VISUAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED GRUISFONTEIN COAL PROJECT, LOCATED NEAR LEPHALALE IN THE WATERBERG DISTRICT, LIMPOPO PROVINCE

Prepared for

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EXECUTIVE SUMMARY

The Visual Impact Assessment (VIA) report forms part of the Environmental Impact Assessment (EIA) process being undertaken by Jacana Environmentals cc for the establishment of the proposed Gruisfontein Coal Project, to be located on the farm Gruisfontein 230LQ (hereafter referred to as the "farm Gruisfontein" or the "project area"). The farm Gruisfontein is located within the Lephalale Local Municipality and the Waterberg District Municipality, in the Limpopo Province, approximately 15km north of the Steenbokpan (Lesedi) settlement and 18km southwest of the Stockpoort Border Post. The project area is located within a region with overall low levels of development, with the most significant exceptions being the town of Lephalale and adjacent settlements of Onverwacht and Marapong, the Matimba and Medupi Power Stations, the Grootegeluk Mine (all located between 30 and 50km to the southeast of the project area) and the paved R510 regional road to the northeast.

The project area is located within a region characterised by game and livestock farming. The farm Gruisfontein is a privately-owned farm, also used for cattle and game ranching and has an extent of around 1 136.1 hectares (ha).

A VIA involves the collation and interpretation of spatial and elevation data applicable to the project area and surrounds, and takes cognisance of the aesthetic aspects of the receiving environment in terms of topography, vegetation cover, prevailing land uses, landscape character, sense of place, Visual Absorption Capacity (VAC) and visual intrusion on the one hand, and the location, exposure and sensitivity of potential visual receptors towards the project on the other.

Method of Assessment

Geographic Information Systems (GIS) mapping, using the expected heights of the individual project infrastructure components as input data, was undertaken to determine the theoretical zone of visual influence and corresponding locations of potential visual receptor sites, where full, partial or obscured views between receptors and the proposed infrastructure exist, without taking screening effects from existing vegetation and man-made infrastructure into account.

A field assessment was undertaken over three (3) days from 21 to 23 January 2019 to verify the findings of the desktop assessment, to gain an understanding of the prevailing land uses and landscape character of the region and to determine the actual zone of visual influence and visibility of the project infrastructure by taking the level of screening provided by existing vegetation and man-made infrastructure, into account.

Project Description

The proposed project involves the mining of coal through an open pit truck and shovel mining method and the development of associated mining-related infrastructure. Surface infrastructure of increased height include a Coal Handling and Preparation Plant (CHPP) with an expected height of 25m, and various stockpiles, of which the majority range between 5m and 15m in height. Of particular significance to the VIA is the Long-term Discard Dump which is proposed to come into operation from Year 4 onwards, until Year 16, where after discard material from the dump will be used for backfilling of the open pit (Jacana Environmentals cc, 2019). Around Year 16, it is therefore expected that the discard dump will reach its maximum height of 90m.

The results of the VIA are summarised below. Please refer to the relevant section in the report for detailed analyses of the findings.

Description of the Receiving Environment

Description of the Receiving Environment	
Topography	Level plains with some relief; the project area slopes slightly towards the north and northwest in the direction of the Limpopo River. No prominent ridges or distinct topographical features are associated with the project area and immediate surrounds.
Vegetation	Vegetation within the region is relatively homogeneous, dense and of medium height (up to 10m). Vegetation in the region provides good screening of existing mining infrastructure, such as noted at Grootegeluk Coal Mine.
Land Uses	Within the project area and immediate surrounds:

	• Game and cattle farming; and • Tourism: hunting and recreational tourism, including lodges, camps and game ranches. In the region: • Game and cattle farming; • Tourism: hunting and recreational tourism, including accommodation such as lodges, safari and hunting camps and game ranches, also a prominent land use along the Limpopo River to the northwest; • Mining: Grootegeluk Coal Mine; • Industrial: Matimba and Medupi Coal Fired Power Stations; and • Conservation: various Private Nature Reserves (PNRs), Nature Reserves and Game Reserves are located in the vicinity of the project area. The Waterberg Biosphere Reserve is located approximately 54km to the south of the project area.
Heritage	It is expected that the region is highly valued by residents, landowners and communities, as well by tourists visiting or frequenting the area. No heritage sites of outstanding significance are known to occur within the project area (R & R Cultural Resource Consultants, 2019).
Visual Characteristics of the Project Area and Surrounds	
Landscape Character	Rural, level, open bushveld interspersed regularly with unpaved access roads.
Sense of Place	The receiving landscape exhibits an identifiable and positive sense of place, which can be defined as natural and rural bushveld. The sense of place is mainly attributed to the presence of distinctive bushveld vegetation, the vast skies, the relative proximity of the Limpopo River, and the overall relaxed and tranquil atmosphere.
Landscape Value	Moderate: • The landscape is considered to have moderate importance and rarity in terms of recreational value, scenic beauty, tranquillity or wildness, cultural associations or other conservation interests. • The landscape has limited potential for substitution (once it is lost it is unlikely to be regained).
Landscape Condition and Quality	Moderate: • Although the receiving landscape is relatively uniform, no distinct landscape features, such as prominent hills or watercourses are present within the project area. • The vegetation and scenic resources are largely intact although a few distracting or contrasting landscape elements, such as signage, access roads and bare road reserves, power lines, gates and fences are present. • The landscape is cohesive and in an overall good condition, but relatively well-represented in the region. • Landscape elements, such as the existing bushveld vegetation contribute towards the overall positive character of the area.
Landscape Sensitivity	Medium: • The landscape has some capacity to accept well-planned and designed change and development.
Visual Absorption Capacity (VAC)	Moderate: • Existing vegetation is the primary contributor to screening of infrastructure, with screening from man-made structure and topography being limited. • Overall visual variety and topographical diversity in the area is low and the homogeneous landscape and vegetation pattern will contribute to the increased visual intrusion of infrastructure that contrasts with the receiving environment.
Visual Intrusion	High: • The proposed project and change in land use are likely to result in a noticeable change or are discordant with the surroundings.

Viewshed and Elevation Profile Analysis

- A computer-generated viewshed analysis (also referred to as a zone of theoretical visibility or zone of visual influence) based on elevation and topography, was undertaken in order to determine, at a landscape scale, from where the proposed project infrastructure will theoretically be visible.
- From the viewshed analysis of individual project components, it was found that the Long-term Discard Dump (90m high) and CHPP (25m high) will theoretically be highly visible, while the ROM, Hard Overburden Dump (15m) and Product Stockpiles (12m high) will be moderately visible. The remaining infrastructure components, all below 5m in height or at ground level, are expected to have low visibility.
- From the combined viewshed analysis it was found that:
    - the proposed project will theoretically be visible from almost all areas within 5km of the project area and intermittently within 10km thereof;

  - the combined viewshed coverage area extends up to 20km to the south, to include the Steenbokpan (Lesedi) settlement and small commercial centre, up to 30km to the southeast and up to around 15km to the east and west, but not as far as the town of Lephalale and surrounding settlements to the east and southeast;
  - the proposed project will theoretically be visible to the north, including certain locations adjacent to the Limpopo River, and extend beyond the South African-Botswana border.
- Elevation profile analyses were undertaken in support of the viewshed analysis regarding whether full, partial or obstructed views toward the project from various receptors sites potentially exist. Cross sections through the landscape were selected to include as many potential visual receptors located in various directions as possible, and to specifically include areas shown to be located within the combined viewshed coverage area. Elevation profiles were digitally generated and analysed by superimposing infrastructure components, to scale, onto the profiles.

Visual Exposure and Important Observation Points (IOPs)

- Screening provided by existing vegetation and man-made infrastructure is likely to significantly reduce the theoretical viewshed/ zone of visual influence, since increasing distance from the infrastructure will also serve to exponentially reduce visual exposure towards the project (Oberholzer, 2005). For this reason, distance zones as prescribed by BLM (1984) were implemented to more accurately identify visual receptors and visual receptor sensitivity classes, and to determine such receptors' level of visual exposure towards the proposed infrastructure.
- IOPs analysed during the field assessment confirmed that the actual zone of visual influence of the project is smaller than the theoretical viewshed, mainly due to the effect of distance and effective screening afforded by existing vegetation, particularly when considering infrastructure of less significant heights. It is unlikely that any infrastructure will be visible beyond 15km of the project footprint area.

Sensitive Visual Receptors

Based on the findings of the viewshed and line of sight analysis and initial identification of potential receptor types and receptors sites, together with the application of distance zones confirmed during the field assessment, sensitive visual receptors were identified as follows:

Visual Sensitivity Class	Receptors types and receptor sites
High	• Residents and residences, hunting and tourism operators and tourists, including associated farms, within 5km of the project footprint area. • Protected and conservation areas: Jacobs PRN and Emaria PRN.
Medium	• Residents and residences, hunting and tourism operators and tourists, including associated farms, within 5 – 10km of the project footprint area with a clear line of sight/ unobstructed view towards the project infrastructure. • Motorists on the D175 district road to the north and west of the project area, located within 5km of the project area. • Protected and conservation areas: Jancornel PRN.
Low	• Residents and residences, hunting and tourism operators and tourists, including associated farms, within 10 – 15km of the project area, with a clear line of sight/ unobstructed views towards the project infrastructure. • Towns and settlements within 10 – 15km of the project area: Steenbokpan (Lesedi village) where a clear line of sight exist toward the project infrastructure. • Protected and conservation areas: Jee Lee PRN. • Motorists on the D2001, D2286, D175 and D1675 (Marula Route) district roads within 5 – 15km of the project area where a with a clear line of sight towards the project infrastructure.

The proposed project will not be visible from the R510 regional road (Mokolo Route), the town of Lephalale and Onverwacht and Maropong settlements, nature and game reserves beyond 15km of the project footprint area, or from the Waterberg Biosphere Reserve.

Impact Assessment Results

The results of the impact assessment are summarised in the table below.

No/	Impact Description	Without Mitigation (WOM)	With Mitigation (WM)
Pre-construction/ Planning Phase			
1.	Visual intrusion and visibility	Low to Medium	Low
	Construction Phase		
2.	Visual intrusion and visibility	Medium	Low to Medium
3.	Landscape character and sense of place	Medium	Low to Medium
Operational Phase			
4.	Visual intrusion and visibility	Medium to High	Medium
5.	Landscape character	Medium to High	Medium
6.	Topographic alteration	Medium to High	Low to Medium
7.	Night-time lighting	Medium to High	Low to Medium
Closure and Decommissioning			
8.	Visual intrusion and visibility	Medium	Low to Medium

Conclusion

From the findings of the VIA, it may be concluded that the proposed project will have an overall moderate to low significance visual impact on the receiving environment in its current condition, should effective mitigation measures as presented in this report be implemented. This is mainly due to the relative isolation of the project area in relation to sensitive visual receptors, the relatively short period (3 - 5 years) when infrastructure heights will be at a maximum, and importantly, the presence of existing vegetation in the area that provides high levels of visual screening. The majority of infrastructure components, all of which are considered incompatible with the surroundings, such as the CHPP and open pit, will be effectively obscured from view from the surrounding visual receptor sites and IOPs identified, such as residential, tourism and hunting infrastructure on surrounding farms, regional and district roadways, and protected/ conservation areas. Adjacent landowners and residents utilising farm roads or bushveld areas in proximity to the project area may however be afforded occasional views of infrastructure components below 30m in height, depending on their location in relation to the infrastructure.

The Long-term Discard Dump will be the most visually intrusive infrastructure component. It is expected to reach a maximum height of up to 90m around Year 16 of the mining operation and will be at least partially visible up to 15km from the project area from all viewing directions during this time period (possibly up to 3 to 5 years), prior to backfilling taking place. Night-time lighting, topographic alteration, dust, an increase in vehicular movement on local roads and cumulative impacts, as well as residual impacts post-closure as a result of ineffective rehabilitation are other impacts that have been considered in the VIA.

It is of significance to note that the proposed project is located within the Waterberg Coalfield, a region indicated in terms of the Waterberg District Environmental Management Framework (EMF; 2017) as a 'mining focus area'. A number of coal mining projects are proposed in the immediate vicinity of the project area, and various applications for supporting infrastructure, such as power lines, road diversions, pipelines and rail loops are also currently underway. Mineral rights, for both prospecting and mining, are held by various companies in the vicinity of the farm Gruisfontein. While the aforementioned contribute to the cumulative visual impact that the proposed project may have on the receiving landscape, it also highlights the proximity of potential future mining and industrial developments, and the perceived manner in which the landscape character and sense of place in the region may possibly change in future.

Based on the findings of this VIA, it has been determined that sufficient information is available to guide the competent authority in the decision-making process from a visual perspective. Based on the available information and visual analyses set out in this report, no foreseeable fatal flaws are associated with the project from a visual impact perspective, provided that effective mitigation measures are implemented, and that potential residual visual impacts are managed throughout the life of the project. In this regard specific mention is made of effective planning for rehabilitation and revegetation from the time of project initiation.

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ABBREVIATIONS AND ACRONYMS

ARC	Agricultural Research Council
BAP	Biodiversity Action Plan
BGIS	Biodiversity Geographical Information Services
CHPP	Coal Handling and Preparation Plant
DEA & DP	(Western Cape) Department of Environmental Affairs and Development Planning
DEA	Department of Environmental Affairs
DEM	Digital Elevation Model
DWA	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
GIS	Geographic Information System
GPS	Global Positioning System
Ha	Hectares
IAPs	Interested and Affected Parties
IDP	Integrated Development Plan
ILP	Institute of Lighting Professionals
IOP	Important Observation Point
LDP	Limpopo Development Plan
LED	Light Emitting Diode
LI & IEMA	United States Landscape Institute and Institute of Environmental Management and Assessment
LoM	Life of Mine
m.a.m.s.l.	meters above mean sea level
MAP	Mean Annual Precipitation
ME	Mitigation Efficiency
MRA	Mining Right Application
PNR	Private Nature Reserve
QDS	Quarter Degree Square
ROM	Run of Mine
SAPAD	South African Protected Areas Database
SACAD	South African Conservation Areas Database
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SFM	Significance Following Mitigation
SFM	Significance Following Mitigation
SR	Significance Rating
UNESCO	United Nations Educational, Scientific and Cultural Organisation
USDA	United States Department of Agriculture
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
WM	With Mitigation
WOM	Without Mitigation

GLOSSARY OF TERMS

Characterisation	The process of identifying areas of similar character, classifying and mapping them and describing their character.
Characteristics	Elements, or combinations of elements, which make a particular contribution to distinctive character.
Digital Elevation Model	Three-dimensional topographic models or simulations created by a computer using digital data.
Elements	Individual components which make up the landscape, such as trees and hedges.
Features	Particularly prominent or eye-catching elements, like tree clumps, church towers, or wooded skylines.
Impact (visual)	A description of the effect of an aspect of the development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.
Landscape Character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape Character Type	A landscape type will have broadly similar patterns of geology, landform, soils, vegetation, land use, settlement and field pattern discernible in maps and field survey records.
Landscape Condition	This is based on judgements about the physical state of the landscape, and about its intactness, from visual, functional and ecological perspectives. It also reflects the state of repair of individual features and elements which make up the character in any one place.
Landscape Sensitivity	The extent to which a landscape can accept change of a particular type and scale without unacceptable adverse effects on its character.
Landscape Value	The relative value or importance attached to a landscape (often as a basis for designation or recognition), which expresses national or local consensus, because of its quality, special qualities including perceptual aspects such as scenic beauty, tranquillity or wildness, cultural associations or other conservation issues.
(Visual) Receptors	Viewers who would be affected by a proposed development or who are subject to the visual influence of a particular project, the viewers usually being residents, commuters, visitors or tourists.
Scenic route	A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.
Sense of place	The unique or special qualities found in a particular location, including the combined natural, cultural, aesthetic, symbolic and spiritual qualities.
View corridor	A linear geographic area, usually along movement routes, that is visible to users of the route.
Viewpoint	A selected point in the landscape from which views of a particular project or other feature can be obtained.
Viewshed	A geographic zone encompassing a view catchment area, usually defined by ridgelines, similar to a watershed.
Visual Absorption Capacity	The ability of an area to visually absorb development as a result of screening topography, vegetation or structures in the landscape.
Visual exposure	The relative visibility of a project or feature in the landscape.
Zone of Visual Influence	An area subject to the direct visual influence of a particular project.

LEGAL REQUIREMENTS

In terms of the National Environmental Management Act No. 107 of 1998 (NEMA) 2014 Environmental Impact Assessment (EIA) Regulations contained in GN R982 of 04 December 2014 (as amended in 2017) a specialist report must contain all information set out in Appendix 6 to these Regulations, as summarised in the table below.

Legal Requirement	Relevant Section in Report
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;	Annexure A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Annexure A
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.2
(cA) an indication of the quality and age of base data used for the specialist report;	Section 3.2 and 3.3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.3
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Sections 3.2 and 3.3
(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;	Sections 5.2 and 6.3
(g) an identification of any areas to be avoided, including buffers;	N/A
(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;	Section 6.3
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities, including identified alternatives on the environment;	Sections 4, 5 and 6
(k) any mitigation measures for inclusion in the EMPr;	Section 7.1
(l) any conditions for inclusion in the environmental authorisation;	Section 7.1
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7.6
(n) a reasoned opinion – (i) as to 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 8
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 6.1
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
(q) any other information requested by the competent authority.	N/A

1. INTRODUCTION

1.1 Background

Field and Form Landscape Science was appointed by Jacana Environmentals cc to undertake a Visual Impact Assessment (VIA) for the proposed Gruisfontein Mining Right Application (MRA), hereafter referred to as the 'Gruisfontein Project' or the 'proposed project'. The proposed project is to be located on the farm Gruisfontein 230 LQ, hereafter referred to as the 'farm Gruisfontein' or the 'project area'. The farm Gruisfontein is located within the Lephalale Local Municipality and the Waterberg District Municipality, in the Limpopo Province, approximately 15km north of the settlement of Steenbokpan (also referred to as Lesedi, a settlement located on the farms Steenbokpan and Vangpan) and 46km to the northwest of the town of Lephalale (Figures 1 & 2).

The proposed project involves the mining of coal through an open pit truck and shovel mining method and the development of associated mining-related infrastructure as described in Section 2.

The farm Gruisfontein can be accessed by a municipal gravel road (D175) which heads north towards the border between SA and Botswana (defined by the Limpopo River), which is located approximately 8km to the northwest. The farm can be accessed from this road via another farm road which leads to the south western boundary of the project area. The only regional road in the area is the Lephalale-Rustenburg roadway (R510), which runs approximately 43km to the east of the project area and extends north up to the Stockpoort Border Post, while the Lephalale-Steenbokpan Road (D1675) is located approximately 12km to the south.

The land use in the vicinity and within the project area is that of cattle and game farming, including hunting and tourism opportunities. While some disturbance has occurred within the project area due to these and related activities, the majority of the farm Gruisfontein comprises natural vegetation. Development in the immediate region is mainly limited to low-density residential dwellings and related outbuildings, low-density infrastructure associated with cattle and game farming, as well as lodges, ranches, hunting camps and accommodation facilities, also bordering the Limpopo River. Existing large-scale infrastructure in the vicinity and within 50km of the project area of the farm Gruisfontein include the significant Grootegeluk Coal Mine, Eskom's Matimba Coal Fired Power Station and Eskom's new Medupi Coal Fired Power Station which is currently under construction. Several other infrastructure and projects, particularly mining-related projects, are also currently being considered for environmental authorisation.

The topography associated with the project area and the surrounding region is relatively level, with no significant distinguishing topographical features such as rivers or watercourses, or prominent hills, rocky outcrops or ridges present. The Limpopo River to the northwest is not visible from within the project area.

The purpose of this VIA report is to describe the receiving environment in terms of its existing landscape and aesthetic characteristics, and to define the location and visual sensitivity of potential viewers or receptors, in order to determine the potential visual impacts and the degree of significance that may be experienced by sensitive visual receptors due to visual alteration of the landscape as a result of the proposed mining infrastructure and activities. This report, based on its outcomes, should serve to inform the planning and design of the proposed project from a visual and aesthetic perspective and should be considered in decision-making processes during the environmental authorisation process.

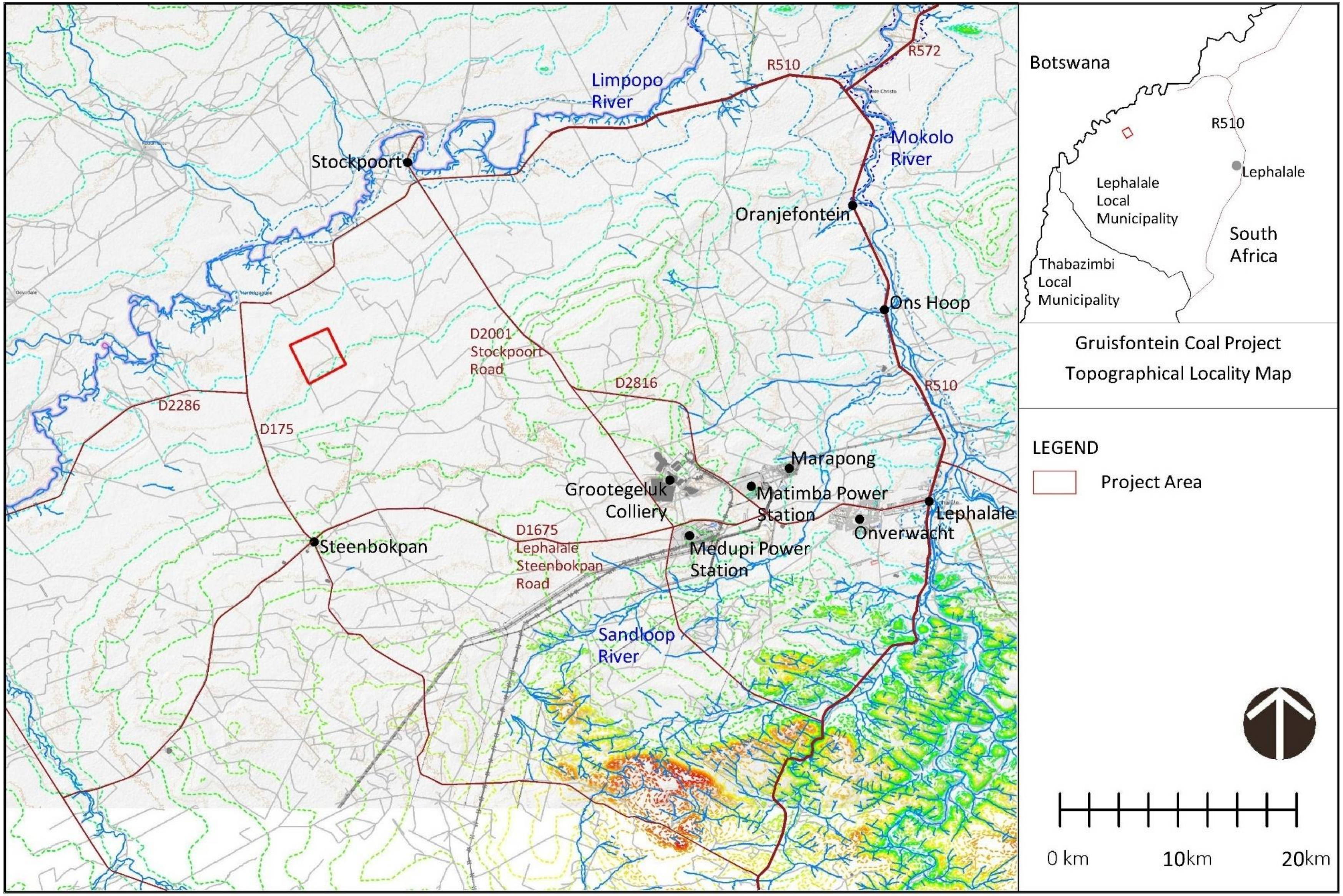


Figure 1. Topographical locality map of the project area.

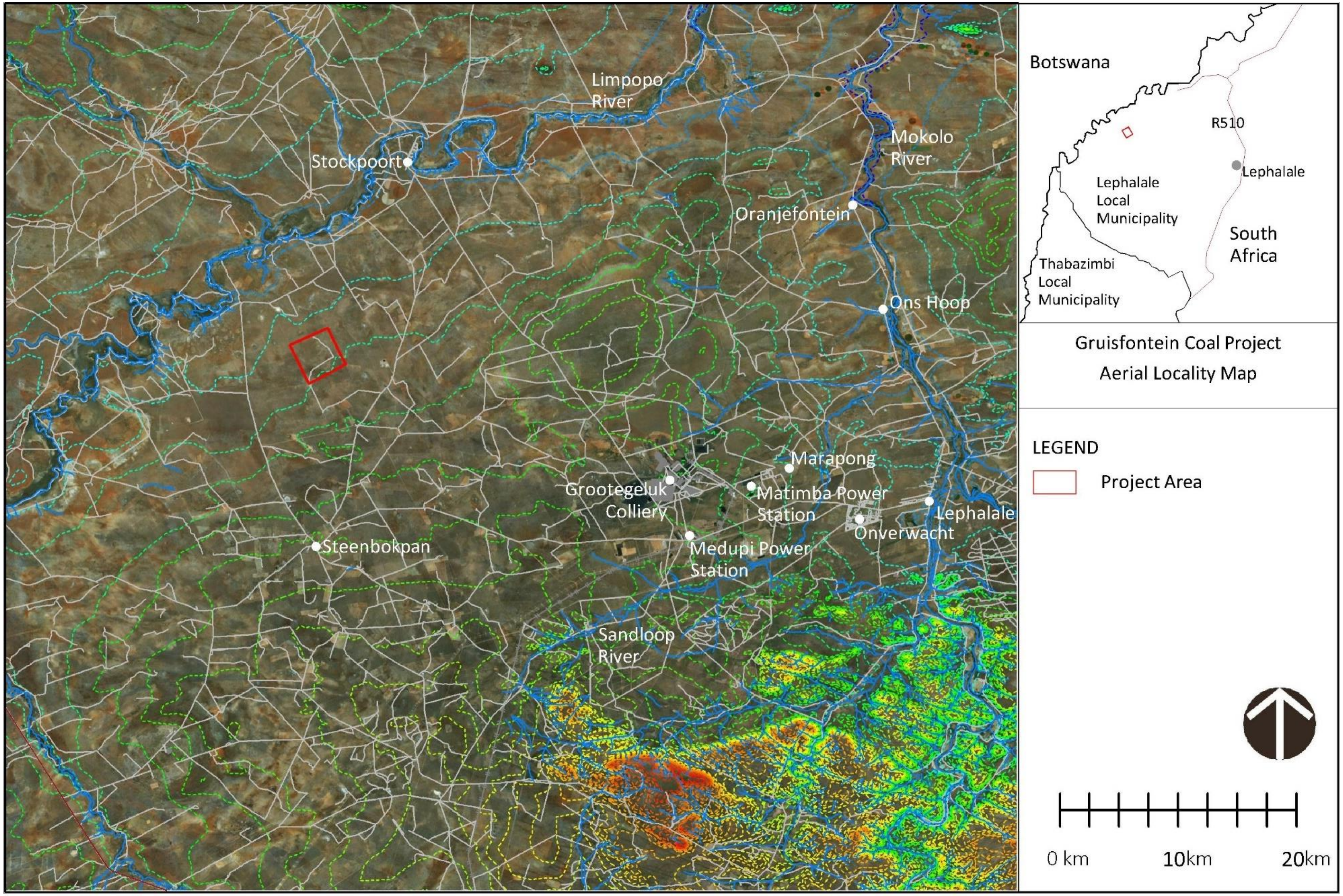


Figure 2. Aerial locality map of the project area.

1.2 Scope

According to Oberholzer (2005), a VIA entails a process of data collection, spatial analysis, visualisation and interpretation to describe the receiving landscape setting before development takes place and then identifying possible visual impacts resulting from the development. The scope of the VIA report is as follows:

- To provide a description of the proposed project, including the proposed layout and expected heights of infrastructure;
- To provide a visual resource description of the receiving visual and aesthetic environment in terms of:
    - the local and regional biophysical and socio-economic landscape setting which serve to inform the identification and sensitivity of visual receptors; and
    - the specific attributes of the receiving landscape in terms of aspects such as perceived value, condition and sense of place, as well as the level of visual intrusion that the landscape can accommodate.
- To define potential visual receptors, determine their locations in relation to the project area and evaluate the expected level of visual exposure towards the project, through both desktop and field assessments;
- To develop conceptual visual simulations from identified Important Observation Points (IOPs) or viewing locations;
- To identify anticipated visual impacts (including residual and cumulative impacts) on visual receptors and to evaluate the degree to which the visual resource can accommodate the expected change that will occur as a result of the proposed project;
- To evaluate and discuss project alternatives, where applicable; and
- To develop appropriate mitigation and management measures, as well as monitoring requirements in order to minimise potential visual impacts as far as possible.

1.3 Limitations to the Assessment

The following limitations are applicable to the study:

- No specific visual specialist guidelines exist for the Limpopo Province specifically and therefore, the Guidelines for Involving Visual and Aesthetic Specialists in the EIA Process (Oberholzer, 2005), prepared for the Western Cape Department of Environmental Affairs and Development Planning (DEA & DP) was used in determining the development category and the level of visual input required, and as a general guideline in developing the VIA;
- Assessing visual impacts always contain an element of subjectivity and certain aspects are based on the informed judgement of the assessor. As such, visual impacts may be difficult to assess or quantify because a person’s perception is affected by more than only the immediate environmental factors and because visual and scenic resources often have cultural or symbolic meaning (Oberholzer, 2005);
- All desktop information contained in this study and databases consulted, as well as the input data such as proposed infrastructure heights, are based on the most recent information available and are assumed to be accurate at the time of assessment;
- Although the proposed stockpiles and discard dumps may never reach the stipulated final design heights as indicated in Section 2.2 due to this material being used in progressive backfilling, the worst-case scenario was considered in developing viewsheds and elevation profiles and in assessing the potential visual impacts;

- Not all properties where potential sensitive visual receptors reside (and where important potential observation points are located) could be accessed at the time of assessment due to property owners and residents being out of town. Such properties include certain residential and tourism structures located within 5km of the proposed project, such as the residence on the farm Pentonville, located approximately 3.75km north of the project area, the hunting lodge of the farm Wynberg, located approximately 3.2km northeast of the project area and the residence (labour tenant) on the farm Duikerpan, located around 2.43km south of the project area;
- Due to the wide distribution of residential buildings, outbuildings, support infrastructure and hunting/ tourism destinations in the area, beyond 5km of the project, field verification of these locations and determination of the visual exposure at these locations were not undertaken; and
- The study does not include an assessment of the visual impact beyond the border of South Africa, although the viewshed generated extends into neighbouring Botswana.

2 PROJECT DESCRIPTION

The section below provides a brief overview of the proposed project (Jacana Environmentals cc, 2019).

2.1 Mining Method

Mining Method Selection

The selected mining method for the proposed project is an open pit truck and shovel operation.

Overburden and Carbonaceous Material Handling

The approach to the handling of the overburden and carbonaceous material is described below:

First Three Years

Discard, soft overburden, hard overburden and carbonaceous material will be stockpiled separately, although the commencement of the construction of the long-term discard/ carbonaceous dumps will take place in terms of the construction of the paddocks using hard and soft overburden. A short-term discard dump will be constructed to the west of the proposed plant.

From Year 4 Onwards

All the waste material from the open pit, including the plant discard will be stockpiled on the long-term dump. Topsoil will be stockpiled separately.

Once sufficient room has been established in the open pit, in-pit stockpiling of carbonaceous material and discard will take place. For the purpose of this study, and as a worst-case scenario, it is assumed that all material over the 16-year+ Life of Mine (LoM) will be stockpiled on surface. Backfilling is expected to only start after Year 16.

During the next study phase in planning of the mine an optimised mine plan will be developed to create sufficient space for in-pit back filling as soon as practically possible. The size of the current dumps should therefore reduce substantially in size.

Discard Handling

During the first three years of operation, the plant discard will be placed on a temporary discard dump located in close proximity to the Coal Handling and Processing Plant (CHPP).

Final Open Pit Rehabilitation

The overall LoM of Gruisfontein is at yet to be determined, but it will be in excess of 16 years. Once the LoM has reached 16 years, backfilling of the open pit will commence using the surface method model described above whereby paddocks will be constructed with soft and hard overburden and the paddocks filled with carbonaceous material and discard.

This operation will advance in the direction of mining until the open pit has exhausted its reserve base. Once mining operations have ceased, the surface stockpiles comprising of soft and hard overburden, carbonaceous material and discard will be transported back into the pit and levelled. Thereafter, the soft overburden and topsoils used to construct the surface berms will be used to cover the material transported back into the pit as final layer works.

Hours of Operation

24 hours per day.

Conveyance Equipment/ Type

Stockpile loading and conveyance of material will take place by means of wheel loaders.

Noise and Dust

Dust suppression will take place, but the processing plant will not be clad.

2.2 Proposed Infrastructure

For each of the infrastructure components, the following infrastructure heights are expected:

Plant

- Height of CHPP: 25m

Stockpiles

- Temporary discard dump: 5m
- Long-term carbonaceous (discard) dump: 90m
- Soft Overburden included in carbonaceous dump, 30% used for berm: 5m
- Hard Overburden – included as cladding for carbonaceous dump: 15m
- Run of Mine (ROM) Stockpile: 15m
- 4 Product Stockpiles: 12m

The long-term carbonaceous dump will be constructed in paddocks configuration, with each layer being a height of 30m. Three layers will be constructed resulting in a final stockpile height of 90m. In terms of the Scoping Phase Comments and Response Report (Diphororo Development, 2019), it is stated that stockpiles will only be present for a period of 3 to 5 years, and that the stockpiles will not reach a height of 50m over the LoM. For the purpose of this assessment, the heights stated in the Scoping Report (Jacana Environmentals cc, 2019) were however used in consideration of the worst-case scenario.

Topsoil and soft overburden, which will not be used for the construction of the carbonaceous dump, will be used for the construction of water diversion berms to a maximum height of 5m. This material will then be used at the end of the LoM for final layer works after backfilling of the pit with waste material.

The proposed Gruisfontein Project layout is shown in Figure 3 below.

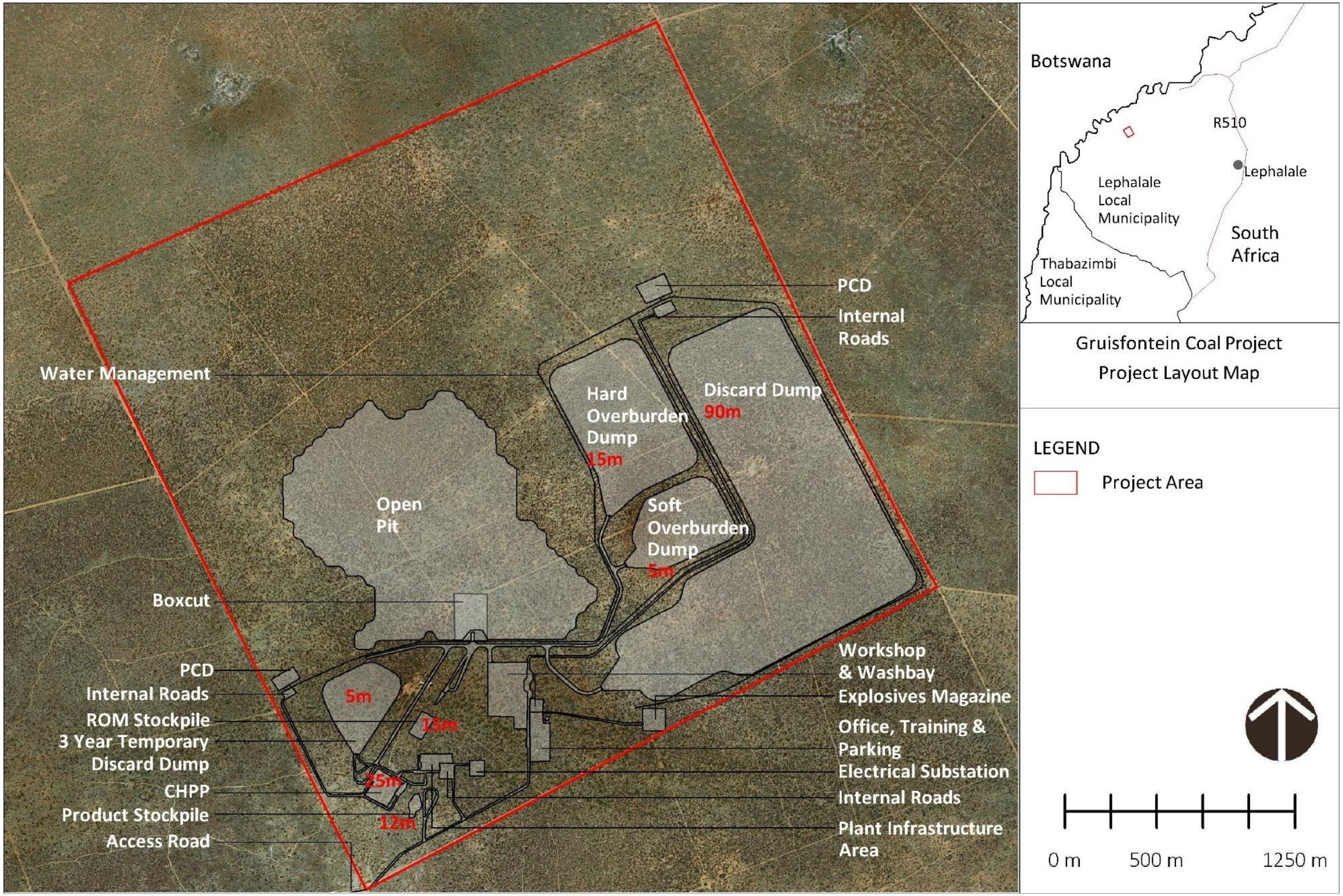


Figure 3. Proposed Gruisfontein Project layout, indicating height of prominent infrastructure components.

3 METHODS OF ASSESSMENT

In undertaking the VIA report, the following primary documents were used to quantify certain aspects of the study:

- Oberholzer, B. (2005). Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1. CSIR Report No. ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town;
- United States Department of Agriculture (USDA; 1995). Landscape Aesthetics A Handbook for Scenery Management, Agriculture Handbook Number 701. United States Department of Agriculture Forest Service; and
- The Institute of Environmental Management and Assessment (IEMA)/ Landscape Institute (2013) Guidelines for Landscape and Visual Impact Assessment. 3rd Edition.

3.1 Level of Input Required

According to the various development categories defined by Oberholzer (2005), the proposed project falls within Category 5, which includes quarrying and mining activities with related processing plants. Although the area is considered to have scenic value, the findings of the Phase 1 Heritage Impact Assessment (R & R Cultural Resource Consultants, 2019) indicate that no heritage sites of outstanding significance occur within the project area and that the project area has a low importance in terms of natural and cultural heritage, as well as a low importance in exhibiting particular aesthetic characteristics valued by a community or cultural group. As a result, and by combining the perceived increased scenic and low cultural-historical value of the project area, a medium scenic, cultural and historical significance was assigned.

Table 1. Categorisation of issues and level of input to be addressed by the visual assessment.

Type of environment	Category 5 development	Visual Impact	Level of Input
Areas or routes of medium scenic, cultural, historical significance	High visual impact expected	Potential intrusion on protected landscapes or scenic resources; Noticeable change in visual character of the area; and Establishes a new precedent for development in the area.	Level 4

As indicated in Table 1, a Level 4 visual assessment is therefore required, which include, in addition to establishing viewsheds, viewpoints and receptors, the inclusion of potential night-time lighting impacts, as well as 3D modelling and visual simulations before and after mitigation.

3.2 Desktop Assessment

The desktop assessment component of the VIA included a regional and local assessment of the current environment setting within which the project is located, in order to contextualise the project and to identify potential visual receptors. Data were obtained from various databases including the South African National Biodiversity Institute (SANBI) Biodiversity Geographical Information Services (BGIS), and the electronic GIS database of the Department of Environmental Affairs (DEA). These datasets were used in conjunction with available 1:50 000 topographical maps for the Quarter Degree Squares (QDSs) 2327CA and 2327CB, as well as high resolution aerial photographs.

A 1-arc resolution Digital Elevation Model (DEM) using ASTER GDEM Worldwide elevation data, was created making use of GlobalMapper and other Geographical Information System (GIS) software. The DEM together with proposed transmitter elevations (infrastructure heights) and receiver elevations (receptor heights) were then used to digitally generate individual viewsheds for each proposed infrastructure component, which were overlaid to create a combined viewshed, accounting for the heights of all infrastructure components. The viewshed serves as a theoretical indication of the zone of visual influence and does not taking fine-scale topographical variation, man-made structures or vegetation cover into account, and therefore provides a theoretical indication of locations in the surrounding landscape from where the proposed infrastructure will be visible, and indicates a theoretical clear line of sight between a visual receptor and the proposed infrastructure. A view radius over a distance of 100km was analysed.

In support of the viewshed analysis, elevation profiles were generated using GlobalMapper, upon which project infrastructure components and potential receptor sites were graphically superimposed to scale (with vertical exaggeration factors taken into consideration), to provide a visual representation of the height of the proposed infrastructure in relation to potential visual receptors.

3.3 Field Assessment

In assessing visual and aesthetic impacts, both quantitative criteria, such as visibility, and qualitative criteria, such as aesthetic value or sense of place should be considered (Oberholzer, 2005). To determine the aforementioned and to gain an understanding of the visual and aesthetic environment within which the project area is located, a field assessment was undertaken over a period of three (3) days from 21 to 23 January 2019. The field assessment was undertaken during the summer months, which is deemed a suitable season for undertaking VIAs, as undertaking VIAs is not restricted to seasonality (although seasonal variation should be considered).

During the field assessment, note was made of the landscape characteristics and qualities associated with the project area and surrounds. Special attention was paid to identifying representative and specific Important Observation Points (IOPs) and to verify visibility of the proposed project infrastructure from areas indicated to fall within the combined viewshed generated, thereby accounting for vegetation and man-made structures. The purpose of the field assessment was also to determine the expected level of visual intrusion and exposure of the proposed project on its surroundings and associated potential visual receptors.

A photographic study, using a Canon EOS digital camera, was also undertaken during this time. Global Positioning System (GPS) points corresponding with the locations where photographs were taken were recorded using a handheld Garmin eTrex GPS device. The photographic study served as the basis for simulation of the expected views towards the proposed project as presented in Section 6.3.1.

3.4 Impact Significance Assessment

The impact assessment was undertaken according to the method proposed by Jacana Environmentals cc (2019), as outlined below.

3.4.1 Impact Significance

- **Nature and Status**

The 'nature' of the impact describes what is being affected and how. The 'status' is based on whether the impact is positive, negative or neutral.

- **Spatial Extent**

'Spatial Extent' defines the spatial or geographical scale of the impact.

Category	Rate	Descriptor
Site	1	Site of the proposed development
Local	2	Limited to site and/or immediate surrounds (500m zone of influence)
District	3	Lephalale Municipal area
Regioal	4	Waterberg District, and direct neighbouring district
Provincial	5	Limpopo Province
National	6	South Africa
International	7	Beyond South African borders

- **Duration**

'Duration' gives the temporal scale of the impact.

Category	Rate	Descriptor
Temporary	1	0 – 1 years
Short term	2	1 – 5 years
Medium term	3	5 – 15 years
Long term	4	Where the impact will cease after the operational life of the activity either because of natural process or by human intervention
Permanent	5	Where mitigation either by natural processes or by human intervention will not occur in such a way or in such a time span that the impact can be considered as transient

- **Probability**

The 'probability' describes the likelihood of the impact actually occurring.

Category	Rate	Descriptor
Rare	1	Where the impact may occur in exceptional circumstances only
Improbable	2	Where the possibility of the impact materialising is very low either because of design or historic experience
Probable	3	Where there is a distinct possibility that the impact will occur
Highly probable	4	Where it is most likely that the impact will occur
Definite	5	Where the impact will occur regardless of any prevention measures

- **Intensity**

'Intensity' defines whether the impact is destructive or benign, in other words the level of impact on the environment.

Category	Rate	Descriptor
Insignificant	1	Where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected. Localised impact and a small percentage of the population is affected
Low	2	Where the impact affects the environment is such a way that natural, cultural and social functions and processes are affected to a limited extent
Medium	3	Where the affected environment is altered in terms of natural, cultural and social functions and processes continue albeit in a modified way

High	4	Where natural, cultural or social functions or processes are altered to the extent that they will temporarily or permanently cease
Very High	5	Where natural, cultural or social functions or processes are altered to the extent that they will permanently cease, and it is not possible to mitigate or remedy the impact

- **Ranking, Weighting and Scaling**

The weight of significance defines the level or limit at which point an impact changes from low to medium significance, or medium to high significance. The purpose of assigning such weights serves to highlight those aspects that are considered the most critical to the various stakeholders and ensure that the element of bias is taken into account. These weights are often determined by current societal values or alternatively by scientific evidence (norms, etc.) that define what would be acceptable or unacceptable to society and may be expressed in the form of legislated standards, guidelines or objectives. The weighting factor provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Spatial Extent	Duration	Probability	Intensity	Weighting factor	Significance Rating (SR - WOM) Pre-mitigation	Mitigation Efficiency (ME)	Significance Rating (SR-WM) Post Mitigation
Site (1)	Temporary (1)	Rare (1)	Insignificant (1)	Low (1)	Low (0 – 19)	High (0.2)	Low (0 – 19)
Local (2) District (3)	Short term (2)	Improbable (2)	Low (2)	Low to Medium (2)	Low to Medium (20 – 39)	Medium to High (0.4)	Low to Medium (20 – 39)
Regional (4)	Medium term (3)	Probable (3)	Medium (3)	Medium (3)	Medium (40 – 59)	Medium (0.6)	Medium (40 – 59)
Provincial (5) National (6)	Long term (4)	Highly Probable (4)	High (4)	Medium to High (4)	Medium to High (60 – 79)	Low to Medium (0.8)	Medium to High (60 – 79)
International (7)	Permanent (5)	Definite (5)	Very high (5)	High (5)	High (80 – 110)	Low (1.0)	High (80 – 110)

- **Impact significance without mitigation (WOM)**

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:
Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

- **Effect of Significance on Decision-makings**

Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required.

Rating	Rate	Descriptor
Negligible	0	The impact is non-existent or insignificant, is of no or little importance to decision making.
Low	1-19	The impact is limited in extent, even if the intensity is major; the probability of occurrence is low, and the impact will not have a significant influence on decision-making and is unlikely to require management intervention bearing significant costs.
Low to Medium	20 – 39	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels. The impact and proposed mitigation measures can be considered in the decision-making process
Medium	40 – 59	The impact is significant to one or more affected stakeholder, and its intensity will be medium or high; but can be avoided or mitigated and therefore reduced to acceptable levels. The impact and mitigation proposed should have an influence on the decision.
Medium to High	60 -79	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
High	80 – 110	The impact could render development options controversial or the entire project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor and must influence decision-making.

3.4.2 Mitigation

"Mitigation" is a broad term that covers all components of the 'mitigation hierarchy' defined hereunder. It involves selecting and implementing measures, amongst others, to conserve biodiversity and to protect, the users of biodiversity and other affected stakeholders from potentially adverse impacts because of mining or any other land use. The aim is to prevent adverse impacts from occurring or, where this is unavoidable, to limit their significance to an acceptable level. Offsetting of impacts is considered the last option in the mitigation hierarchy for any project.

The mitigation hierarchy in general consists of the following in order of which impacts should be mitigated:

- Avoid/ prevent impact: can be done through utilising alternative sites, technology and scale of projects to prevent impacts. In some cases, if impacts are expected to be too high, the "no project" option should also be considered, especially where it is expected that the lower levels of mitigation will not be adequate to limit environmental damage and eco-service provision to suitable levels.
- Minimise (reduce) impact: can be done through utilisation of alternatives that will ensure that impacts on biodiversity and eco-services provision are reduced. Impact minimisation is considered an essential part of any development project.
- Rehabilitate (restore) impact is applicable to areas where impact avoidance and minimisation are unavoidable where an attempt to re-instate impacted areas and return them to conditions which are ecologically similar to the pre-project condition or an agreed post project land use, for example arable land. Rehabilitation can however not be considered as the primary mitigation toll as even with significant resources and effort rehabilitation that usually does not lead to adequate replication of the diversity and complexity of the natural system. Rehabilitation often only restores ecological function to some degree to avoid ongoing

negative impacts and to minimise aesthetic damage to the setting of a project. Practical rehabilitation should consist of the following phases in best practice:

- Structural rehabilitation which includes physical rehabilitation of areas by means of earthworks, potential stabilisation of areas as well as any other activities required to develop a long terms sustainable ecological structure;
- Functional rehabilitation, which focuses on ensuring that the ecological functionality of the ecological resources on the subject property supports the intended post-closure land use. In this regard, special mention is made of the need to ensure the continued functioning and integrity of wetland and riverine areas throughout and after the rehabilitation phase;
- Biodiversity reinstatement that focuses on ensuring that a reasonable level of biodiversity is re-instated to a level that supports the local post-closure land uses. In this regard, special mention is made of re-instating vegetation to levels which will allow the natural climax vegetation community of community suitable for supporting the intended post-closure land use; and
- Species reinstatement that focuses on the re-introduction of any ecologically important species, which may be important for socio-cultural reasons, ecosystem functioning reasons and for conservation reasons. Species re-instatement need only occur if deemed necessary.

- Offset impact refers to compensating for latent or unavoidable negative impacts on biodiversity. Offsetting should take place to address any impacts deemed unacceptable which cannot be mitigated through the other mechanisms in the mitigation hierarchy. The objective of biodiversity offsets should be to ensure no net loss of biodiversity. Biodiversity offsets can be considered a last resort to compensate for residual negative impacts on biodiversity.

According to the DMR (2013) “Closure” refers to the process for ensuring that mining operations are closed in an environmentally responsible manner, usually with the dual objectives of ensuring sustainable post-mining land uses and remedying negative impacts on biodiversity and ecosystem services. The significance of residual impacts should be identified on a regional as well as national scale when considering biodiversity conservation initiatives. If the residual impacts lead to irreversible loss or irreplaceable biodiversity, the residual impacts should be considered to be of very high significance and when residual impacts are considered to be of very high significance, offset initiatives are not considered an appropriate way to deal with the magnitude and/or significance of the biodiversity loss. In the case of residual impacts determined to have medium to high significance, an offset initiative may be investigated. If the residual biodiversity impacts are considered of low significance, no biodiversity offset is required.

3.4.3 Impact significance with mitigation measures (WM)

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it is necessary to re-evaluate the impact.

3.4.4 Mitigation Efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact. Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:

Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency (ME)

Mitigation Efficiency is rated out of 1 as follows:

Category	Rate	Descriptor
Not Efficient (Low)	1	Mitigation cannot make a difference to the impact.
Low to Medium	0.8	Mitigation will minimise impact slightly.
Medium	0.6	Mitigation will minimise impact to such an extent that it becomes within acceptable standards.
Medium to High	0.4	Mitigation will minimise impact to such an extent that it is below acceptable standards.
High	0.2	Mitigation will minimise impact to such an extent that it becomes insignificant.

3.4.5 Significance Following Mitigation (SFM)

The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.

4 DESCRIPTION OF THE RECEIVING ENVIRONMENT

A broad description of the receiving environment and existing environmental setting, as it relates to the VIA, is provided in the sections below.

4.1 Biophysical Environment

4.1.1 Climate

The project area falls within a summer-rainfall region, and very dry winters are experienced. The Mean Annual Precipitation (MAP) ranges between about 350mm to 500m. Frost is fairly infrequent. Mean monthly maximum and minimum temperatures for Lephalale is 38.2°C and 2.1°C for December and June, respectively (Mucina & Rutherford, 2006).

4.1.2 Geology and Soils

The project area is located within the Waterberg Coal Fields, with the major coal bearing horizons of the Ecca Group of the Karoo Supergroup in the Waterberg being the Volksrust (Grootegeluk) Formation, which consists of 55m of intercalated mudstones and coal, and the Vryheid (Goedgedacht) Formation, which incorporates four major discrete seams of approximately 1.5m, 3m, 9m and 4m in thickness, respectively.

Coal measures occur over a stratigraphic interval of between 90m – 110m thick, characterised by eleven (11) discrete coal zones, with the upper zones (Zone 6 – Zone 11) comprising of the highest commercial value including semi-soft coking coals. The upper zones are overlain by the barren Eendragtpan Formation of the Beaufort Group. The lower zones are underlain by the barren Wellington Formation of the Ecca Group (Jacana Environmentals cc, 2019). At Gruisfontein, all seams/ coal zones are covered by some 30m to 100m of non-coal bearing superficial deposits ("overburden") with no coal outcrops (Jacana Environmentals cc, 2019).

As overall vegetation cover is relatively dense, the underlying sandy soils are not generally exposed over large areas, except within areas of continued disturbance, including roads and adjacent road reserves, overgrazed areas and historical mining areas such as the Sasol Mafutha bulk sampling (prospecting) operation (Sasol Pit), illustrated in Figure 4 below. From this figure the contrast between exposed soils and vegetated areas can be seen (top), as well as vegetation in the process of reestablishment after disturbance (bottom).

Figure 4. Historical disturbance in the vicinity of the project area.

4.1.3 Topography and Drainage

The broader region is characterised by plains, sometimes undulating or irregular, which are traversed by several tributaries of the Limpopo River. The project area itself is relatively level (flat) but slopes gently downwards to the north; the altitude of the project area varies between 865 meters above mean sea level (m.a.m.s.l.) in the south and 849m.a.m.s.l. in the northwest. No significant or prominent hills, outcrops and ridges are located within the project area or immediate surrounds.

No significant rivers or watercourses are located within the project area or immediate surrounds. The proposed project area is however located within a water catchment area that drains into the Limpopo River located approximately 8km to the northwest. Other significant drainage features in the region include the Mokolo River further to the east and the Sandloop River further to the south (Figure 5).

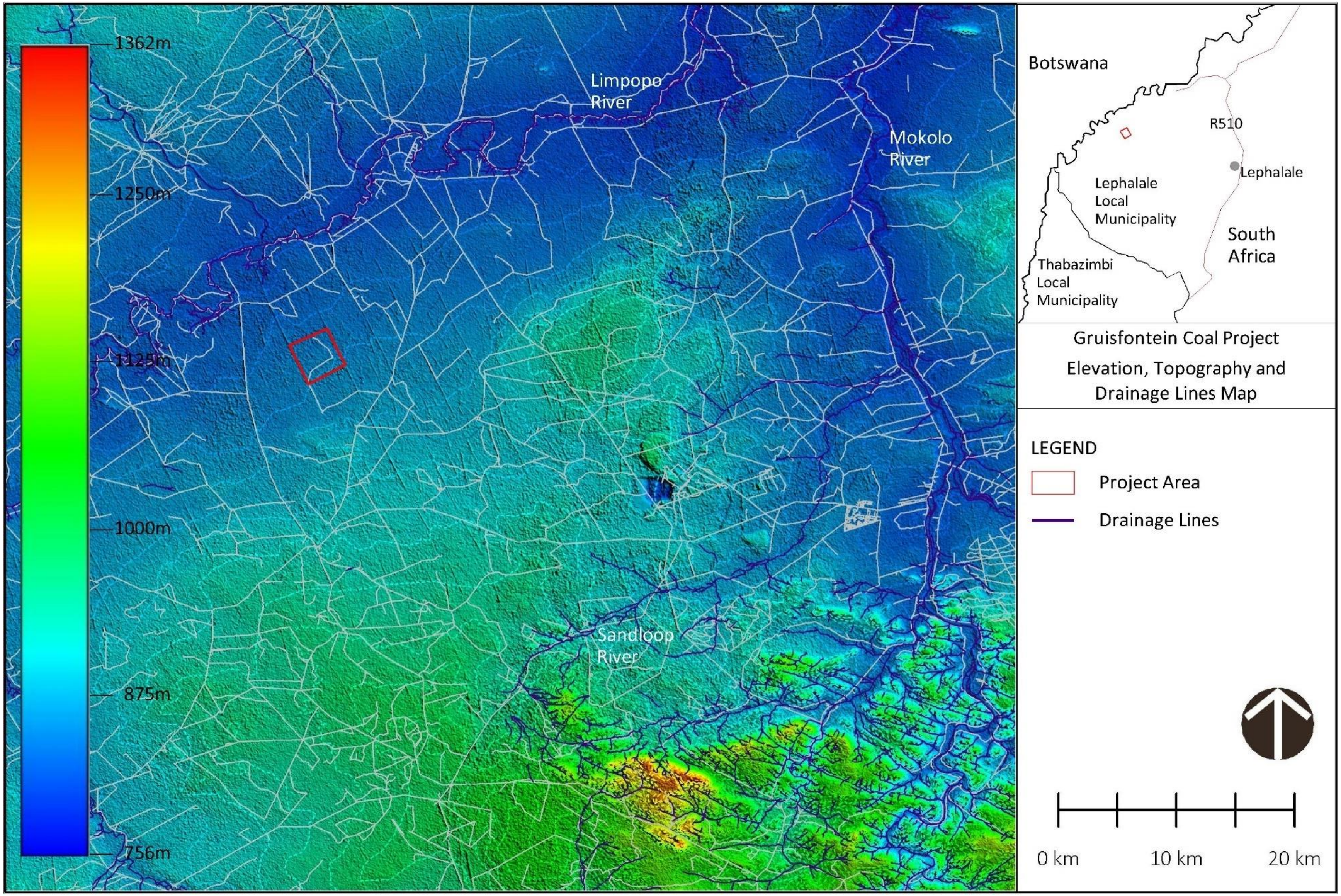


Figure 5. Elevation, topography and major drainage lines associated with the project area and surrounds.

4.1.4 Land Cover

According to the National Land Cover database (DEA, 2015), the project area and its surrounds are predominantly characterised by woodland/ open bush, with limited built-up areas present. Landcover types in the vicinity of the project area include low shrubland and grassland, with only restricted areas being categorised as cultivated land and commercial fields.

4.1.5 Vegetation

The project area is located within the Savanna Biome and within the Limpopo Sweet Bushveld vegetation type as defined by Mucina & Rutherford (2006). This vegetation type is limited to the Limpopo Province and extends from the lower reaches of the Crocodile and Marico Rivers around Makoppa and Derdepoort, respectively, down the Limpopo River Valley including Lephalale. The vegetation of the region is characterised by open woodland while impenetrable thickets of *Dichrostachys cinerea*, *Senegalia* (*Acacia*) *erubescens* and *S.* (*Acacia*) *mellifera* tend to form dense stands within disturbed areas.

Dominant plant species expected to occur within the project area and surrounds include tree species such as *Vachellia* (*Acacia*) *robusta*, *V.* (*Acacia*) *nilotica*, *Senegalia* (*Acacia*) *erubescens*, *Dichrostachys cinerea*, *Boscia albitrunca*, *Albizia anthelmintica* and *Combretum apiculatum*, shrubs such as *Catophractes alexandri*, *Dichrostachys cinerea, Phaeoptilum spinosum, Rhigozum obovatum* and *Vachellia* (*Acacia*) *tenuispina* and a variety of grass species. A number of herbs, and specifically succulent herbs, also occur within this vegetation type (Mucina & Rutherford, 2006).

In undertaking a VIA, consideration should be given to the seasonal differences arising from the level of screening or filtering of views provided by existing vegetation that would apply in summer and winter, and ideally the assessment should consider the "worst-case" situations, namely the season with least leaf cover and therefore the least vegetative screening. Although a number of the abovementioned tree and shrub species are deciduous, certain species are evergreen and due to the relatively dense cover afforded by the vegetation, seasonal variation will not significantly influence the visibility of the infrastructure from various receptor sites. Furthermore, during periods of above average rainfall, deciduous species tend to retain their leaves for longer periods, sometimes dropping their leaves only a week or two prior to the emergence of new leaves (Mucina & Rutherford, 2006), implying that the density of vegetation cover and level of screening provided is not significantly reduced during the colder months.

The indigenous, naturally occurring bushveld vegetation within the region is relatively intact, with a homogeneous vegetation pattern and structure (Figure 6). Overall vegetation cover is relatively dense and has an estimated moderate canopy height of up to 10m, which is sufficient to screen certain views from ground level.

The screening capability of existing vegetation, can be seen when considering Grootegeluk Coal Mine's Dump 4, located in close proximity to District Road D2816, where similar vegetation is present (Figure 7 & 8). The final height of Dump 4 is around 82m (Golder Associates, 2013), which is comparable to the potential final height of the proposed Gruisfontein Long-term Discard Dump.

From the figures below, it can be seen that at a viewing distance of 2.8km and 2.6km, respectively from road D2816, the Grootegeluk Coal Mine Dump 4 is not highly visible, while at a distance of 2.4km, it is partially visible. At a distance of 1.5km from the infrastructure, Dump 4 remains only partially visible, but the top of the dump can be clearly seen to extend intermittently above the canopy line.

The view towards Dump 4 at a distance of 5km to the south thereof on district road D1675, is more open due to disturbance to existing vegetation, and is partially, but clearly visible from this distance.

Figure 6. Vegetation within the region is dense and of medium height – photograph taken from the Sasol Pit, located 2.7km to the southeast of the project area towards the proposed project infrastructure.

Figure 7. View towards Grootegeluk Coal Mine's Dump 4 from 2.8km (top) and view from 2.6km (bottom), illustrating the screening effect of vegetation.

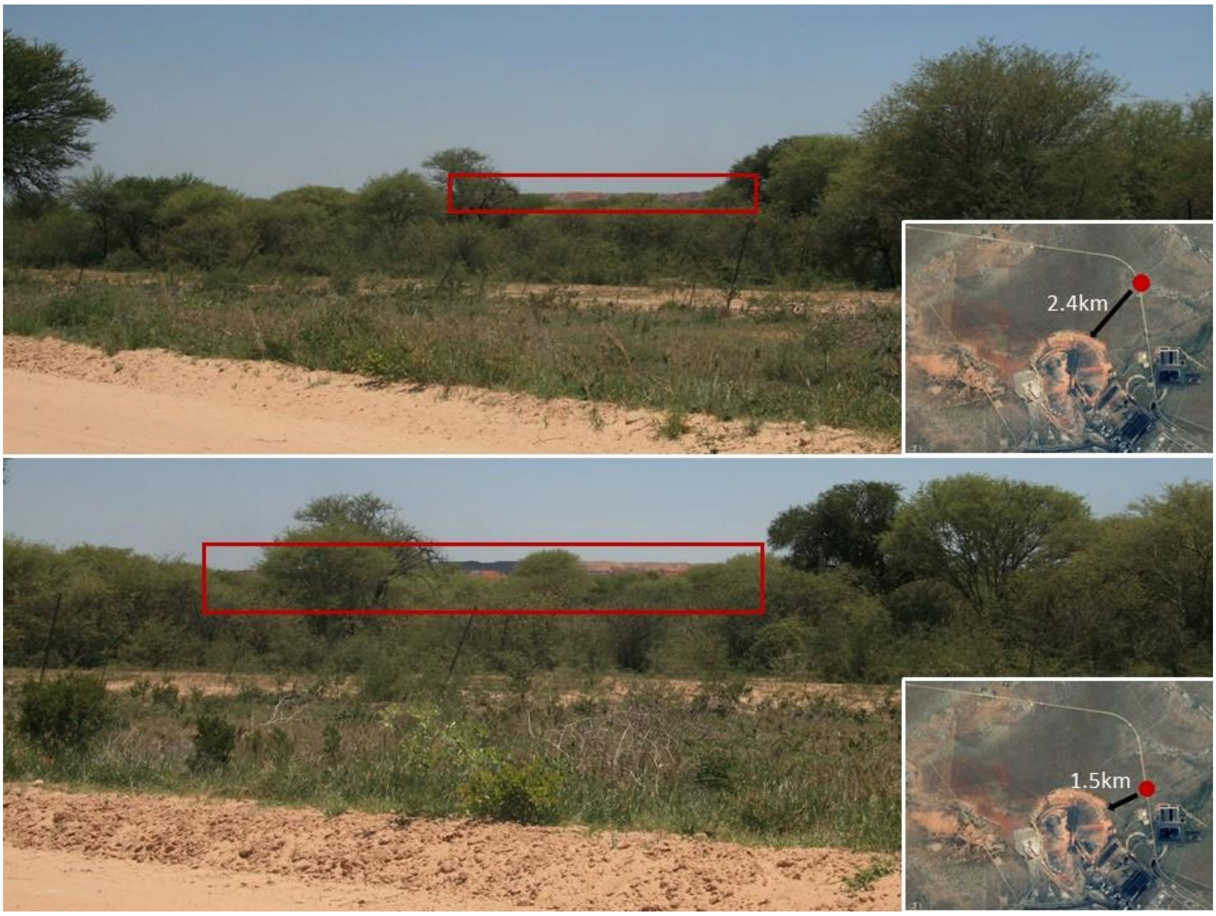


Figure 8. View towards Grootegeluk Coal Mine's Dump 4 from 2.4km (top) and view from 1.5km (bottom), illustrating the screening effect of vegetation.

4.2 Socio-Economic Environment

4.2.1 Provincial, Municipal and Local Development Frameworks

Various development and management frameworks were considered during the VIA, as applicable to the aesthetic environment, including the following:

- Limpopo Development Plan (LDP), 2015-2019;
- Waterberg District Spatial Development Framework (SDF; 2018-2019) and Lephalale Local Municipal SDF (2017);
- Waterberg District Integrated Development Plan (IDP; 2018-2019) and Lephalale Local Municipal IDP (2018-2019); and
- Waterberg District Environmental Management Framework Report (EMF; 2017).

In general, the abovementioned documents emphasise the importance of mining to the Province and both the district and local municipalities' economies. It is however noted that mining, together with urbanisation and cultivation, has however led to the degradation of natural vegetation within the Waterberg District, and has also impacted on other environmental aspects such as air and water quality. The provincial government, and district and local municipalities therefore aim to secure ecologically sustainable development, which implies the use of the natural resources while promoting justifiable economic and social development, preventing pollution and ecological degradation, and promoting conservation.

Special mention is made of United Nations Educational, Scientific and Cultural Organisation (UNESCO) Waterberg Biosphere Reserve, where mining and prospecting applications pose a serious threat. This internationally recognise Biosphere Reserve is located approximately 54km to the south of the project area but falls outside of the zone of visual influence of the proposed project.

When the location of the project area is compared with the tourism map included the Waterberg District EMF (2017) it is evident that the project area is located outside of the main tourism and conservation core of the municipality and located outside of ‘off the beaten track’ and main scenic routes such as the Waterberg Meander. Special care and maintenance of these routes is needed to avoid impact to the scenic quality and to enable such roads to serve as vantage infrastructure from which the scenic value can be appreciated.

The project area is located in the Waterberg District EMF’s Environmental Management Zone 4 (mining focus areas). This zone represents areas where significant mineral resources of strategic national importance occur within largely natural environments. Conservation of natural habitat should be the primary focus of required buffer areas around mining and industrial sites and preference should be given to catering for threatened species that may occur in this zone. Game and cattle farming should be the default activity in parts of the zone that is not used for mining or industrial purposes.

The Lephalale Local Municipal IDP (2018-2019) indicates that the location of the Lephalale Local Municipality provides unique opportunities for economic development and tourism in particular. The area is renowned for hunting, wildlife, scenic beauty and nature reserves, as well as sports and adventure activities. Five tourist routes have been developed in the municipal area and include the following:

- Mokolo Route (R510, located to the east of the project area);
- Marula Route (D1675/ Lephalale Steenbokpan Road, located to the south of the project area);
- Limpopo Route (R572, located approximately 45km to the northeast of the project area);
- Waterberg Route (R33, located approximately 50km to the southeast of the project area in the Waterberg); and
- Heritage route (D3110).

As part of the VIA, the visual exposure of receptors along the abovementioned routes, where these routes are located partially within the theoretical visual zone of influence of the proposed project, has been assessed (refer to Section 6).

The Lephalale Local Municipality IDP (2018-2019) further states that the movement of trucks in the municipal area have increased enormously since the inception of the Matimba and Medupi Power stations. The large quantity of coal reserves in the coal field near Lephalale makes the area likely to develop further as the reserve is unlocked. Current developments include the expansion of existing mines, various proposed new mining projects, the upgrading of the existing Matimba Power Station, and the ongoing construction of the new Medupi Power Station (Waterberg District EMF; 2017).

The Waterberg District EMF (2017) indicates that where possible, development must be kept away from hills or mountainous terrain types, as these add significantly to the cost of providing infrastructure, and development can contribute towards erosion or environmental problems. The EMF further stipulates that scenic areas must be protected as part of a municipal open space system.

The Waterberg District EMF (2017) raises the following as in the Strategic Environmental Management Plan for the District in terms of visual character:

- The visual impact of the power stations and other large-scale developments such as mines in the area is significant and imprints an industrial element onto the bushveld character of the area.

- The sudden, rapid, and perceived poorly planned expansion of the Lephalale urban area resembles a typical “boom town” with all its uncertainties and inability to maintain the old values and expectations of residents;
- The Waterberg (referring to the mountains to the southeast of the project area, and not the district as a whole) is gradually losing its wilderness character as a destination, as more and more enterprises and individuals focus on individual marketing and branding instead of promoting the Waterberg as one nature/wilderness destination.
- Certain types of development in the Waterberg District such as lifestyle and golf estates are damaging the wilderness character of the greater area in return for localised individual benefits; and
- Random and seemingly unplanned advertisement and *ad hoc* retail activities in towns, especially along the main roads, is damaging to the character of the area.

4.2.2 Land Uses

The overall level of development within and in the vicinity of the project area is low. The predominant land use within the project area and surrounds is that of cattle and game farming, with game farms in the area utilised for both hunting and tourism activities. While some disturbance has occurred within the project area due to cattle and game farming and related activities, the majority of the farm Gruisfontein comprises natural vegetation. Development in the immediate region is mainly limited to low-density residential dwellings and outbuildings, low-density infrastructure associated with the aforementioned game and livestock farming, as well as lodges and accommodation facilities situated in the vicinity of the project area, also bordering the Limpopo River.

4.2.3 Settlements

The main settlement in the Lephalale Local Municipality is the town of Lephalale that comprises Ellisras and Onverwacht. Marapong, a large settlement, is located to the northwest of Lephalale. The closest settlement to the proposed Gruisfontein Project is Steenbokpan (Lesedi), located on the farms Steenbokpan and Vangpan approximately 15km to the south of the project area (Jacana Environmentals cc, 2019). The Stockpoort Border Post is located approximately 18km northeast of the project area.

4.2.4 Infrastructure

The Waterberg Coalfield, within which the project areas is sited, is currently host to:

- Exxaro Resources Limited’s (Exxaro) 19 Mtpa Grootegeluk Coal Mine, which is currently the only commercial coal mining operation in the Waterberg Basin and currently being expanded;
- Eskom’s 3 700 MW Matimba Power Station; and
- Eskom’s planned 4 800 MW Medupi Power Station which is currently under construction (RSV ENCO, 2018).

In addition to the above development being located within 50km of the project area, various road and rail infrastructure elements are present in the region, as well as a high number of transmission lines, specifically within the areas surrounding the power stations.

Main roads in the region include the following:

- The paved R510 regional road, 14km north of the project area, running parallel to the Limpopo River/ SA-Botswana border and thereafter running in a north-south direction some 40km east of the project area;

- The unpaved D2001 district road (Stockpoort Road), 13km east of the project area;
- The unpaved D2816 district road in the vicinity of Grootegeluk Coal mine, Matimba and Medupi Power Stations, 18km southeast of the project area;
- The paved D1675 district road (Lephalale-Steenbokpan Road), 12km south of the project area;
- The unpaved D175 district road, approximately 4.5km west of the project area; and
- The unpaved D2286 district road, 4.8km east of the project area, running to west parallel to the Limpopo River/ SA-Botswana border.

Within the project area itself and its immediate surroundings, infrastructure elements are limited to unpaved access roads, generally along farm boundaries, fencing, signage and single residential dwellings with associated outbuildings and support infrastructure.

The Waterberg Coalfield is currently further being explored and developed by a number of exploration and mining companies including *inter alia* (not limited to):

- Waterberg Coal Company, Namane Resources;
- Sasol and PetroSA for various coal-to-liquids and gas-to liquids projects; and
- Anglo Coal and Exxaro with Batepro Limited for coal bed methane gas (RSV ENCO, 2018).

Various mining projects in the region are at various stages in the environmental authorisation process or are currently under development; examples include Thabametsi, Lephalale Coal and Power, Sekoko, Coal 3 and 4, Groothoek, Sasol, Boikarabelo, Temo, Waterberg Coal Mine and Anglo/ Vedanta.

4.2.5 Protected and Conservation Areas

The project area is not located within any formally or informally protected area or within identified conservation areas, according to the most recent South African Protected Areas Database (SAPAD, 2019) and the South African Conservation Areas Database (SACAD, 2019). Several formally protected areas are however indicated to occur within the region and within close proximity of the project area, with four Private Nature Reserves (PNRs), namely the Jacobs, Emaria, Jancornel and Jee Lee PNRs located within 10km of the project area (Figure 9).

The d'Nyala Nature Reserve, a known tourism destination, is located roughly 50km to the southeast, within the northern Waterberg range. This nature reserve is utilised for game viewing, and apart from various management tracks, a 37km gravelled game drive route has been developed on the eastern portion of the reserve (east of R33 provincial road), along with two game viewing hides on the Mokolo River floodplain. Large specimens of trees including massive baobabs (*Adansonia digitata*) and nyala trees (*Xanthocercis zambesiaca)* add to the scenic value and recreation/tourism resource. (Lephalale IDP, 2018-2019).

Although not indicated by the SACAD and SACAP databases, the Manketti Game Reserve, a 22,000 hectare conservation area surrounding the Exxaro Grootegeluk mine (www.mankettilodge.co.za), is located around 18km to the southeast and the Fahad Private Game Reserve approximately 37km to the northeast of the project area.

The SACAD (2019) database furthermore indicates the northwestern boundary of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) Waterberg Biosphere Reserve approximately 54km to the southeast of the project area.

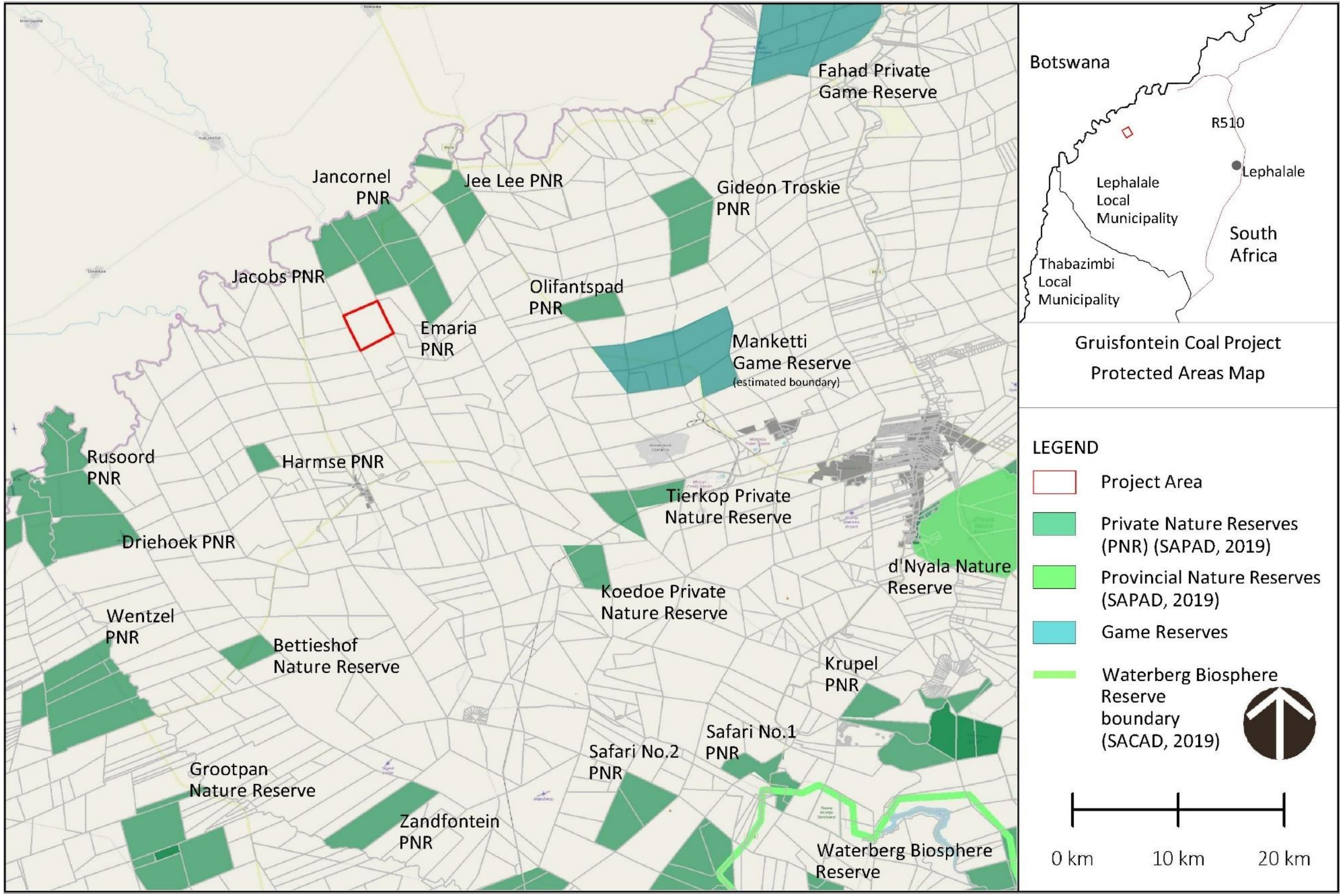


Figure 9. Protected Areas as indicated by the SAPAD database (2019) in relation to the project area.

4.2.6 Heritage and Cultural Value

It is expected that the project area itself and its surroundings have some heritage and cultural value to residents and surrounding communities, which may contribute towards the sense of place of the project area. It is expected that the area is highly valued by local residents (with some farms inherited and in families for many years) and surrounding communities, as well as by hunting and recreational tourists who visit or frequent the region and stay at lodges, camps and safari ranches in the area.

The findings of the Phase 1 Heritage Impact Assessment (R & R Cultural Resource Consultants, 2019) indicate that no heritage sites of outstanding significance occur within the project area and that the project area has a low importance in terms of natural and cultural heritage as well as a low importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.

5 VISUAL ATTRIBUTES OF THE RECEIVING ENVIRONMENT

5.1 Landscape Character

The landscape character and scenic attributes of an area is defined by vegetation and topography, as well as the manner in which the landscape has been altered by human activity through cultural factors such as land use or settlement patterns. Landscape characterisation is therefore concerned with identifying, classifying and describing areas of distinctive character and then making judgements to inform particular decisions (Countryside Agency and Scottish Natural Heritage, 2011). A single landscape character type will have broadly similar patterns of geology, landform, soils, vegetation, land use, settlement and fields in every area where it occurs. This does not mean that every area will be identical but rather that there is a common pattern which can be discerned both from regional maps and during field assessments (Countryside Agency and Scottish Natural Heritage, 2011).

The landscape character type associated with the Gruisfontein Project's receiving environment is relatively uniform and can broadly be defined as rural, level, open bushveld interspersed with unpaved access roads, in contrast to, for example, areas further to the southeast while has a more industrial and transformed character due to the presence of existing mining activity and adjacent power stations.

The general landscape character of the region and project area is illustrated in Figure 10 below. The vegetation cover is largely undisturbed and can be considered one of the most attractive features in the area.

Figure 10. Landscape character of the project area and surrounds.

5.2 Sense of Place

The landscape character of the region informs its sense of place. Oberholzer (2005) defines sense of place as the unique quality or character of a place, whether natural, rural or urban. Sense of place relates to uniqueness, distinctiveness or strong identity and can also be referred to as *genius loci* meaning 'spirit of the place'. Sense of place is created by the land use, character and quality of a landscape, as well as by the tangible and intangible value assigned thereto. The landscape character type, defined as rural, level, open bushveld, is relatively common within the larger region and has little visual variety, but the natural and pastoral character of the area exhibits an identifiable and positive sense of place. This is mainly due to the presence of distinctive bushveld vegetation, the vast skies, the relatively proximity of the Limpopo River, and the overall relaxed and tranquil rural atmosphere.

Considering the number of prospecting and planned mining developments in the region and its location within an environmental zone designed in terms of the Waterberg District EMF (2017) as a mining focus area, it is highly likely that the current sense of place and landscape character will change to that of a more industrial and developed sense of place in the near future.

5.3 Landscape Value, Condition and Sensitivity

In order to define to overall sensitivity of the particular landscape character type associated with the project area, the landscape value and condition have been determined.

Landscape value is defined as the relative importance attached to a landscape, based on national or local opinion, because of its unique qualities, including importance in terms of recreational value and perceptual aspects such as scenic beauty, tranquillity or wildness, cultural associations or other conservation interests (LI & IEMA, 2013).

The table below outlined the criteria according to which landscape value can be determined.

Table 2. Landscape Value.

Value	Typical criteria	Typical scale of importance/ Rarity	Typical examples
Exceptional	High importance and Rarity. No or limited potential for substitution	International, National	World Heritage Site, National Park.
High	High importance and Rarity. Limited potential for substitution.	National, Regional, Local	Conservation areas.
Moderate	Moderate importance and Rarity. Limited potential for substitution.	Regional, Local	Undesignated but value perhaps expressed through non-official publications or demonstrable use.
Low	Low importance and Rarity. Considerable potential for substitution.	Local	Areas identified as having some redeeming feature or features and possibly identified for improvement.
Poor	Low importance and Rarity.	Local	Areas identified for recovery.

In terms of the table above, the landscape value of the project area and surrounds can be defined as Moderate. The project area falls outside of any protected and conservation areas and is located more than 50km from the Waterberg Biosphere Reserve. The region can however be considered to be of importance in terms of recreational and scenic on a regional and local scale, even though not formally designated as such.

Landscape condition or quality is based on judgements about the physical state of the landscape, including its intactness from functional, ecological and visual perspectives. Landscape condition also reflects the state of individual features and elements which make up the landscape character. The criteria for the assessment of landscape condition are included in the table below.

Table 3. Landscape Condition.

Landscape Condition	Description
High	The landscape and its features are in a good state and have a high contribution to landscape character. The landscape is highly distinctive and cohesive, with positive characteristics and features and no or very few detracting or intrusive elements.
Moderate	The landscape and its features are in an average state and make a medium contribution to the landscape character. The landscape is distinctive and more commonplace, with some positive characteristics and features and some detracting or intrusive elements.

Low	The landscape and its features are in a poor or improving state and make a low contribution to landscape character. The landscape is of mixed character with a lack of coherence and include detracting or intrusive elements.

Although the receiving landscape is relatively uniform, no distinct landscape features, such as prominent hills or watercourses are present within the project area, and the landscape condition and quality are considered Moderate. The vegetation and scenic resources are largely intact although a few distracting or contrasting landscape elements, such as signage, access roads and bare road reserves, power lines, gates and fence are present. The landscape is cohesive and in an overall good condition, but relatively well-represented in the region. Elements, such as the existing bushveld vegetation contribute towards the overall positive character of the area.

Landscape sensitivity can be defined as the extent to which a landscape can accommodate change of a particular type and scale without unacceptable adverse effects on its character and without distracting from its inherent scenic qualities. It is determined as a function of its value and condition as per Table 4 and the definitions outlined below.

Table 4. Landscape Sensitivity.

Landscape Value	Sensitivity		
High to exceptional	Very High	High	Moderate
Moderate	High	Moderate	Low
Low to poor	Moderate	Low	Low
	High	Moderate	Low
	Landscape Condition		

Very High Sensitivity: The landscape has no capacity to accept the type of change and development proposed.
High Sensitivity: The landscape has limited capacity to accept the type of change and development proposed.
Moderate Sensitivity: The landscape has some capacity to accept well planned and designed change and development of the type proposed.
Low Sensitivity: The landscape has capacity to accept the type of change and development proposed.

From the table above, it was found that the overall landscape sensitivity of the area can be perceived as Moderate.

5.4 Visual Absorption Capacity

According to Oberholzer (2005), Visual Absorption Capacity (VAC) refers to the ability of an area to visually absorb or conceal development as a result of screening topography, vegetation or structures in the landscape.

Existing, man-made structures with the potential to conceal infrastructure in the immediate vicinity of the project area are limited, but where present (such as in the case of fences, residential dwellings and supporting structures) may locally screen views at ground level from certain receptors sites. Due to the level slope of the farm Gruisfontein and surroundings (refer to Figure 5), local screening of infrastructure through topography is also limited, particularly at close distances (refer to the elevation profiles shown in Section 6.2.2). The bushveld vegetation of medium height surrounding the project area and many of the potential visual receptor sites at ground level however contributes significantly to the VAC of the project area. The existing, intact vegetation on the farm Gruisfontein and on surrounding farms extend over distances of 4km to the west and north and up to 12km to the east and south and has the potential to at least partially screen the majority of project infrastructure components from view of road users and nearby settlements (refer to Figures 7 & 8).

Table 5. Visual Absorption Capacity.

VAC	Level of screening
High VAC	Effective screening by topography and vegetation
Moderate VAC	Partial screening by topography and vegetation
Low VAC	Little screening by topography and vegetation

In line with Table 5 above, the overall VAC of the project area is considered to be Moderate, with existing vegetation being the primary contributor to local and regional infrastructure screening, as screening from man-made structure and topography in particular is limited across shorter distances. Furthermore, visual contrast of exposed soils where disturbances take place is expected to be high (refer to Figure 6), screening provided by vegetation will not necessarily extend to dust and emission plumes or the movement of mine vehicles on local roads. The area has an overall low visual diversity due to the homogeneous vegetation structure and road patterns, which may cause visible, contrasting infrastructure be visually intrusive.

5.5 Visual Intrusion

VAC is closely related to the concept of visual intrusion, which refers to the nature of the contrast created by a project and the level of compatibility or congruence of a project with the particular qualities and sense of place of the receiving landscape (Oberholzer, 2005). Visual intrusion is also a measure of the compatibility or conflict of a project with the existing landscape context and surrounding land use. The visual intrusion ratings are listed in the table below.

Table 6. Visual Intrusion.

Level of visual intrusion	Description
High	Results in a noticeable change or is discordant with the surroundings
Moderate	Partially fits into the surroundings, but clearly noticeable
Low	Minimal change or blends in well with the surroundings

Considering the current land use, land cover and low level of development within the region, as well as the absence of existing mining operations in the immediate vicinity of the project area, the level of intrusion of the proposed project is expected to be High. The proposed project, from areas where it may be visible, will contrast strongly with its surroundings.

5.6 Night-time Lighting

The Institute of Lighting Professionals (ILP) defines certain Environmental Zones (ILP, 2011) as per the table below, for the control of exterior lighting.

Table 7. Environmental Zones as pertaining to night-time lighting environments.

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, International Dark-Sky Association (IDA) Dark Sky Sanctuaries.
E1	Natural	Intrinsically dark	National Parks, Proclaimed Wilderness Areas, , etc.
E2	Rural	Low district brightness	Villages or relatively dark outer suburban locations.
E3	Suburban	Medium district brightness	Small town centres or suburban locations.
E4	Urban	High district brightness	Town/ city centres with high levels of night-time activity.

The proposed project is located within a rural area and is considered to have an overall low district brightness (Zone E2). The management of night-time lighting during all development phases is therefore of high importance in order to limit the night-time effect of proposed light sources. The existing vegetation and relative distance from visual receptors should serve to screen lighting at ground level (such as at offices and workshops) from surrounding receptor sites, but movement of vehicles and machinery on higher stockpiles at night and time-lighting of the CCHP (25m high) may be visible across significant distances, also leading to skyglow which will be further exacerbated by the low district brightness.

6 VISUAL RECEPTORS

6.1 Public Involvement

All comments received during the Scoping and EIA Phases of the project will be included in a detailed Comment and Response Report for the project and environmental authorisation process. During the Scoping Phase of the project comments relating to the visual impact of the proposed project were raised. These comments addressed the impact of mine machinery and trucks on existing hunting operations, with the height of the proposed stockpiles also raised as a concern. The response towards this was that stockpiles will be utilised as backfill, will only be present for a period of between 3 and 5 years, and will never reach heights of 30m to 50m (Diphororo Development, 2019). The impact of the proposed mine on hunting operations will have to be determined based on the location of the hunting activities and whether the proposed infrastructure will be visible from that particular location. It is however noted that hunting is mostly incompatible with a mining land use, and as further mining operations develop in the region, the area may become less desirable as a hunting and tourism destination.

6.2 Potential Sensitive Visual Receptors

Sensitive visual receptors in may include residents, tourists and visitors to an area, users of recreational land and open space areas, public walkways and trails, residents, road and railway users travelling through or past the affected landscape, people at their place of work and receptors who experience views towards or from any valued landscape (LI & IEMA, 2013).

The number of observers, their location in relation to the proposed project, as well as their perception of the proposed project will have an impact on the VIA and also, in turn, on the perceived sensitivity of the landscape. The sensitivity of visual receptors and certain important observation points will depend on:

- The location and context of the viewpoint;
- The expectation and occupation or activity of the receptor; and
- The importance of the view (LI & IEMA, 2013).

The perception of viewers is difficult to determine as there are many variables to consider, such as cultural background, state of mind, reason for the sighting and how often the project is viewed within a set period. It is therefore necessary to identify areas of increased viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the project (Oberholzer, 2005). In general, the level of visual impact considered acceptable is dependent on the type of receptors.

- High sensitivity – e.g. residential areas with views affected by the development, communities where the development results in changes in the landscape setting or valued views enjoyed by the community, and users of outdoor recreational facilities, including public rights of way, nature reserves and scenic routes or trails, whose attention or interest may be focused on the landscape;

- Moderate sensitivity – e.g. sporting or recreational areas, or places of work; and
- Low sensitivity – e.g. industrial, mining or degraded areas (Oberholzer, 2005).

In terms of the Gruisfontein Project, the most sensitive visual receptor types will be residents on farms and outdoor farm workers residing in close proximity to the proposed project on neighbouring farms (the existing residence on farm Gruisfontein will be demolished), residents of the owners and staff of lodges, ranches and safari operations in the region, visitors to conservation areas and game reserves, as well as tourists visiting the area for recreational (including scenic) and hunting purposes. Other sensitive receptors will include vehicle users/ motorists travelling past the project area as part of their day-to-day activities, those *en route* to tourist accommodation and hunting or recreational destinations, as well as incidental travellers and motorists travelling towards the Stockpoort Border Post to enter Botswana. Receptors in moving vehicles are expected to be less visually sensitive due to their viewing experience being transient or one of a sequence of views, as opposed to a stationary view.

Visual receptor types expected to be less sensitive to visual intrusion include people at their indoor places of work, as well as receptors working in the mining and industrial setting to the southeast of the project area. It is also important to note that receptors and receptor sites are only be regarded as visually sensitive towards the project if they are located within clear line of sight of the proposed project (whether fully or partially), and within viewing distance thereof.

The aforementioned, as applicable to the Gruisfontein Project is summarised in the table below.

Table 8. Expected visual sensitivity of potential visual receptor types and sites towards the proposed project.

Expected Visual Sensitivity	Receptor Types	Receptor Sites
High Sensitivity Visual Receptors	• Residents (farm owners and workers).	• Residences, farmsteads and associated outbuildings. • The extent of farm properties, including internal roads.
	• Residents in surrounding settlements and towns.	• The extent of each settlement or town.
	• Lodges, ranches, hunting camps and safari operators (owners and staff).	• Accommodation facilities and associated infrastructure, as well as the extent of each farm property, including internal roads.
	• Hunting and recreational tourists.	• Extent of applicable properties and all areas accessed during hunting and recreational activities.
	• Tourists at private and provincial nature reserves and game reserves.	• The extent of nature and game reserves.
Moderate Sensitivity Visual Receptors	• Motorists on paved and unpaved/ gravel roads.	• Road sections located within line of sight of the proposed infrastructure.
Low Sensitivity Visual Receptors	• People at their place of work, particularly within existing mining and industrial settings.	• Places of work and operation.

The locations of the abovementioned potential visual receptor groups and sites in relation to the project area, within an area of 20km thereof, are indicated in the figure below, with the map inlay indicating the locations of individual receptor sites, such as residences and hunting/ tourism structures, as well as the farms located within 5km of the farm Gruisfontein. Although similar receptor sites are located on the other farms in the area, their precise locations, functions and statuses were not assessed in detail as part of this VIA.

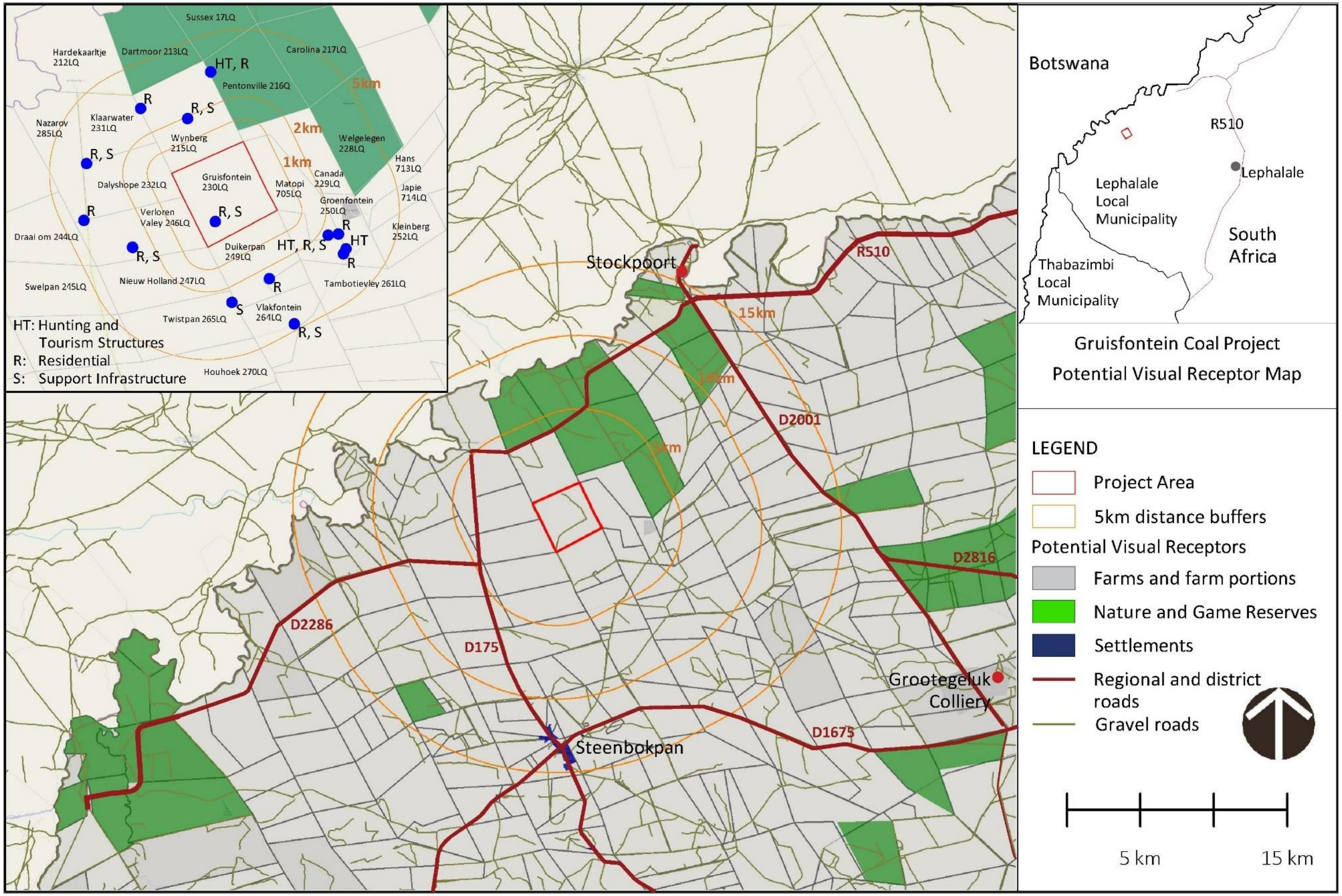


Figure 11. Potential visual receptor sites within the vicinity of the project area (inlay: receptor sites within 5km of the farm Gruisfontein).

6.2.1 Viewsheds and Theoretical Visibility

Computer-generated viewshed analyses (also referred to as a zone of theoretical visibility or zone of visual influence) based on elevation and topography, were undertaken in order to determine, at a landscape scale, from where the proposed project infrastructure will theoretically be visible. The viewsheds indicate which proposed infrastructure components can theoretically be seen by receptors from a particular location in the landscape, and also determine the extent of the surrounding geographic area and distance from the project, which may be visually affected. It is important to note that existing vegetation and man-made infrastructure were not taken into account during the viewshed analysis.

Viewsheds generated for individual project infrastructure components are illustrated in Figures 12 and 13.

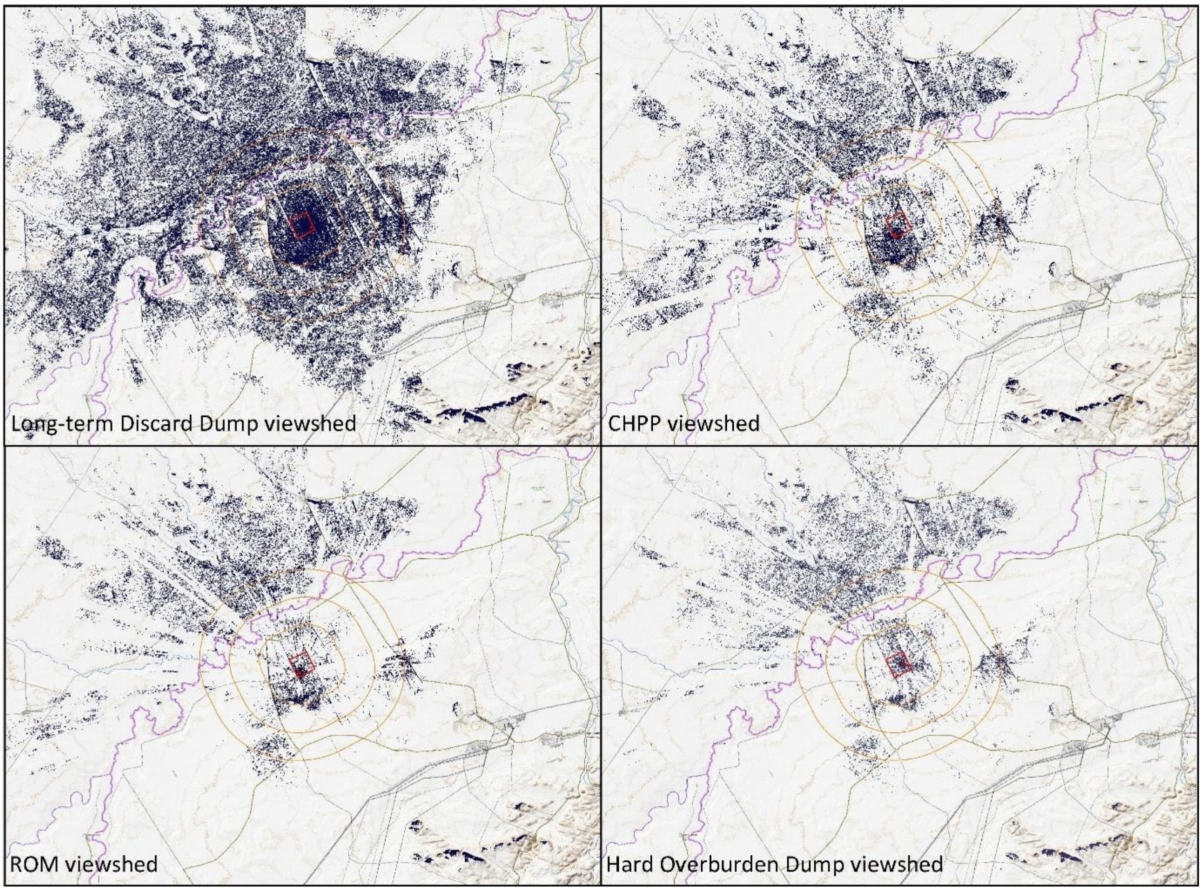


Figure 12. Viewshed analyses for individual project components (5km distance buffers indicated in orange and viewshed coverage indicated in dark blue).

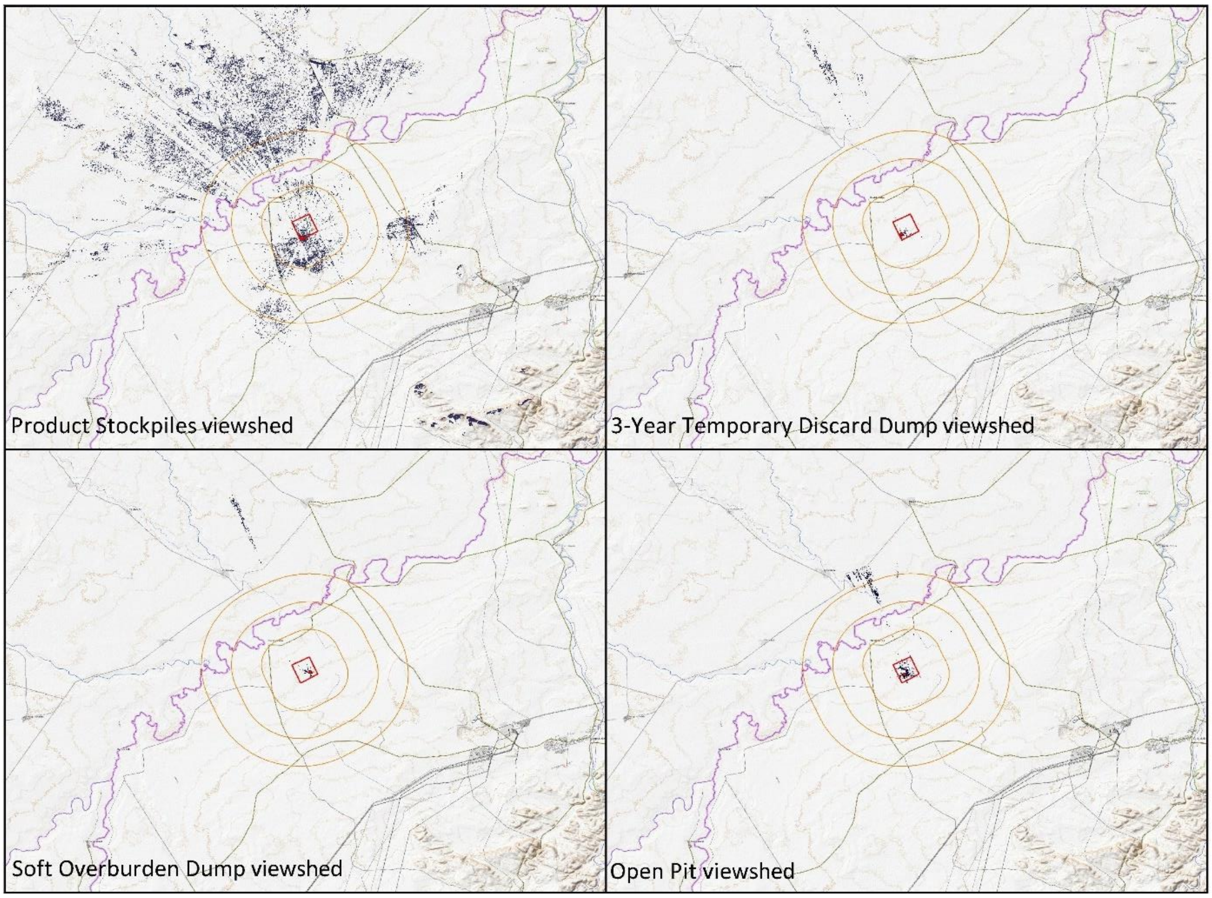


Figure 13. Viewshed analyses for individual project components (5km distance buffers indicated in orange and viewshed coverage indicated in dark blue).

From Figures 12 and 13, it is evident that large areas of each individual viewshed extend towards the northwest into neighbouring Botswana as a result of regional topography and the location of the lower-lying Limpopo River in this direction. The viewshed coverage of all project components over 12m in height are concentrated within 5km of the project area, with the visual influence of the proposed Long-term Discard Dump extending the furthest.

Infrastructure of 5m or lower in height, such as the Temporary Discard Dump and the Soft Overburden Dump, are unlikely to be visible to receptors beyond the boundaries of the project area, while the same is true for infrastructure at located ground level such as the Open Pit and access roads. It is also important to note that the Discard Dump, once in place from Year 4 onwards, will serve to fully or partially obscure infrastructure such as the CHPP and associated infrastructure, as well as dumps that are lower in height, from view.

From the viewshed analysis, the theoretical visibility of infrastructure components, which refers to the geographic area from which a project (or project component) will be visible, have been determined according the visibility classes outlined below.

Table 9. Visibility classes (Oberholzer, 2005).

Visibility Class	Description
High visibility	Visible from a large area (e.g. several square kilometers).
Moderately visibility	Visible from an intermediate area (e.g. several hectares).
Low visibility	Visible from a small area around the project site.

Table 10. Visibility classes of individual infrastructure components.

Visibility Class	Description
High visibility	Long-term Discard Dump (90m high) CHPP (25m high)
Moderately visibility	ROM (15m) Hard Overburden Dump (15m) Product Stockpiles (12m high)
Low visibility	3 Year Temporary Discard Dump (5m) Soft Overburden Dump (5m) Open Pit (ground level and below) Electrical substation (assumed to be less than 3m in height) Office, training (assumed to be single storey structure) and parking Workshop and Washbay (assumed to be single storey structure) Explosives magazine (assumed to be single storey structure) Plant Infrastructure area (assumed to be single storey structure) Water management infrastructure and Pollution Control Dams (PCDs) (assumed to be less than 5m in height) Internal roads (ground level) Access road (ground level)

The cumulative or combined viewshed for the Gruisfontein Project, whereby the viewsheds for individuals project infrastructure components were overlaid and superimposed on potential receptor sites, is shown in Figure 14 below.

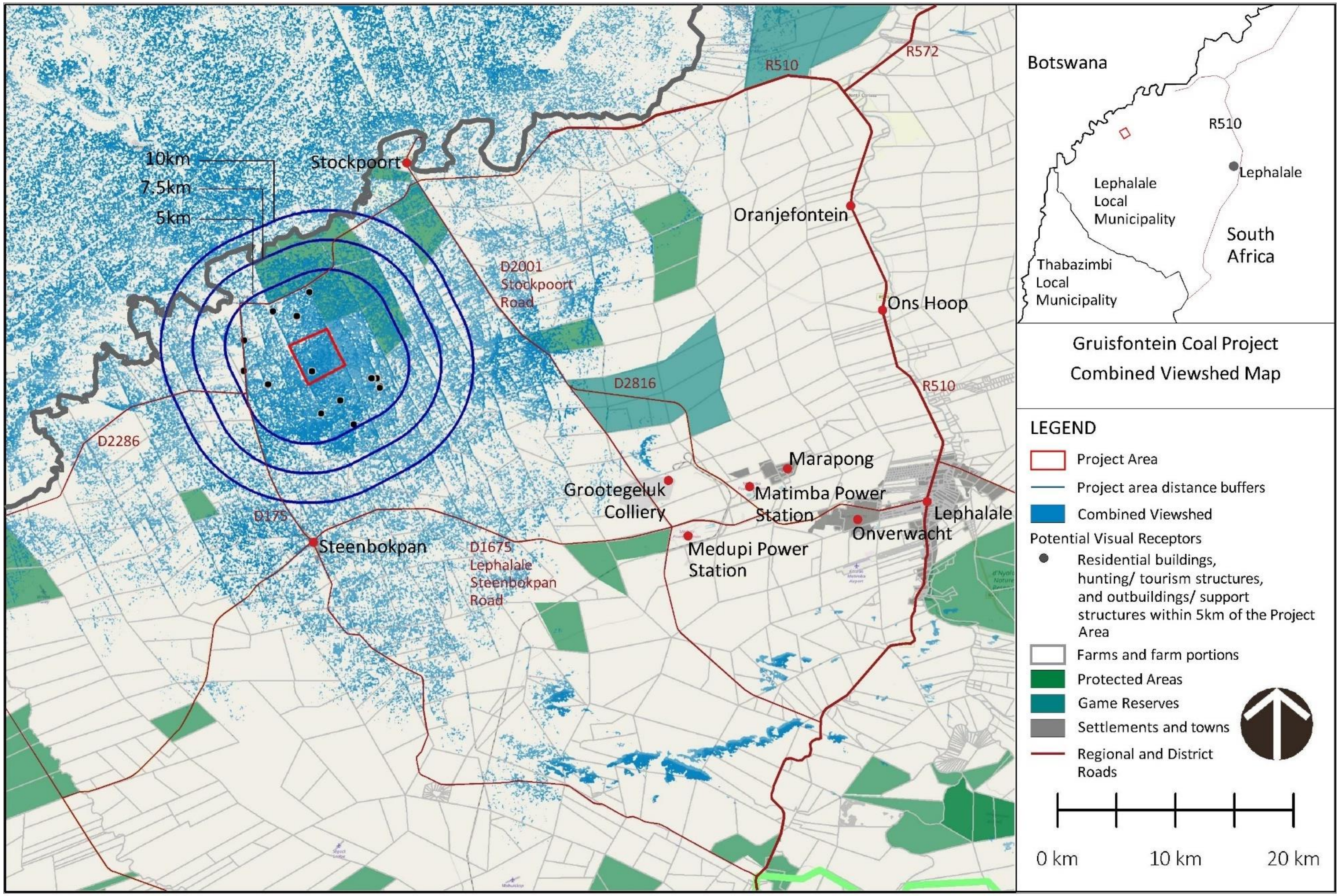


Figure 14. Combined viewshed generated for the proposed project.

From the combined viewshed analysis, it is evident that the proposed project will theoretically be visible from almost all areas within 5km of the farm Gruisfontein and intermittently within 10km thereof. The viewshed extends up to 20km to the south, to include the Steenbokpan settlement and commercial centre, and up to around 15km to the east and west, but not as far as the town of Lephalale and surrounding settlements to the east and southeast. The proposed project will also theoretically be visible to the north, including certain locations adjacent to the Limpopo River, and extend beyond the South African-Botswana border. It is however important to note that screening provided by existing vegetation and man-made infrastructure is likely to significantly reduce the theoretical viewshed, while increasing distance from the infrastructure will also serve to exponentially reduce visual exposure towards the project.

6.2.2 Elevation Profiles

Elevation profiles were generated and analysed by superimposing infrastructure components, to scale, onto the profiles. This was done in support of the viewshed analysis, whereby cross sections were selected to include as many potential visual receptors located in various directions as possible, and to specifically include areas shown to be located within the combined viewshed coverage area. The locations of the line of sight cross sections through the landscape are indicated in Figure 15 below.

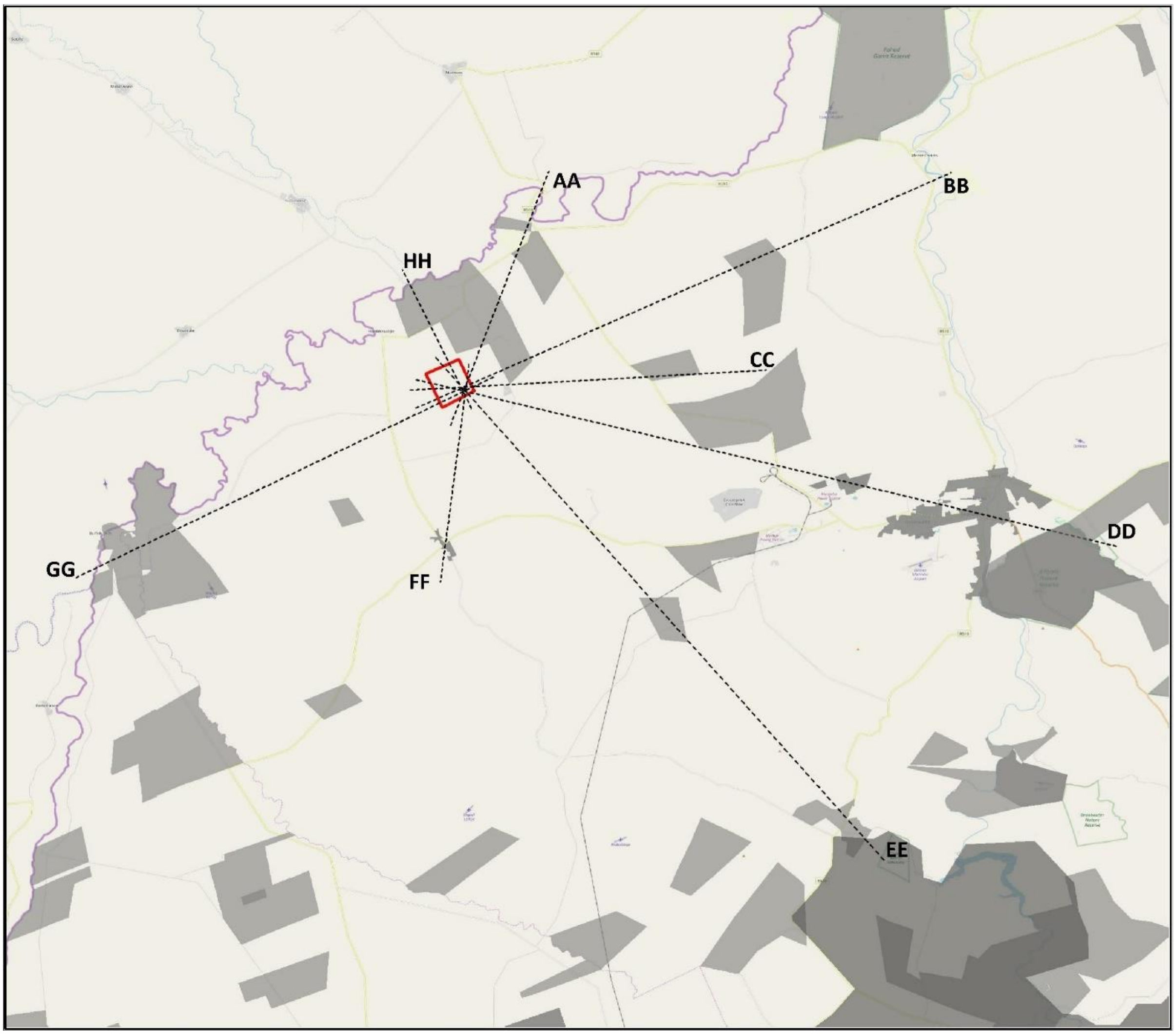


Figure 15. Locations of the Line of Sight cross sections in relation to the project area.

The following should be noted in terms of the elevation profile analyses (Figures 16 – 19):

- The representations of project infrastructure components are conceptual only, often profiling the infrastructure at oblique angles, and do not take the final shape, detailed design of object in the background into consideration;
- Vertical exaggeration factors varying between 20x and 150x, as applicable to each elevation profile, were applied in order to emphasise the landscape profiles and to illustrate infrastructure in relation to topography more clearly;
- In selecting cross section locations, an attempt was made to include the proposed discard dump in the profile, as this is the highest infrastructure component proposed and contributes most to the combined viewshed;
- Smaller gravel roads, generally present between farm portions are not indicated; and
- Maximum heights, indicative of the worst-case scenario and a limited period of time (3 – 5 years) over the lifespan of the project, were used in representing the project infrastructure components.

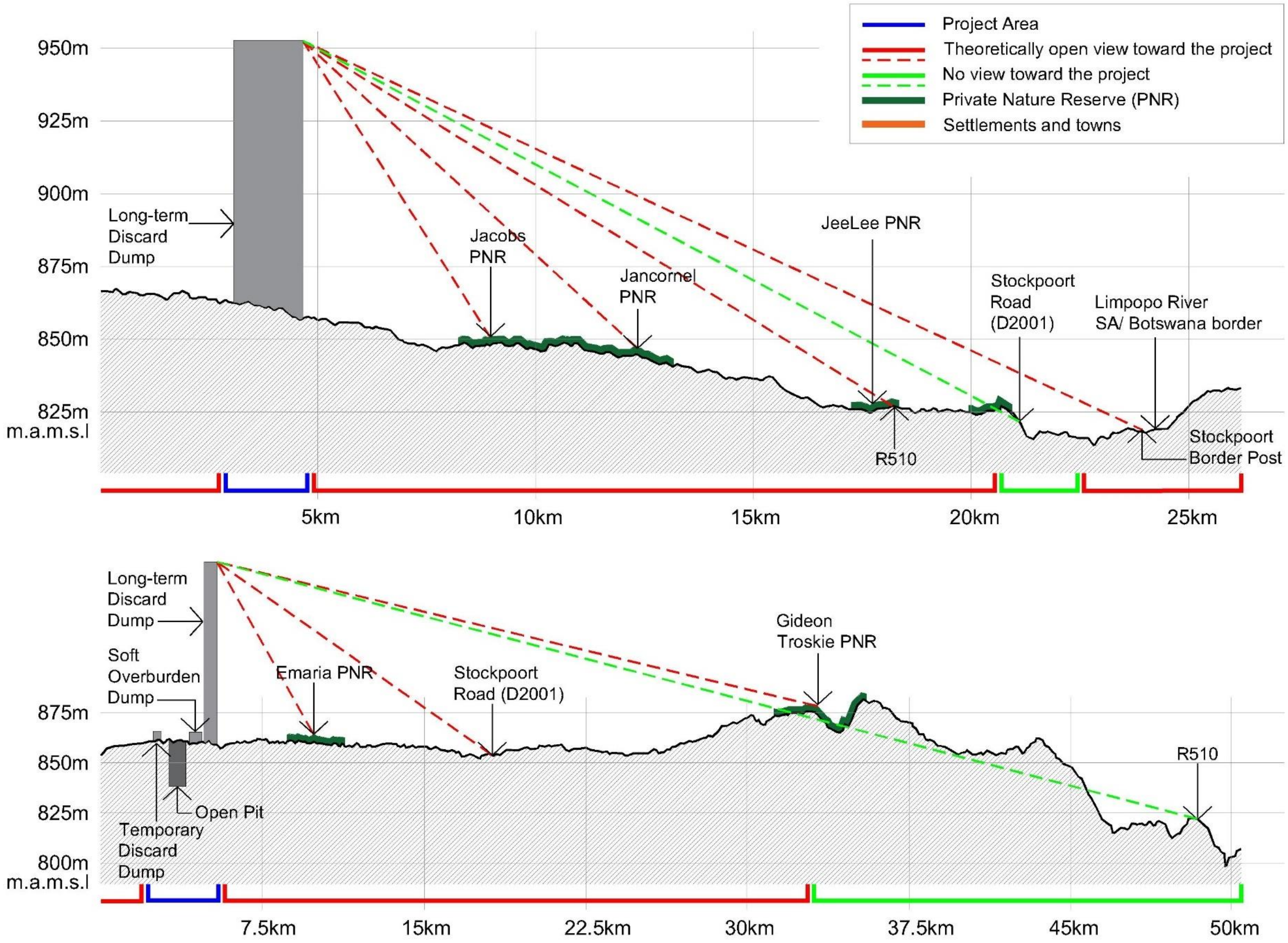


Figure 16. Elevation profile and line of sight analysis for Cross Sections AA (top) and BB (bottom).

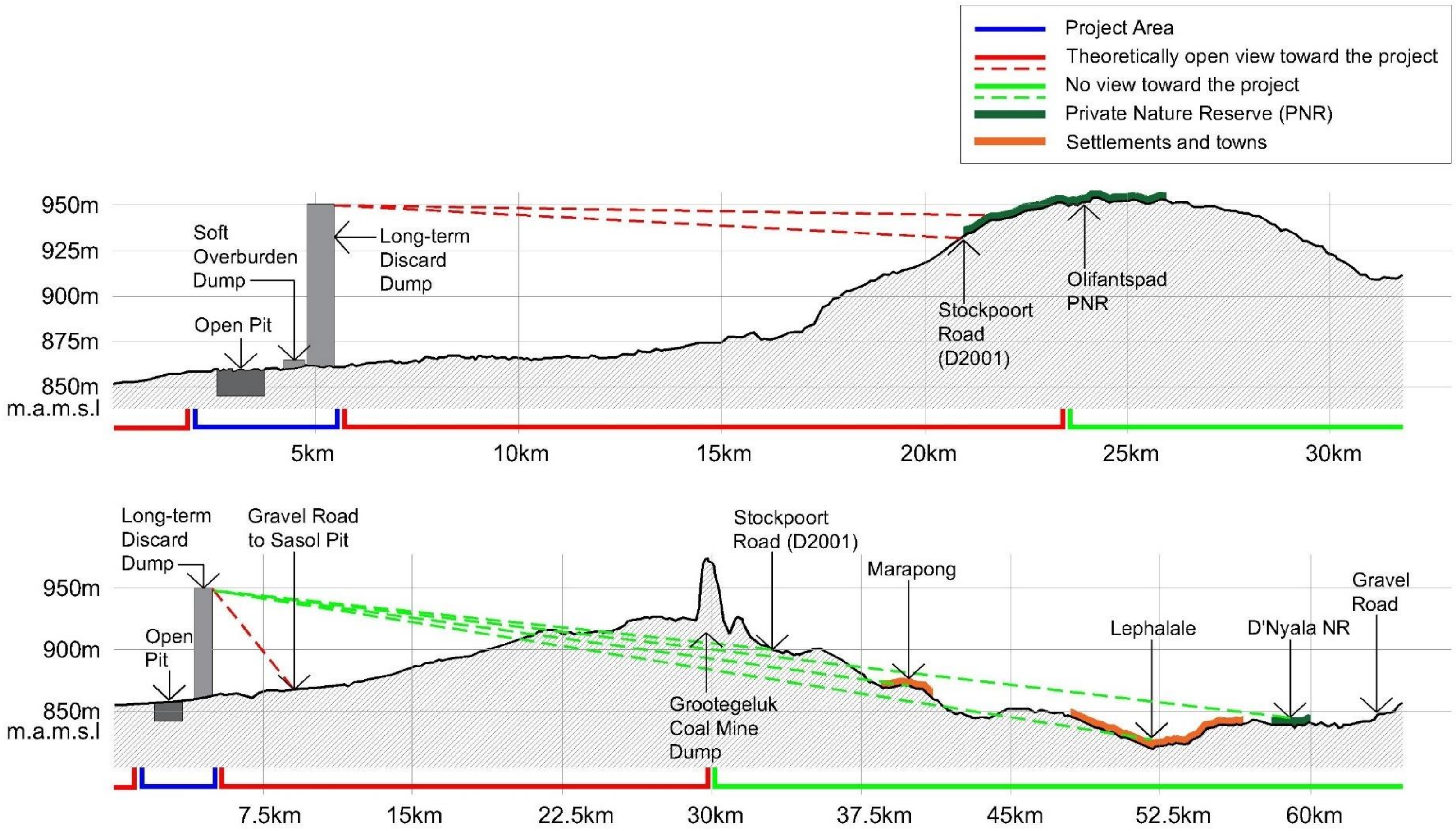


Figure 17. Elevation profile and line of sight analysis for Cross Sections CC (top) and DD (bottom)

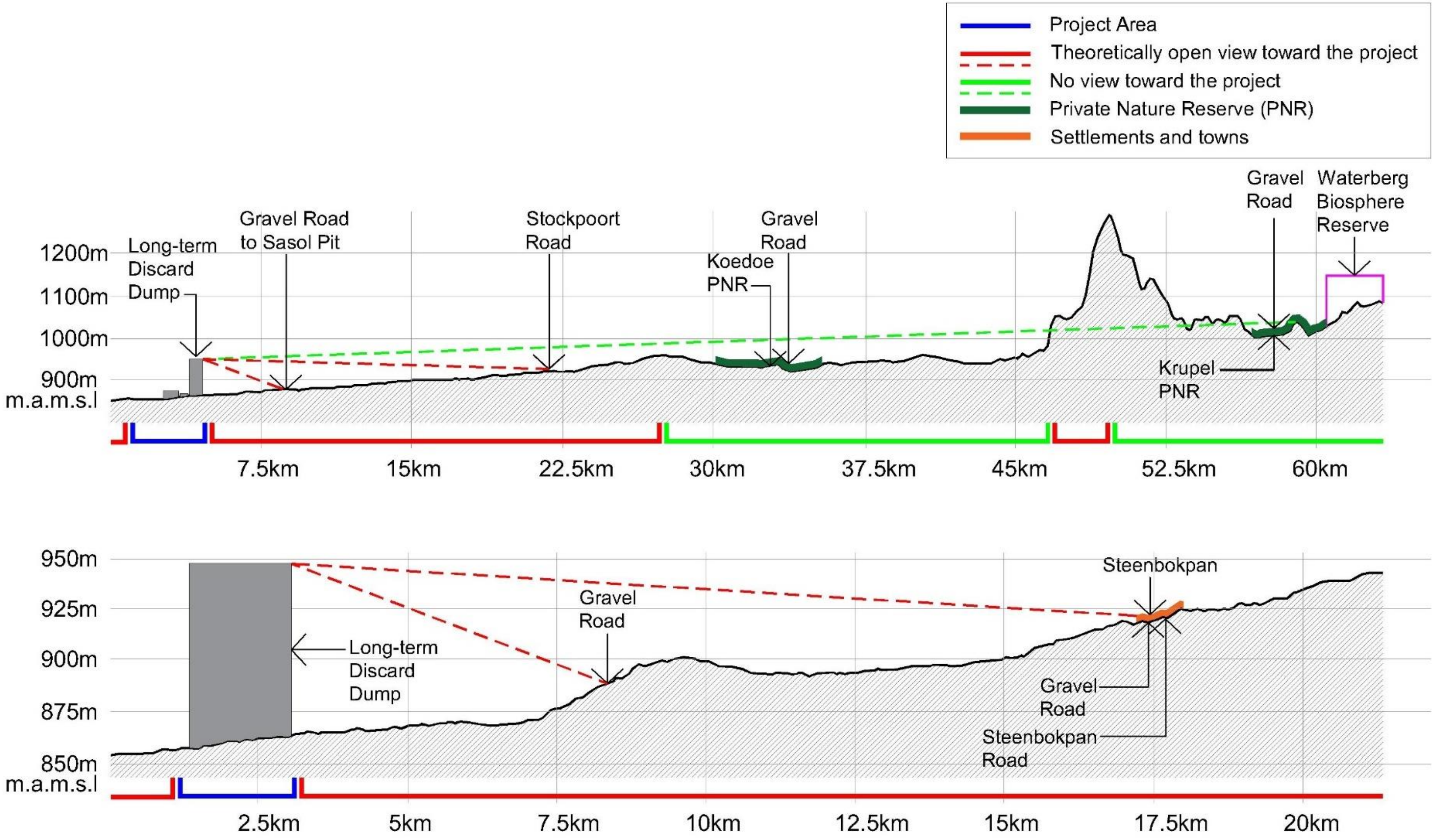


Figure 18. Elevation profile and line of sight analysis for Cross Sections EE (top) and FF (bottom).

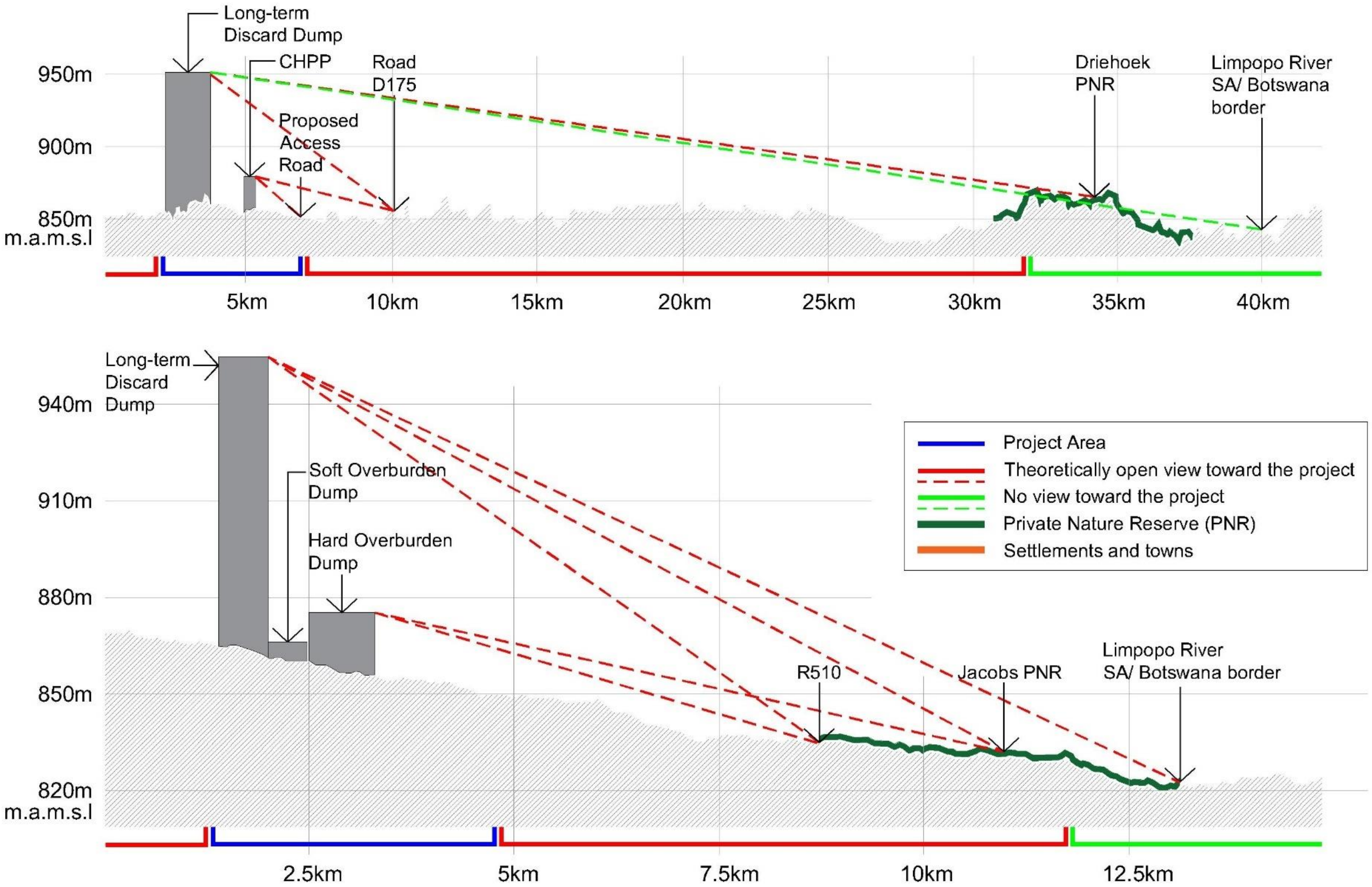


Figure 19. Elevation profile and line of sight analysis for Cross Sections GG (top) and HH (bottom).

The elevation profile and line of sight analyses represented in the figures above, support the findings of the theoretical viewshed assessment regarding whether open or obstructed views toward the project from various receptors sites potentially exist. This information was used during the field assessment as an indication of specific locations to be ground-truthed in order to determine the level of localised screening provided by man-made infrastructure and vegetation as present on site, and to refine the actual degree of visual exposure of the proposed project on identified visual receptors (refer to Section 6.3.1).

6.3 Visual Exposure

Visual exposure is based on the distance from the project to selected IOPs or other receptor sites and tends to reduce exponentially with distance (Oberholzer, 2005).

In order to broadly define the level of visual exposure of each receptor type or site, based on their distance from the proposed project, the four distance zones proposed by BLM (1984), namely Foreground, Middleground, Background and Seldom Seen, have been quantified. The effects of distance are highly dependent on the size, height and other characteristics of the proposed infrastructure, as well as those of the receiving landscape. As such, the distance zones as indicated in the table below have been deemed suitable for application to this project, based on the expected height of the proposed infrastructure, the general topography and pattern of the receiving landscape, together with field observations.

General visual exposure classes, together with the proposed distance zones applicable to the project, are indicated in the table below.

Table 11. Visual exposure classes (IEMA, 2013; Oberholzer, 2005; BLM, 1984).

Visual Exposure Class	Description
High	Dominant or clearly noticeable within the observer's view frame. Foreground: 0 – 5km (local setting)
Moderate	Recognisable feature within observer's view frame. Middleground: 5 to 7.5km (subregional setting)
Marginal	Not particularly noticeable within observer's view frame and only prominent with clear visibility as part of the wider landscape. Background: 7.5 to 10km (subregional setting)
Low	Practically not visible unless pointed out to observer and seen in very clear visibility as a minor element in the landscape. Seldom seen: 10 to 15km (regional setting)
None	Entirely screened from view. Not seen: 15km+

Typical viewer sensitivity, taking the visual exposure classes outlined in the table above and information provided in Section 6.2, into account, are defined in the table below.

Table 12. Visual receptor sensitivity, taking distance zones into account.

Receptor Type	Receptor Site	Visual Exposure			
		Foreground	Middleground	Background	Seldom Seen
		0 – 5km	5 – 7.5km	7.5 – 10km	10 – 15km
Residents	Residences and associated properties (including local roads)	High	Medium	Medium	Low
	Towns and settlements	High	Medium	Medium	Low
	Accommodation facilities, lodges, safari ranches, hunting camps (owners and staff) and associated properties	High	Medium	Medium	Low
Tourists	Hunting and recreational tourists (and associated areas accessed)	High	Medium	Medium	Low
Tourists – Nature and Game Reserves	Private and Provincial Nature Reserves and Game Reserve	High	Medium	Medium	Low
Motorists	Regional Road	Medium	Medium	Low	Low
Motorists	District Roads	Medium	Low	Low	Low
Workers	Industrial Areas	Low	Low	Low	Low
Workers	Mining Area	Low	Low	Low	Low

Based on the table above,_the following visual receptors per visual sensitivity class, as specifically applicable to the Gruisfontein Project, have been determined. Visual exposure classes as applicable to the project in relation to visual receptors are illustrated in Figure 20.

<u>High sensitivity visual receptors</u>:

- All residents and residences, hunting and tourism operators and tourists including associated farms within 5km of the project footprint area.
- Protected and conservation areas: Jacobs PNR and Emaria PRN.

<u>Moderate sensitivity visual receptors</u>:

- All residents and residences, hunting and tourism operators and tourists including associated farms within 5 – 10km of the project footprint area with a clear line of sight towards the project infrastructure.
- Motorists on the D175 district road north and west of the project area located within 5km of the project area.
- Protected and conservation areas: Jancornel PRN.

<u>Low sensitivity visual receptors:</u>

- All residents and residences, hunting and tourism operators and tourists including associated farms within 10 – 15km of the project area, with a clear line of sight towards the project infrastructure.
- Towns and settlements within 10 – 15km of the project area: Steenbokpan (Lesedi village) where a clear line of sight exist toward the project infrastructure.
- Protected and conservation areas: Jee Lee PRN.
- Motorists on the D2001, D2286, D175 and D1675 district roads within 5 – 15km of the project area where a with a clear line of sight towards the project infrastructure.

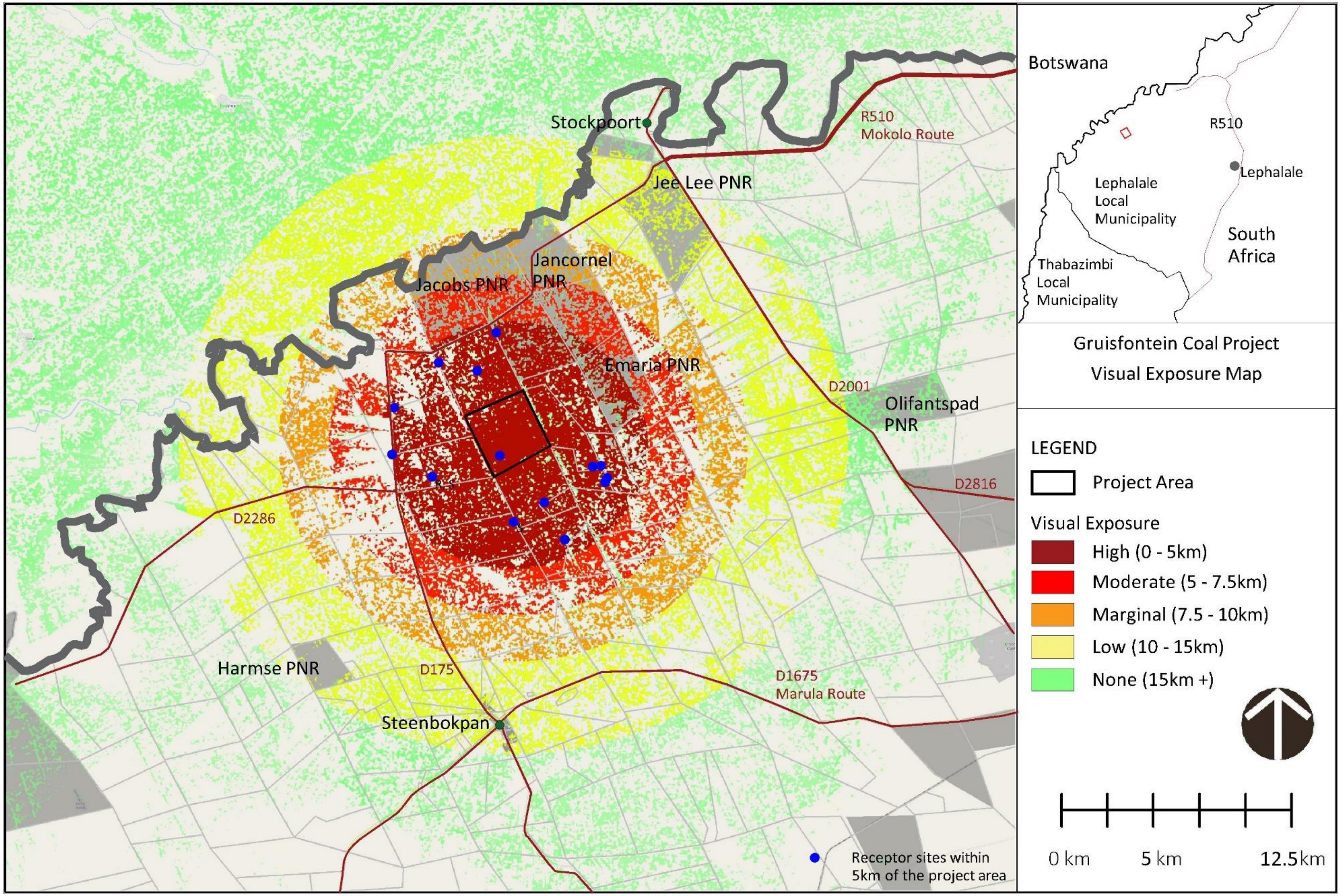


Figure 20. Visual exposure map.

6.3.1 Important Observation Points (IOPs)

Several viewpoints, referred to as IOPs, were considered during the field assessment, with some IOP locations representing typical views from a larger receptor site. These viewpoints were chosen based on their clear relationship with the proposed project as assessed in Sections 6.2.1 and 6.2.2 above and were selected to represent a range of receptor sites, such as tourist resources, residential areas, settlements and farmsteads, as well as roads that form linear view corridors and roads that are indicated in the Lephalale Local Municipality IDP (2018-2019) to be designated as tourist routes. IOPs were selected to represent views from the foreground, middleground and background in order to define actual distances and location from where receptors will be visually exposed to project infrastructure.

The IOPs further consider potential receptor sites in reasonable proximity to the project area from where the project is indicated to potentially be highly visible, and in certain instances serve to illustrate that certain receptor sites, although located within the proposed infrastructure's theoretical zone of visual influence, benefit from effective or partial screening by existing structures and vegetation, as well as the effect of distance. The locations of the IOPs are indicated in Figure 21.

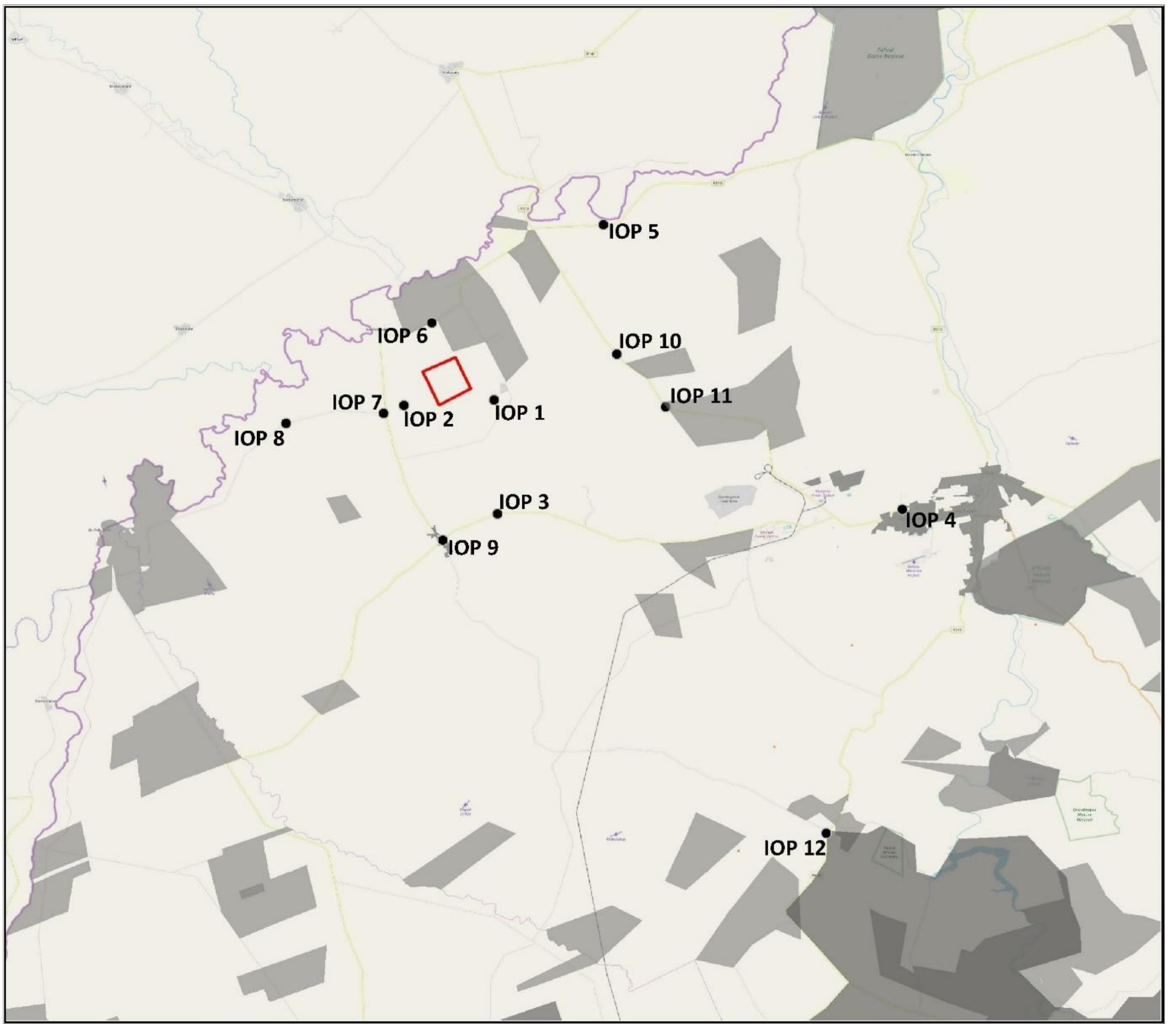


Figure 21. Locations of IOPs in relation to the project area.

Conceptual visual simulations were developed for each of the IOPs to illustrate overall appearance of the proposed infrastructure in its unmitigated state (Figures 22 – 27).

Figure 22. View simulation of mine infrastructure from IOP 1: Matopi (top) and IOP 2: Verloren Valey (bottom).

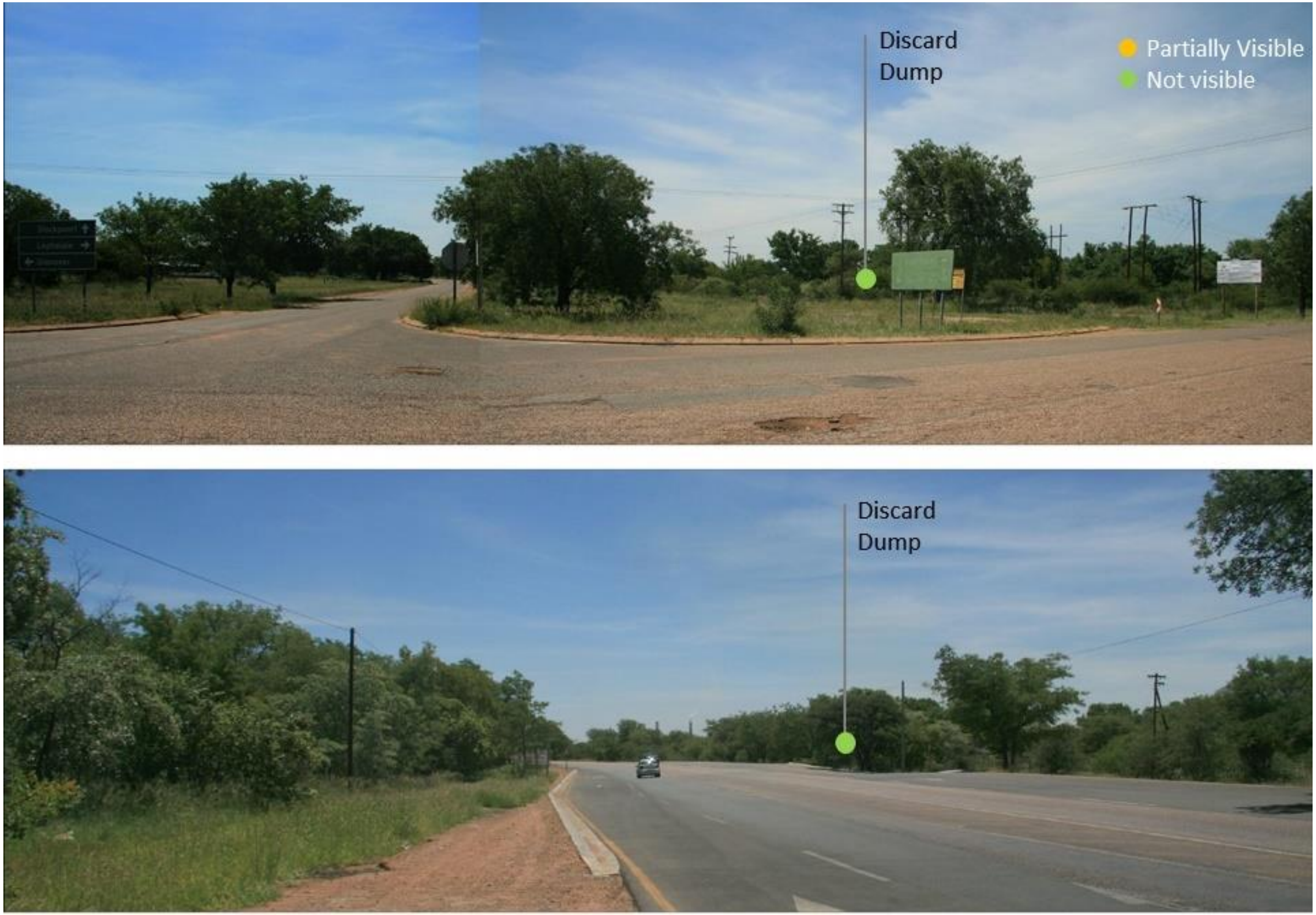


Figure 23. View simulation from IOP 3: Steenbokpan (top) and IOP 4: Marapong/ Lephalale/ Onverwacht (bottom).

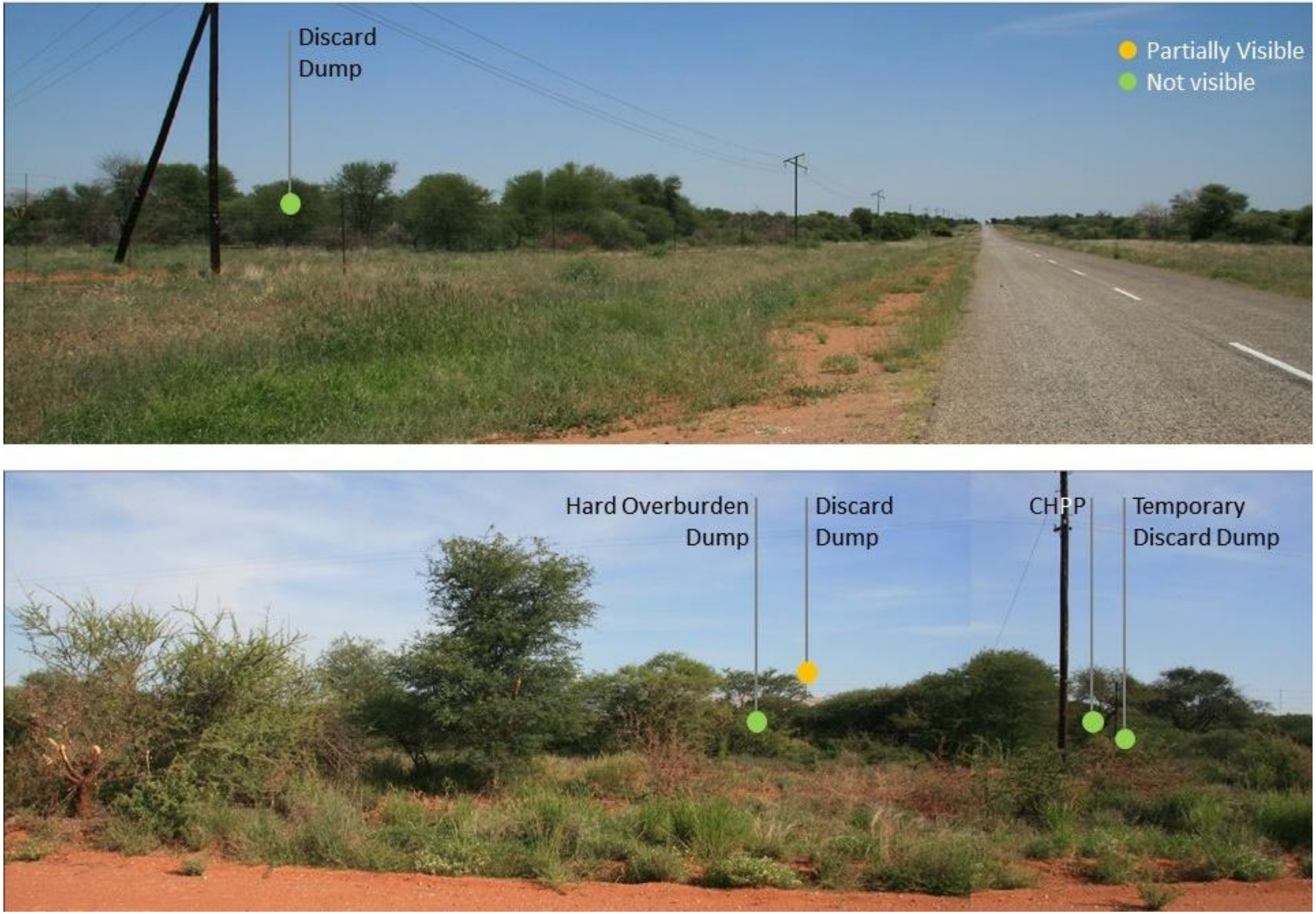
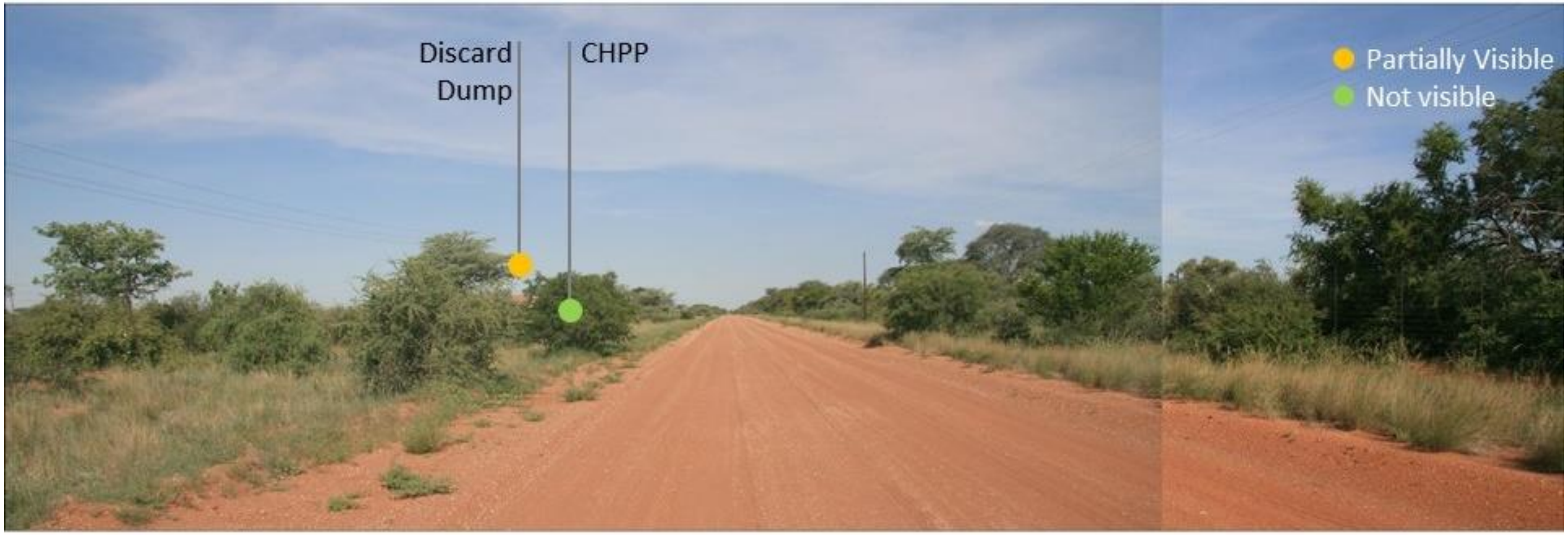


Figure 24. View simulation from IOP 5: R510 (top) and IOP 6: D175 district road (bottom).



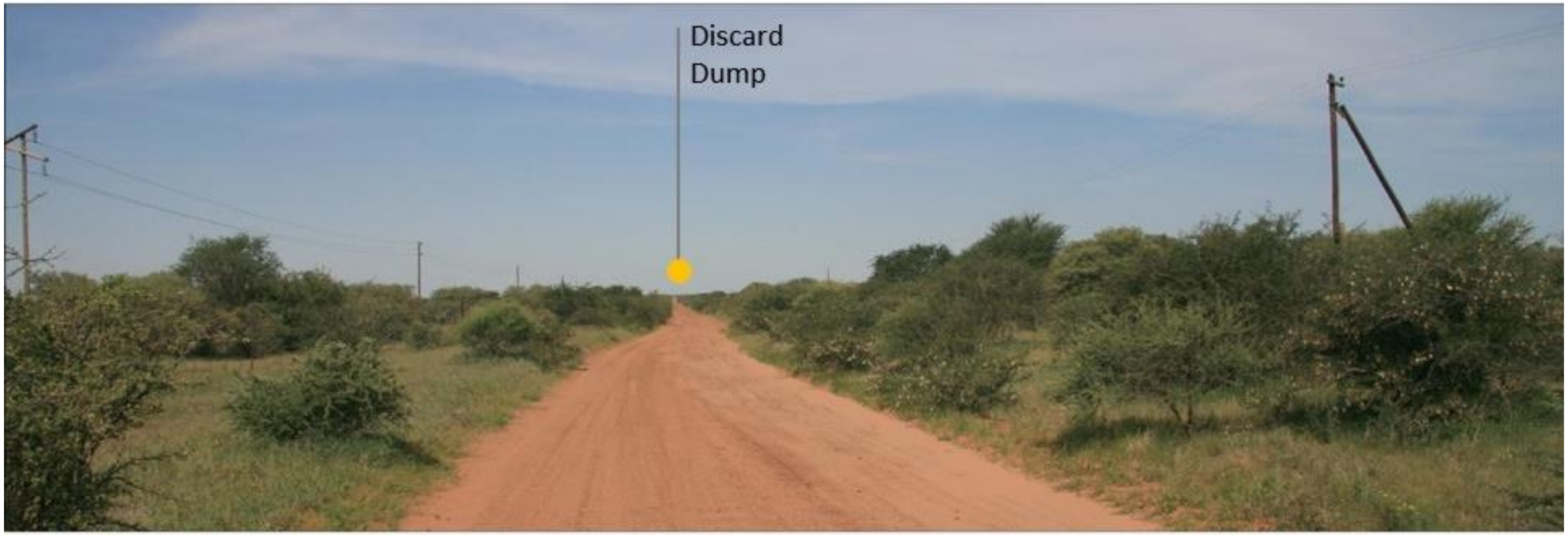


Figure 25. View simulation from IOP 7: D175 and D2286 district roads intersection (top) and IOP 8: D2286 district road (bottom).

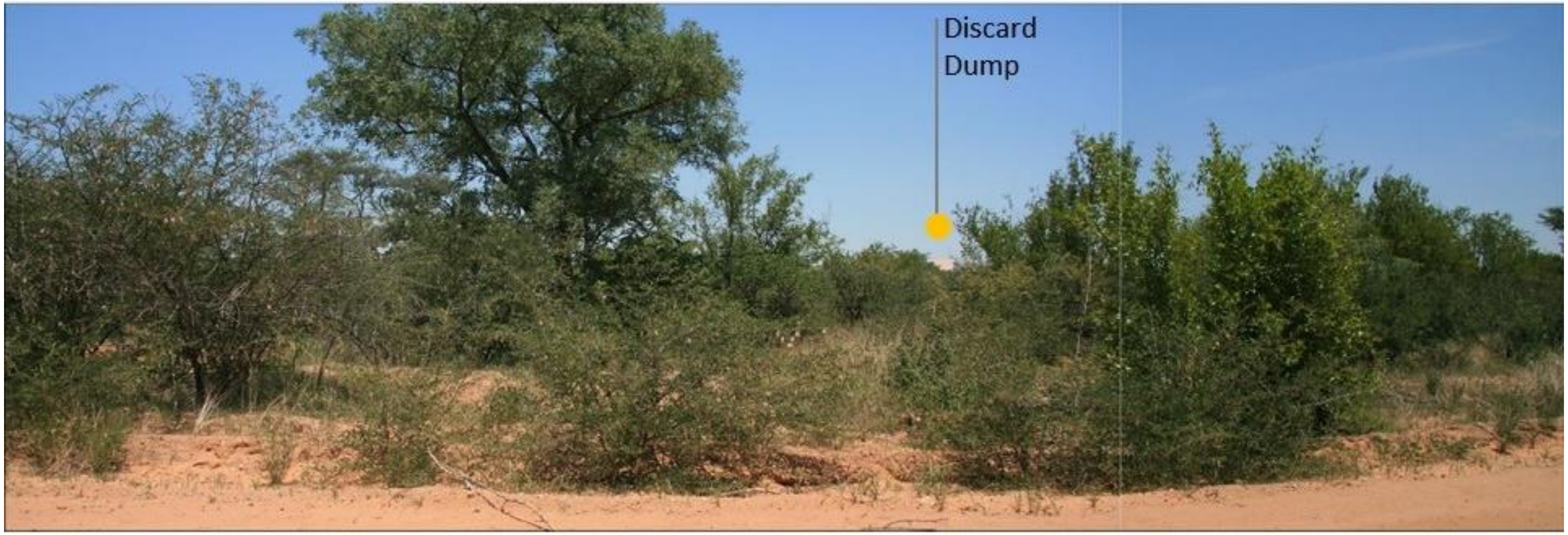


Figure 26. View simulation from IOP 9: Lephalale Steenbokpan Road (D1675) (top) and IOP 10: Stockpoort Road (D2001) (bottom).

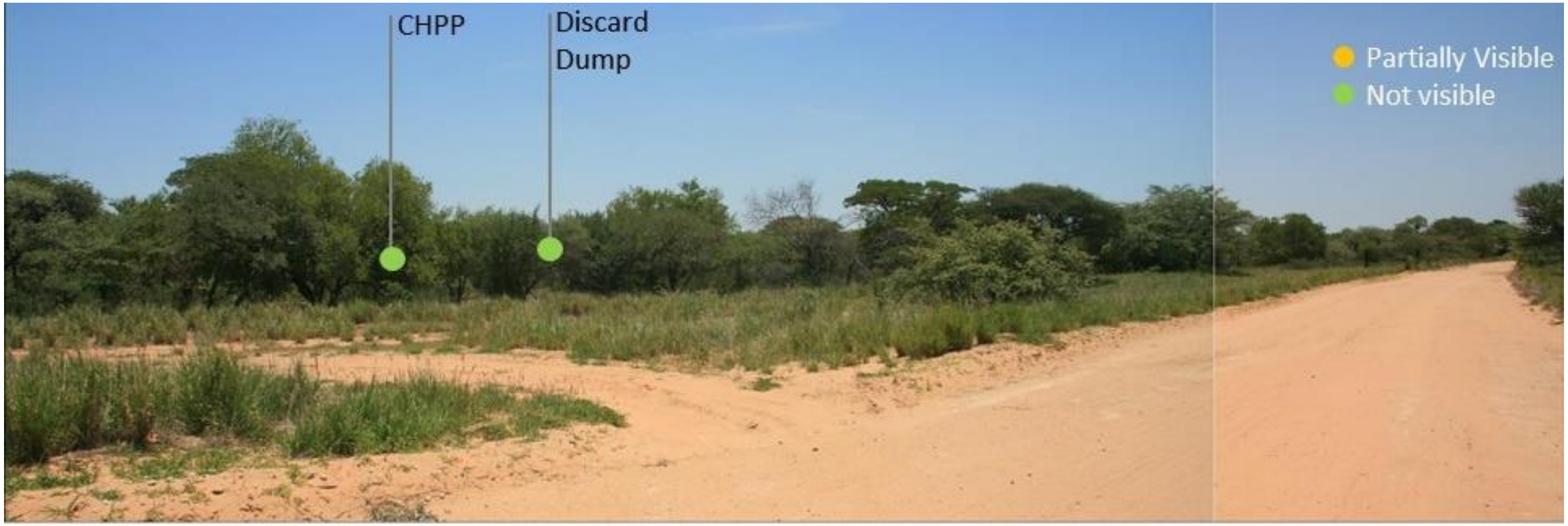


Figure 27. View simulation from IOP 11: Manketti Game Reserve/ D2816 district road (top) and IOP 12: R510/ Waterberg Biosphere Reserve boundary (bottom).

A summary of the findings of the IOP field and visual analysis is included in Table 13 below.

Table 13. Summary of the findings of the IOP analysis.

Ref.	Location in relation to the project area	Distance zone/ theoretical viewshed	Description of Visual Receptor Type/ Site	Perceived Receptor Sensitivity	Degree of visual exposure	Nature of the view
IOP 1	2.4km to the southeast	Foreground (within viewshed coverage area)	Residence/ Hunting Lodge on Matopi Farm. Within	High sensitivity: residents (including farm workers), hunting tourists.	High: Partial view of Long-term Discard Dump. Possible view of CHPP when viewed from other locations at receptor site.	Fixed
IOP 2	3.2km to the west	Foreground (within viewshed coverage area)	Residence on Verloren Valey	High sensitivity: residents, including farm workers.	High: Partial view of Long-term Discard Dump. Possible view of CHPP when viewed from other locations at receptor site.	Fixed
IOP 3	14.4km to the south	Seldom Seen	Steenbokpan (Lesedi village)	Moderate sensitivity: residents and workers	None: Unlikely that any infrastructure will be visible.	Fixed
IOP 4	40km to the southeast	Not seen (outside viewshed coverage area)	Onverwacht (also representing Lephalale and Marapong)	Low sensitivity: residents including towns and settlement beyond 15km of the project area.	None: No infrastructure will be visible across this distance.	Fixed
IOP 5	19km to the northeast	Not seen (within viewshed coverage area)	R510	Low sensitivity: motorists beyond 15km of the project area.	None: Unlikely that any infrastructure will be visible.	Sequence of views (if visible)
IOP 6	5.4km to the north	Middleground (within viewshed coverage area)	Protected and Conservation Areas: Jacobs PNR	Moderate sensitivity: tourists beyond 5km of the project area.	Moderate: Partial view of Long-term Discard Dump	Fixed (if views were to be available)
IOP 7	5km to the west	Foreground (within viewshed coverage area)	District road D2286/ D175	Moderate: motorists 5km from the project area.	Moderate: Partial view of Long-term Discard Dump	Sequence
IOP 8	13.3km to the southwest	Seldom Seen (within viewshed coverage area)	District Road D2286	Low: Motorists beyond 10km of the project area.	Low: Partial view of Long-term Discard Dump (over a long distance)	Sequence of views
IOP 9	12.2km to the south	Seldom Seen (within viewshed coverage area)	District Road D1675	Low: Motorists beyond 10km of the project area.	Low: No infrastructure will be visible due to screening from existing vegetation.	Sequence of views (if available)

IOP 10	13.7km to the east	Seldom Seen (within viewshed coverage area)	District Road D2001	Low: Motorists beyond 10km of the project area.	Low: Partial view of Long-term Discard Dump (over a long distance)	Sequence of views (if available)
IOP 11	17.6km to the southeast	Not seen (within viewshed coverage area)	Manketti Game Resere/ District Road D2001	Low: Tourists and motorists beyond 10km of the project area.	None: Tourists and motorists beyond 15km of the project area.	Sequence of views (If available)
IOP 12	54km to the south	Not seen (outside viewshed coverage area)	Boundary of Waterberg Biosphere Reserve	Low: Tourists beyond 15km of the project area.	None No infrastructure will be visible across this distance.	Fixed (if views were to be available)

From the results of Table 13 above it is evident that the actual zone of visual influence of the project is smaller than the theoretical viewshed, mainly due to the effect of distance (it is highly unlikely that any infrastructure will be visible beyond 15km of the project footprint area) and effective screening afforded by existing vegetation, particularly when considering infrastructure of less significant heights.

7 RESULTS OF THE IMPACT ASSESSMENT

7.1 Impact Significance

Visual impacts result from changes in the physical landscape which may lead to changes in landscape character, available views and overall changes to visual amenities, and how such changes are experienced by viewers/ visual receptors. In turn, this may affect the perceived value assigned to a landscape.

Potential impacts on the visual environment of the region as a result of the proposed project, as based on current available information and the receiving landscape in its current state, were assessed according to the method outlined in Section 3.3. Table 14 below presents an assessment of the impact significance without mitigation (WOM) and a re-evaluation of the overall significance of the impact with mitigation measures (WM).

Table 14: Visual Impact Assessment significance ratings table.

No.	Potential Impact	Nature of Impact	Spatial Extent	Duration	Probability	Intensity	Weighting factor	Impact Significance WOM	Possible Mitigation Measures	Mitigation Efficiency	Impact Significance WM
Pre-Construction/ Planning Phase											
1.	Visual intrusion of mining infrastructure and activities on sensitive visual receptors during the pre-construction phase, due to: o Initial site clearing and removal of bushveld vegetation; o Establishment of access roads and contractor's laydown areas; o Removal and demolition of existing infrastructure such as the existing residence and outbuildings on the farm Gruisfontein; and o Failure to plan for mine rehabilitation and final closure and rehabilitation through open pit backfilling of the open pit with stockpiled material and surface structure demolition which may lead to further visual intrusion and landscape character alteration during later development phases.	Negative	Local (2)	Short term (2)	Highly Probable (4)	Low (2)	Low to Medium (2)	Low to Medium (20)	• Areas of disturbance during site clearing and establishment of initial infrastructure, where natural vegetation is removed and soils are exposed, should be kept to a minimum. • Planning for closure and final rehabilitation must be initiated. • A Biodiversity Action Plan (BAP) and alien vegetation control and eradication plan must be designed proactively and implemented throughout all development phases in order to manage indigenous vegetation within the project area, avoid unnecessary loss thereof, and to monitor and control alien floral recruitment in disturbed areas.	Medium (0.6)	Low (12)
Construction Phase											
2.	Visual intrusion of construction activities on visual receptors during the construction phase, due to: o Site clearing, including large-scale vegetation clearing removal of topsoil for	Negative	District (3)	Short term (2)	Highly Prob. (4)	High (4)	Medium to High (4)	Medium (52)	• Areas of disturbance during site clearing and construction infrastructure, where natural vegetation is removed and soils are exposed, should be kept to a minimum.	Medium (0.6)	Low to Medium (31)

	stockpiling within infrastructure footprint areas; o Establishment of dumps and stockpiles; o General construction of mining infrastructure associated with the proposed project, such as the CHPP, offices, wash bays, workshops, and water and electrical infrastructure, etc.; o Increased amount of human activity within the project area and surrounds; o Presence of vehicles, equipment and machinery within the project area and surrounds; o Increased number of vehicles making use of local roads; and o Presence of fugitive dust related to construction and vehicle movement on unpaved roads.							• Large trees surrounding the infrastructure footprint areas should remain intact as far as possible. • Any landscaping done around offices, workshops and parking area should only include locally indigenous species. No lawns or alien vegetation should be introduced due to the long-term effects this may have of species composition. • General housekeeping should receive priority to ensure construction areas are always neat and orderly. • The duration of the construction period must be reduced as far as possible through careful project planning. • The use of permanent signage and project construction signs should be minimised and not visually obtrusive. • Linear infrastructure components should follow natural contours or existing road alignment as far as possible to avoid unnecessary and unsightly cut and fill works, lower erosion potential and avoid visual contrast. • The CHPP and all buildings such as offices and workshops should be designed to fit their surroundings through the appropriate use of colour and material selection in order to lower their visual intrusion. Painting or coating infrastructure components to match darker colours in the natural surroundings may reduce the actual visibility of these components.		

									• Natural colours should be used in all instances and the use of highly reflective material should be avoided. Any metal surfaces should be painted to fit in with the natural environment in a colour that blends in effectively with the background. Bright or white structures are to be avoided as these will contrast significantly with the natural surroundings. • Dust management and suppression of unpaved roads with major vehicle activity, as well as all areas where excessive dust is noted should take during the construction phase. • Vehicles should be restricted to existing roads and the speed of hauling and other vehicles should be limited to minimise dust.		
3.	Visual impact on the landscape character and sense of place associated with the project area and surrounds during the construction phase, due to: o Site clearing and the direct loss of natural vegetation which visually contrast with the surrounding landscape; o Site clearing and the presence of exposed soils which visually contrast with the surrounding landscape; o General construction of mining infrastructure and establishment of dumps and stockpiles; o Formalisation of access roads; o Increased human activity in the region;	Negative	Local (2)	Short term (2)	Highly probable (4)	High (3)	Medium to High (4)	Medium (52)	Refer to Item No.2. above.	Medium (0.6)	Low to Medium (31)

	○ Heavy machinery and increased number of construction and other vehicles on local roads; ○ Presence of fugitive dust related to construction and vehicle movement on unpaved roads; and ○ Topographic alteration of the landscape within and adjacent to the project area.										
Operational Phase											
4.	Visual intrusion of mining activities on visual receptors during operations, due to: ○ Ongoing opencast mining and operational activities; ○ Ongoing loss of vegetation, exposure of soils and alteration of landforms and contours; ○ Presence of mining infrastructure such as the offices, wash bays, workshops, and water and electrical infrastructure, etc.; ○ Presence and ongoing increasing height of various dumps and stockpiles, such as the ROM, Temporary and Long-term Discard Dumps and overburden dumps; ○ Increased amounts of human activity within the project area and surrounds; ○ Increased traffic and presence of mining vehicles on the local roads (mainly D175 and D1675) between the project area and	Negative	District (3)	Medium term (3)	Definite (5)	High (4)	Medium to High (4)	Medium to High (60)	• Areas of disturbance during operational activities where natural vegetation is removed and soils are exposed, should be kept to a minimum. • Where possible, infrastructure should be placed within areas that are already disturbed. • Large trees surrounding the infrastructure footprint areas should remain intact as far as possible. • General housekeeping should receive priority to ensure operational areas are always neat and orderly. • All operational facilities should be actively maintained. • Visually intrusive activities must be screened off or make use of local screening opportunities as far as is considered feasible. • Where screening opportunities from topography and vegetation are absent, natural-looking constructed landforms and vegetative or architectural screening may be used to minimise visual impacts.	Low to Medium (0.8)	Medium (48)

	Medupi/ Matimba Power Stations; and o Increased levels of fugitive dust related to construction and vehicle movement on unpaved roads.								• Infrastructure heights, including that of dumps and stockpiles should be designed to be a low as possible, without increasing the footprint areas. • Backfilling of the open pit should commence as soon as possible in order to avoid discard dumps reaching maximum final heights and limit the operational size of the open pit. • Vegetation growth on dumps and stockpiles, with particular mention of the proposed Long-term Discard Dump, should be encouraged, and if required facilitated through seeding with a locally indigenous seed mixture. • The Long-term Discard Dump should be shaped as the dump increases in height, to blend in with the surrounding landscape, as far as possible. • Disturbed areas and bare soils should be revegetated as soon as possible during the operational phase. • Vehicles should be restricted to existing roads and the speed of hauling and other vehicles should be limited to minimise dust generation. • The latest technology must be employed to reduce vehicle exhaust gas emissions and all mining vehicles must suitably maintained to avoid diesel spillages and break downs. • Access roads must be suitably maintained to limit and prevent erosion and dust. • Transport of the mined resource should be optimised as far as possible		

									to limit the number of additional vehicles on local and district roads. • Dust management and suppression of unpaved roads with major vehicle activity, as well as all areas where excessive dust is noted should continue during the operational phase. • Ongoing dust monitoring is to be implemented. • Ongoing alien vegetation control and management should take place. • Erosion prevention and control should be implemented throughout the operational phase of the project. • Off-site visual mitigation measure that should be considered could include reclaiming unnecessary roads, removing unnecessary fencing, signage and buildings that will not be repurposed, and rehabilitating and revegetating existing erosion or disturbed areas. • If required, additional screening vegetation may be planted at receptor sites (IOPs) from where a clear view towards mining infrastructure of increased height exists.		
5.	Visual impact on the landscape character and sense of place associated with the project area and surrounding area during operations, due to: o On-going mining activities within an area characterised by a low level of development;	Negative	District (3)	Medium term (3)	Definite (5)	High (4)	Medium to High (4)	Medium to High (60)	Refer to Item No 4. above.	Low to Medium (0.8)	Medium (48)

	○ Visibility of infrastructure of increased height by sensitive visual receptors; ○ Ongoing loss of vegetation cover that contributes significantly toward the landscape character; ○ Increased proliferation of alien plant species; ○ Disturbance and exposure of soils and potential occurrence of erosion due to operational activities; and ○ An increase in vehicular traffic on local roads as well as the maintenance of roads and infrastructure.										
6.	Alteration of topography due to: ○ On-going mining and operational activities; ○ Excavation and increased depth and size of open pit; ○ Presence and ongoing increasing height of various dumps and stockpiles, such as the ROM, Temporary and Long-term Discard Dumps and overburden dumps; and ○ Development of linear infrastructure such as roads power lines and water management infrastructure which may require alterations of contours.	Negative	District (3)	Long term (4)	Highly Probable (4)	High (4)	Medium to High (4)	Medium to High (60)	• Backfilling of the open pit should commence as soon as possible in order to avoid discard dumps reaching maximum final heights and limit the operational size of the open pit. • Erosion of dumps and stockpiles should be prevented. • Vegetation growth on dumps and stockpiles, with particular mention of the proposed Long-term Discard Dump, should be encouraged, and if required facilitated through seeding with a locally indigenous seed mixture. • The Discard Dump in particular, should be shaped and rounded as it increases in height and as more material is added, to blend in with the surrounding landscape, as far as possible, particularly once the discard dump reaches a height where skylining or changes to the horizon may occur.	Medium (0.6)	Low to Medium (36)

7.	Visual impacts from night-time lighting, due to: o 24-hour operations impacting on visual receptors accustomed to a low district brightness during night-time; o Exterior lighting around the offices, workshops, parking areas, along access roads and other work areas; o Security lighting around mining infrastructure; o Night-time lighting from operational vehicles within the project area and on surrounding roads; o Maintenance activities conducted at night; and o Material placement on dumps and stockpiles on increased height during the night-time.	Negative	Long term (3)	Medium term (3)	Definite (5)	High (4)	Medium to High (4)	Medium to High (60)	• Existing vegetation will assist in screening surrounding receptors from night-time lighting at ground level, and therefore as much existing vegetation as possible surrounding the proposed infrastructure should be retained and development footprints should remain as small as possible. • A lighting engineer should be consulted to assist in the planning and placement of light fixtures for the CHPP and all ancillary infrastructure in order to reduce visual impacts associated with glare and light trespass. • Placement of lighting outside of the project area should be avoided or strictly limited. • All outdoor lighting must be strictly controlled, and lighting shields installed where required. • The use of high light masts should be avoided to reduce sky glow. • Up-lighting of structures must be avoided, with lighting installed at downward angles that provide precisely directed illumination, thereby minimising the light spill and trespass beyond the immediate surroundings of the mining infrastructure. • Lighting use should be minimised during construction and night-time operations. Localised and portable lighting should be used where and when the operations or maintenance work is occurring.	Medium (0.6)	Low to Medium (34)

									• Care should be taken when selecting luminaries to ensure that appropriate units are chosen and that their location will reduce spill light and glare to a minimum. • Only “full cut-off” light fixtures that direct light below the horizontal level of the light fixture the must be used on the buildings and infrastructure. • Censored and motion/ movement-activated lighting should be installed for security purposes at offices and workshops to prevent use of lights when not needed. • Vehicle-mounted lights or portable light towers are preferred over permanently mounted lighting for night-time maintenance activities. • Placement of material on infrastructure such as discard dumps of increased heights during the night-time should be avoided; • Minimum wattage light fixtures should be used, with the minimum intensity necessary to accomplish the light's purpose. • The use of low-pressure sodium lamps, yellow Light Emitting Diode (LED) lighting, or an equivalent reduces skyglow and wildlife impacts. Bluish-white lighting is more likely to cause glare. • Off-site hauling of product should be limited to daylight hours.		

Decommissioning/ Closure Phase										
8.	• Visual intrusion of decommissioning activities on visual receptors, due to: ○ General decommissioning activities including the dismantling and removal of infrastructure; ○ Final removal of dumps and stockpiles; ○ Final infilling of open pit; ○ Final shaping of landforms; ○ Rehabilitation and revegetation activities; and ○ Potential ineffective final rehabilitation actions resulting poor vegetation cover, erosion and alien vegetation being present; infrastructure, dumps and stockpiles remaining; and open pits not being adequately backfilled and shaped.	Negative	District (3)	Long term (4)	Highly Probable (4)	Medium (3)	Medium (3)	Medium (42)	• Once mining activities have been completed, it must be ensured that all surface infrastructure, including foundations to the depth specified, signage and moveable infrastructure, must be removed from site (unless otherwise agreed with stakeholders). • It must be ensured that all dumps and stockpiles have been completely removed by using this material as backfill in the open pit. • It must be ensured that that the open pit has been completely backfilled, shaped to follow natural contours and is stable. • All bare and impacted areas must be sufficiently graded, shaped and vegetated to blend in with the surroundings. • It must be ensured that revegetation takes place to a high standard to ensure that vegetation structure, height and composition as per pre-mining conditions are achieved as far as possible. Locally indigenous species should be used for this purpose. • Alien vegetation management must continue post-closure as specified in the BAP. • Erosion control measures must be implemented, or existing erosion control measures should remain in place where applicable.	Medium (0.6)	Low to Medium (25)

7.2 Visual Impact Significance Synthesis

A summary of the significance ratings obtained during the impact significance assessment above, is included in the table below.

Table 15: Visual Impact Assessment Significance summary.

No/	Impact Description	Without Mitigation (WOM)	With Mitigation (WM)
Pre-construction/ Planning Phase			
1.	Visual intrusion and visibility	Low to Medium	Low
	Construction Phase		
2.	Visual intrusion and visibility	Medium	Low to Medium
3.	Landscape Character and sense of place	Medium	Low to Medium
Operational Phase			
4.	Visual intrusion/ Visibility	Medium to High	Medium
5.	Landscape Character	Medium to High	Medium
6.	Topographic Alteration	Medium to High	Low to Medium
7.	Night-time lighting	Medium to High	Low to Medium
Closure and Decommissioning			
8.	Visual intrusion and visibility	Medium	Low to Medium

7.3 Residual Visual Impacts

Residual visual impacts may remain present once the LoM has been reached. Residual impacts could be the result of aspects such as ineffective and incomplete removal of mining infrastructure (whereby dumps and stockpiles remain completely or partially in place) and incomplete backfilling of the open pit, which will permanently alter the landscape topography.

Ineffective revegetation, either through procuring incompatible species for this purpose or failing to prepare for revegetation to such a degree that vegetation establishment cannot take place successfully (through, for example, effective soil analysis and amelioration), may lead either to a local change in landscape character or to ongoing visual intrusion through the ongoing presence of exposed soil surfaces and associated landscape scarring. It should be noted that it is unlikely that the current plant communities, and complex vegetation structure and species composition will ever return to its current state, and the existing vegetation height will not be reached for a number of years. Edge effects such as erosion and the ongoing proliferation of alien plant species may remain should these impacts not be managed throughout all development phases of the project. Taking this, and possible long-term visual contrast between impacted vegetation and surrounding natural vegetation into consideration, the potential for residual risk once the project has been completed is considered High.

7.4 Cumulative Visual Impacts

Cumulative visual impacts can be defined as the combined visual impact that a series of developments, either present, past or future, will have on the aesthetic environment of the receiving landscape and surrounds, over a period of time. In defining the expected cumulative impact towards which the proposed Gruisfontein Project will contribute, it is important to note its location within the Waterberg Coalfield, a region earmarked and targeted for mining development. A number of coal mining projects are proposed in the immediate vicinity of the project area, and various applications for supporting infrastructure, such as power lines, road diversions, pipelines and rail loops are also currently underway. Commercial or mining companies own several of the farms located within 5km of the farm

Gruisfontein and mineral rights, for both prospecting and mining, are held by various companies in the vicinity of the project area (Jacana Environmentals cc, 2019).

As a result of the aforementioned, coupled with the presence of existing large-scale coal mining infrastructure such as the Grootegeluk Coal Mine and visually intrusive coal-fired power stations (of which Medupi is currently still under construction) to the southwest of the project area that have already impacted on the receiving landscape and the perception of certain visual receptors, it is expected that the development of the proposed Gruisfontein Project will further contribute to cumulative visual impacts in the region. The proposed project is likely to specifically contribute to the overall change in the landscape character and sense of place of the area, particularly once other mining projects commence operation. Where the receiving landscape is currently defined as rural with a bushveld character and relatively high landscape sensitivity, this will be altered towards a sense of place more defined as one of industry and development, with a lowered landscape sensitivity, as an increased number of mining projects are undertaken.

Other potential cumulative impacts include changing the night-time lighting environment to one of medium district brightness, permanently altering regional topography, a cumulative loss of vegetation and lowered VAC which will expose views towards mining infrastructure and contributing towards increased fugitive dust levels. High levels of visual intrusion will further impact on the value and importance of the landscape as perceived by residents, tourists and motorists.

7.5 No-Go Alternative

No activity alternatives, location and site alternatives, process alternatives, or design alternatives are currently available for the Gruisfontein Project. The proposed project infrastructure layout has also been optimised as informed by the existing site conditions and location and depth of coal resources.

Should the proposed Gruisfontein project not be developed, no additional visual impacts will occur.

7.6 Visual Monitoring

Visual monitoring must take place during the construction, operational and decommissioning phases of the proposed project in order to ensure that all mitigation measures regarding visual impacts are adequately implemented and maintained throughout the life of the project. It is suggested that visual monitoring take place internally by the mine’s environmental department. The visual monitoring programme should largely be based on visual reconnaissance at ground level and should consider the following main parameters:

- Visual intrusion of project infrastructure from surrounding viewpoints.
- Relative vegetation cover and height, and other screening; and
- Distracting features noted, such as the presence of new mining activities on other properties.

The following are proposed to form part of the visual monitoring requirements:

- The selected IOPs (Section 6.3.1), including IOPs from where infrastructure will not be visible, should be used over the life of the proposed project as a baseline against which to review the effectiveness of mitigation measures to address visual impacts. Initial photographs should be taken upon commencement of the construction phase, and thereafter taking place as per the following proposed timeframes:
  - Monthly during the construction phase;
  - Biannual (twice a year) during the operational phase; and
  - Monthly during the decommissioning/ closure phase.

Ad hoc inspections should be undertaken, reported upon and action plans developed, should any complaints from Interested and Affected Parties (IAPs) and surrounding landowners regarding the visual environment be received.

- In addition to IOP1 – 12, additional viewpoints where visual monitoring should take place may be identified to include areas such as the main entrance to the project area, additional residences within 5km of the project area should access be obtained, and additional locations along the main product transport routes (D175 and D1675). Should any complaints be received from IAPs or surrounding land owners, such locations should also be included into the monitoring plan.
- A complete record of dated photographs, taken from IOPs and other identified viewpoints, should be kept on file together with notes on the following:
  - Indigenous vegetation condition, height and density within the view frame;
  - the degree of visual exposure noted by the assessor (how much of the infrastructure is visible);
  - distracting landscape elements or features within each view frame, including potential new mining activities or other developments noted in the area;
  - presence of dust, erosion or alien vegetation; etc.

  Table 13 can also be incorporated into the notes and used for orientation purposes.
- The visual monitoring procedures must be continually updated and refined to allow for site-specific requirements that may come to light as the proposed project progresses.
- Due to the importance of screening from vegetation at the Gruisfontein Project, vegetation monitoring and revegetation measure as proposed by the floral specialist should also be implemented.

8 CONCLUSION

From the findings of the VIA, it may be concluded that the proposed project will have an overall moderate to low significance visual impact on the receiving environment in its current condition, should effective mitigation measures be implemented. This is mainly due to the relative isolation of the project area in relation to sensitive visual receptors, the relatively short period (3 - 5 years) when infrastructure heights will be at a maximum, and importantly, the existing vegetation in the area that provides high levels of visual screening. The majority of infrastructure components, such as the CHPP and open pit, will be effectively obscured from view from the surrounding visual receptor sites identified, such as residential, tourism and hunting infrastructure on surrounding farms, regional and district roadways, and protected/ conservation areas. Adjacent landowners and residents utilising farm roads and natural bushveld areas on their properties may however be exposed to occasional views of infrastructure components below 30m in height, depending on their location in relation to the infrastructure.

Although the proposed Long-term Discard Dump will serve to screen the CHPP, support infrastructure and various lower stockpiles from views from the northeast, east and southeast, this infrastructure is expected to reach a final height of up to 90m around Year 16 of the mining operation and may be at least partially visible up to 15km from the project area from all viewing directions during this time period (possibly up to 3 to 5 years), prior to backfilling taking place. The following mitigation measures should therefore be considered:

- For vegetation screening to be effective, it is essential that as much existing vegetation present between the proposed Gruisfontein project footprint area and sensitive visual receptors remain intact. Although this requirement extends beyond the boundaries of the farm Gruisfontein, as much as possible should be done within the project area itself to avoid loss of vegetation, and particularly large trees, around project infrastructure and along the periphery of the site;

- Backfilling of the open pit should commence as soon as possible, and it should be aimed that the maximum height of 90m of the proposed Long-term Discard Dump is never reached;
- The proposed Long-term Discard Dump should be shaped to blend in with the environment as far as possible, as it increases in height and as more material is added (i.e. straight edges and corners should be avoided when viewed in profile), particularly once the Discard Dump reaches a height where skylining or changes to the horizon may occur; and
- Vegetation growth on the Discard Dump should be encouraged, and if necessary, facilitated, through revegetation with a locally indigenous seed mixture to mitigate short-term visual infrastructure once the Discard Dump reaches its maximum height.

Night-time lighting within the area with its low district brightness, should be carefully managed to prevent night-time visual impacts by implementing, amongst others, the following mitigation measures:

- As much existing vegetation around the proposed infrastructure as possible should be retained to screen night-time lighting at ground level;
- Placement of material on infrastructure such as discard dumps of increased heights during the night-time should be avoided;
- A lighting engineer should be consulted to assist in the planning and placement of light fixtures;
- Placement of lighting outside of the project area should be avoided or strictly limited;
- All outdoor lighting must be strictly controlled, and lighting shields installed where required;
- Movement-activated lighting should be installed for security purposes at offices and workshops to prevent use of lights when not needed;
- The type of luminaries used should be carefully considered;
- The use of high light masts and up-lighting of structures should be avoided to reduce sky glow;
- Lighting use should be minimised during construction and night-time operations. Localised and portable lighting should be used where and when the operations or maintenance work is occurring; and
- Off-site hauling of product should be limited to daylight hours.

Once mining activities have been completed, the following must be ensured:

- All surface infrastructure, including signage and temporary, moveable infrastructure, must be removed from site (unless otherwise agreed with stakeholders);
- All surface dumps and stockpiles must be completely removed by using this material as backfill in the open pit;
- The open pit must be completely backfilled, shaped to follow natural contours and be stable;
- All bare and impacted areas must be sufficiently graded, shaped and vegetated to blend in with the surroundings;
- Revegetation, using locally indigenous species, must take place to a high standard to ensure that pre-mining land uses are achieved as far as possible. It should however by noted, that visual contrast within the project area itself (which, at ground level, will not be highly visible to surrounding receptors) is likely to result in a long-term, residual visual impact, as the pre-development vegetation structure, composition and height is unlikely to be achieved in the short to medium-term;
- Alien vegetation control and management must take place during all development phases and continue post-closure; and

- Soft erosion control measures must be implemented if required where erosion risks exist, or erosion control measures put in place during the operational phase of the project should remain in place where applicable.

Based on the findings of this VIA, it has been determined that sufficient information is available to guide the competent authority in the decision-making process from a visual perspective. Based on the available information and visual analyses set out in this report, no foreseeable fatal flaws are associated with the project from a visual impact perspective, provided that effective mitigation measures be implemented, and potential residual visual impacts managed throughout the life of the project. In this regard specific mention is made of planning for rehabilitation and revegetation from the time of project initiation.

9 REFERENCES

Bureau of Land Management (BLM, 1984). Visual Resource Management, BLM Manual Handbook 8400, Release 8-24. U.S. Department of the Interior, Washington DC.

Department of Environmental Affairs (DEA, 2015). DEA National Landcover (TIFF) 2015 [Raster].

Diphororo Development (2019). Public Participation Report in Support for a Mining Right in terms of the Mineral and Petroleum Resources Development Act (Act 28 Of 2002), 24 April 2019.

Golder Associates (2013) EXXARO Coal (Pty) Ltd: Grootegeluk Coal Mine. Consolidated Environmental Management Programme Report, September 2013.

Institution of Lighting Professionals (ILP, 2005) Guidance Notes for Reduction of Obtrusive Light, GN01:2011.

Jacana Environmentals cc. (2019). Proposed Gruisfontein Project. Draft Scoping Report for Listed Activities Associated with a Mining Right Application.

Landscape Institute and Institute of Environmental Management and Assessment (LI & IEMA, 2013) Guidelines for Landscape and Visual Impact Assessment. 3rd Edition.

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

Oberholzer, B. (2005). Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1. CSIR Report No. ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

Oberholzer, B. (2014). Reading the Landscape. Landscape Notebook Series, Republic of South Africa

R & R Cultural Resource Consultants (2019). Heritage Scoping Report. Gruisfontein Coal Mining Project, Waterberg District Municipality, Limpopo Province. Prepared for Jacana Environmentals CC, April 2019.

RSV ENCO Consulting (Pty) Ltd (2018). Concept Study Report Gruisfontein Project. Prepared for Cronimet Mining Group, 19 March 2018.

RSV ENCO Consulting (Pty) Ltd (2018). Gruisfontein Project Specialist Information Required. 27 November 2018.

Scottish Natural Heritage and the Countryside Agency (now Natural England) (2002) Landscape Character Assessment Guidance for England and Scotland.

United Kingdom Department for Communities and Local Government (1997). Lighting in the Countryside: Towards Good Practice - Main document.

United States Department of Agriculture (USDA; 1995). Landscape Aesthetics A Handbook for Scenery Management, Agriculture Handbook Number 701. United States Department of Agriculture Forest Service.

Various national and provincial databases available from bgis.sanbi.org and egis.environment.gov.za.

APPENDIX A: Specialist Declaration and CV

SPECIALIST DECLARATION

I, **Michelle Pretorius**, 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 relevant legislation and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have not, 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.

Michelle Pretorius Pr.LATechno; Pr.Sci.Nat

Date: 27 May 2019

CV OF THE SPECIALIST

FIELD & FORM

LANDSCAPE SCIENCE

CURRICULUM VITAE – MICHELLE PRETORIUS Pr.LA.Techno Pr.Sci.Nat

PERSONAL DETAILS

ID number: 8210050124087

Address: 2 Lynnro Gardens, 110 Lynnro Avenue, Lynnwood Manor, 0081

Telephone: 082 442 7637

Driver's License: Code 08

Marital Status: Married

Languages: Afrikaans, English

PROFESSIONAL MEMBERSHIP

Professional Landscape Architectural Technologist - South African Council for the Landscape Architectural Profession (SACLAP) Registration number: 20253

Professional Natural Scientist (Ecology and Botany) - South African Council for Natural Scientific Professions (SACNASP) Registration number: 400003/15

Member of the Botanical Society of South Africa (BotSoc) since 2011

Member of the Grassland Society of southern Africa (GSSA) since 2018

Member of the Land Rehabilitation Society of southern Africa (LaRRSA) since 2018

Volunteering: Administrator of the Gauteng Custodians of Rare and Endangered Wildflower (CREW) group since 2016.

EDUCATION

University of Pretoria

MSc (Environmental Ecology) in process	2016 – present
BSc (Hons) Plant Science with Distinction	2008 – 2009
BSc (LArch) Landscape Architecture	2004 – 2006
BSc (Botany)	2001 – 2003

Selected Short Courses/ Conferences Attended

Wild Orchids of Southern Africa Conference - WOSA	2018, 2019
Institute of Landscape Architects (ILASA)/ LaRSSA Conference	2018
Advanced Grass Identification - Africa Land-Use Training	2018
Asteraceae Identification Course - SANBI	2018
Identification Course: Sedges – SANBI	2017
Wetland Rehabilitation and Construction Course - ILASA	2016
Invasive Species Training - SAGIC	2016
Global Mapper Training - Blue Marble	2014

Rehabilitation of Mine-impacted Land - African Land-use Training 2011
Mine Closure and Rehabilitation Conference - ITC 2011
Rehabilitation of Degraded Land - African Land-use Training 2010

WORK EXPERIENCE

Field and Form Landscape Science/ Independent Specialist Consultant 2016 – present

Main fields of interest:

- Visual Impact Assessments across all development sectors
- Specialist floral and vegetation assessments and opinions, including Red Data floral species assessments, impact assessments, plant species identification, habitat evaluation and the compilation of vegetation management plans.
- Alien Floral Species Management and Control Plans
- Floral Species Rescue and Relocation planning and implementation
- Terrestrial and Wetland Rehabilitation Planning, design and implementation
- Landscape Planning and Evaluation, including preparing landscape plans for Water Use Licence Applications
- GIS and Mapping Services
- Open Space, Ecological and Environmental Management Plans
- Ecological Conditional Requirements for Green Star Ratings
- Environmental Control Officer (ECO) function and reporting
- Protected tree identification and permit applications
- Peer reviews of specialist environmental and enviro-legal reports

Scientific Aquatic Services (SAS) 2011 – 2015

Responsibilities:

General project management, GIS work and desktop assessments, Visual Impacts Assessments, specialist floral and Red Data listed species assessments throughout South Africa, as well as Tanzania and the Democratic Republic of the Congo (DRC), wetland and riparian delineations and assessments, ecological rehabilitation plans, Environmental Management Plans (EMPs), plant rescue and relocation, terrestrial monitoring.

Bokamoso Landscape Architects and Environmental Consultants 2009 – 2011

Responsibilities:

Visual Impact Assessments, compilation of environmental reports (Basic Assessments, Scoping reports, Environmental Impact Assessments), EMPs, Ecological Control Officer (ECO) on various construction sites, preparation of rehabilitation plans, rehabilitation design, specification and implementation, landscape design and technical documentation, overseeing of landscape installation.

Insite Landscape Architects and Environmental Consultants 2007 – 2009

Responsibilities:

Landscape design and documentation, cost estimates and Bills of Quantities, preparation of presentations, tender documentation, site supervision.

Other 2007 – present

Assisting various landscaping companies on an *ad hoc* basis with landscape documentation.

Lifestyle College

Guest lecturer 2018

University of Pretoria

External Examiner – 3rd year landscape architecture students (PWT322) 2014
External Examiner – 2nd year landscape architecture students (LAN 212, LAN 222) 2013
Invited as guest lecturer by Botany Department 2010

Tutored first year BSc students in Botany	2003 – 2004
Presented practical courses in ecology for students from Vista University	2003 – 2004

VISUAL IMPACT ASSESSMENTS: KEY PROJECT EXPERIENCE

Recently completed projects as independent contractor and specialist consultant include

- Visual Specialist Opinion on the Establishment of a Telecommunication Mast on Erf 736 Waterkloof Ridge, Gauteng Province (2018).
- Visual Impact Assessment for the proposed Leslie 2 Mining Project, Gauteng Province (2017).
- Visual Impact Assessment for the proposed Accommodation Facility at Venetia Mine, near Alldays, Limpopo Province (2017).
- Visual Impact Assessment for the proposed Spitskop West Overhead Powerlines, near Riebeek East, Eastern Cape Province (2017).
- Visual Impact Assessment for the proposed Haga Haga Wind Energy Facility near Haga Haga, Eastern Cape Province (2017).
- Visual Impact Assessment for the proposed Haga Haga Wind Energy Facility Grid Connection between Komga and Soto, Eastern Cape Province (2017).
- Visual Impact Assessment for the proposed Lanseria Outfall Sewer Pipeline, Gauteng Province (2017).
- Visual Impact Assessment as part of the environmental assessment and authorisation process for the proposed Lanseria Wastewater Treatment Works, Gauteng Province (2017).
- Visual Impact Assessment for the proposed Black Mountain Project, Burgersfort, Limpopo Province (2016).
- Visual Impact Assessment for the proposed Rietkol Mining Operations near Delmas, Mpumalanga Province (2016).
- Visual Impact Assessment for the proposed Leandra Mining project, Gauteng and Mpumalanga Provinces (2016).
- Scoping Phase Baseline Visual Impact Assessment as part of the environmental authorisation for the proposed Mutsho Independent Power Producers (IPP) project, near Musina in the Limpopo Province (2016).

Completed projects (2012 – 2015) as lead specialist while previously employed include

- Visual Impact Assessment as part of the environmental assessment and authorisation process for the proposed The Duel Mining Project, Limpopo Province.
- Visual Impact Assessment as part of the environmental impact assessment and authorisation process for the proposed Harriet's Wish Mining Project, Limpopo Province.
- Visual Impact Assessment as part of the environmental impact assessment and authorisation process for the proposed Tjate Platinum Mine, Limpopo Province.
- Visual Impact Assessment as part of the environmental assessment and authorisation process for the proposed Argent Colliery, Mpumalanga.
- Visual Impact Assessment as part of the EIA process for the proposed upgrade of the Zonderwater Prison Waste Water Treatment Works in the vicinity of Cullinan, Gauteng.
- Visual Impact Assessment as part of the EIA process for the proposed Moabsvelden Colliery, Mpumalanga.
- Visual Impact Assessment as part of the EIA process for the proposed Springboklaagte Colliery, Mpumalanga.
- Visual Impact Assessment as part of the EIA Process for the Proposed Pan Palladium PGE Project, Limpopo Province