommended buffers, in GIS format.
- Provide review input on the preferred infrastructure layout following the sensitivity analysis.
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a visual perspective, both without and with mitigation, for the construction, operational and decommissioning phases of the project.
- Prepare schematic portrayals of the potential visual impact of the proposed project infrastructure.
- Identify any protocols, legal and permit requirements that are relevant to this project and the implications thereof.
- Provide recommendations with regards to potential monitoring programmes.
- Determine mitigation and/or management measures which could be implemented to reduce the effect of negative impacts and enhance the effect of positive impacts.
- Identify best practice management actions, monitoring requirements, and rehabilitation guidelines to be included in the Environmental Management Programme (EMPr).

- Incorporate and address visual issues and concerns raised by Stakeholders, Competent Authorities, Interested and Affected Parties (I&APs) and the public during the Public Participation Process.

2. Approach and Methodology

The methodology involved a number of standard procedures including those in the 'Guideline for Involving Visual and Aesthetic Specialists' (Oberholzer, B. 2005), including the following steps:

- A baseline survey of existing scenic resources and visual characteristics of the study area was made, including desktop work and field observations.
- A photographic survey included views from potentially sensitive receptor locations. A number of cameras were used to record features and determine the Global Positioning System (GPS) coordinates and compass direction of viewpoints.
- View corridors / routes and important viewpoints / receptors were mapped in relation to the proposed SEFs.
- Distance radii from the proposed SEFs were mapped to determine its potential visibility from the identified viewpoints.
- The viewsheds of the proposed SEFs and connecting powerlines were mapped to determine their zones of visual influence as well as those areas in a view shadow.
- Photomontages were constructed from selected viewpoints using panoramic photographs taken in the field, along with digital terrain modelling and superimposing a 3D model of the proposed SEFs. The montages gave a realistic impression of the proposed SEFs from the identified viewpoints at a range of distances.
- The potential visibility, zone of visual influence and photomontages of the proposed SEFs provided a quantitative measure of visual impact intensity.
- Existing vegetation cover, land uses, topographic features and general intactness of the landscape, along with the overall 'sense of place' provided a qualitative measure of visual impact intensity.
- Potential impacts identified in the visual specialist study have been assessed based on the criteria and methodology outlined in Appendix D.
- The site inspection was carried out over a full day on 27 August 2020 by two principal visual specialists. The season was not a consideration, nor had any effect on carrying out a visual assessment. Clear visibility was required for the photographic survey.

2.1. Information Sources

Base data used in the visual assessment is listed in Table 1 below. Although some of the information has not been updated for a few years, the quality of the data was considered adequate for the purpose of this assessment.

Table 1: Information Sources

Data / Information	Source	Date	Type	Description
Topo-Cadastral information	Chief Directorate: National Geospatial Information	Various dates	1:250 000 raster maps	Used for base mapping.
Topographic information	Chief Directorate: National Geospatial Information	Various dates	1:50 000 raster maps	Used for base mapping.
Elevational Data	Chief Directorate: National Geospatial Information	Various dates	Spatial Vector Dataset	RSA 5m Contour Data
Geological information	Council for Geoscience	2011	Spatial Vector Dataset	1:1 000 000 Geological Map of South Africa

Data / Information	Source	Date	Type	Description
Digital Elevation Model (DEM)	Shuttle Radar Topography Mission (SRTM)	2014	Elevational information (Raster)	1 arcSEC 30m
South African National Protected Areas Database (SAPAD)	Department of Environment, Forestry and Fisheries (DEFF)	2020, Q2	Spatial Vector Dataset	Spatial delineation of protected areas in RSA. Updated quarterly.
South African Conservation Areas Database (SACAD)	DEFF	2020, Q2	Spatial Vector Dataset	Spatial delineation of conservation areas in RSA. Updated quarterly.
Renewable Energy EIA Application Database (REEA)	DEFF	2020, Q2	Spatial Vector Dataset	Location of wind and solar renewable energy applications.
National Freshwater Ecosystem Priority Areas (NFEPA)	SANBI	2017	Spatial Vector Dataset	Spatial delineation of rivers and wetlands.
National Heritage Sites Inventory Database	SAHRA	2017	Spatial Vector Dataset	Location of classified heritage sites in SA.
Electricity Grid Infrastructure (EGI) Dataset	ESKOM	2018	Spatial Vector Dataset	Transmission line routes and Substations in RSA.
Airport, Airfields and Obstacle Datasets	Civil Aviation Authority (CAA)	2018	Spatial Vector Dataset	Location of airfields in RSA.

2.2. Assumptions, Knowledge Gaps and Limitations

Other projects in the surrounding area (within a 30km radius) that have been considered for cumulative impact assessment, are indicated on Map 1, believed to be the latest information.

No detailed layouts, heights or type of solar PV arrays were available during the preparation of the visual assessment, but a worst-case scenario of 10m height for the arrays and similarly for the battery storage systems was used in the visual modelling. The internal layout is not considered a visual concern.

No details of building finishes, or the location of construction camps, were available at this stage, and provided the mitigation measures are adhered to, this should not have any effect on the visual significance ratings.

2.3. Consultation Processes Undertaken

No consultation has taken place for this visual assessment to date and it is anticipated that any visual issues will be identified in the Socio-Economic Impact Assessment and the Public Participation Process, and that these will be addressed in the final BA Report.

3. Description of Project Aspects relevant to the Visual Assessment

The Project Applicant is proposing to design, construct and operate the Hoek Doornen solar PV cluster, consisting of four solar PV power generation facilities, north of Touws River in the Western Cape Province. Two other adjacent PV clusters, (Grootfontein with 3 facilities and Witte Wall with 2 facilities), are also being assessed. Each solar PV facility will have associated infrastructure, including an on-site substation and will connect to the Eskom Kappa Substation to the south via a dedicated 132 kV power line, (see Maps 1 and 2).

Each Solar PV plant will have a footprint of about 250 hectares, along with an approximately 300 m wide corridor for the power lines. Visual sensitivity maps, prepared during the Screening Phase, were used to identify the best locations for the 250 hectare PV areas and related infrastructure. Facilities that could have visual implications are listed in Table 2 below. It must be noted that the specifications

provided in Table 2 apply to a single PV facility and are the same for Hoek Doornen PV 1, PV 2, PV 3 and PV 4, unless where specified. A general layout of the project and route taken during the field trip, are indicated on Map 2.

Table 2: Description of Proposed Hoek Doornen PV Cluster with four SEFs

Facility	Extent/Footprint	Height	Comments
SEF project area	Maximum 250 ha, including internal roads for each PV project. However, with access roads leading to the PV site, the total footprint will be approximately 260 ha.	n/a	175 MW capacity
Solar PV arrays	Single axis, fixed axis, dual axis, fixed tilt options, or bifacial panels.	Max. 10m	Galvanised steel and aluminium mounting structures.
Offices	1 000m^2	Max. 7m	
Operations and maintenance control centre	500m^2	Max. 7m	
Warehouse/workshop	500m^2	Max. 7m	
Ablution facilities	50m^2	Max. 7m	
Converter/inverter stations	2 500m^2	2,5 - 7m	
Onsite substation and/or switching station for each PV plant	20 000m^2	Max. 7m	Pylons up to 30m high
Battery energy storage systems (BESS) for each of the 4 solar projects	Up to 8 ha within the laydown area	5 – 10m	Lithium ion battery containers
Guard house	40m^2	Max. 3m	
Internal powerlines	33kV	9m	Above ground/ underground. If underground, they will have a maximum depth of about 1.6 m.
Internal service roads and service road below power line	4m wide	n/a	Gravel surface.
Access roads	4 - 8m wide	n/a	Gravel surface. A gravel road running through Hoek Doornen PV4 will also be re-routed to the south and east of the PV area.
Water storage tanks	10 000 litre tanks x20	3m	At O&M buildings during the operational phase.
Security fencing	Perimeter and internal security fencing.	2 - 3m	Either palisade, mesh or fully electrified.
Security Lighting	To be determined		Only at substation, O&M buildings and BESS.
132kV overhead powerline to Kappa Substation	33m wide servitude.	22,5 – 30m	Corridor approximately 300m wide and 20 - 23km long (power lines range from 18 – 20 km long).
Construction phase laydown area	Approximately 13 ha		Temporary construction camp and area for construction materials.

The potential visual effect of the SEFs and the associated electrical grid infrastructure could include the following:

- The visibility of the SEFs from a number of surrounding farms and routes in the area, given the relatively flat and open nature of the Karoo landscape.
- The industrial character of the SEFs, which would have an effect on the prevailing pastoral sense of place of the local region, typified by its general remoteness and wildness.
- The potential effect on tourism in the area, particularly where guest accommodation or hunting facilities are offered.
- The additional visual clutter of power lines across the landscape, adding to the existing ESKOM power lines to the south.

4. Baseline Environmental Description

4.1. General Description

The general character and landscape features of the receiving environment are described below, and in the photographic illustrations. The descriptions in this Section apply to all four solar PV facilities, being the Hoek Doornen PV 1, PV 2, PV 3 and PV 4 facilities, associated infrastructure and electrical grid infrastructure.

4.2. Project Specific Description

Location (Map 1)
The project site for all four proposed SEFs lies at the southern end of the Tanqua Karoo, also known in this section as the Ceres Karoo. Touws River and Ceres are the nearest towns, both being about 60km away by road. Access to the site is via the R356 gravel road and smaller farm gravel roads. The ESKOM Kappa Main Substation is located on the district road to the south, with existing powerlines running parallel with the road.

Geology (Map 3)
The geology of the project site consists of shale of the Tierberg Formation, which forms part of the Ecca Group of rocks within the Karoo Sequence (Council for Geoscience). The soft shales of the Tierberg Formation have been eroded by the Doring, Groot and Droëlaagte Rivers to form a broad, flat valley. More resistant sandstones give rise to the surrounding mountains, while alluvium occurs along the drainage courses. The larger study area to the south (where the proposed powerlines will run) consists of Dwyka Formation tillite, sandstone and mudstone. The geology determines the topography and therefore the scenic characteristics of the site and surroundings. (See Figures 1, 2 and 3 below).

Physical Landscape (Maps 4 and 5)
The site is surrounded to the west by the Swartruggens mountains, to the south by the Bontberg and to the north-east by the prominent Roosterberg. The relatively flat eroded plain is a semi-arid landscape, being in the rain-shadow of the surrounding mountains. The relatively even topography presents few physical constraints for development, the only major feature being the broad dry drainage course of the Groot River.

Vegetation
The vegetation type of the arid plains is classified as *Tanqua Karoo (SKv5)*, consisting of sparse low succulent shrubland on the Dwyka tillite and Ecca shales. The *Tanqua Wash Riviere* type (AZi7) is also a sparse vegetation occurring on the alluvial deposits of the sheet-wash plains, (Mucina and Rutherford, 2006). Acacia thorn trees are confined to the drainage courses, which are dry for most of the year. Copses of mainly exotic trees, provide shelter (and visual screening) around farmsteads. Succulent vygies were in flower during the site visit in late August.

Land Use

The relatively low rainfall and sparse vegetation limit the agricultural potential to mainly extensive grazing, including sheep, interspersed with game farms. Crops are confined to the minor patches of deeper soils along drainage courses or where irrigation is available.

Farms tend to be large in area in order to be viable for sheep or game farming, with farmsteads being on average 5 to 10km apart. Inverdoorn, which has tourist accommodation, and Klaserie Private Nature Reserve are about 10km from the site. Wittewal is a game farm used for hunting, while Sadawa (Doringrivier farm) offers guest accommodation. These and other receptors are indicated on Map 2.

The ESKOM Kappa substation is located about 12km to the south of the site. The substation and ESKOM 400kV power lines, together with the existing Perdekraal wind farm to the south-west have already resulted in visual intrusions in the local area.

Figure 1: Hoek Doornen landscape looking south-west

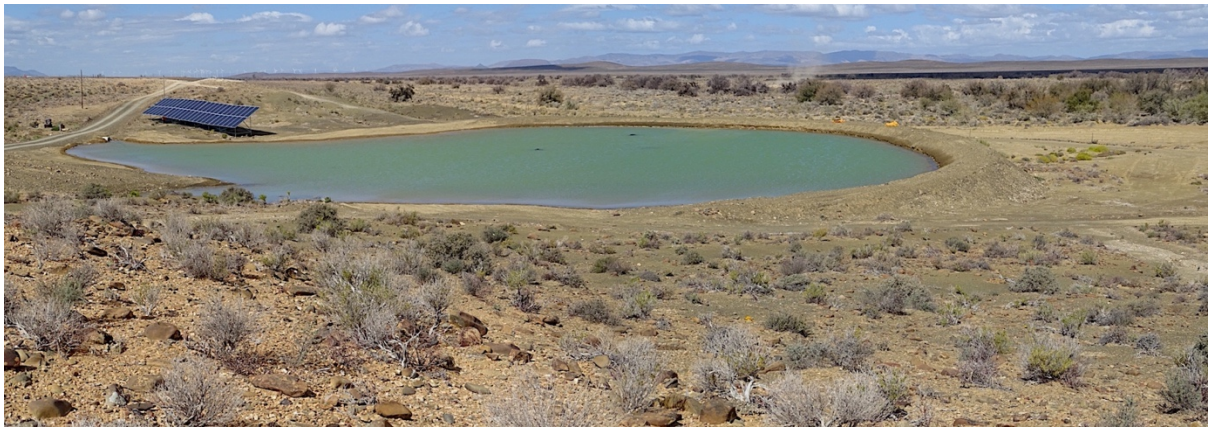

Figure 2: Farm dam in the area

Figure 3: Hoek Doornen dwelling

4.3. Identification of Environmental Sensitivities

4.3.1. Sensitivities identified by the National Web-Based Environmental Screening Tool

The visual sensitivities identified in this Section apply to the cluster of all four solar facilities proposed for Hoek Doornen, associated buildings and electrical grid infrastructure.

A screening report was compiled by the CSIR (20/8/2020) using the Department of Environment, Forestry and Fisheries (DEFF) Screening Tool based on the assessed area for all nine solar PV facilities and electrical grid infrastructure. The Screening Report includes a 'Map of Relative Landscape (Solar) Theme Sensitivity', indicated in Figure 4 below. This would have been based on mapping prepared for the Wind and Solar Strategic Environmental Assessment (SEA) by the CSIR for the DEFF in 2015 (DEA, 2015). The Screening Tool shows that the site for the proposed Hoek Doornen PV 1, PV 2, PV 3 and PV 4 facilities only has small areas of medium to very sensitivity (which the actual layout of the PV facilities largely avoid); and that the corridor for the power lines has sensitivities ranging from medium to very high. The study area falls within the Komsberg Renewable Energy Development Zone (REDZ).

The current visual sensitivity mapping undertaken in this VIA is in greater detail at the site scale for the proposed solar PV facilities and electrical grid infrastructure, and takes into account detailed viewshed mapping and local site conditions, as indicated on Figure 5.

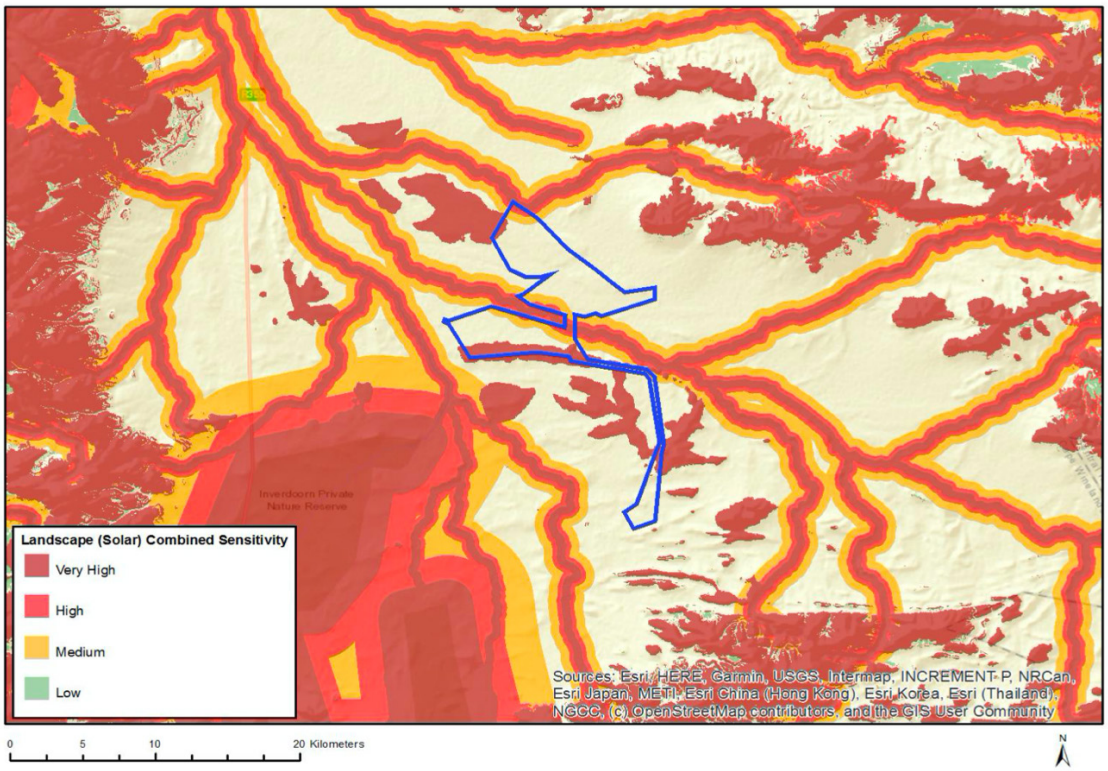

Figure 4: DEFF Screening Tool for the Landscape Theme

4.3.2. Specialist Sensitivity Analysis and Verification

The specific sensitivity of the site related to the four Hoek Doornen PV facilities, associated structures and electrical grid infrastructure are identified in this section. Areas to be avoided (including buffers) are identified, including areas not suitable for development or construction activities.

A four-tier sensitivity map of the study area (which shows very high, high, medium and low sensitivities) has been provided, with the PV facilities and associated infrastructure superimposed on the visual sensitivity map, (see Figure 5 and Maps 8 and 9).

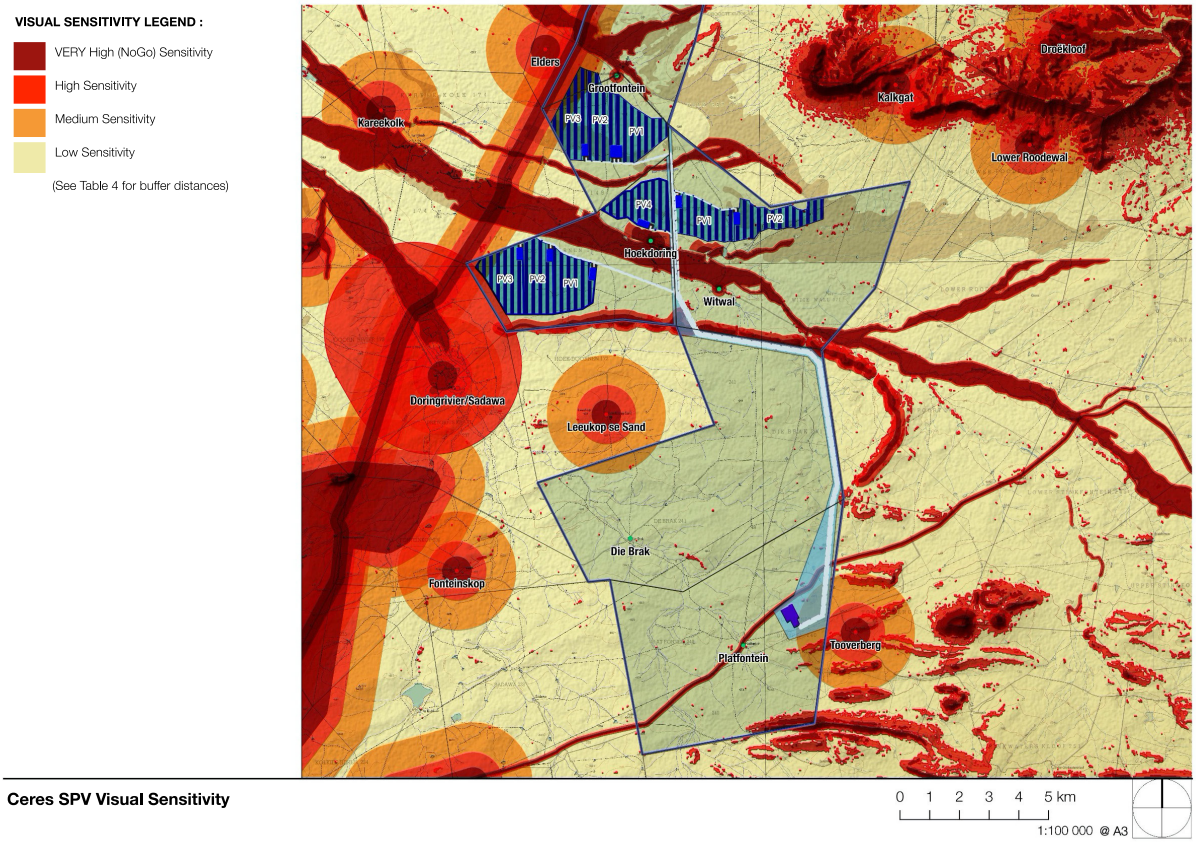

Figure 5: Detailed Visual Sensitivity Mapping for the Study Area

The Environmental Sensitivities are indicated for the four PV Facilities and Electrical Grid Infrastructure on Maps 8 and 9. A summary of visual features and sensitive receptors, and the rationale for these, is given in Table 3 below.

Table 3: Visual Features and Sensitive Receptors

Scenic Resource	**Landscape features within or adjacent to the development site.**
Topographic features	Landscape features in the area, such as hills, *koppies* and outcrops contribute to scenic and natural heritage value, providing visual interest or contrast in the landscape.
Water Features	In places, rivers have been carved into the softer Ecca shales, such as the Droëlaagte Rivier, Grootrivier and Doringrivier, which traverse the study area. In the arid landscape, drainage features with riverine thicket and dams provide scenic and amenity value.
Cultural landscapes	Intact wilderness or rural landscapes contribute to scenic value and sense of place, along with green patches of cultivated land and tree copses around farmsteads. Cultural landscapes include archaeological and historical sites identified in the Heritage Assessment.
	Receptors adjacent to the site or in the local surroundings.
Protected	The Tanqua Karoo National Park is more than 30km to the north-west of the study

Areas	area, and would not be affected by the proposed SEF projects. The Touw Local Nature Reserve is about 15km from the site, in a view shadow behind the Bontberg Mountains.
Private nature reserves, game farms	Private nature reserves and game farms in the area, some of which have guest accommodation, are important for the local tourism economy, and tend to be sensitive to loss or degradation of scenic quality. The Inverdoorn Private Nature Reserve facilities to the south-west are about 10km from the project site. The Klaserie Private Nature Reserve to the south is a similar distance from the site and both are unlikely to be visually affected by the proposed SEFs. Sadawa (Doringrivier) is a game farm, about 8.5km from the project site, with guest accommodation.
Human settlements, farmsteads	Surrounding farmsteads are widely spread and tend to be 5km or more from the project site. It is assumed that farms that form part of the leased development site are less visually sensitive.
Scenic / arterial routes	The R355, which runs north to the Tanqua Karoo and Calvinia, and which is some 12km away, would not be in the viewshed of the proposed SEF projects. The R356 runs north-east in the direction of Sutherland and abuts the study area for several kilometres. This stretch would probably not be considered a scenic route, but would require a nominal visual buffer.
Cultural and heritage sites	These form part of the heritage study, but could have visual implications.

Identification of Environmental Sensitivities

Given the relatively featureless nature of the study area, described above, the only sensitive visual features are the drainage courses, neighbouring farmsteads, and game farms, which are some distance away. Heritage features, documented by the Heritage Specialists, may have visual significance.

Other local features in the landscape, such as the existing ESKOM Kappa Substation and power lines are visual intrusions that have already altered the landscape character of the area to the south.

Visual sensitivity mapping at the broad regional scale for the Phase 1 Wind and Solar SEA (DEA, 2015) indicated a 'Low' visual sensitivity for the study area.

Visual buffers indicated in the Phase 1 Wind and Solar SEA (DEA, 2015) are listed in Table 4 below. This was for mapping at a regional scale and was used as a guide. Visual sensitivity categories and related buffers at the site scale are listed in Tables 5 and 6. Buffers for visual features and receptors are indicated on Map 8 for the proposed solar facilities, and on Map 9 for the proposed connecting powerlines.

Table 4: Visual buffers for Solar PV Facilities at the Regional Scale

Landscape features/criteria	**Wind and Solar SEA (DEA, 2015)**	**Comments relating to proposed Hoek Doornen PV facilities**
Project area boundary	-	Farm boundary setback usually 30m.
Ephemeral streams/ tributaries	-	Subject to the Biodiversity Assessment.
Steep slopes (gradient)	>1:4 (very high sensitivity) 1:4 -1:10 (high sensitivity)	None on the proposed SEF project sites.
Prominent ridgelines, peaks and rock outcrops	250m (very high sensitivity)	None on the proposed SEF project sites.
Arterial / district gravel roads	0-250m (very high sensitivity) 250m-1 km (mod. sensitivity)	The R355 is about 12km to the west of the site and the R356 adjacent to the study area.
Scenic routes, passes	0-500m (very high sensitivity)	None in the immediate area.
Protected Areas	0-1,5 km (very high sensitivity) 1,5-2 km (high sensitivity) 2-3 km (mod. sensitivity)	None in the immediate area.
Private reserves/ game farms/ guest farms.	0-1 km (very high sensitivity) 1-2 km (high sensitivity) 2-3 km (mod. sensitivity)	Two private nature reserves are about 10km from the proposed site. Sadawa guest farm is about 3km from the project site.
Farmsteads	0-250m (high sensitivity) 250-500m (mod. sensitivity)	Leeukop se Sand farmstead is about 3.5km and other farmsteads 5km or more from the SEF project sites.

Table 5: Visual Sensitivity Mapping Categories for the Proposed Solar Facilities

Scenic Resources	**Very high sensitivity (No-go)**	**High visual sensitivity**	**Medium visual sensitivity**	**Low visual sensitivity**
Topographic features	Feature	Within 150-250m	-	-
Steep slopes	Slopes > 1:4	Slopes > 1:10	-	-
Drainage courses	Feature	Within 50m	-	-
Cultural landscapes/ cropland	within 250m	within 500m	-	-
Protected Landscapes / Sensitive Receptors				
Private reserves / game farms	within 500m	within 1 km	within 2 km	-
Farmsteads outside site	within 500m	within 1 km	within 2 km	-
Farmsteads inside site	within 250m	within 500m	-	-
Arterial routes	within 250m	within 500m	within 1km	-

Table 6: Visual Sensitivity Mapping Categories for Proposed 132kV Connecting Power Lines

Scenic Resources	Very high sensitivity (No-go)	High visual sensitivity	Medium visual sensitivity	Low visual sensitivity
Topographic features	Feature*	Within 150m	-	-
Steep slopes	-	Slopes > 1:4	Slopes > 1:10	-
Drainage courses	Feature*	Within 50m	-	-
Cultural landscapes/ cropland	within 100m	within 150m	Within 250m	-
Protected Landscapes / Sensitive Receptors				
Private reserves / game farms	Feature	within 250m	within 500m	-
Farmsteads outside site	within 50m	within 100m	-	-
Farmsteads inside site	within 50m	within 100m	-	-
Arterial / district routes	within 50m	within 100m	-	-

Note: *The power lines could cross these features at right angles.

4.3.3. Sensitivity Analysis Summary Statement

The visual sensitivities described above and in Maps 8 and 9 correspond roughly with the screening tool sensitivities, the former being more detailed and specific to the study area. These formed the basis of the Screening Phase layout. (The site sensitivity verification is included in Appendix C).

5. Issues, Risks and Impacts

5.1. Identification of Potential Impacts/Risks

The potential visual impacts resulting from the proposed Hoek Doornen PV and electrical grid infrastructure development on landscape features and receptors identified above are listed below for each of the project phases, including cumulative impacts. The potential visual impacts would be identical for each of the proposed PV facilities and electrical grid infrastructure. The impacts identified are direct and cumulative impacts. No indirect impacts have been identified.

Hoek Doornen PV 1, PV 2, PV 3 and PV 4 Solar Facilities and Associated Buildings

Construction Phase

- Potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on residents and visitors to the area, particularly users of the main arterial route (R356), to the site.
- Potential visual effect of haul roads, access roads, stockpiles and construction camps in the exposed landscape.

Operational Phase

- Potential visual intrusion of solar arrays and related infrastructure and the impact on receptors, including residents and visitors, as well as game farms in the area.
- Potential visual impact of an industrial type activity on the rural or wilderness character 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 the four solar PV facilities with the similarly proposed Grootfontein and Witte Wall solar facilities in the study area, as well as with other nearby existing and proposed renewable energy farms in the area.

Hoek Doornen PV 1, PV 2, PV 3 and PV 4 Electrical Grid Infrastructure and Substations

Construction Phase

- Potential effect of dust and noise from construction machinery during the construction of the substation and pylons, and the effect of this on residents and visitors to the area.
- Potential visual effect of access roads, stockpiles and construction camps in the exposed landscape.

Operational Phase

- Potential visual intrusion of substations and powerlines, and the impact on receptors, particularly where powerlines cross roads.
- Potential visual impact of industrial type activities on the rural or wilderness character of the area.

Decommissioning Phase

- Potential visual effect of any remaining electrical grid structures and disused roads on the landscape.

Cumulative Impacts

- Potential combined visual effect of the four Hoek Doornen substations and four connecting powerlines with those of Witte Wall and Grootfontein solar PV facilities within the study area, as well as the nearby existing Perdekraal WEF. This would potentially result in the visual effect of nine connecting powerlines to the ESKOM Kappa substation.

5.1.1. Summary of Issues identified during the Public Consultation Phase

Comments will be received when the Draft BAR is released for public participation. This section will therefore be updated once the information is available.

6. Impact Assessment

This section provides an assessment of the potential visual impacts of the Hoek Doornen cluster of four solar PV facilities and associated buildings, as well as the electrical grid infrastructure. Comment on the no-go alternative and the overall findings are provided.

As the four solar facilities within the cluster are very similar, and because visual no-go areas have been avoided during the screening phase, only one set of assessment tables were deemed necessary.

Criteria for determining visual impact included the following:

Visibility:

Estimated degrees of visibility based on the scale of the facilities and related infrastructure, and on distance from various viewpoints are indicated in Table 7 below:

Table 7: Degrees of Visibility of Proposed SEF and Related Infrastructure

	Very high visibility	0-500m	Prominent feature within the observer's view frame
	High visibility	500m-1km	Relatively prominent within observer's view frame
	Moderate visibility	1-2km	Only prominent as part of the wider landscape
	Low visibility	2-4km	Visible as a minor element in the landscape
	Very low visibility	>4km	Hardly visible with the naked eye in the distance

The height of the solar PV arrays is relatively low (up to 10m), while the substation and power line pylons are higher. Possible degrees of visibility from a number of viewpoints are indicated in Table 8 below. (See also photomontages). Visibility of lights at night would not be significant because of the localised need for lighting and the distance of receptors. Visibility of the proposed powerline connection would also not be generally significant, except where it crosses roads.

Table 8: Hoek Doornen PV and Electrical Grid Infrastructure Viewing Distances and Visibility from Receptors

Viewpoint	Latitude	Longitude	Distance to PV arrays	Distance to powerline	Potential Visibility
S1 Elders Gate	32.937334ºS	19.929514ºE	4.93 km	-	not visible - in view shadow
S2 R356 Grootfontein Gate	32.932353ºS	19.934539ºE	5.19 km	-	not visible - in view shadow
S3 Kareekolk Gate	32.973741ºS	19.907129ºE	2.22 km	-	moderately visible
S4 Sadawa Gate	32.030539ºS	19.879571ºE	3.20 km	-	moderately visible PV 1 and 2 only
S5 Kalkgat	32.946363ºS	20.049133ºE	8.36 km	-	No Access - not visible - in view shadow
P1 District Road	33.091035ºS	20.025678ºE	-	273 m	highly visible
P2 Witwal Gate	33.025376ºS	20.015431ºE	-	193 m	highly visible
P3 Tooverberg	33.110072ºS	20.032875ºE	-	1.27 km	No Access - marginally visible
P4 Platfontein	33.115838ºS	19.992370ºE	-	1.98 km	visibility obscured by foreground of the Kappa substation
P5 Leeukop se Sand	33.045424ºS	19.943761ºE	-	3.97 km	No Access - marginally visible

Scenic Resources / Sensitive Receptors: (Map 8)

Except for river courses, there are no topographic or scenic features of note in the study area. The general area is sparsely populated, the farmsteads being far apart, and mostly a considerable distance from the proposed SEF projects. Visual sensitivity is therefore low.

Visual Exposure: (Maps 6 and 7)

The viewshed, or zone of visual influence, potentially extends for some 5km, but is partly restricted by low hills to the south, where parts of the surrounding area are in a view shadow. The viewshed (or zone of visual influence) of the proposed solar facilities and power lines tends to be fairly limited.

Landscape Integrity:

The natural landscape intactness of the area has been altered to some extent by the ESKOM Kappa Substation and power lines to the south. Further alteration of the surrounding landscape has taken place through the Perdekraal WEF to the south-east. The clustering of proposed solar facilities would help to minimise visual intrusion in the larger landscape.

Visual Absorption Capacity:

The area around the proposed site is generally flat to gently undulating, with low grass and scrub vegetation and therefore visually exposed, with low visual absorption capacity, i.e. low potential to screen any proposed structures.

The above visual criteria are summarised in Table 9 below in order to determine visual impact **consequence** for the proposed solar facilities, related infrastructure and powerline grid connections. **Significance** is determined by combining consequence with probability as indicated in Figure 6 below.

Table 9: Visual Impact Consequence

Visual Criteria	Comments	Four Solar PV facilities	Related Infrastructure	Four Connecting Powerlines
Visibility of facilities	Distance from receptors is a mitigating factor.	Low	Low	Medium
Visibility of lights at night	Distance from receptors is a mitigating factor.	Low	Low	Low
Visual exposure	Limited viewshed. Some areas in a view shadow.	Medium	Medium	Medium
Scenic resources and receptors	No scenic features of note. Receptors are isolated farmsteads.	Low	Low	Low
Landscape integrity	Rural character, with previous disturbance by powerlines and the existing Perdekraal WEF.	Low	Low	Low
Visual absorption capacity	Visually exposed landscape. Low visual absorption capacity.	Medium	Medium	Medium
Consequence	Summary	**Moderate**	**Moderate**	**Moderate**

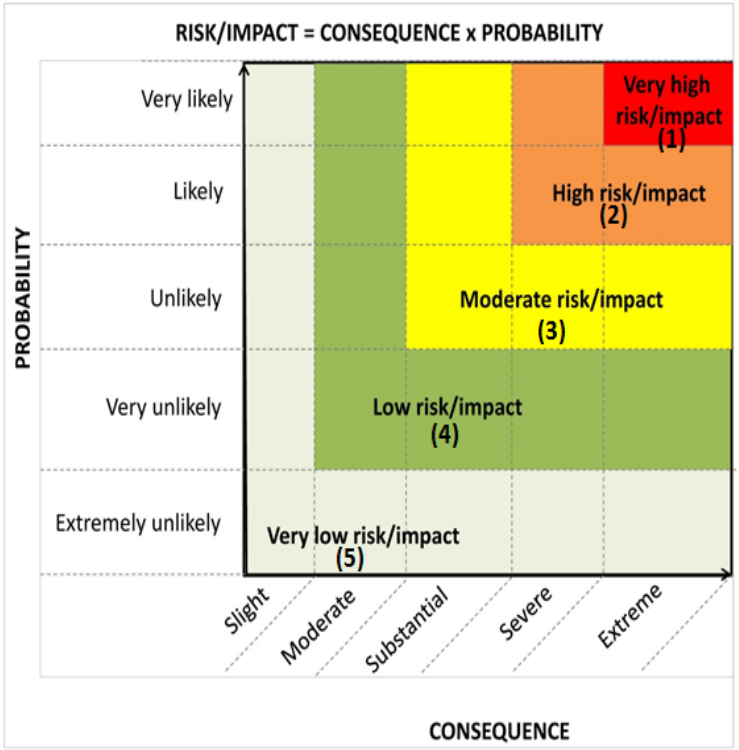

Figure 6: Visual impact Significance in relation to Consequence and Probability

6.1 Hoek Doornen PV 1, PV 2, PV 3 and PV 4 Solar Facilities and Associated Buildings

6.1.1. Potential Impacts during the Construction Phase

This section includes an assessment of the potential direct and cumulative impacts identified for the Hoek Doornen PV 1, PV 2, PV 3 and PV 4 Solar Facilities and Associated Buildings for the construction, operational and decommissioning phases.

6.1.1.1. Impact 1: Potential effect of dust and noise from trucks and construction machinery during the construction period

This impact relates to the potential effect of dust and noise from trucks and construction machinery during the construction period, and the effect of this on residents and visitors to the area, particularly users of the main arterial route (R356), to the site. This is rated as a negative, direct impact that extends locally and is of a short term duration. The consequence is rated as moderate, and the probability identified as very likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been allocated, such as ensuring the EMPr is implemented during the construction phase via the appointment of an Environmental Control Officer (ECO); and ensuring that construction camp and other facilities are located in visually unobtrusive areas, away from public roads. Section 6.1.1.3 provides an impact summary table.

6.1.1.2. Impact 2: Potential visual effect of haul roads, access roads, stockpiles and construction camps in the exposed landscape.

This impact relates to the potential visual effect of haul roads, access roads, stockpiles and construction camps in the exposed landscape. This is rated as a negative, direct impact with a short term duration and local spatial extent. The consequence and probability are respectively rated as moderate and very likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.1.1.1) apply to Impact 2. Section 6.1.1.3 provides an impact summary table.

6.1.1.3. Impact Summary Table: Construction Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1 and Impact 2 for the construction phase	*Status*	**Negative**	**Low risk (level 4)**	Locate construction camps, batching plants (if required) and stockpiles in visually unobtrusive areas, away from public roads. Implement the EMPr with an ECO during construction.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Moderate**				
	Probability	**Very Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.1.2. Potential Impacts during the Operational Phase

6.1.2.1. Impact 1: Potential visual intrusion of solar arrays and related infrastructure and the impact on receptors, including residents and visitors, as well as game farms in the area.

This impact relates to the potential visual intrusion of solar arrays and related infrastructure and the impact on receptors, including residents and visitors, as well as game farms in the area. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as very likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been identified:

- Locate the O&M buildings in unobtrusive low-lying areas, away from public roads, and/or screened with earth berms where necessary.
- Use muted natural colours and non-reflective finishes for buildings and structures generally.

- Keep internal access roads as narrow as possible, and use existing roads or tracks as far as possible.
- Fit outdoor / security lighting with reflectors to minimise light spillage.
- Locate internal powerlines underground where possible.
- Use discrete outdoor signage and prohibit intrusive commercial or billboard signage.

Section 6.1.2.3 provides an impact summary table.

6.1.2.2. Impact 2: Potential visual impact of an industrial type activity on the rural or wilderness character of the area.

This impact relates to the potential visual impact of an industrial type activity on the rural or wilderness character of the area. This is rated as a negative, direct impact with a long term duration and local spatial extent. The consequence and probability are respectively rated as moderate and very likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.1.2.1) apply to Impact 2. Section 6.1.2.3 provides an impact summary table.

6.1.2.3. Impact Summary Table: Operational Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
OPERATIONAL PHASE						
Impact 1 and Impact 2 – Operational Phase	*Status*	**negative**	**Low risk (level 4)**	Locate the O&M buildings in unobtrusive low-lying areas, away from public roads, and/or screened with earth berms where necessary. Use muted natural colours and non-reflective finishes for buildings and structures generally. Keep internal access roads as narrow as possible, and use existing roads or tracks as far as possible. Fit outdoor / security lighting with reflectors to minimise light spillage. Locate internal powerlines underground where possible. Use discrete outdoor signage and prohibit intrusive commercial or billboard signage.	**Low risk (level 4)**	**High**
	Spatial Extent	**local**				
	Duration	**long term**				
	Consequence	**moderate**				
	Probability	**very likely**				
	Reversibility	**high**				
	Irreplaceability	**low**				

6.1.3. Potential Impacts during the Decommissioning Phase

6.1.3.1. Impact 1: Potential visual effect of any remaining structures, platforms and disused roads on the landscape.

This impact relates to the potential visual effect of any remaining structures, platforms and disused roads on the landscape. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance.

Various mitigation measures have been allocated, such as ensuring that the solar arrays are removed and building structures are recycled or demolished; and that hardened areas and access roads no longer required are ripped and regraded, and that disturbed areas are revegetated or returned to grazing. Section 6.1.3.2 provides an impact summary table.

6.1.3.2. Impact Summary Table: Decommissioning Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
DECOMMISSIONING PHASE						
Impact 1 – Decommissioning Phase	*Status*	**Negative**	**Low risk (level 4)**	Remove solar PV arrays and demolish or recycle building structures for new uses. Rip and regrade hardened platform areas and access roads no longer required. Revegetate or return to grazing exposed or disturbed areas to blend with the surroundings.	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.1.4. Cumulative Impacts

6.1.4.1. Impact 1: Potential combined visual effect of the four Hoek Doornen solar PV facilities with those of Grootfontein (i.e. three) and Witte Wall (i.e. two) within the study area, and other nearby existing and proposed renewable energy farms in the area.

This impact relates to the potential combined visual effect of the nine proposed solar PV facilities within the study area (i.e. two for Witte Wall, three for Grootfontein and four for Hoek Doornen), and other nearby existing and proposed renewable energy farms in the area. This is rated as a negative, cumulative impact for the construction, operational and decommissioning phases. The duration for the impact is rated as short term for the construction and decommissioning phases; and long term for the operational phase. The impacts have been rated with a local spatial extent. The consequence of the impact has been rated as substantial for the operational and decommissioning phases and moderate for the construction phase; and the probability has been rated as likely for the three phases. Without the implementation of mitigation measures, the impact is rated as low significance for the construction phase, and moderate significance for the operational and decommissioning phases. With the implementation of mitigation measures, the significance of this impact is rated as low, moderate and very low significance for the construction, operational, and decommissioning phases. The mitigation measures are noted in Section 6.1.4.2 below.

6.1.4.2. Impact Summary Tables: Cumulative Impacts

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1	*Status*	**negative**	**Low risk (level 4)**	Observe EMPr requirements	**Low risk (level 4)**	**High**
	Spatial Extent	**local**				
	Duration	**short term**				
	Consequence	**Moderate**				
	Probability	**likely**				
	Reversibility	**high**				
	Irreplaceability	**low**				
OPERATIONAL PHASE						
Impact 1	*Status*	**negative**	**Moderate risk (level 3)**	Observe mitigations in 6.1.2.3 above	**Moderate risk (level 3)**	**High**
	Spatial Extent	**local**				
	Duration	**long term**				
	Consequence	**substantial**				
	Probability	**likely**				
	Reversibility	**high**				
	Irreplaceability	**low**				
DECOMMISSIONING PHASE						
Impact 1	*Status*	**negative**	**Moderate risk (level 3)**	Observe mitigations in 6.1.3.2 above	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**local**				
	Duration	**short term**				
	Consequence	**substantial**				
	Probability	**Likely**				
	Reversibility	**high**				
	Irreplaceability	**low**				

6.2. Hoek Doornen PV 1, PV 2, PV 3 and PV 4 Electrical Grid Infrastructure and Substations

This section includes an assessment of the potential direct and cumulative impacts identified for the Hoek Doornen PV 1, PV 2, PV 3 and PV 4 Electrical Grid Infrastructure and Substations for the construction, operational and decommissioning phases.

6.2.1. Potential Impacts during the Construction Phase

6.2.1.1. Impact 1: Potential effect of dust and noise from construction machinery during the construction of the substation and pylons, and the effect of this on residents and visitors to the area.

This impact relates to the potential effect of dust and noise from construction machinery during the construction of the substation and pylons, and the effect of this on residents and visitors to the area. This is rated as a negative, direct impact that extends locally and is of a short term duration. The consequence is rated as moderate, and the probability identified as very likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been allocated, such as ensuring the EMPr is implemented during the construction phase; and ensuring that construction camps and other facilities are located in visually unobtrusive areas, away from public roads. Section 6.2.1.3 provides an impact summary table.

6.2.1.2. Impact 2: Potential visual effect of access roads, stockpiles and construction camps in the exposed landscape.

This impact relates to the potential visual effect of access roads, stockpiles and construction camps in the exposed landscape. This is rated as a negative, direct impact with a short term duration and local spatial extent. The consequence and probability are respectively rated as moderate and very likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.2.1.1) apply to Impact 2. Section 6.1.1.3 provides an impact summary table.

6.2.1.3. Impact Summary Tables: Construction Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1 and Impact 2 for the construction phase	*Status*	**negative**	**Low risk (level 4)**	Locate construction camps and stockpiles in visually unobtrusive areas, away from public roads. Implement the EMPr requirements.	**Low risk (level 4)**	**High**
	Spatial Extent	**local**				
	Duration	**short term**				
	Consequence	**moderate**				
	Probability	**very likely**				
	Reversibility	**medium**				
	Irreplaceability	**low**				

6.2.2. Potential Impacts during the Operational Phase

6.2.2.1. Impact 1: Potential visual intrusion of substations and powerlines, and the impact on receptors, particularly where powerlines cross roads.

This impact relates to the potential visual intrusion of substations and powerlines, and the impact on receptors, particularly where powerlines cross roads. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. Various mitigation measures have been identified:

- Locate substations in un-obtrusive low-lying areas, away from public roads.
- Avoid powerlines on hillcrests and ridge skylines where possible.
- Use monopoles in preference to lattice pylons.
- Keep maintenance / access roads as narrow as possible, and use existing roads or tracks as far as possible.
- Fit outdoor / security lighting at substations with reflectors to minimise light spillage.

Section 6.2.2.3 provides an impact summary table.

6.2.2.2. Impact 2: Potential visual impact of industrial type activities on the rural or wilderness character of the area.

This impact relates to the potential visual impact of industrial type activities on the rural or wilderness character of the area. This is rated as a negative, direct impact with a long term duration and local spatial extent. The consequence and probability are respectively rated as moderate and likely, rendering a low impact significance, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is still rated as low significance. The same mitigation measures identified for Impact 1 (Section 6.2.2.1) apply to Impact 2. Section 6.2.2.3 provides an impact summary table.

6.2.2.3. Impact Summary Tables: Operational Phase

Impact	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
OPERATIONAL PHASE						
Impact 1 and Impact 2 – Operational Phase	*Status*	**Negative**	**Low risk (level 4)**	Locate substations in un-obtrusive low-lying areas, away from public roads. Avoid powerlines on hillcrests and ridge skylines where possible. Use monopoles in preference to lattice pylons. Keep maintenance / access roads as narrow as possible, and use existing roads or tracks as far as possible. Fit outdoor / security lighting at substations with reflectors to minimise light spillage.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.2.3. Potential Impacts during the Decommissioning Phase

6.2.3.1. Impact 1: Potential visual effect of any remaining electrical grid structures and disused roads on the landscape.

This impact relates to the potential visual effect of any remaining electrical grid structures and disused roads on the landscape. This is rated as a negative, direct impact that extends locally and is of a long term duration. The consequence is rated as moderate, and the probability identified as likely, resulting in an impact significance of low, without the implementation of mitigation measures. With the implementation of mitigation measures, the significance of this impact is rated as very low significance. Various mitigation measures have been allocated, such as ensuring that the pylons and substation structures are removed and recycled; and that access roads no longer required are ripped and regraded, and that disturbed areas are revegetated or returned to pasture. Section 6.2.3.2 provides an impact summary table.

6.2.3.2. Impact Summary Tables: Decommissioning Phase

Impact 1	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
DECOMMISSIONING PHASE						
Impact 1 – Decommissioning Phase	*Status*	**Negative**	**Low risk (level 4)**	Remove or recycle electrical grid substation and pylons. Rip and regrade access roads no longer required. Revegetate or return to pasture exposed or disturbed areas to blend with the surroundings.	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Moderate**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

6.2.4. Cumulative Impacts

6.2.4.1. Impact 1: Potential combined visual effect of the four Hoek Doornen substations and four connecting powerlines with those of Grootfontein and Witte Wall solar PV facilities within the study area, as well as the nearby existing Perdekraal WEF. This would potentially result in the visual effect of nine connecting powerlines to the ESKOM Kappa substation.

This impact relates to the potential combined visual effect of the nine proposed power lines and nine on-site substations within the study area (i.e. two for Witte Wall, three for Grootfontein and four for Hoek Doornen), and other nearby existing and proposed renewable energy farms in the area. It must be noted that it is unlikely that nine power lines will be constructed all the way to the Eskom Kappa Substation. If all nine proposed Ceres PV projects are developed, it is likely that a maximum of four power lines from the project sites (on the farms Witte Wall, Grootfontein and Hoek Doornen) to the Kappa substation will be constructed, realistically (i.e. along Die Brak and Platfontein Farms). However, based on the uncertainties around the future Independent Power Producers bidding process, the requirements of Eskom, and not knowing if and which project will receive preferred bidder status; it is necessary to assess nine power lines to the Kappa Substation so that future lines can be based on this.

The cumulative impact is rated as negative for the construction, operational and decommissioning phases. The duration for the impact is rated as short term for the construction phase; and long term for the operational and decommissioning phases. The impacts have been rated with a local spatial extent. The consequence of the impact has been rated as substantial for the construction, operational and decommissioning phases; and the probability has been rated as likely for all three phases. Without the implementation of mitigation measures, the impact is rated as moderate significance for the construction, operational and decommissioning phases. With the implementation of mitigation measures, the significance of this impact is rated as low for construction and operations, and very low significance for the decommissioning phase. The mitigation measures are noted in Section 6.2.4.2 below.

6.2.4.2. Impact Summary Tables: Cumulative Impact

Impact 1	*Impact Criteria*		*Significance / Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance / Ranking (Post-Mitigation)*	*Confidence Level*
CONSTRUCTION PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Combine connecting powerlines from Witte Wall, Grootfontein and Hoek Doornen, where possible. Observe EMPr requirements.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Short Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
OPERATIONAL PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Combine connecting powerlines from Witte Wall, Grootfontein and Hoek Doornen, where possible. Observe mitigations in 6.2.2.3 above.	**Low risk (level 4)**	**High**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				
DECOMMISSIONING PHASE						
Impact 1	*Status*	**Negative**	**Moderate risk (level 3)**	Observe mitigations in 6.2.3.2 above.	**Very low risk (level 5)**	**Medium**
	Spatial Extent	**Local**				
	Duration	**Long Term**				
	Consequence	**Substantial**				
	Probability	**Likely**				
	Reversibility	**High**				
	Irreplaceability	**Low**				

7. Impact Assessment Summary

The overall impact significance findings, following the implementation of the proposed mitigation measures, are shown in Table 10 and Table 11 below for the proposed Hoek Doornen solar PV facilities and for the electrical grid infrastructure.

Table 10: Overall Impact Significance for Solar PV facilities and Related Buildings (post mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Moderate (level 3)
Cumulative - Decommissioning	Very low (level 5)

Table 11: Overall Impact Significance for Substations and Connecting Powerlines (Post Mitigation)

Phase	**Overall Impact Significance**
Construction	Low (level 4)
Operational	Low (level 4)
Decommissioning	Very low (level 5)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Low (level 4)
Cumulative - Operational	Low (level 4)
Cumulative - Decommissioning	Very low (level 5)

No-go Alternative

In the no-go alternative, there would be no SEFs or additional powerlines and therefore no additional visual intrusion on the rural landscape and on surrounding farmsteads. At the same time no renewable energy would be produced at the site for export to the national grid. The visual significance would therefore be neutral, with neither impacts nor benefits occurring.

Findings

Given the fairly contained footprint of the proposed cluster solar PV facilities, the limited viewshed and the localised visual effects in a remote area, the visual impact significance was found to be **low risk**, and **very low risk** after mitigation in the long term if the solar facilities are decommissioned.

The electrical grid infrastructure would also have a **low risk** significance after mitigation, provided the proposed power lines leading to the ESKOM Kappa substation to the south of the study area are consolidated. (Although nine power lines have been assessed, in reality a maximum of four power lines from the project sites to the Kappa Substation would be constructed, depending on the bidding process).

Although the potential cumulative visual impacts, when combined with the proposed Grootfontein and Witte Wall solar PV clusters, as well as the existing Perdekraal WEF, could result in a semi-industrialised landscape, the proposed solar PV facilities tend to have less visual significance than the larger scale wind farms. It would be important however for power lines to be shared where possible, to avoid the proliferation of these in the exposed landscape.

8. Legislative and Permit Requirements

The National Environmental Management Act (Act No. 107 of 1998, as amended). (NEMA) and the (NEMA Environmental Impact Assessment (EIA) Regulations (2014, as amended) apply as the development of the proposed SEFs and associated infrastructure are a listed activity. As the site falls within a gazetted REDZ, a BA is required. The need for a visual assessment has been identified.

The National Heritage Resources Act (Act No. 25 of 1999) (NHRA), and associated provincial regulations, provide legislative protection for natural, cultural and scenic resources, as well as for archaeological and paleontological sites within the study area. This report deals with visual considerations, including scenic resources, which form part of the National Estate. The Visual Assessment would therefore form part of the Heritage Assessment in terms of obtaining the relevant comments from Heritage Western Cape.

Other than the above legislation, there are no specific policies or guidelines for visual and scenic resources for the Western Cape. The Guideline for Involving Visual and Aesthetic Specialists in EIA Processes, by the Provincial Government of the Western Cape, was used as a general guide.

The South African Civil Aviation Authority (SACAA) has an Obstacle Notice 4/2017 requiring solar project applications to be accompanied by a Glint and Glare Impact Assessment Report with relevance to aviation. There is an airstrip at Sadawa, which is about 3km away, and it is only occasionally used for small aircraft, therefore no Glint and Glare Impact Assessment is considered necessary.

9. Environmental Management Programme Inputs

Planning and Design Phase

Ensure that visual management measures are included as part of the EMPr, monitored by an ECO, including the siting of the construction camps and material stockpiles in visually unobtrusive positions in the landscape, away from public roads.

Construction Phase Monitoring:

Implement dust suppression and litter control measures, as well as rehabilitation of borrow pits (if required) and haul roads to minimise their visual effect on the surroundings. Ensure regular reporting to an environmental management team by the ECO during the construction phase.

Operation Phase Monitoring:

Ensure that visual mitigation measures are monitored by management on an on-going basis, including the control of signage, lighting and wastes on the site by the appointed Environmental Manager.

Decommissioning Phase Monitoring:

Ensure that procedures for the removal of structures and stockpiles during the decommissioning phase are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard as prescribed in a rehabilitation plan, and signed off by the delegated authority.

10. Final Specialist Statement and Authorisation Recommendation

10.1. Statement and Reasoned Opinion

The proposed cluster of Hoek Doornen PV 1, PV 2, PV 3 and PV 4 solar facilities form part of a larger solar energy project, which includes the Grootfontein and Witte Wall clusters. These fall within the Komsberg REDZ, and would form part of a larger group of renewable energy facilities concentrated near the ESKOM Kappa substation.

The generally flat terrain is visually exposed with the result that structures and pylons can be seen for several kilometres. However, there are no major scenic features of note, and the main receptors, being surrounding farmsteads, are spread fairly far apart, and except for the Elders homestead, are mostly more than 5km distance from the proposed solar facilities and connecting powerlines. This means that visibility of the proposed solar facilities and powerlines is generally low, (hardly visible to not visible from the farmsteads).

Taking into account the relatively low structures and the local scale of the proposed solar facilities and related infrastructure located in a fairly remote area, the visual impact significance was considered to be **low** before and after mitigation, and **low** before and after mitigation for the connecting powerlines for the construction and operational phases. The visual landscape could be restored after potential decommissioning of the Solar PV facilities and the power lines which means the visual significance would be **very low** with mitigation for this phase.

The potential cumulative visual impact for the cluster of four solar facilities, in combination with the proposed Grootfontein and Witte Wall clusters, as well as the existing Perdekraal WEF would increase to **moderate** both before and after mitigation during the operational phase, as the landscape becomes more semi-industrialised. The fact that the ESKOM Kappa substation and power lines already occur in the area needs to be taken into account.

The potential cumulative visual impact for the electrical grid infrastructure of all the clusters (Witte Wall, Grootfontein and Hoek Doornen), could be high in the unlikely event that all nine connecting power lines to the Kappa substation are built, but but in reality only a maximum of four power lines would be constructed. This would reduce the significance to **moderate** before mitigation and **low** after mitigation if the connecting power lines are shared. (See Figure P4 photomontage).

10.2. EA Condition Recommendations

Key visual management actions include locating the substations and other buildings, as well as construction camps, in unobtrusive (generally low-lying) positions in the landscape away from public roads. The Karoo landscape is particularly fragile and therefore new access roads and disturbance generally should be kept to a minimum for both the proposed solar facilities and connecting power lines. Connecting power lines should be shared where possible, to avoid a plethora of power lines in the exposed landscape.

There are no fatal flaws from a visual perspective arising from the proposed project, and given the marginal nature of agriculture in the area, the solar energy project is probably an inherently suitable land use that should receive authorisation, provided the mitigation measures are implemented as a condition of approval.

References

CSIR, August 2020. Terms of Reference for Specialist Studies for the Basic Assessments for proposed development of Solar Voltaic Facilities and Associated Electrical Grid Infrastructure, near Touws River, Western Cape.

Department of Environmental Affairs, 2015. Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa. CSIR Report Number: CSIR/CAS/EMS/ER/2015/0001/B. Stellenbosch.

Lawson, Q. and Oberholzer, B. 2014. National Wind and Solar PV SEA Specialist Report: Landscape Assessment, with CSIR for Department of Environmental Affairs.

Mucina, L. and Rutherford, M.C. (eds) 2006.The Vegetation of South Africa, Lesotho and Swaziland. Strelizia 19. SANBI, Pretoria.

Oberholzer, B. 2005. Guideline for Involving Visual and Aesthetic Specialists in EIA Processes: Edition 1 CSIR Report No. ENV-S-C 2005 053 F. Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning.

Appendix A - Specialist Expertise

Quinton Lawson Architect (qarc)

Qualifications:
Bachelor of Architecture (Univ. of Natal 1977)

Professional registration/membership:
Professional member of the SA Council for the Architectural Profession (SACAP), reg. no. 3686.
Member of the Cape Institute for Architects and SA Institute of Architects.
B-BBEE Status: Level 4.

Quinton has practiced as a professional architect since 1978, specialising in architectural and urban design, environmental design and computer visualisation.

He was one of the founding partners of Meirelles Lawson Architects formed in 1988, initially specialising in economic and sustainable housing. He was a senior partner at MLB Architecture and Urban Design, with specialist expertise in visual modelling and design solutions.

In the past he has been a visiting lecturer at UCT teaching a post-graduate course on Computer Techniques in Landscape Architecture, including visualisation and visual assessment techniques.

Together with BOLA, Quinton has been involved in numerous visual impact assessments over a number of years, and previously served on the Impact Assessment Review Committee of Heritage Western Cape.

Bernard Oberholzer Landscape Architect + Environmental Planner (BOLA)

Qualifications:
Bachelor of Architecture (UCT 1970), Master of Landscape Architecture (U. of Pennsylvania 1975)

Professional registration/membership:
Professional member of the SA Council for the Landscape Architectural Profession (SACLAP), reg. no. 87018.
Fellow of the Institute of Landscape Architects of South Africa.
B-BBEE Status: Level 4.

Bernard has 40 years of experience as a professional landscape architect, specialising in, environmental planning, coastal planning, urban landscape design and visual assessments.

He is currently an independent consultant, and was for 7 years the Convenor of the Master of Landscape Architecture Programme at UCT.

He has presented papers on *Visual and Aesthetic Assessment Techniques*, and provides specialist services as a reviewer of visual impact studies prepared by other firms.

He is the author of *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes,* prepared with the CSIR for the Dept. of Environmental and Development Planning, Provincial Government of the Western Cape, 2005.

Bernard has been involved in numerous land use suitability studies and visual assessments for a wide range of projects, and serves as a member of the Stanford Heritage Committee.

Bernard and Quinton were joint authors of the visual specialist chapters for the National Wind and Solar SEA and National Electricity Grid Infrastructure SEA, with the CSIR, for the Department of Environmental Affairs.

Appendix B - Specialist Statement of Independence

We, Quinton Lawson and Bernard Oberholzer, declare that –

- We act as the independent specialist in this application;
- We will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- We declare that there are no circumstances that may compromise our objectivity in performing such work;
- We have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- We will comply with the Act, Regulations and all other applicable legislation;
- We have no, and will not engage in, conflicting interests in the undertaking of the activity;
- We undertake to disclose to the applicant and the competent authority all material information in our possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by us for submission to the competent authority;
- all the particulars furnished by us in this form are true and correct; and
- We realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialists:

Name of Companies: qarc and bola

Date: 09 October 2020

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Basic Assessments for the Proposed Development of four 175 MW Solar Photovoltaic Facilities and associated Electrical Grid Infrastructure (i.e. Hoek Doornen 1; Hoek Doornen 2; Hoek Doornen 3; and Hoek Doornen 4), near Touws River, Western Cape

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	BOLA			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	5	Percentage Procurement recognition	
Specialist name:	Bernard Oberholzer			
Specialist Qualifications:	B. Arch M.L.Arch			
Professional affiliation/registration:	SACLAP			
Physical address:	16 Caledon St. Stanford			
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Postal code:	7210	Cell:	083 513 5696	
Telephone:	028 341 0264	Fax:		
E-mail:	bernard.bola@gmail.com			

2. DECLARATION BY THE SPECIALIST

I, B. Oberholzer, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

BO

Signature of the Specialist

BOLA

Name of Company:

26 Oct 2020

Date

3. **UNDERTAKING UNDER OATH/ AFFIRMATION**

I, B. Obermozer, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

BJO

Signature of the Specialist

BOLA

Name of Company

26 Oct 2020

Date

Signature of the Commissioner of Oaths

26 Oct 2020

Date

COMMISSIONER OF OATHS
KARIN T. SFREDDO
9/1/8/2 PRETORIA (A14)
805 STANZA BOPAPE STR. ARCADIA 0083

Karin Sfreddo

Appendix C: Site Sensitivity Verification

Prior to commencing with the specialist assessment in accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

The details of the site sensitivity verification are noted below:

Date of Site Visit	27 August 2020
Specialist Name	Quinton Lawson and Bernard Oberholzer
Professional Registration Number	SACAP 3686, SACLAP 87018
Specialist Affiliation / Company	qarc and bola

The site sensitivity verification was undertaken using the following means:

(a) desk top analysis, using satellite imagery;
(b) preliminary on-site inspection; and
(c) a range of other available / relevant information included in Section 2.1 of this Report.

A screening report was compiled by the CSIR (20/8/2020) using the DEFF Screening Tool. The Report includes a 'Map of Relative Landscape (Solar) Theme Sensitivity', based on mapping prepared for the Phase 1 Wind and Solar SEA by the CSIR for DEFF in 2015 (DEA, 2015). The study area falls within the Komsberg REDZ.

The current visual sensitivity mapping included in Section 4 of this Visual Impact Assessment is in greater detail (at the site scale) for the proposed solar photovoltaic (PV) and electrical grid infrastructure study area, taking into account detailed viewshed mapping and local site conditions. This mapping largely confirms the mapping contained in the DEFF Screening Tool, but provides more detail. Refer to Section 4 of the Visual Impact Assessment for a motivation and evidence of the verified use of the land and environmental sensitivity.

Appendix D: Impact Assessment Methodology

The following impact assessment methodology was used in this VIA:

The impact assessment includes:

- *the nature, significance and consequences of the impact and risk;*
- *the extent and duration of the impact and risk;*
- *the probability of the impact and risk occurring;*
- *the degree to which impacts and risks can be mitigated;*
- *the degree to which the impacts and risks can be reversed; and*
- *the degree to which the impacts and risks can cause loss of irreplaceable resources.*

As per the DEFFT 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 have been rated in terms of the direct, indirect and cumulative:

- *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.*

The impact assessment methodology includes the following aspects:

- *Nature of impact/risk - The type of effect that a proposed activity will have on the environment.*

- *Status - Whether the impact/risk on the overall environment 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 not be affected.*

- *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);*
    - *National; or*
    - *International (e.g. Greenhouse Gas emissions or migrant birds).*

- *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)).*

- *Consequence – The anticipated consequence of the risk/impact:*
    - *Extreme (extreme alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they permanently cease);*
    - *Severe (severe alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*
    - *Substantial (substantial alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*

- *Moderate (notable alteration of natural systems, patterns or processes, i.e. where the environment continues to function but in a modified manner); or*
- *Slight (negligible alteration of natural systems, patterns or processes, i.e. where no natural systems/environmental functions, patterns, or processes are affected).*

- *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).*

- *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).*

Using the criteria above, the impacts have been further assessed in terms of the following:

- *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).*

To determine the significance of the identified impact/risk, the consequence is multiplied by probability (qualitatively as shown in Figure D.1).

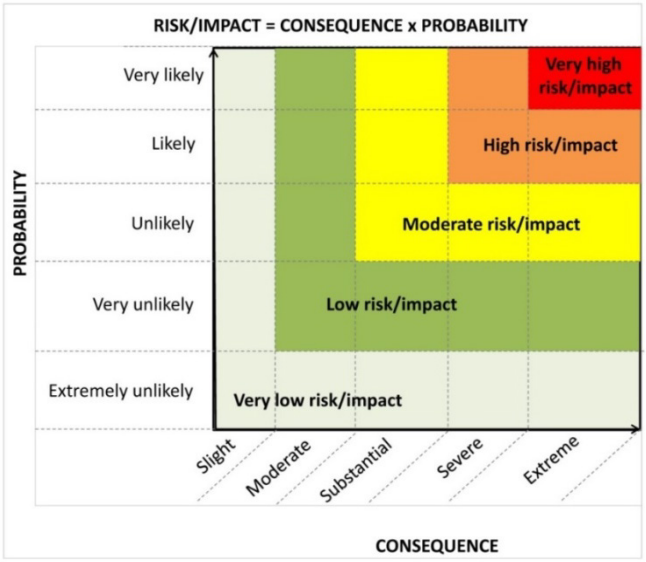


Figure D.1. Guide to assessing risk/impact significance as a result of consequence and probability.

- *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.*

Confidence – The degree of confidence in predictions based on available information and specialist knowledge:

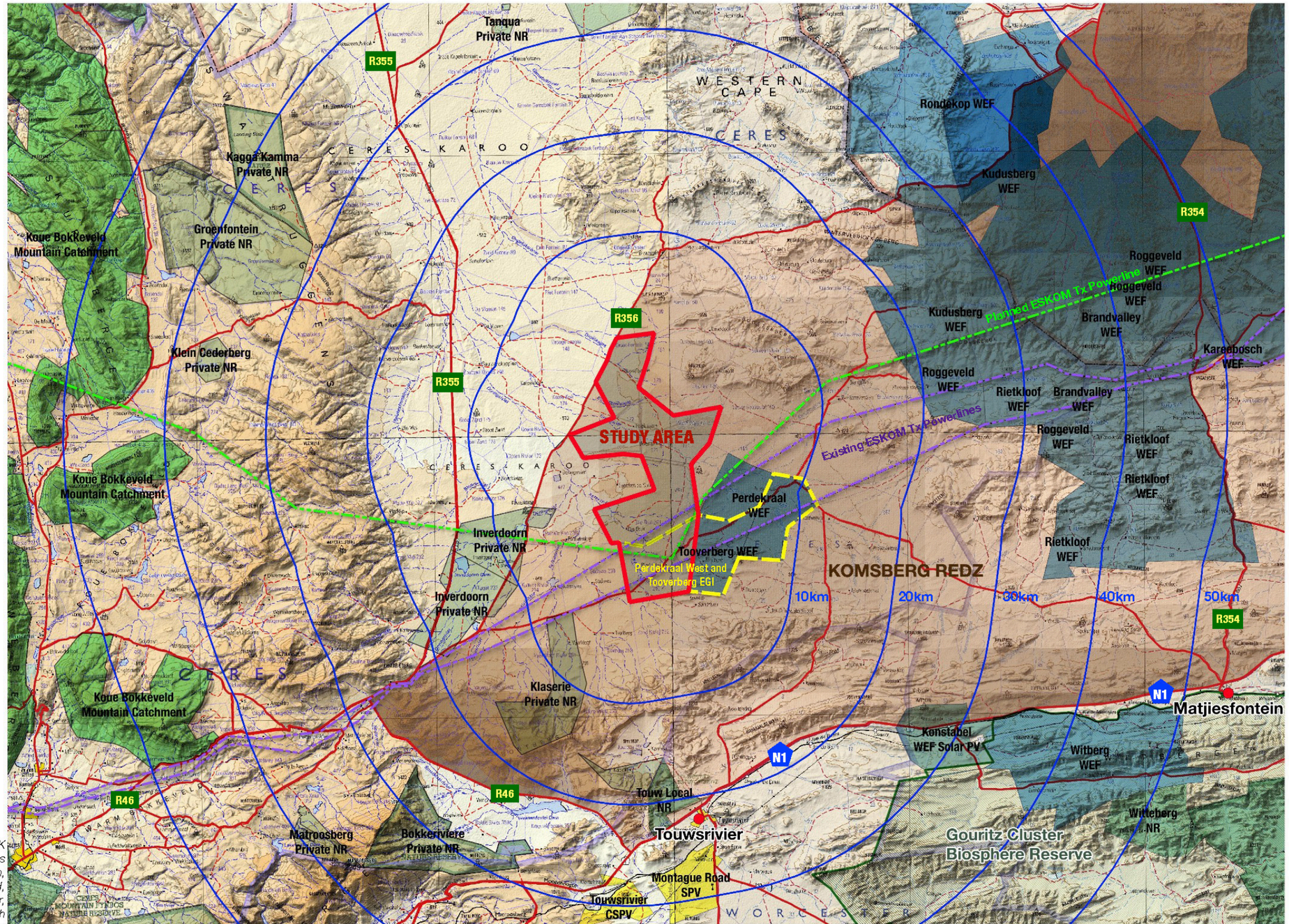
- *Low;*
- *Medium; or*
- *High.*

Appendix E: Compliance with the Appendix 6 of the 2014 EIA Regulations (as amended)

Requirements of Appendix 6 (Specialist Reports) of Government Notice R326 (Environmental Impact Assessment (EIA) Regulations of 2014, as amended)	***Section where this has been addressed in the Specialist Report***
1. (1) A specialist report prepared in terms of these Regulations must contain - *a) details of -* *i. the specialist who prepared the report; and* *ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;*	*Section 1.2 and Appendix A*
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	*Appendix B* *And Attachment*
c) an indication of the scope of, and the purpose for which, the report was prepared;	*Section 1.1 and Section 1.3*
(cA) an indication of the quality and age of base data used for the specialist report;	*Section 2.1*
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	*Section 4 and Section 5*
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	*Section 2*
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	*Section 2*
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	*Section 4.2 and Section 4.3*
g) an identification of any areas to be avoided, including buffers;	*Section 4.2 and Section 4.3*
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	*Maps 8 and 9*
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	*Section 2.2*
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	*Section 6 and Section 7*
k) any mitigation measures for inclusion in the EMPr;	*Section 6 and Section 9*
l) any conditions for inclusion in the environmental authorisation;	*Section 10.2*
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	*Section 6 and Section 9*
n) a reasoned opinion- *i. whether the proposed activity, activities or portions thereof should be authorised;* *(iA) regarding the acceptability of the proposed activity or activities; and* *ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;*	*Section 10*
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	*Section 2.3 and Section 5.2, and Refer to the Draft BAR*
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	*Not applicable at this stage. Report to still be released for public comment. Refer to Draft BAR*
q) any other information requested by the competent authority.	*Refer to EAP*

Requirements of Appendix 6 (Specialist Reports) of Government Notice R326 (Environmental Impact Assessment (EIA) Regulations of 2014, as amended)	***Section where this has been addressed in the Specialist Report***
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	*Section 4.3.1 and Appendix C Part A of the Assessment Protocols published in GN 320 on 20 March 2020 are applicable.*

MAPS



base map : NGI 1:250K Topo-Cadastral Series 3218 Clanwilliam, 3220 Sutherland, 3319 Worcester, 3320 Ladismith

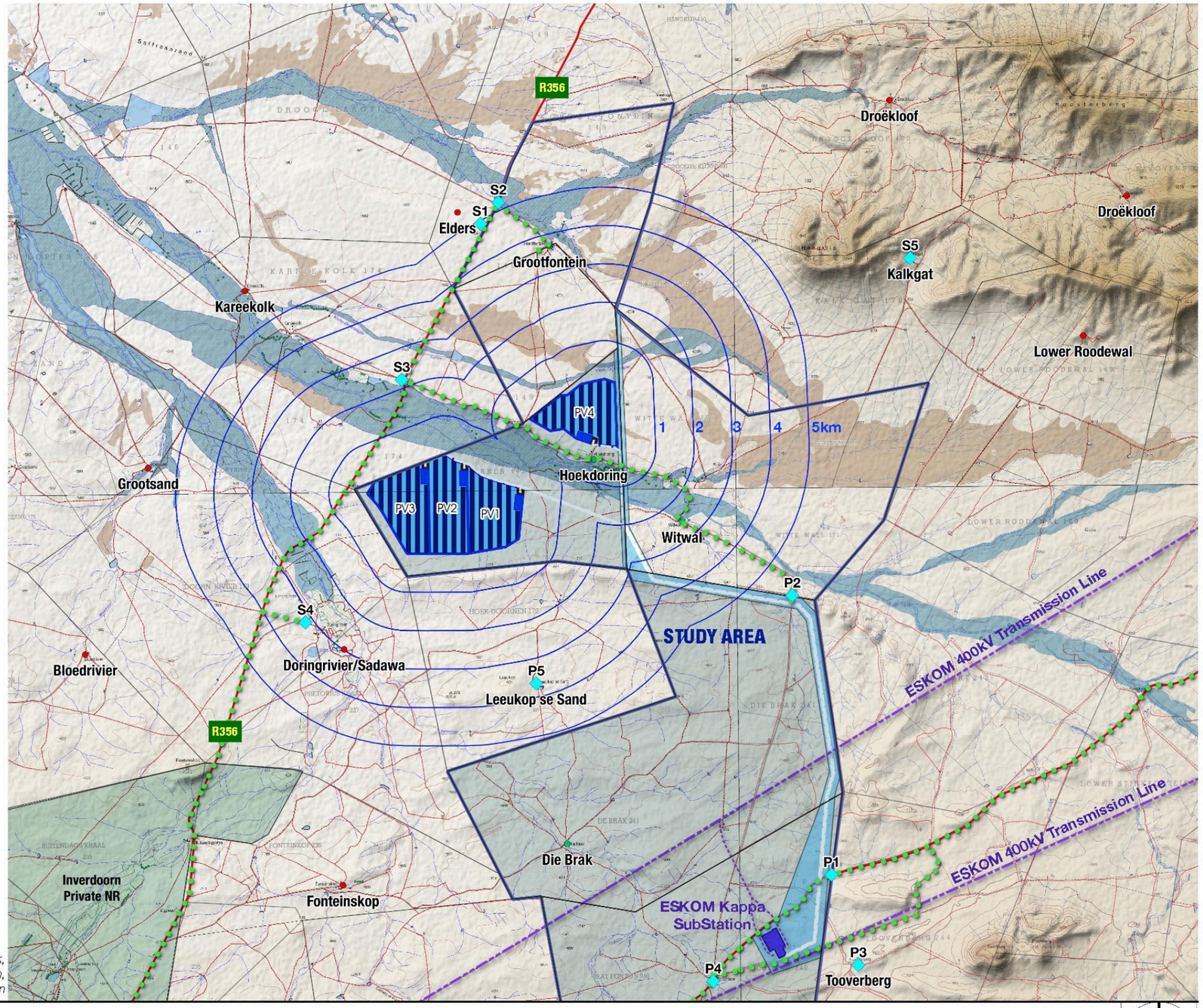
map 1 : Regional Context • Cumulative Renewable Energy Facilities

0 10 20 30 40 50 km

1:350 000 @ A3

LOCAL CONTEXT LEGEND :

- Solar PV Area
- 4x 132kV Powerlines within Corridor
- FieldTrack Route
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 2 : Local Context • Fieldwork, Viewpoints, Existing Infrastructure, ESKOM Transmission Lines

0 1 2 3 4 5 km

1:100 000 @ A3

GEOLOGY LEGEND :

Q : Alluvium

Pa : Beaufort Group, Escourt Formation (mudstone, sandstone)

Pko : Ecca Group, Koedoesberg Formation (sandstone, shale)

Pk : Ecca Group, Kookfontein Formation (shale)

Ps : Ecca Group, Skoorsteen Formation (shale, sandstone)

Pt : Ecca Group, Tierberg Formation (shale)

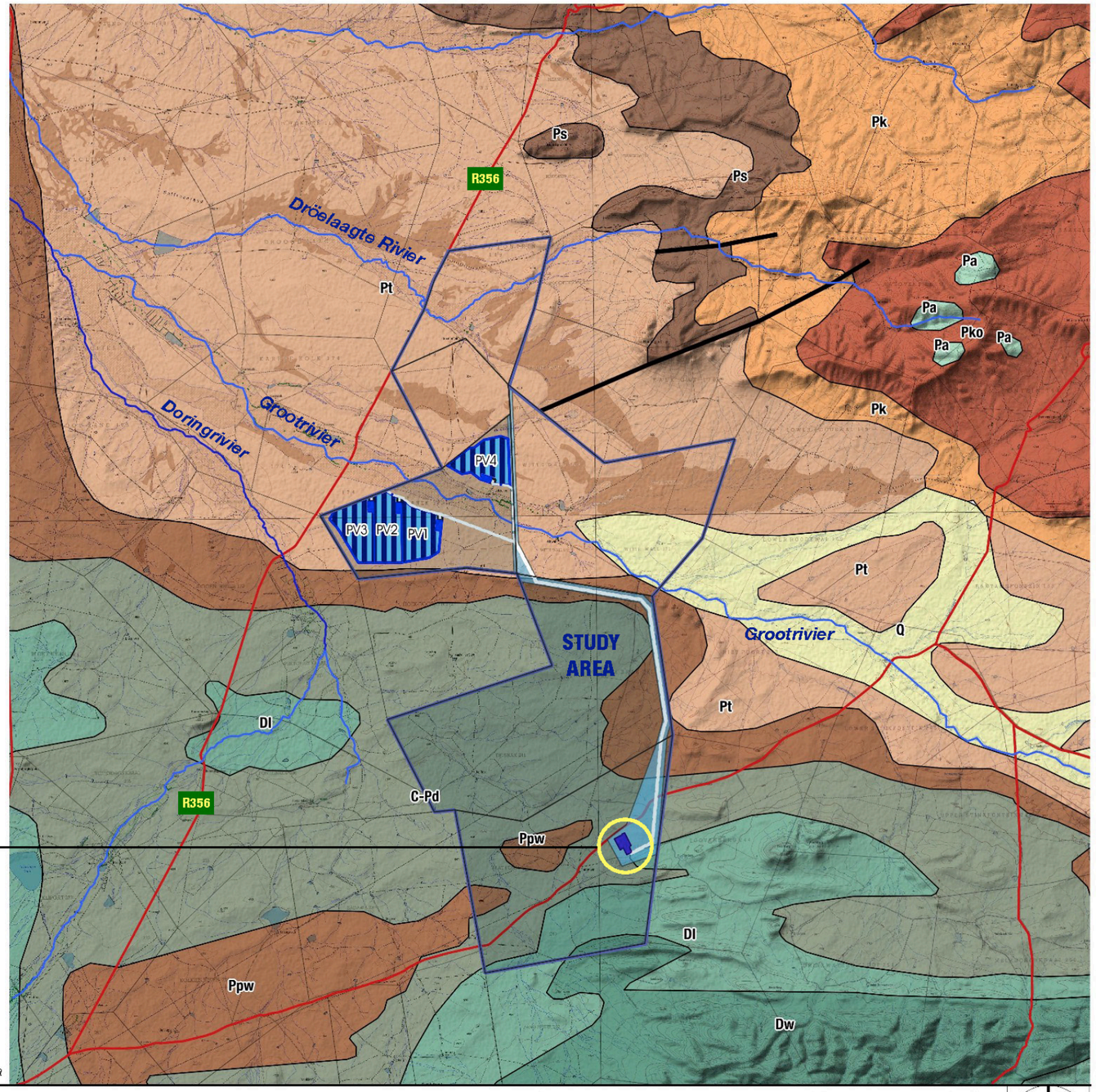
Ppw : Ecca Group, Prince Albert F./ Whitehill F. (shale, carbonaceous shale)

C-Pd : Dwyka Formation (tillite, sandstone, mudstone)

Dl : Witteberg Group, Kommadagga F./ Lake Mentz F. (shale, sandstone)

Dw : Witteberg Group, Witpoort F./ Weltevrede F. (quartzitic sandstone, shale)

ESKOM Kappa SubStation



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB, Inverdoorn, 3320AA Brewelsfontein : Council for Geoscience : RSA 1:1M Geological Spatial Data

map 3 : Geology

0 5 10 15 km

1:150 000 @ A3

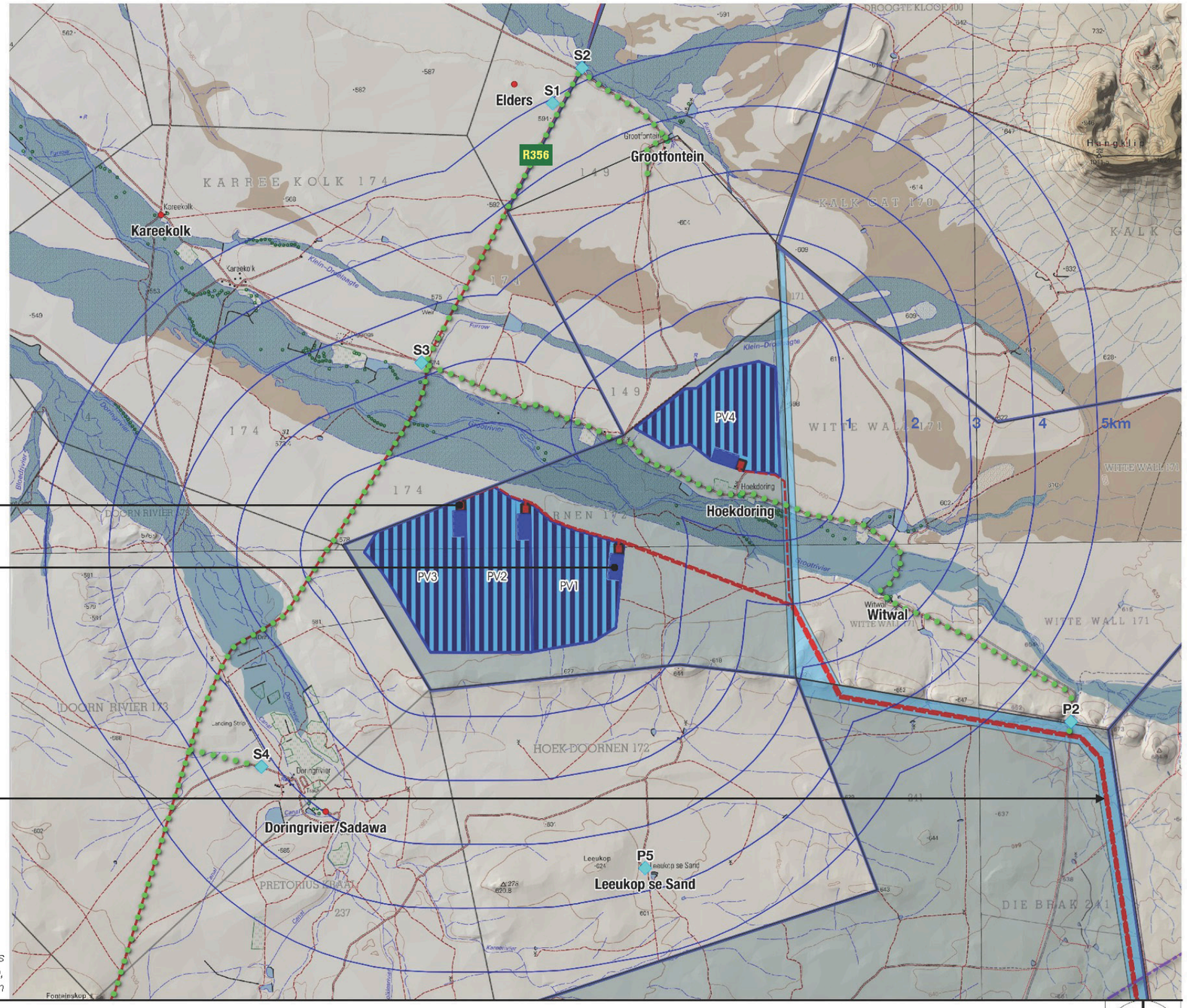
LEGEND :

- Hoekdoornen PV1, PV2, PV3 and PV4
- FieldTrack Route
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area

SubStations

Battery Energy Storage Systems

Hoekdoornen 4x 132kV Overhead Powerlines



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 4 : Project Layout • Hoekdoornen PV1, PV2, PV3 and PV4 Solar Arrays max 10m High

0 1 2 3 4 5 km

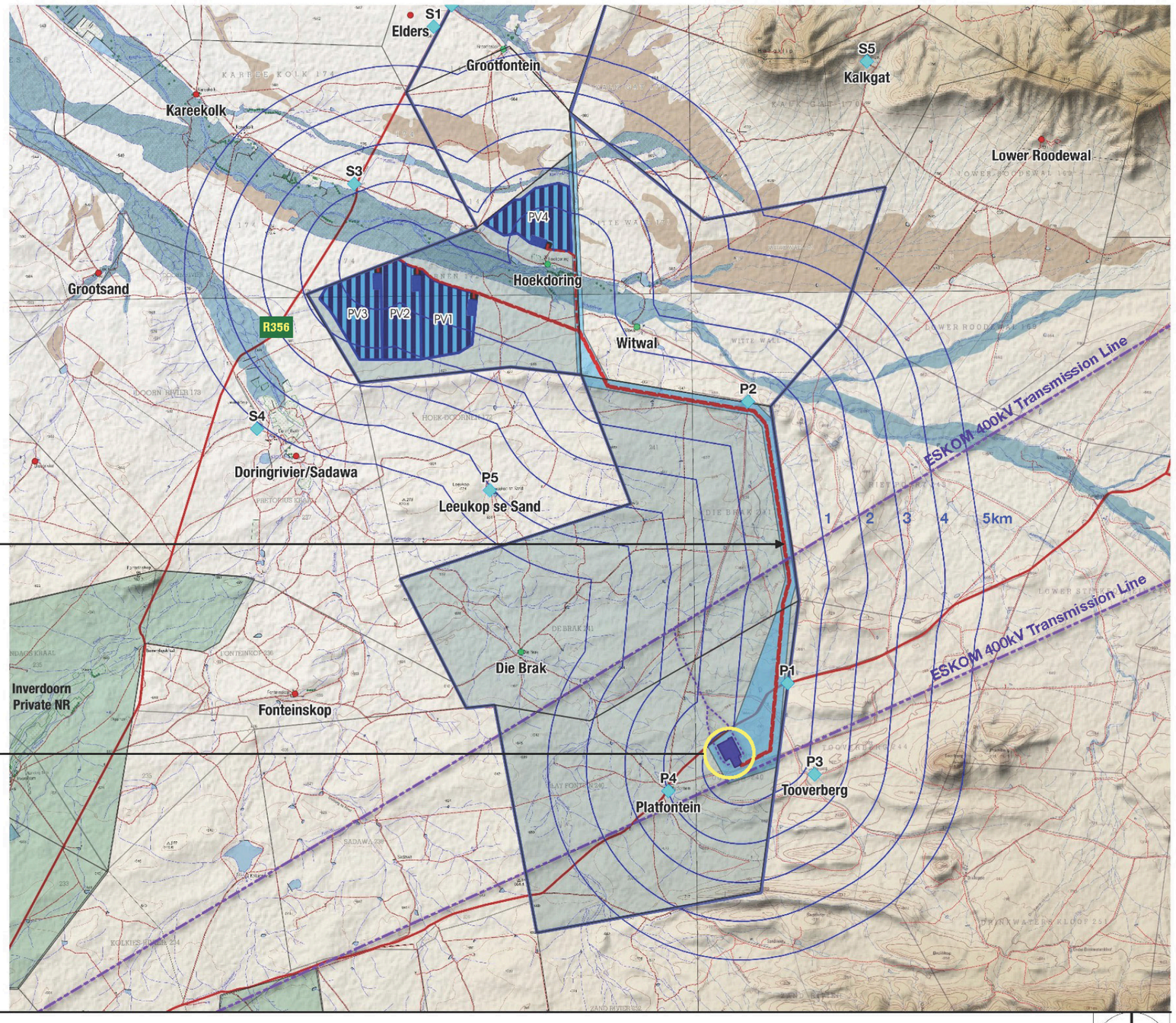
1:60 000 @ A3

LEGEND :

- Hoekdoornen PV1, PV2, PV3 and PV4
- FieldTrack Route
- Viewpoints
- Farmsteads within Study Area
- Farmsteads outside Study Area

Hoekdoornen 4x 132kV Overhead Powerlines within Servitude Corridor

ESKOM Kappa SubStation



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 5 : Project Layout • Hoekdoornen PV1, PV2, PV3 and PV4 132kV Powerlines max 30m High

0 1 2 3 4 5 km
1:100 000 @ A3

Viewshed Legend :

- High Visibility
- Medium Visibility
- Low Visibility
- No Visibility (View Shadow)

SubStations

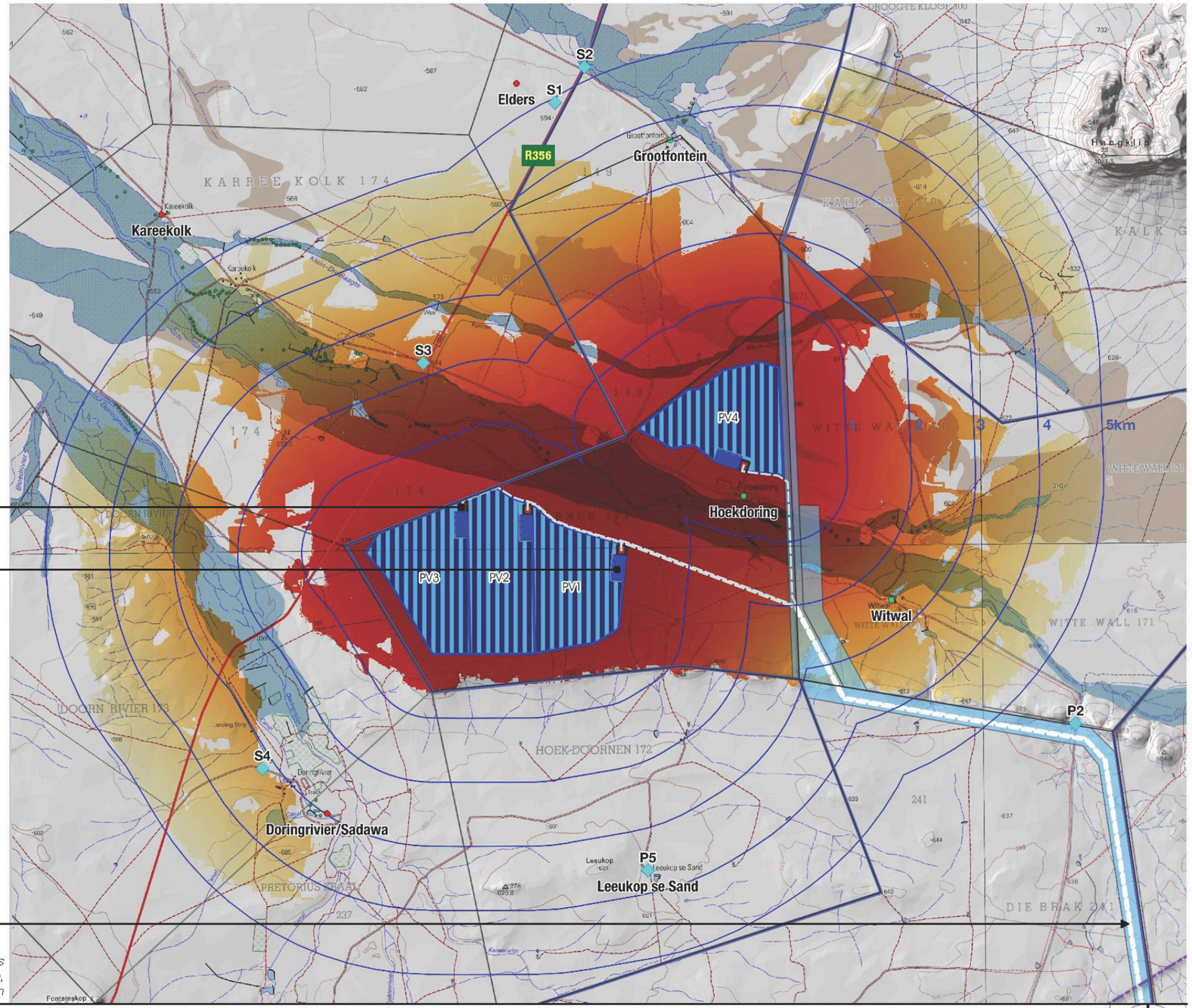
Battery Energy Storage Systems

LEGEND :

- PV1 — Hoekdoornen PV1, PV2, PV3 and PV4
- S4 S — Viewpoints
- Die Brak — Farmsteads within Study Area
- Elders — Farmsteads outside Study Area

Hoekdoornen 4x 132kV Overhead Powerlines

base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Plenaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein



map 6 : Viewshed • Hoekdoornen PV1, PV2, PV3 and PV4 Solar Arrays max 10m High

Viewshed Legend :

High Visibility

Medium Visibility

Low Visibility

No Visibility (View Shadow)

LEGEND :

PV1 Hoekdoornen PV1, PV2, PV3 and PV4

FieldTrack Route

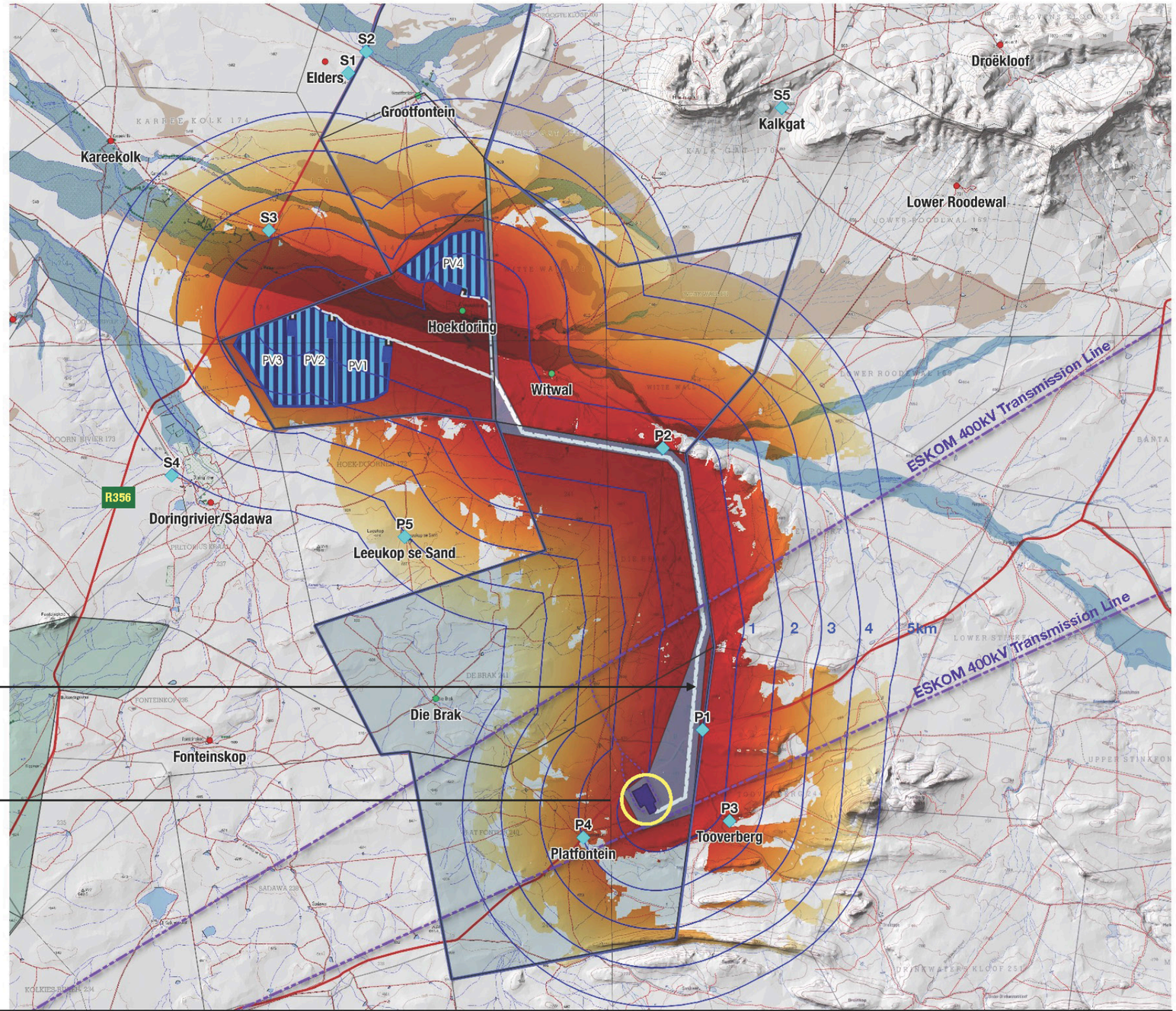
S4 S Viewpoints

Die Brak Farmsteads within Study Area

Elders Farmsteads outside Study Area

Hoekdoornen 4x 132kV Overhead Powerlines within Servitude Corridor

ESKOM Kappa SubStation



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 7 : Viewshed • Hoekdoornen PV1, PV2, PV3 and PV4 132kV Powerlines max 30m High

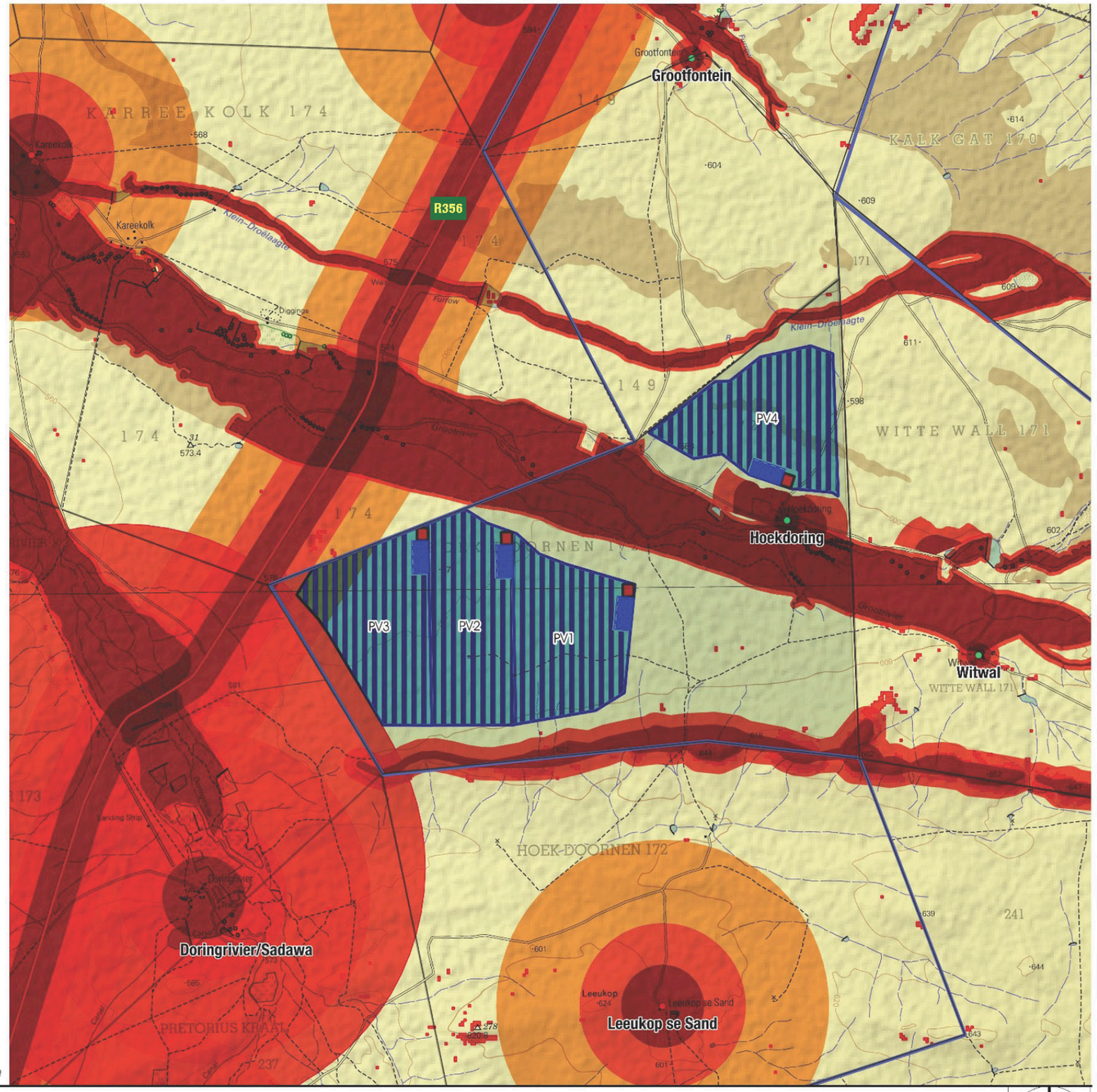
0 1 2 3 4 5 km

1:100 000 @ A3

VISUAL SENSITIVITY LEGEND :

- VERY High (NoGo) Sensitivity
- High Sensitivity
- Medium Sensitivity
- Low Sensitivity

(See Table 5 for buffer distances)



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 8 : Visual Sensitivity • Hoekdoornen PV1, PV2, PV3 and PV4

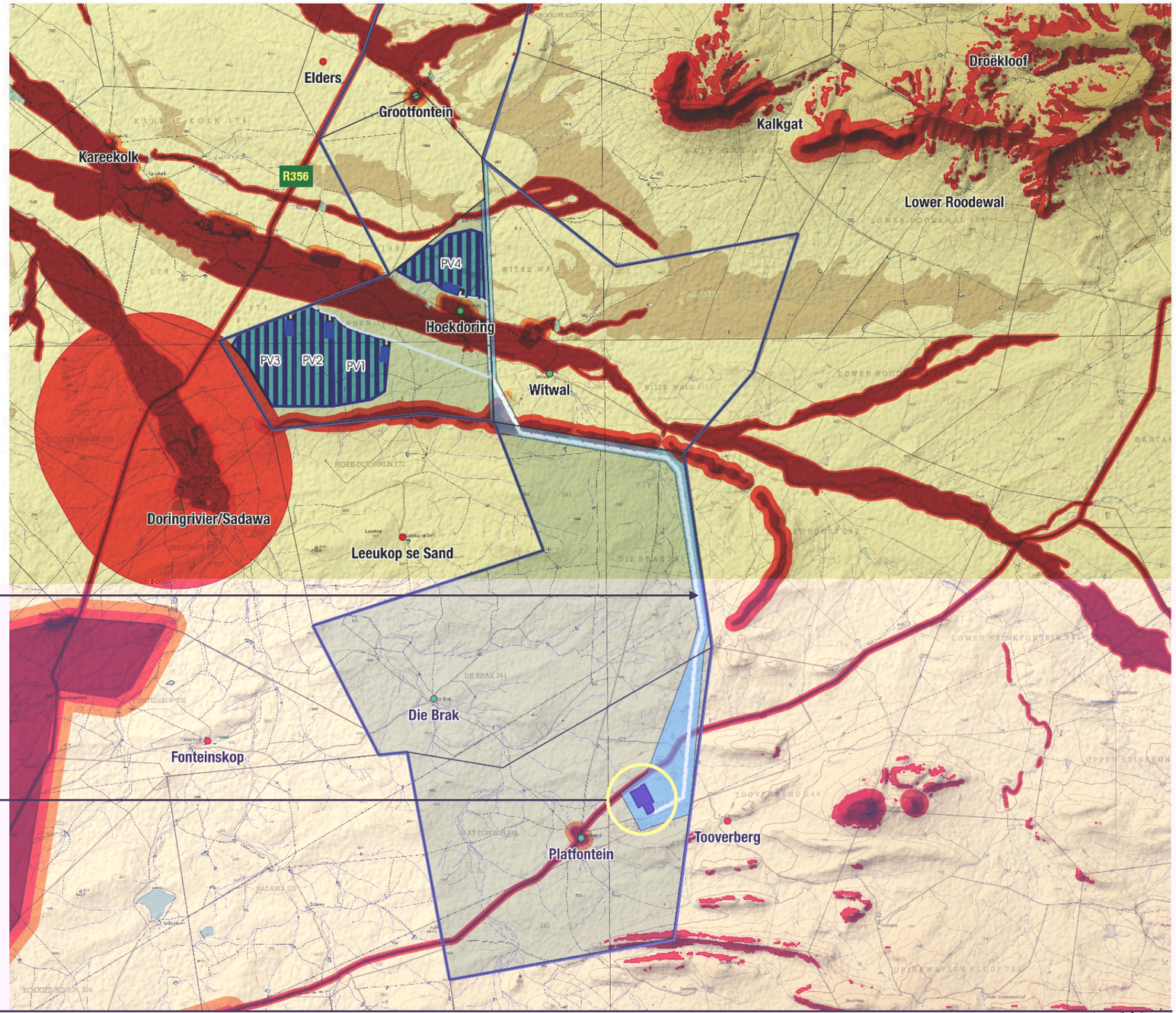
0 2.5 5 7.5 10 km

1:50 000 @ A3

VISUAL SENSITIVITY LEGEND :

- VERY High (NoGo) Sensitivity
- High Sensitivity
- Medium Sensitivity
- Low Sensitivity

(See Table 6 for buffer distances)



base map : NGI 1:50K Topographic Series 3219DD Kareekolk, 3220CC Pienaarsfontein, 3319BB Inverdoorn, 3320AA Brewelsfontein

map 9 : Visual Sensitivity • Hoekdoornen Connecting Power Lines 4x 132kV max 30m High

0 1 2 3 4 5 km

1:100 000 @ A3

***Viewpoint S3** : looking East from Kareekolk Gate*

Location 32.973741°S 19.907129°E Distance 3.52km

***Viewpoint S3** : looking South-East from Kareekolk Gate*

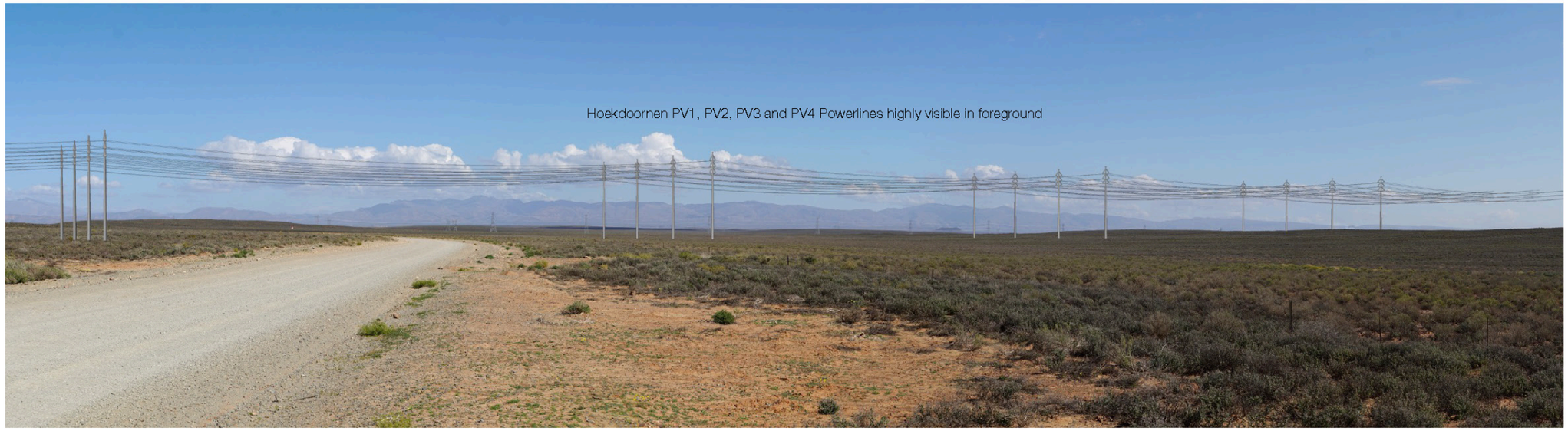
Location 32.973741°S 19.907129°E Distance 2.22km

Figure P1 : Photomontages • Hoekdoornen PV1, PV2, PV3 and PV4 : SPV Viewpoints

***Viewpoint S4** : looking North-East from Sadawa Gate*

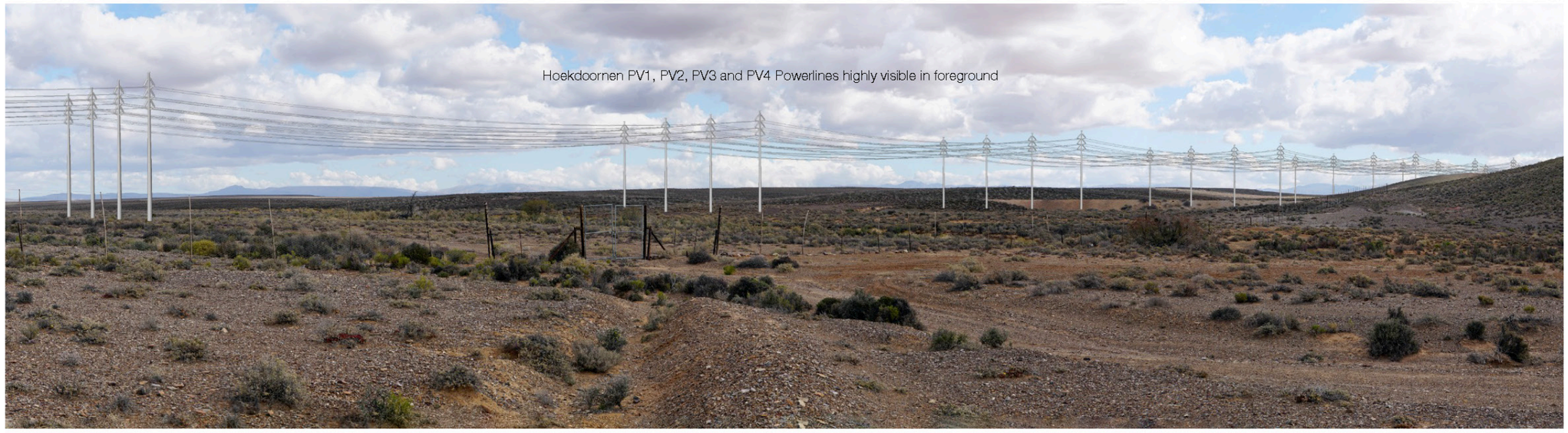
Location 32.030539ºS 19.879571ºE Distance 3.20km

Figure P2 : Photomontages • Hoekdoornen PV1, PV2, PV3 and PV4 : SPV Viewpoints



***Viewpoint P1** : looking West from District Road at Powerline Crossing*

Location 33.091035°S 20.025678°E Distance 273m



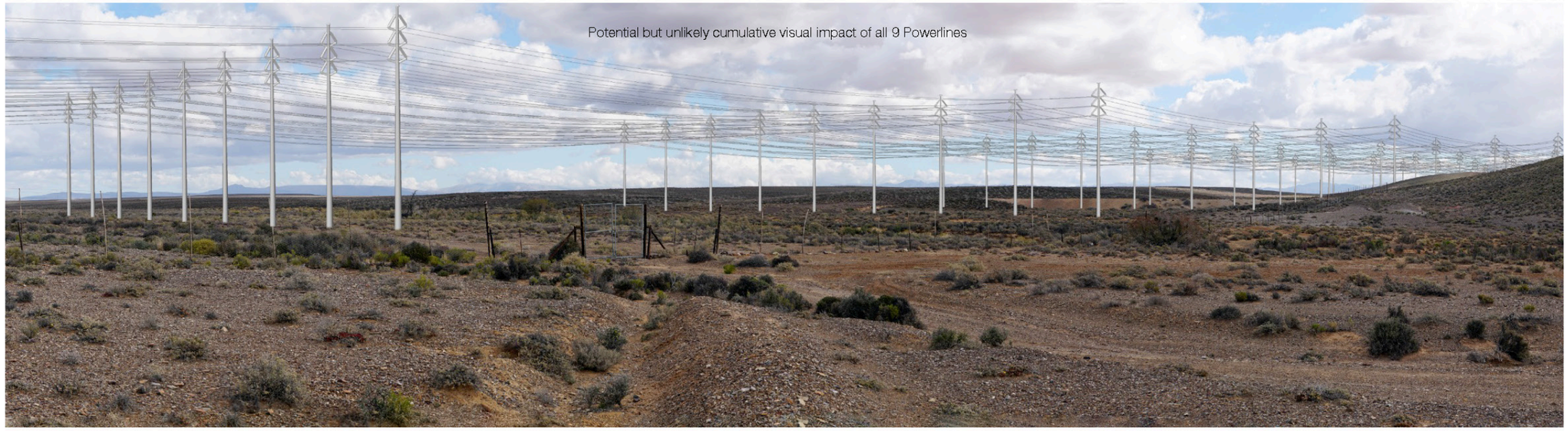
***Viewpoint P2** : looking South-West from Wittewall Gate at Powerline Crossing*

Location 33.025376°S 20.015431°E Distance 193m

Figure P3 : Photomontages • Hoekdoornen : Powerline Viewpoints P1 and P2

***Viewpoint P1** : looking West from District Road at Powerline Crossing*

Location 33.091035°S 20.025678°E Distance 195m



***Viewpoint P2** : looking South-West from Wittewall Gate at Powerline Crossing*

Location 33.025376°S 20.015431°E Distance 116m

Figure P4 : Photomontages • Powerline Viewpoints P1 and P2 showing all 9 potential 132kV powerlines