THE PROPOSED MARULA PLATINUM MINE SOLAR POWER, LIMPOPO PROVINCE, SOUTH AFRICA

Visual Impact Assessment

Final v_3

DATE: 15 May 2023

Document prepared for SLR Consulting (Africa) Pty (Ltd)
On behalf of Marula Platinum Mine (Pty) Ltd

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LIST OF ACRONYMS

APHP	Association of Professional Heritage Practitioners
BLM	Bureau of Land Management (United States)
BPEO	Best Practicable Environmental Option
CALP	Collaborative for Advanced Landscape Planning
DEM	Digital Elevation Model
DoC	Degree of Contrast
EIA	Environmental Impact Assessment
EMPr	Environmental Management Plan

GIS	Geographic Information System
GPS	Global Positioning System
IDP	Integrated Development Plan
IEMA	Institute of Environmental Management and Assessment (United Kingdom)
KOP	Key Observation Point
LVIA	Landscape and Visual Impact Assessment
MAMSL	Metres above mean sea level
NELPAG	New England Light Pollution Advisory Group
PNR	Private Nature Reserve
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VRM	Visual Resource Management
VRMA	Visual Resource Management Africa
ZVI	Zone of Visual Influence

GLOSSARY OF TECHNICAL TERMS

Technical Terms	**Definition** (Oberholzer, 2005)
Degree of Contrast	The measure in terms of the form, line, colour and texture of the existing landscape in relation to the proposed landscape modification in relation to the defined visual resource management objectives.
Visual intrusion	Issues are concerns related to the proposed development, generally phrased as questions, taking the form of "what will the impact of some activity be on some element of the visual, aesthetic or scenic environment".
Receptors	Individuals, groups or communities who would be subject to the visual influence of a particular project.
Sense of place	The unique quality or character of a place, whether natural, rural or urban.
Scenic corridor	A linear geographic area that contains scenic resources, usually, but not necessarily, defined by a route.
Viewshed	The outer boundary defining a view catchment area, usually along crests and ridgelines. Similar to a watershed. This reflects the area, or the extent thereof, where the landscape modification would probably be seen.
Visual Absorption Capacity	The potential of the landscape to conceal the proposed project.

Technical Term	**Definition** (USDI., 2004)
Key Observation Point	Receptors refer to the people located in the most critical locations, or key observation points, surrounding the landscape modification, who make consistent use of the views associated with the site where the landscape modifications are proposed. KOPs can

	either be a single point of view that an observer/evaluator uses to rate an area or panorama, or a linear view along a roadway, trail, or river corridor.
Visual Resource Management	A map-based landscape and visual impact assessment method development by the Bureau of Land Management (USA).
Zone of Visual Influence	The ZVI is defined as 'the area within which a proposed development may have an influence or effect on visual amenity.'

1 DFFE SPECIALIST REPORTING REQUIREMENTS

1.1 Specialist declaration of independence

Table 1. Specialist declaration of independence.

All intellectual property rights and copyright associated with VRM Africa's services are reserved, and project deliverables, including electronic copies of reports, maps, data, shape files and photographs, may not be modified or incorporated into subsequent reports in any form, or by any means, without the written consent of the author. Reference must be made to this report, should the results, recommendations or conclusions in this report be used in subsequent documentation. Any comments on the draft copy of the Visual Impact Assessment (VIA) must be put in writing. Any recommendations, statements or conclusions drawn from, or based upon, this report, must make reference to it.

This document was completed by Silver Solutions 887 cc trading as VRM Africa, a Visual Impact Study and Mapping organisation located in George, South Africa. VRM Africa cc was appointed as an independent professional visual impact practitioner to facilitate this VIA. I, Stephen Stead, hereby declare that VRM Africa, an independent consulting firm, has no interest or personal gains in this project whatsoever, except receiving fair payment for rendering an independent professional service.

Stephen Stead
APHP accredited VIA Specialist

The official DFFE declaration can be viewed in the Annexure.

1.2 Specialist report requirements in terms of Appendix 6 of the EIA Regulations (2014), as amended in 2017

Table 2: Specialist report requirements table.

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	**Relevant section in report**
Details of the specialist who prepared the report	Stephen Stead, owner / director of Visual Resource Management Africa. steve@vrma.co.za

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	Relevant section in report
	Cell: 0835609911
The expertise of that person to compile a specialist report including a curriculum vitae	Registration with Association of Professional Heritage Practitioners
A declaration that the person is independent in a form as may be specified by the competent authority	Table 1
An indication of the scope of, and the purpose for which, the report was prepared	Terms of Reference
A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Baseline Assessment
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	NA
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Methodology
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 alternative;	Baseline Visual Inventory
An identification of any areas to be avoided, including buffers	Visual Resource Management Classes
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;	Figure 21: Visual Resource Management Classes map with development overlay.
A description of any assumptions made and any uncertainties or gaps in knowledge;	Assumptions and Limitations
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	1st December 2022
A description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Visual Impact Assessment
Any mitigation measures for inclusion in the EMPr	Environmental Management Plan
Any conditions for inclusion in the environmental authorisation	250m setback from village settlement
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	NA
A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Opportunities and Constraints
Regarding the acceptability of the proposed activity or activities; and	Conclusion
If the opinion is that the proposed activity 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	It is the recommendation that the proposed development should commence WITH MITIGATION for the key reasons motivated in the Executive Summary.

A specialist report prepared in terms of the Environmental Impact Regulations of 2014 (as amended in 2017) must contain:	Relevant section in report
A description of any consultation process that was undertaken during the course of carrying out the study	NA
A summary and copies if any comments that were received during any consultation process	NA
Any other information requested by the competent authority.	NA

1.3 DFFE Screening Tool Site Sensitivity Verification

In terms of Part A of the Assessment Protocols published in GN 320 on 20 March 2020, site sensitivity verification is required relevant to the DFFE Screening Tool. As indicated in Figure 1 below, the Map of Relative Landscape (Solar).

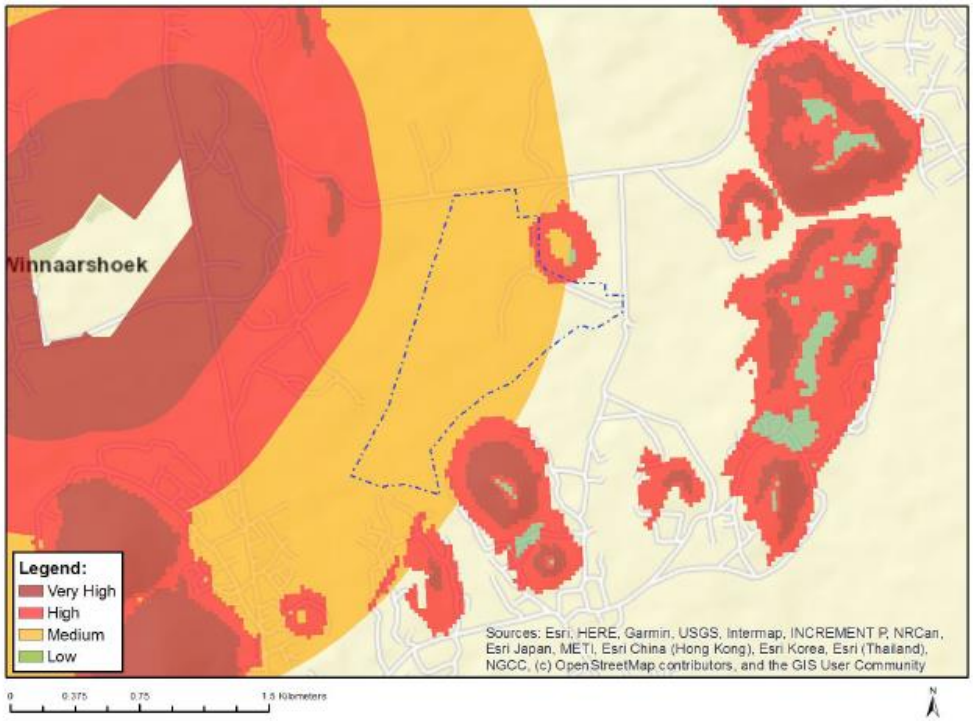
SSV as informed by the ***site visit that was undertaken on the 1st of December 2022.*** During the survey, photographs and comments were recorded and can be viewed in Annexure A, with the associated map of the survey points as well as the survey tracks.

The following table outlines the relevance of the risks raised in the SSV as informed by the site visit.

Table 3. DFFE SSV PV and Landscape Risk table.

DFFE Feature	DFFE Sensitivity	Risk Verification	Motivation
Slope between 1:4m and 1:10m	*High*	**High**	The northern portions of the site are in close proximity to the steep slopes and recommendations have been made to exclude this area.
Between a and 2 km of a town or village	*Medium*	**Medium**	The site visit confirmed that the proposed development will take place in close proximity to a rural settlement area.

MAP OF RELATIVE LANDSCAPE (SOLAR) THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Slope between 1:4 and 1:10
Medium	Between a and 2 km of a town or village

Figure 1. DFFE Screening Tool for Landscape and PV.

2 EXECUTIVE SUMMARY

Visual Resource Management Africa CC (VRMA) was appointed by SLR Consulting (Africa) (Pty) Ltd to undertake a ***Visual Impact Assessment*** for the proposed Marula Mine PV Developments and Associated Infrastructure on behalf of Marula Platinum Mine (Pty) Ltd. A ***site visit that was undertaken on the 1st of December 2022.*** During the survey, photographs and comments were recorded and can be viewed in Annexure A, with the associated map of the survey points as well as the survey tracks.

CONCLUSION

The recommendation of the Landscape and Visual Impact Assessment is that development should be authorised with mitigation. The scoping phase findings made recommendation for a setback of 250m from the western and southern village settlements to buffer the visual intrusion to some degree, allow for the existing bushveld vegetation around the site to provide some visual screening, as well as allow for the continued communal land uses in areas of close proximity to the tribal settlements. This recommendation was included in the design phase, and the 250m buffer excluded from the development. As the surrounding landscape is strongly defined by existing mining features, the proposed PV project would be viewed against this backdrop, and the remaining landscape resources would not be significantly degraded.

POLICY FIT	**+VE Medium**

In terms of planning suitability for landscape and visual related themes, the **expected visual/ landscape policy fit of the landscape change is rated +VE Medium.** While the mining landscapes do degrade the local scenic resources, the remaining tribal settlement areas need to be kept intact as close proximity of the proposed PV plant to tribal settlement is likely to detract from this cultural landscape.

METHODOLOGY	**Bureau of Land Management's Visual Resource Management (VRM) method**

The methodology for determining landscape significance is based on the United States Bureau of Land Management's Visual Resource Management (VRM) method (USDI., 2004). This GIS-based method allows for increased objectivity and consistency by using standard assessment criteria to classify the landscape type into four VRM Classes, with Class I being the most valued and Class IV, the least. The Classes are derived from *Scenic Quality*, *Visual Sensitivity Levels*, and *Distance Zones*. Specifically, the methodology involved: site survey; review of legal framework; determination of Zone of Visual Influence (ZVI); identification of Visual Issues and Visual Resources; assessment of Potential Visual Impacts; and formulation of Mitigation Measures.

ZONE OF VISUAL INFLUENCE	**Local**

The visible extent, or viewshed, is "the outer boundary defining a view catchment area, usually along crests and ridgelines" (Oberholzer, 2005). In order to define the extent of the possible influence of the proposed project, a viewshed analysis was undertaken from

the proposed site at a specified height above ground level. The theoretical viewshed is relatively contained by the local topography, reducing the visual extent to the local level. This is due to the hilly landforms surrounding the site, that restricted the extent (especially to the southwest) as well as fragment the visibility of the proposed landscape change.

In terms of massing intensity, where the full PV area is viewed will be essentially contained to within the 3km distance area. **As a result of the topographically contained viewshed, the ZVI is described as Local.** Within the general topographic landscape, the area is strongly defined by the medium to large sized hills that are located around the wide valley where the PV project is proposed. The effect of this topography is that the ZVI will be primarily contained with the valley, with views to the southwest restricted within the 3km distance.

RECEPTORS AND KEY OBSERVATION POINTS **4 Key Observation Points**

Key Observation Points (KOPs) are the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. Within the ZVI, due to the **tribal settlement patterning, numerous receptors were identified with High Visual Exposure**. To better understand the nature of the landscape change as seen from this rural community, four KOP were defined based on the main views from the surrounding settlements:

- Western settlements.
- South-western settlement.
- Southern settlements,
- South-eastern settlements.

SCENIC QUALITY ***Medium to Low***

The scenic quality of the proposed development site is rated Medium to Low. The flat terrain of the site with no water features and a predominantly single vegetation type reduces visual appeal. However, the Bushveld vegetation does have added value and creates colour contrast to the khaki-coloured veld grasses. Adjacent landscapes include the low hills which do add value and increase the landscape character. Cultural modifications are mining related in nature and detract from the rural residential sense of place. Due to the close proximity to the mine, the site is visually degraded to some degree, with the areas in closer proximity to the mining area depicting a degraded landscape.

RECEPTOR SENSITIVITY TO LANDSCAPE CHANGE ***Medium***

Receptor sensitivity to landscape changes is rated Medium. Sensitivity for the areas closer to the mine site is rated Low due to the mining sense of place. The site survey found that the southwest section of the study area has some utilisation to the local communities for grazing of livestock. This area has been excluded from the proposed PV development area. Receptors are mainly rural residential in nature and located to the

west of the sites and are likely to be sensitive to landscape change in areas resulting in loss of close proximity communal lands. Due to the flat terrain and low vegetation, the amount of use of the site is rated Medium. Due to the mining sense of place associated with the Marula Mine, Public Interest in the landscape change is expected to be Low. Adjacent Land Users are likely to have Medium to Low levels of sensitivity to landscape change. Unless specified vegetation species are identified as Special Areas, no protected areas were identified on site

VISUAL RESOURCE MANAGEMENT ASSESSMENT

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined making use of the VRM Matrix:

i. **Classes I and II** are the most valued.
ii. **Class III** represent a moderate value.
iii. **Class IV** is of least value

Class I (No-go)	• Any river / streams and associated flood lines buffers identified as significant in terms of the WULA process. • Any wetlands identified as significant in terms of the WULA process. • Any ecological areas (or plant species) identified as having a high significance. • Any heritage area identified as having a high significance.
Class II (Not recommended)	• **250m Settlement Buffer**
Class III (suitable with mitigation)	• **Bushveld (defined as having some value by the botanical survey).**
Class IV (suitable with mitigation))	• **Mining associated transformation/ highly degraded vegetation areas.**

EXPECTED IMPACT SIGNIFICANCE

By way of alternative assessment, the mitigated layout that includes the 250m setback from the rural settlements, was compared and contrasted against the full development layout (without the 250m setback).

	Full Development Area
High (-ve) *(without mitigation)*	Without mitigation, -ve High in that the existing rural, tribal settlement pattern that is a key component of the cultural landscape, would be degraded with loss of common land in close proximity to the southern located settlements.

250m Setback Development Area

Medium (-ve)
(with mitigation)

With mitigation, the high levels of visual intrusion were reduced with the settlement setback as well as lighting mitigations. This will allow for the PV landscape change to be seen against the existing mining landscape and where there is a higher VAC level.

CUMULATIVE EFFECTS

High (-ve)
(without mitigation)

It is possible that the development without could set a regional negative precedent for inappropriate development in tribal settlements. Retaining the setback buffer would allow existing communal lands around the settlements to be retained for subsistence farming/ communal grazing.

Medium (-ve)
(with mitigation)

KEY MITIGATIONS MEASURES

Landscape Element	Mitigation	Status
Cultural landscape	• Restrict height of PV panels to 5m (recommendation).	Incorporated into the design specifications.
	• Incorporate a 250m setback from the adjacent rural/ tribal settlements.	Incorporated into the design specifications.
Glint and Glare	To ensure that glint and glare impacts to not occur for western elevated rural receptors, north-south aligned single-axis trackers should be used where the panels track the sun and no low angle reflection would take place.	Incorporated into the design specifications.

3 INTRODUCTION

Visual Resource Management Africa CC (VRMA) was appointed by SLR Consulting (Africa) (Pty) Ltd to undertake a ***Visual Impact Assessment*** for the proposed Marula Platinum Mine PV Developments and Associated Infrastructure on behalf of Marula Platinum Mine (Pty) Ltd. A site visit was undertaken on 1 December 2020. The proposed development site is located in the Limpopo Province Greater Sekhukhune District Municipality and within the Fetakgomo Tubatse Local Municipality.

The Proponent proposes to construct a solar photovoltaic power station with associated infrastructure on a site located adjacent to the mine site in the Limpopo Province of South Africa. The Grid Connections will be assessed in a separate study.

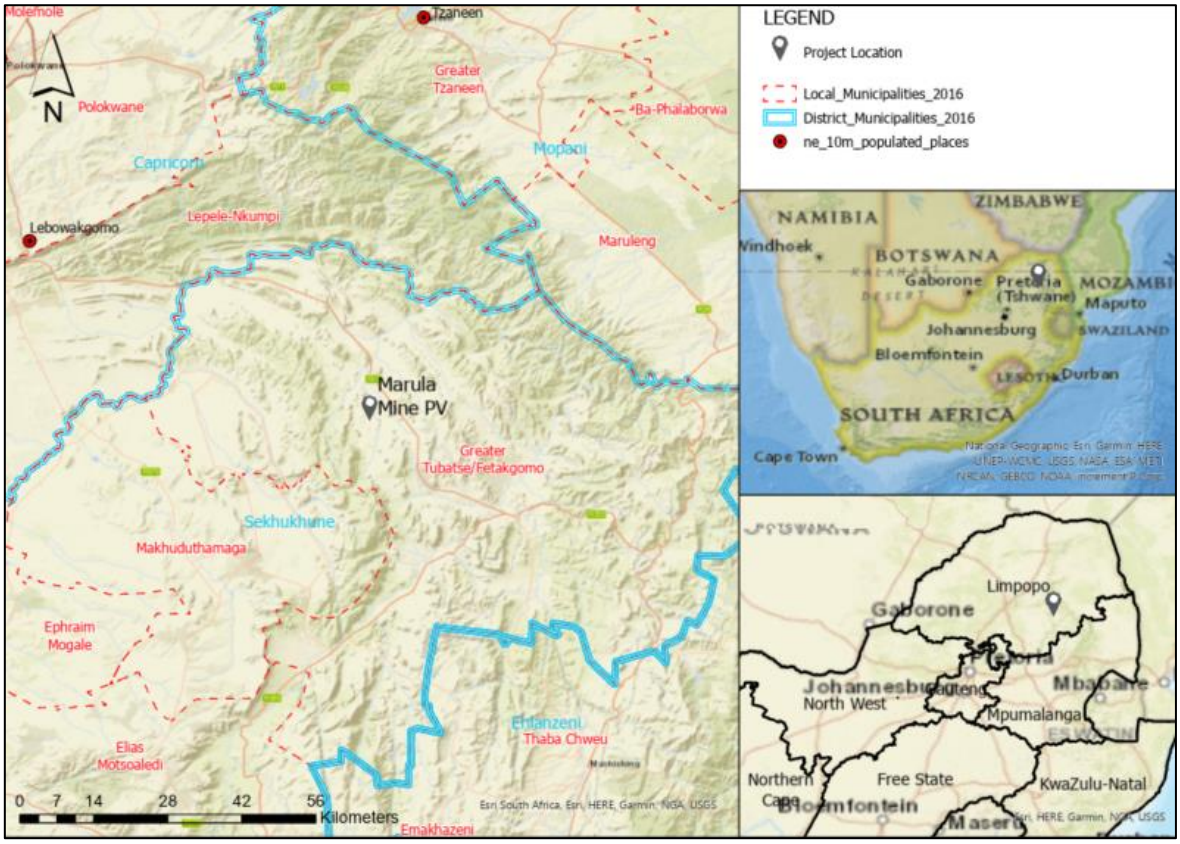


Figure 2: National and regional locality map.

3.1 Terms of Reference

The scope of this study is to cover the entire proposed project area. The broad terms of reference for the study are as follows:

- Collate and analyse all available secondary data relevant to the affected proposed project area. This includes a site visit of the full site extent, as well as of areas where potential impacts may occur beyond the site boundaries.
- Specific attention is to be given to the following:
  - Quantifying and assessing existing scenic resources/visual characteristics on, and around, the proposed site.
  - Evaluation and classification of the landscape in terms of sensitivity to a changing land use.

- Determining viewsheds, view corridors and important viewpoints in order to assess the visual impacts of the proposed project.
- Determining visual issues, including those identified in the public participation process.
- Reviewing the legal framework that may have implications for visual/scenic resources.
- Assessing the significance of potential visual impacts resulting from the proposed project for the construction, operation and decommissioning phases of the proposed project.
- Assessing the potential cumulative impacts associated with the visual impact.
- Generate photomontages of the proposed landscape modification.
- Identifying possible mitigation measures to reduce negative visual impacts for inclusion into the proposed project design, including input into the Environmental Management Programme report (EMPr).

3.2 Study Team

Contributors to this study are summarised in the table below.

Table 4: Authors and Contributors to this Report.

Aspect	Person	Organisation / Company	Qualifications
Landscape and Visual Assessment (author of this report)	Stephen Stead B.A (Hons) Human Geography, 1991 (UKZN, Pietermaritzburg)	VRMA	• Accredited with the Association of Professional Heritage Practitioner and • 16 years of experience in visual assessments including renewable energy, Power lines, roads, dams across southern Africa. • Registered with the Association of Professional Heritage Practitioners since 2014.

3.3 Visual Assessment Approach

The full methodology used in the assessment can be found in Annexure B, with this section outlining the key elements of the assessment process. The process that VRM Africa follows when undertaking a VIA is based on the United States Bureau of Land Management's (BLM) Visual Resource Management method (USDI., 2004). This mapping and GIS-based method of assessing landscape modifications allows for increased objectivity and consistency by using standard assessment criteria.

- *"Different levels of scenic values require different levels of management. For example, management of an area with high scenic value might be focused on preserving the existing character of the landscape, and management of an area with little scenic value might allow for major modifications to the landscape. Determining how an area should be managed first requires an assessment of the area's scenic values".*
- *"Assessing scenic values and determining visual impacts can be a subjective process. Objectivity and consistency can be greatly increased by using the basic design elements of form, line, colour, and texture, which have often been used to describe and evaluate landscapes, to also describe proposed projects. Projects that repeat these*

design elements are usually in harmony with their surroundings; those that don't create contrast. By adjusting project designs so the elements are repeated, visual impacts can be minimized" (USDI., 2004).

Baseline Phase Summary

The VRM process involves the systematic classification of the broad-brush landscape types within the receiving environment into one of four VRM Classes. Each VRM Class is associated with management objectives that serve to guide the degree of modification of the proposed site. The Classes are derived by means of a simple matrix with the three variables being the scenic quality, the expected receptor sensitivity to landscape change, and the distance of the proposed landscape modification from key receptor points. The Classes are not prescriptive and are utilised as a guideline to determine visual carrying capacity, where they represent the relative value of the visual resources of an area. Classes I and II are the most valued, Class III represents a moderate value; and Class IV is of least value. The VRM Classes are not prescriptive and are used as a guideline to determine the carrying capacity of a visually preferred landscape as a basis for assessing the suitability of the landscape change associated with the proposed project.

Table 5: VRM Class Matrix Table

		VISUAL SENSITIVITY LEVELS								
		High			Medium			Low		
SCENIC QUALITY	A (High)	II	II	II	II	II	II	II	II	II
	B (Medium)	II	III	III/ IV *	III	IV	IV	IV	IV	IV
	C (Low)	III	IV	IV	IV	IV	IV	IV	IV	IV
DISTANCE ZONES		Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen	Fore/middle ground	Background	Seldom seen

* If adjacent areas are **Class III** or lower, assign **Class III**, if higher, assign **Class IV**

The visual objectives of each of the classes are listed below:

- The Class I objective is to preserve the existing character of the landscape and the level of change to the characteristic landscape should be very low and must not attract attention. Class I is assigned when a decision is made to maintain a natural landscape.
- The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low. The proposed development may be seen but should not attract the attention of the casual observer, and should repeat the basic elements of form, line, colour and texture found in the predominant natural features of the characteristic landscape.
- The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. The proposed development may attract attention, but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape; and

- The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be the major focus of the viewer's (s') attention without significantly degrading the local landscape character.

Impact Phase Summary

To determine impacts, a degree of contrast exercise is undertaken. This is an assessment of the expected change to the receiving environment in terms of the form, line, colour and texture, as seen from the surrounding Key Observation Points. This determines if the proposed project meets the visual objectives defined for each of the Classes. If the expected visual contrast is strong, mitigation recommendations are to be made to assist in meeting the visual objectives. To assist in the understanding of the proposed landscape modifications, visual representation, such as photomontages or photos depicting the impacted areas, can be generated. There is an ethical obligation in the visualisation process, as visualisation can be misleading if not undertaken ethically.

3.4 VIA Process Outline

The following approach was used in understanding the landscape processes and informing the magnitude of the impacts of the proposed landscape modification. The table below lists a number of standardised procedures recommended as a component of best international practice.

Table 6: Methodology Summary Table

Action	***Description***
Site Survey	The identification of existing scenic resources and sensitive receptors in and around the study area to understand the context of the proposed development within its surroundings to ensure that the intactness of the landscape and the prevailing sense of place are taken into consideration.
Project Description	Provide a description of the expected project, and the components that will make up the landscape modification.
Reviewing the Legal Framework	The legal, policy and planning framework may have implications for visual aspects of the proposed development. The heritage legislation tends to be pertinent in relation to natural and cultural landscapes, while Strategic Environmental Assessments (SEAs) for renewable energy provide a guideline at the regional scale.
Determining the Zone of Visual Influence	This includes mapping of viewsheds and view corridors in relation to the proposed project elements, in order to assess the zone of visual influence of the proposed project. Based on the topography of the landscape as represented by a Digital Elevation Model, an approximate area is defined which provides an expected area where the landscape modification has the potential to influence landscapes (or landscape processes) or receptor viewpoints.
Identifying Visual Issues and Visual Resources	Visual issues are identified during the public participation process, which is being carried out by others. The visual, social or heritage specialists may also identify visual issues. The significance and proposed mitigation of the visual issues are addressed as part of the visual assessment.
Assessing Potential Visual Impacts	An assessment is made of the significance of potential visual impacts resulting from the proposed project for the construction, operational and decommissioning phases of the project. The rating of visual significance

Action	*Description*
	is based on the methodology provided by the Environmental Assessment Practitioner (EAP).
Formulating Mitigation Measures	Possible mitigation measures are identified to avoid or minimise negative visual impacts of the proposed project. The intention is that these would be included in the project design, the Environmental Management Programme report (EMPr) and the authorisation conditions.

3.5 Assumptions and Limitations

- Digital Elevation Models (DEM) and viewsheds were generated using a 30-metre SRTM elevation data provided by NASA Earthdata (https://earthdata.nasa.gov/, n.d.). Although every effort to maintain accuracy was undertaken, as a result of the DEM being generated from satellite imagery and not being a true representation of the earth's surface, the viewshed mapping is approximate and may not represent an exact visibility incidence.
- The use of open-source satellite imagery was utilised for base maps in the report.
- Some of the mapping in this document was created using Bing Maps, Open-Source Map, ArcGIS Online and Google Earth Satellite imagery.
- The project deliverables, including electronic copies of reports, maps, data, shape files and photographs are based on the author's professional knowledge, as well as available information.
- VRM Africa reserves the right to modify aspects of the project deliverables if and when new/additional information may become available from research or further work in the applicable field of practice or pertaining to this study.

3.6 Impact Assessment Methodology

SLR Impact Assessment Criteria was utilised in the assessment. The following impact assessment mythology and motivation was provided.

The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed project. The process involves consideration of, *inter alia*: the purpose and need for the project; views and concerns of I&APs; social and political norms, and general public interest.

Identified impacts will be described in terms of the nature of the impact, compliance with legislation and accepted standards, receptor sensitivity and the significance of the predicted environmental change (before and after mitigation). Mitigation measures may be existing measures or additional measures that were identified through the impact assessment and associated specialist input. The impact rating system considers the confidence level that can be placed on the successful implementation of mitigation.

Specialists are to use SLR's standard convention for assessing the significance of impacts, a summary of which is provided below. In assigning significance ratings to potential impacts before and after mitigation the approach presented below is to be followed.

- **Determine the impact consequence rating:** This is a function of the "intensity",

"duration" and "extent" of the impact (see Section 1.2.2 in the Annexures). The consequence ratings for combinations of these three criteria are given in Section 1.2.3 (in the Annexure);

- **Determine impact significance rating:** The significance of an impact is a function of the consequence of the impact occurring and the probability of occurrence (see Section 1.2.2 in the Annexure). Significance is determined using the table in Section 1.2.4 (in the Annexure);
- **Modify significance rating (if necessary):** Significance ratings are based on largely professional judgement and transparent defined criteria. In some instances, therefore, whilst the significance rating of potential impacts might be "low", the importance of these impacts to local communities or individuals might be extremely high. The importance/value which interested and affected parties attach to impacts will be highlighted, and recommendations should be made as to ways of avoiding or minimising these perceived negative impacts through project design, selection of appropriate alternatives and / or management;
- **Determine degree of confidence of the significance assessment:** Once the significance of the impact has been determined, the degree of confidence in the assessment will be qualified (see Section 1.2.2 in the Annexure). Confidence in the prediction is associated with any uncertainties, for example, where information is insufficient to assess the impact.

3.6.1 SLR Impact Assessment Criteria

Impacts will be defined in terms of the standardised impact assessment criteria provided by the environmental practitioner. See Annexure E: Methodology Detail for further details.

Table 7: SLR Interpretation of Significance Table

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline**
Very High	Potential fatal flaw unless mitigated to lower significance.
High	It must have an influence on the decision. Substantial mitigation will be required.
Medium	It should have an influence on the decision. Mitigation will be required.
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely to be required.
Very Low	It will not have an influence on the decision. Does not require any mitigation
Insignificant	Inconsequential, not requiring any consideration.

4 PROJECT DESCRIPTION

The following table outlines the project information that was provided by the client that will be incorporated into the assessment and proposed infrastructure relating to the project.

Table 8: Project Information Table

PROPONENT SPECIFICATIONS	
Applicant Details	**Description**
Applicant Name:	Marula Platinum Mine (Pty) Ltd
Project Name:	Marula Platinum Mine PV Development and Associated Infrastructure

The project involves the development of a PV facility that will likely include the following:

- PV Generation facility with a generation capacity of up to 33MWac 5m in height
- On-site switching station / substation.
- Auxiliary buildings (gatehouse and security, control center, office, warehouse, canteen & visitors center, staff lockers etc.).
- Battery Energy Storage System (within an electrical common area)
- Inverter-stations, transformers and internal electrical reticulation (underground
- cabling).
- Access and internal road network.
- Laydown area.
- Powerline (either overhead or underground from the facility substation to the
- collector substation).
- Rainwater tanks; and
- Electrified Perimeter fencing and security infrastructure.

The following image depicts the possible landscape changes that could occur.

(www.hawaiirenewableenergy.org/Villamesias2, n.d.)

(Junior Mining Network, n.d.)
Figure 3: Photographic example of what the proposed PV could look like as fixed and single portrait model on a tracker.

Figure 4. Typical construction site and laydown with fences (excluding overhead lighting) *(Source: VRMA)*

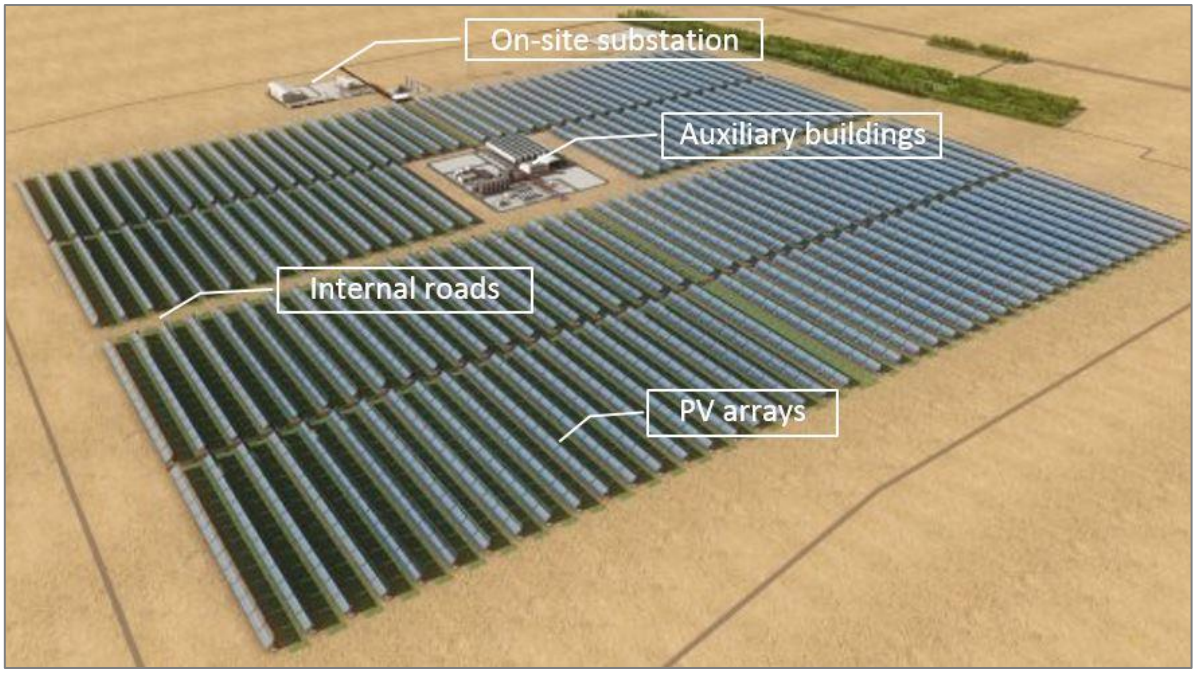


Figure 5. Perspective view of typical PV Plant Layout
(Source: Solek; Joram Solar. August 2014)

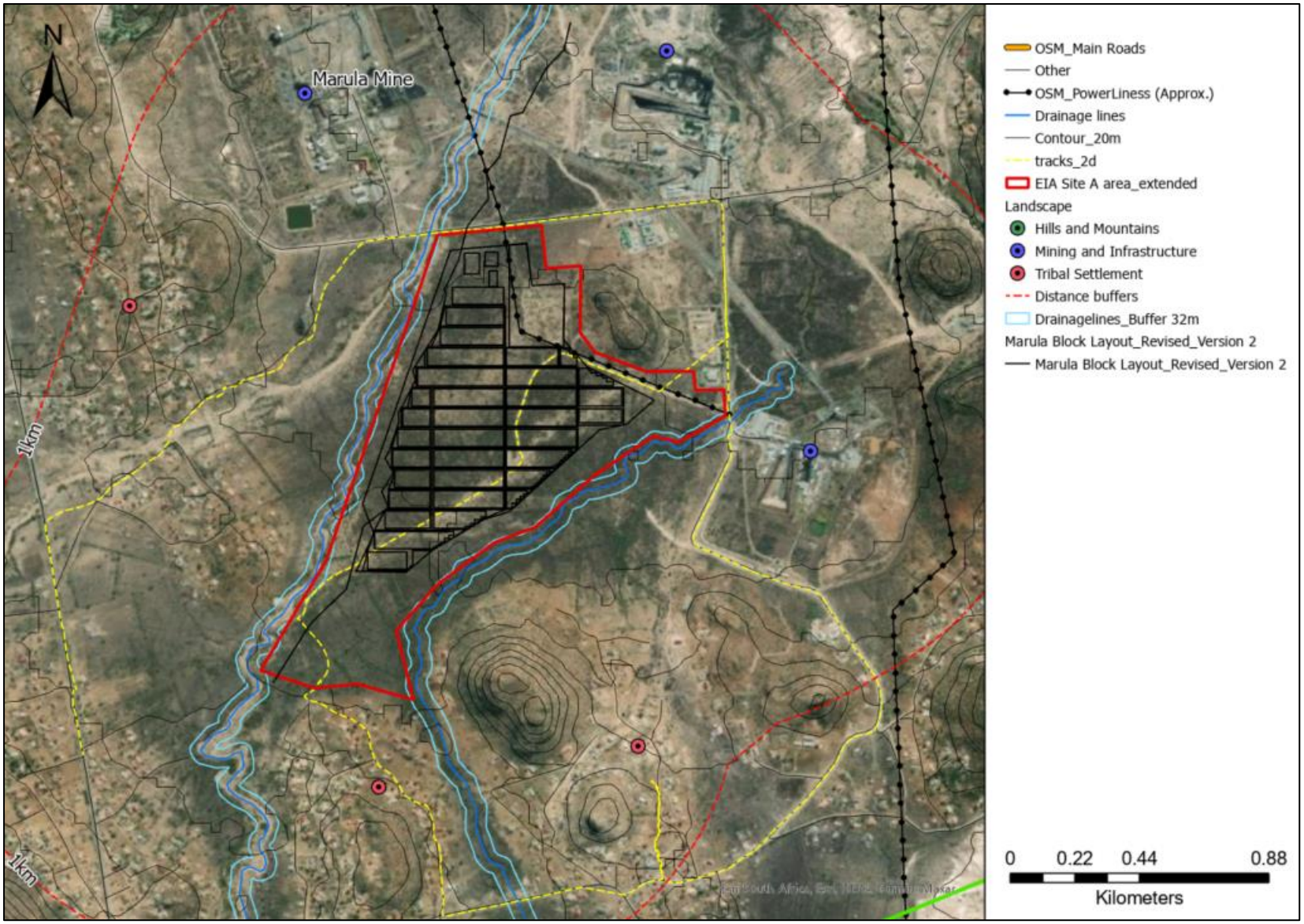


Figure 6: Proposed PV Block layout plan with overlay onto satellite imagery and key landscape nodes map.

5 LEGAL FRAMEWORK

In order to comply with the Visual Resource Management requirements, it is necessary to relate the proposed landscape modification in terms of international best practice in understanding landscapes and landscape processes. The proposed project also needs to be evaluated in terms of 'policy fit'. This requires a review of International, National and Regional best practice, policy and planning for the area to ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the planned sense of place and character of the area.

5.1 International Good Practice

For cultural landscapes, the following documentation provides good practice guidelines, specifically:

- Guidelines for Landscape and Visual Impact Assessment (GLVIA), Second Edition.
- International Finance Corporation (IFC).
- Millennium Ecosystem Assessment (MEA).
- United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Convention (WHC).

5.1.1 Guidelines for Landscape and Visual Impact Assessment, Second Edition

The Landscape Institute and the Institute of Environmental Management and Assessment (United Kingdom) have compiled a book outlining best practice in landscape and visual impact assessment. This has become a key guideline for LVIA in the United Kingdom. "The principal aim of the guideline is to encourage high standards for the scope and context of landscape and visual impact assessments, based on the collegiate opinion and practice of the members of the Landscape Institute and the Institute of Environmental Management and Assessment. The guidelines also seek to establish certain principles and will help to achieve consistency, credibility and effectiveness in landscape and visual impact assessment, when carried out as part of an EIA" (The Landscape Institute, 2003);

In the introduction, the guideline states that 'Landscape encompasses the whole of our external environment, whether within village, towns, cities or in the countryside. The nature and pattern of buildings, streets, open spaces and trees – and their interrelationships within the built environment – are an equally important part of our landscape heritage" (The Landscape Institute, 2003: Pg. 9). The guideline identifies the following reasons why landscape is important in both urban and rural contexts, in that it is:

- An essential part of our natural resource base.
- A reservoir of archaeological and historical evidence.
- An environment for plants and animals (including humans).
- A resource that evokes sensual, cultural and spiritual responses and contributes to our urban and rural quality of life; and
- Valuable recreation resources. (The Landscape Institute, 2003).

5.1.2 International Finance Corporation (IFC)

The IFC Performance Standards (IFC, 2012) do not explicitly cover visual impacts or assessment thereof. Under IFC PS 6, ecosystem services are organized into four categories, with the third category related to cultural services which are defined as "the non-

material benefits people obtain from ecosystems" and "may include natural areas that are sacred sites and areas of importance for recreation and aesthetic enjoyment" (IFC, 2012).

However, the IFC Environmental Health and Safety Guidelines for Electric Power Transmission and Distribution (IFC, 2007) specifically identifies the risks posed by power transmission and distribution projects to create visual impacts to residential communities. It recommends mitigation measures to be implemented to minimise visual impact. These should include the siting of powerlines and the design of substations with due consideration to landscape views and important environmental and community features. Prioritising the location of high-voltage transmission and distribution lines in less populated areas, where possible, is promoted.

IFC PS 8 recognises the importance of cultural heritage for current and future generations and aims to ensure that projects protect cultural heritage. The report defines Cultural Heritage as "(i) tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls" (IFC, 2012). The IFC PS 8 defines Critical Heritage as "one or both of the following types of cultural heritage: (i) the internationally recognized heritage of communities who use or have used within living memory the cultural heritage for long-standing cultural purposes; or (ii) legally protected cultural heritage areas, including those proposed by host governments for such designation" (IFC, 2012).

Legally protected cultural heritage areas are identified as important in the IFC PS 8 report. This is for "the protection and conservation of cultural heritage, and additional measures are needed for any projects that would be permitted under the applicable national law in these areas". The report states that "in circumstances where a proposed project is located within a legally protected area or a legally defined buffer zone, the client, in addition to the requirements for critical cultural heritage, will meet the following requirements:

- Comply with defined national or local cultural heritage regulations or the protected area management plans.
- Consult the protected area sponsors and managers, local communities and other key stakeholders on the proposed project; and
- Implement additional programs, as appropriate, to promote and enhance the conservation aims of the protected area". (IFC, 2012).

5.1.3 Millennium Ecosystem Assessment

In the Ecosystems and Human Well-being document compiled by the Millennium Ecosystem Assessment in 2005, Ecosystems are defined as being "essential for human well-being through their provisioning, regulating, cultural, and supporting services. Evidence in recent decades of escalating human impacts on ecological systems worldwide raises concerns about the consequences of ecosystem changes for human well-being". (Millennium Ecosystem Assessment, 2005)

The Millennium Ecosystem Assessment defined the following non-material benefits that can be obtained from ecosystems*:*

- Inspiration: Ecosystems provide a rich source of inspiration for art, folklore, national symbols, architecture, and advertising.
- Aesthetic values: Many people find beauty or aesthetic value in various aspects of ecosystems, as reflected in the support for parks, scenic drives, and the selection of housing locations.
- Sense of place: Many people value the “sense of place” that is associated with recognised features of their environment, including aspects of the ecosystem.
- Cultural heritage values: Many societies place high value on the maintenance of either historically important landscapes (“cultural landscapes”) or culturally significant species; and
- Recreation and ecotourism: People often choose where to spend their leisure time based in part on the characteristics of the natural or cultivated landscapes in a particular area. (Millennium Ecosystem Assessment, 2005)

The Millennium Ecosystem Assessment Ecosystems and Human Well-being: Synthesis report indicates that there has been a “rapid decline in sacred groves and species” in relation to spiritual and religious values, and aesthetic values have seen a “decline in quantity and quality of natural lands”. (Millennium Ecosystem Assessment, 2005)

5.2 National and Regional Legislation and Policies

In order to comply with the Visual Resource Management requirements, it is necessary to clarify which National and Regional planning policies govern the proposed development area to ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the sense of place and character of the area as mapped in Figure 7 below.

- DEA&DP Visual and Aesthetic Guidelines.
- REDZ Planning.
- Regional and Local Municipality Planning and Guidelines.

Table 9: List of key planning informants to the project.

Theme	Requirements
Province	Limpopo
District Municipality	Greater Sekhukhune
Local Municipality	Fetakgomo Tubatse
REDZ	Not applicable

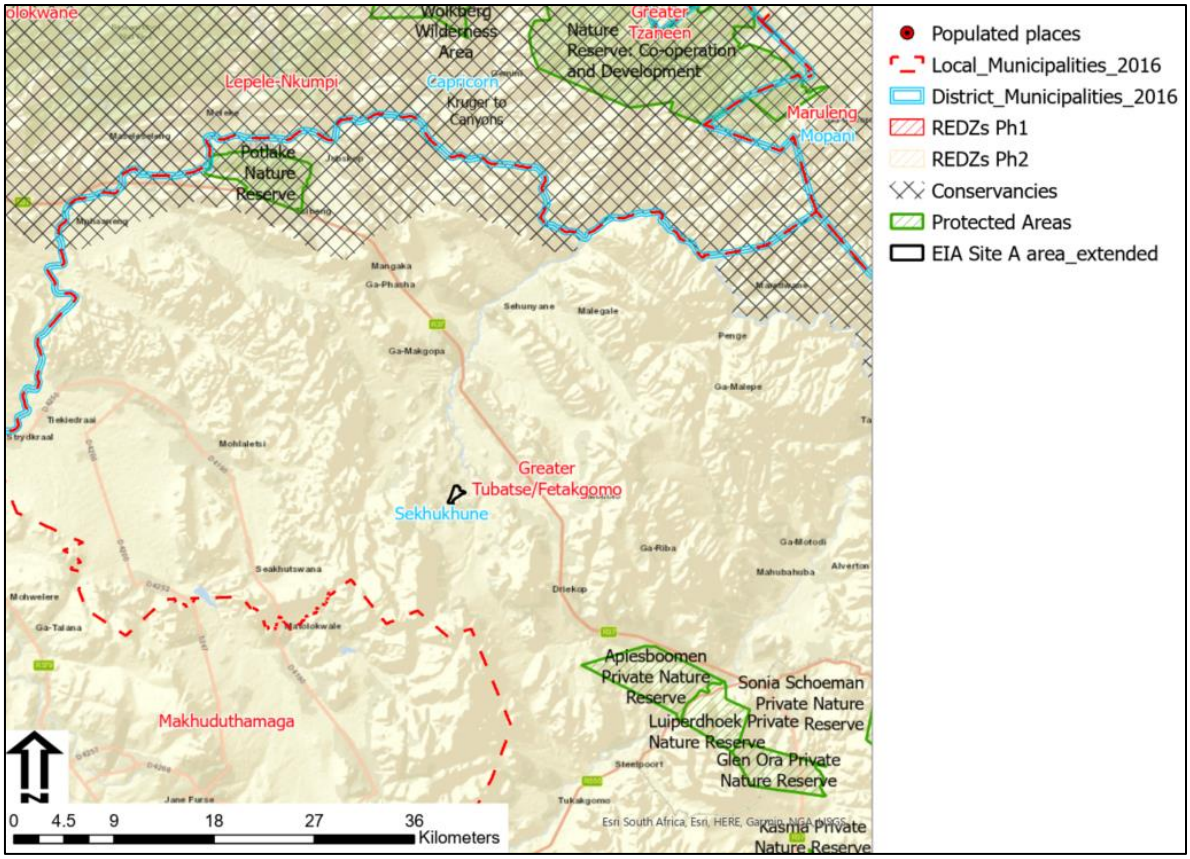


Figure 7: Planning locality map depicting the local, district and national planning zones.

5.2.1 DEA&DP Visual and Aesthetic Guidelines

Reference to the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for involving visual and aesthetic specialists in Environmental Impact Assessment (EIA) processes is provided in terms of southern African best practice in Visual Impact Assessment. The report compiled by Oberholzer states that the Best Practicable Environmental Option (BPEO) should address the following:

- Ensure that the scale, density and nature of activities or developments are harmonious and in keeping with the sense of place and character of the area. The BPEO must also ensure that development must be located to prevent structures from being a visual intrusion (i.e., to retain open views and vistas).
- Long term protection of important scenic resources and heritage sites.
- Minimisation of visual intrusion in scenic areas.
- Retention of wilderness or special areas intact as far as possible.
- Responsiveness to the area's uniqueness, or sense of place." (Oberholzer, 2005)

5.2.2 Other Renewable Energy Projects and REDZ Planning

A Strategic Environmental Assessment, commissioned by the Department of Environmental Affairs, undertaken by the CSIR, identified Renewable Energy Development Zones (REDZs) (Department of Environment Affairs). These are gazetted geographical areas in which several wind and solar PV development projects will have the lowest negative impact on the environment while yielding the highest possible social and economic benefit to the country. The project is not located within a REDZ.

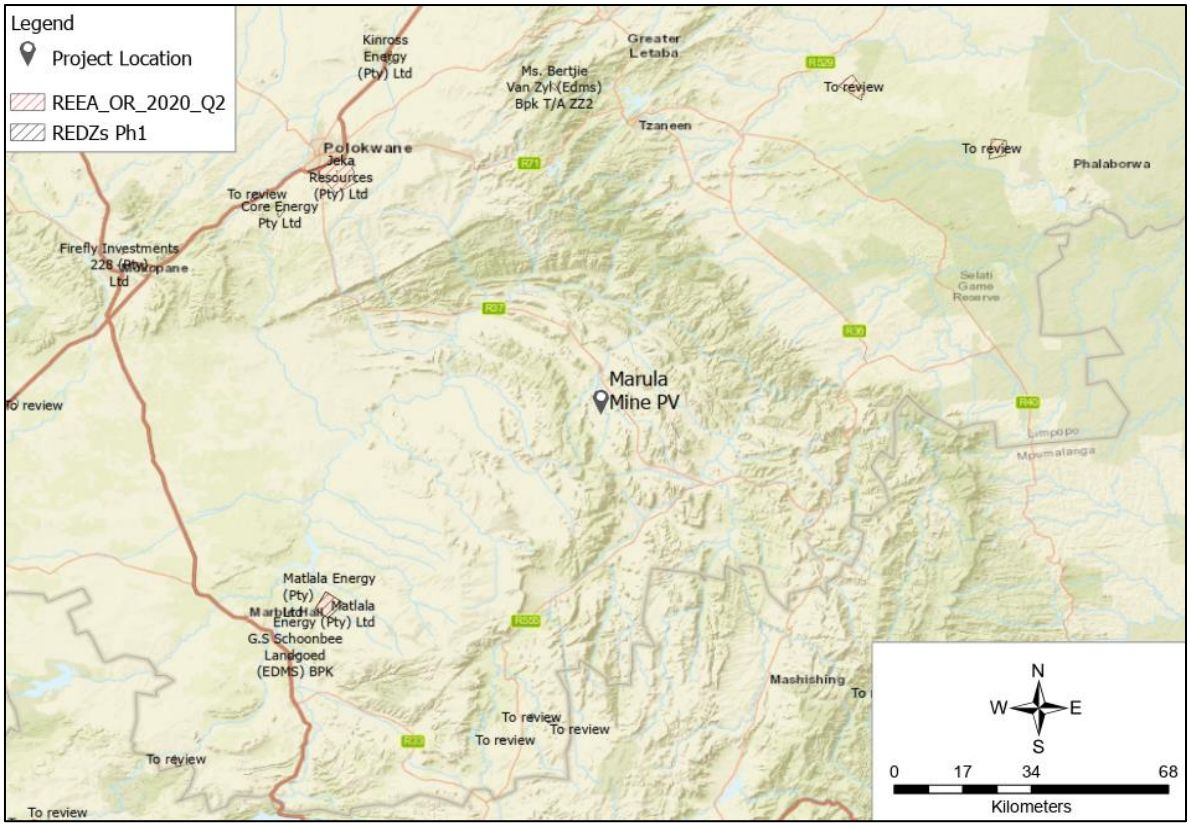


Figure 8: Map depicting DEA Renewable Energy project status.

Multiple RE projects has the potential to result in landscape cluttering or create a semi-industrial sense of place. A mapping of the DEA/ CSIR renewable energy areas found that no other renewable energy projects are located in the Zone of Visual Influence, and that the area does not fall within a proclaimed REDZ area. Given the existing industrial landscape context created by the Marula Platinum Mine plant, the semi-industrial sense of place created by a RE type landscape change would not significantly alter the existing scenic quality.

5.2.3 Nature and Tourism Activities

A review of spatial databases mapping formally protected Nature Reserves found no National Parks or Conservation Area in the immediate vicinity. While numerous protected areas are located in the region, with the Kruger to Canyon Conservancy located to the west, it is unlikely that the PV project Zone of Visual Influence will extend to these areas.

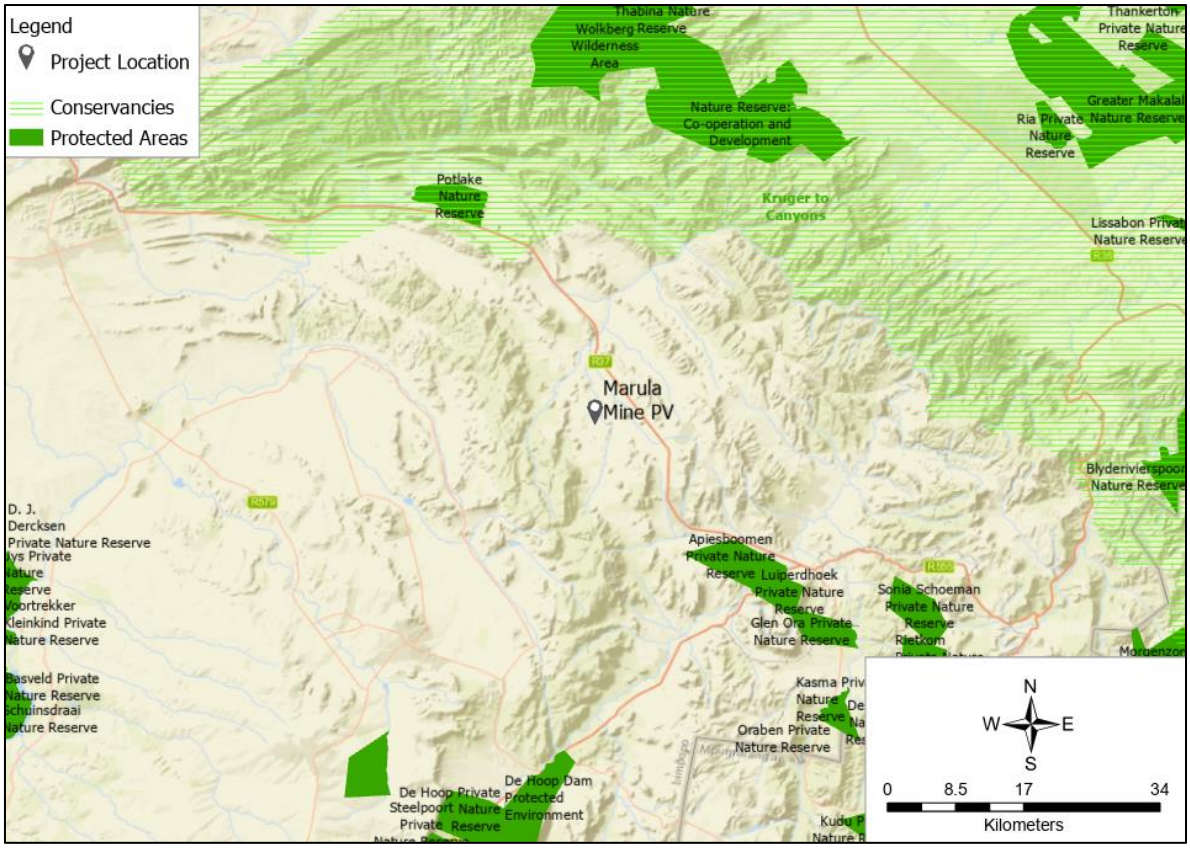


Figure 9: Map depicting the mapped nature reserves and conservation areas that could be used for tourism.

5.2.4 Local and Regional Planning

The following tables list key regional and local planning that has relevance to the project pertaining to landscape-based tourism, and renewable energy projects.

Table 10: District Planning reference table relevant to the project.

Theme	Requirements	Page
Mining	Strategic Objective 4: To enhance Mining development within the district	77
	SDM has recently compiled a review of the Greater Sekhukhune District Municipality SDF and identified the following spatial development objectives and principles: • To actively protect, enhance and manage the natural environmental resources in the municipality in order to ensure a sustainable equilibrium between the mining, tourism and agricultural industries in the area. • To optimally capitalize on the strategic location of the District by way of strengthening internal and external linkages within provincial and regional context. To utilize the natural environmental and cultural historic features in the District as anchors from which to promote ecotourism and conservation. • To maximally utilize the mining potential in the district by way of the development of the Dilokong Corridor and create a strong	325

Theme	Requirements	Page
	east-west movement/development corridor in the District functionally linking the tourism precincts, mining belt and agricultural belt to one another, and to the markets of Gauteng Province along the Moloto Corridor.	
Fetakgomo Tubatse SEZ	Fetakgomo Tubatse SEZ is mining zone area which has been designated for mineral beneficiation. Currently LEDA has secured 1200 ha of land where the SEZ will be located and the processes such as environmental impact assessment, licencing are being undertaken. The challenges affecting the smooth inception of the SEZ include amongst others, the licencing, ESKOM capacity and water provision.	88
Tourism	District hosts the scenic Flag Boshielo Dam area, the adjoining Schuinsdraai Nature Reserve, Potlake Nature Reserve, and the Maleoskop Resort and Conservancy. Furthermore, the District has recently established the Kamoka Open Africa Route, which could be linked with the existing African Ivory and Cultural Heartland routes and the planned Great Limpopo Route.	101
biodiversity	However, there is the risk in over-utilized (whether through overgrazing, mismanagement, increased cropping, mining etc.) systems that the provision of these natural products and services becomes compromised due to unsustainable harvesting of resources	145

Greater Sekhukhune District Municipality Integrated Development Plan (2020/2021 (Greater Sekhukhune District Municipality, 2020)

Theme	Requirements	Page
Limpopo Spatial Development Framework	The aim of the Limpopo Spatial Development Framework (LSDF) is to: • promote social, economic and environmental sustainability throughout the Province. • protect and enhance the Province's natural resources, including scarce fresh water sources and high biodiversity landscapes; • encourage and institutionalise the sustainable development of its massive mineral potential (and encourage green economy initiatives). • Fetakgomo Tubatse is identified as one of four industrial hubs in the province. The main focus of this hub should be downstream beneficiation of minerals.	21
Renewable Energy	At a more detailed level, settlements (existing and new) in the District should be designed in accordance with the principles and standards … in order to ensure innovative and affordable utilisation of solar energy..	75

Greater Sekhukhune DM Spatial Development Plan Framework (Greater Sekhukhune District Municipality, 2018)

Table 11: Local Planning reference table relevant to the project.

Theme	Requirements	Page
Opportunities	Opportunities offered by the Fetakgomo Tubatse Local Municipality: • Mining investment opportunity; • Sustainable livelihoods through Environmental Management • To promote economic development in the FTLM.	13

Theme	Requirements	Page
	• Progress in Electrification of Burgersfort Extension 71 and 72. Sponsored by Mining and Town	

(Fetakgomo Tubatse Local Municipality, May 2021)

5.3 Landscape Planning Policy Fit

Policy fit refers to the degree to which the proposed landscape modifications align with International, National, Provincial and Local planning and policy.

In terms of *international best practice*, the proposed landscape modification will not trigger any issues as there are no significant landscape/ cultural landscape features within the project area there were no significant cultural/ landscape visual resources found on the site or immediate surrounds that are flagged by international landscape guidelines. While the landscape does depict a tribal settlement pattern, the area is already strongly associated with mining landscape changes that degrade the local scenic resources. Care needs to be taken to ensure that the remaining tribal cultural settlement patterning and associated communal landscape adjacent to the settlements is retained to some degree.

In terms of the *local and regional planning*, there is clear mention of the economic value that the renewable energy and mining investment will add to the local and regional economy. The current land use is predominantly mining and as such, the landscape has been significantly modified. However, there are residential dwellings in close proximity, and as such, landscape change would need to ensure that remaining landscape resources not further impacted. There are also no tourism activities located within these rural areas.

In terms of planning suitability for landscape and visual related themes, the ***expected visual/ landscape policy fit of the landscape change is rated*** **+VE Medium*.*** *While the mining landscapes do degrade the local scenic resources, the remaining tribal settlement areas need to be kept intact as close proximity of the proposed PV plant to tribal settlement is likely to detract from this cultural landscape.*

6 BASELINE VISUAL INVENTORY

Landscape character is defined by the U.K. Institute of Environmental Management and Assessment (IEMA) as the 'distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement'. It creates the specific sense of place or essential character and 'spirit of the place' (IEMA, 2002). This section of the VIA identified the main landscape features that define the landscape character, as well as the key receptors that make use of the visual resources created by the landscape.

6.1 Landscape Context

As mapped in Figure 10 below, the key landscape themes within the Foreground / Middle Ground (6km) distance are listed below:

- Medium to large sized hills.
- Mining and Infrastructure.
- Rural agricultural/ tribal settlements adding to a cultural landscape.

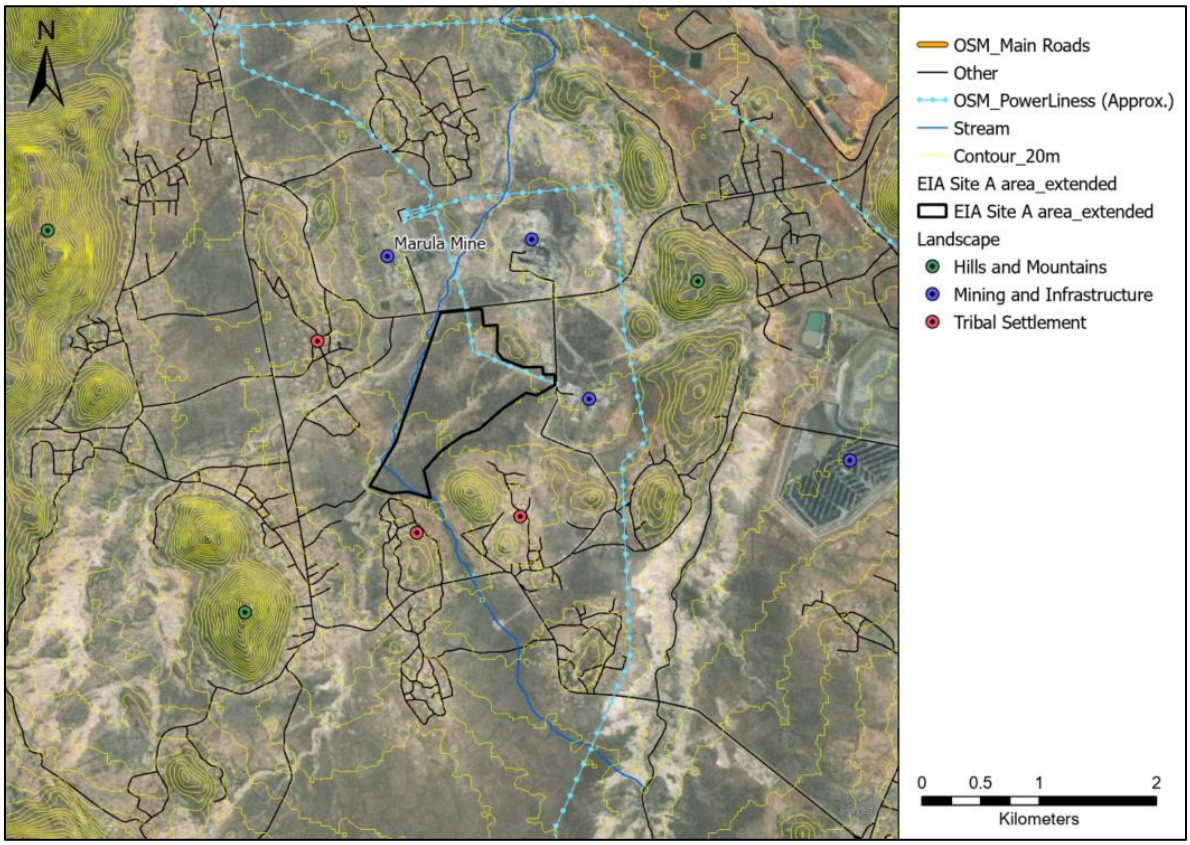


Figure 10. Local landscape themes map.

6.1.1 Mining Features

The Marula Platinum Mine is well established in the landscape, with the large size of the plant and waste rock dumps a key element that does dominate the attention of the casual observer. Numerous mines are also located in the region. However, due to the undulating of the terrain that includes small and large hill-scapes, the intervisibility of the mines is limited to open valleys. Around the Marula Platinum Mine, the views are dominated by the other Marula subsidiary plants, but there are no clear views of other mines as seen from the local area.

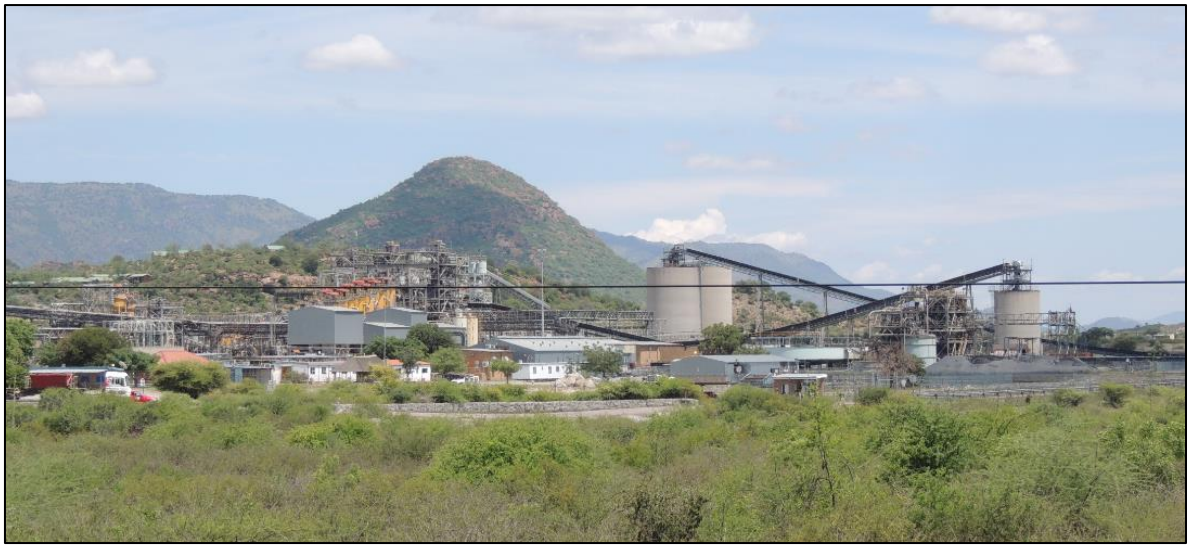


Figure 11. View of the Marula Platinum Mine plant clearly defining regional landscape character associated with intensive mining.

6.1.2 Rural Agricultural Areas

The area is within the Galane area and as such numerous rural residential dwellings are located within the vicinity. Residential proximity to the mining does take place, with the nearest dwellings located approximately 250m away from the mine boundary. Given that the landscapes are dominated by the mining infrastructure, it is likely that the receptor sensitivity to landscape change could be moderated. However, as visual resources are minimal, it is also important to ensure that remaining scenic resources are not degraded.

Figure 12. Photograph depicting the rural settlement dwellings located in the foreground with the mine sites located in low ground areas surrounded by mountains.

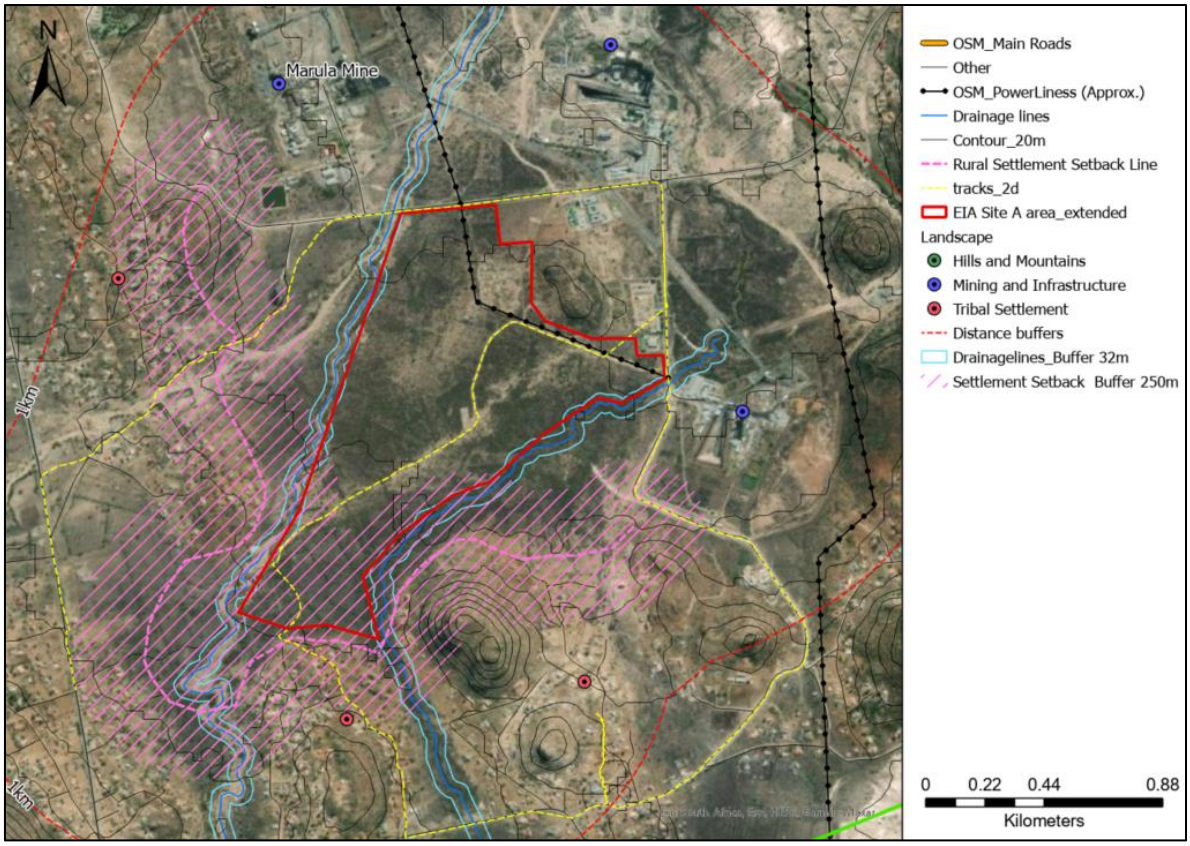


Figure 13. Map depicting the rural settlement dwellings located around the proposed study area and the recommended 250m setback line.

To ensure that existing tribal settlement and cultural landscape resources are not degraded, it is recommended that a 250m setback from the settlement areas is maintained to allow for settlement expansion and continued utilisation of tribal common lands around the settlements.

6.1.3 Infrastructure and Road Access

The area is serviced by the R37 that connects Burgersfort in the south to Mamaolo in the north. Numerous minor roads connect to the R37, creating a well-established network of minor, mainly gravel roads. Numerous power line routings are located in the vicinity, with a 132kV line located over a portion of the proposed PV site.

Figure 14. Photograph of the Marula Platinum Mine access road which would be used by mining vehicles as well as rural residents.

6.1.4 Vegetation

Vegetation type is a large factor in determining the scenic quality or the site in terms of colour and texture, as well as influencing the local ability of the landscape to absorb the landscape change. The map below outlines the vegetation type based on BGIS mapping (South African National Biodiversity Institute, 2018).

According to the South African National Biodiversity Institute (SANBI) 2012 Vegetation Map of South Africa, Lesotho and Swaziland (South African National Biodiversity Institute, 2012) the project area is located in the Savanna Biome with the main vegetation type is Sekhukhune Plains Bushveld located within the Savanna Biome and Central Bushveld Bioregion. As can be seen in the photographs above, the bushveld vegetation is of a medium to low size, with few trees. The low height of the vegetation is unlikely to assist in vegetation screening, however, there is opportunity to plant small sized trees for screening, should this be necessary. As shade from trees negates the efficiency of solar panels, should tree screening be incorporated as a mitigation, care in placement of the trees would need to be undertaken to ensure that this mitigation would not shade the PV panels.

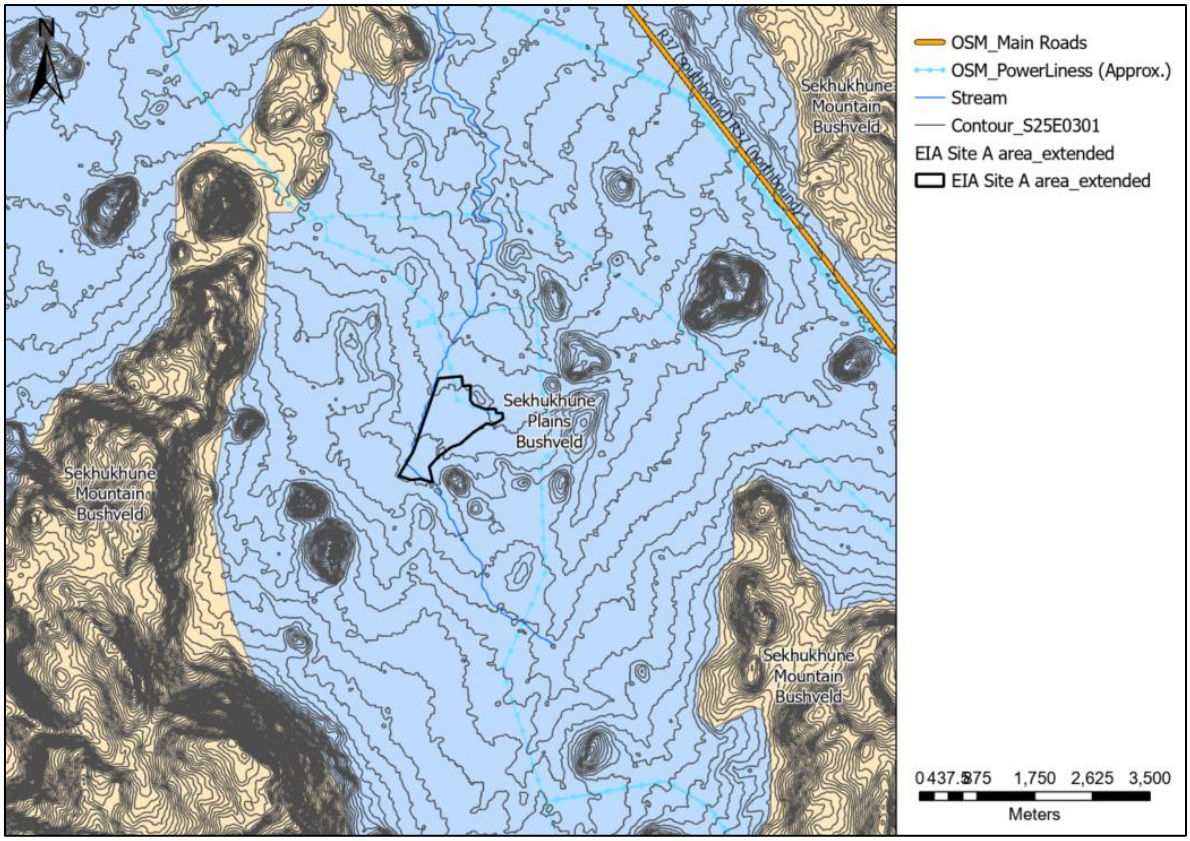


Figure 15. BGIS Biome and Vegetation Type Map (South African National Biodiversity Institute, 2018).

6.2 Project Zone of Visual Influence

The visible extent, or viewshed, is “the outer boundary defining a view catchment area, usually along crests and ridgelines” (Oberholzer, 2005). In order to define the extent of the possible influence of the proposed project, a viewshed analysis was undertaken from the proposed site at a specified height above ground level as indicated in the table below. The viewshed analysis makes use of open-source NASA ASTER Digital Elevation Model data (NASA, 2009).

The extent of the viewshed analysis was restricted to a defined distance that represents the approximate zone of visual influence (ZVI) of the proposed activities, which takes the scale, and size of the proposed projects into consideration in relation to the natural visual absorption capacity of the receiving environment. The maps are informative only as visibility tends to diminish exponentially with distance, which is well recognised in visual analysis literature (Hull & Bishop, 1988). The viewshed is strongly associated with the regional topography and as such this topic is addressed before the viewshed analysis.

6.2.1 Regional Landscape Topography

Making use of the NASA STRM digital elevation model, profile lines were generated for the area within 24km on either side of the project area predominantly in the North to South and East to West compass reference but orientated to take into account dominant topographic trends that could influence the local landscape and viewscape. The map depicting the regional elevation profile lines can be view on the following page.

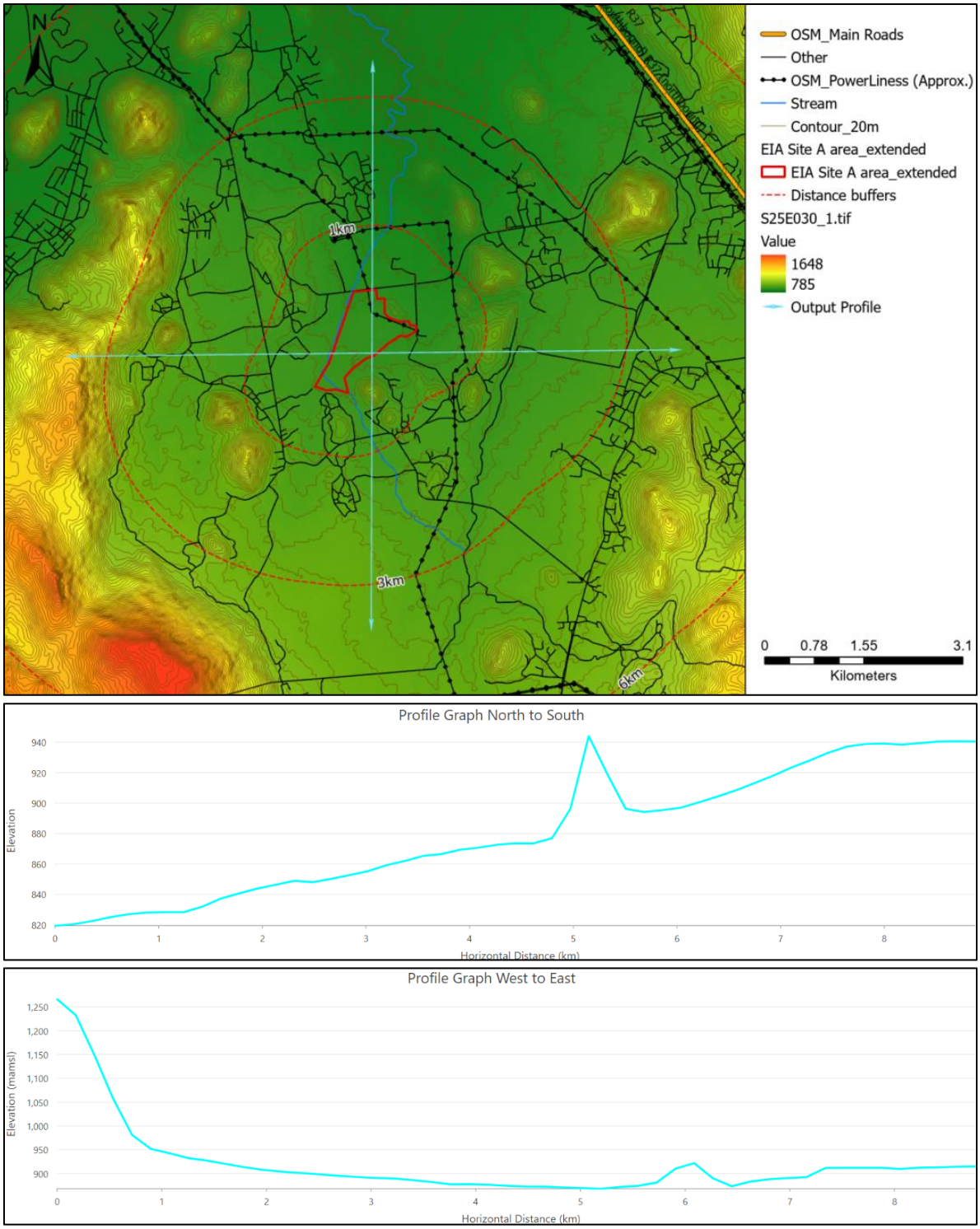


Figure 16: Regional Digital Elevation Mapping and Profiles Graphs.

Within the general topographic landscape, the area is strongly defined by the medium to large sized hills that are located around the wide valley where the PV project is proposed. The effect of this topography is that the ZVI will be primarily contained with the valley, with views to the southwest restricted within the 3km distance.

As can be seen in the North to South Profile, the aspect of the site is gently north facing and draining to the north. The small hill located to the south of the site is clearly visible in the profile. The East to West Profile depicts the wide valley, with the large hill landform to the

west rising 1000m above the project site. Of relevance to the project is that the surrounding hill landforms do add value to the local landscape, creating interesting features that increase scenic value.

In order to better understand the site topography, a slopes analysis was undertaken. As can be seen in Figure 17 below, no steep slopes were found on site, but the close proximity of the adjacent hill landforms would increase scenic quality. Also depicted on the map are the two small drainage lines located on either site of the site. Some erosion has taken place and as such, a 32m buffer has been placed on the drainage lines to protect the site from erosional instability, as well as maintain the river landscape. This buffer is subject to the findings of the Surface Water hydrologist.

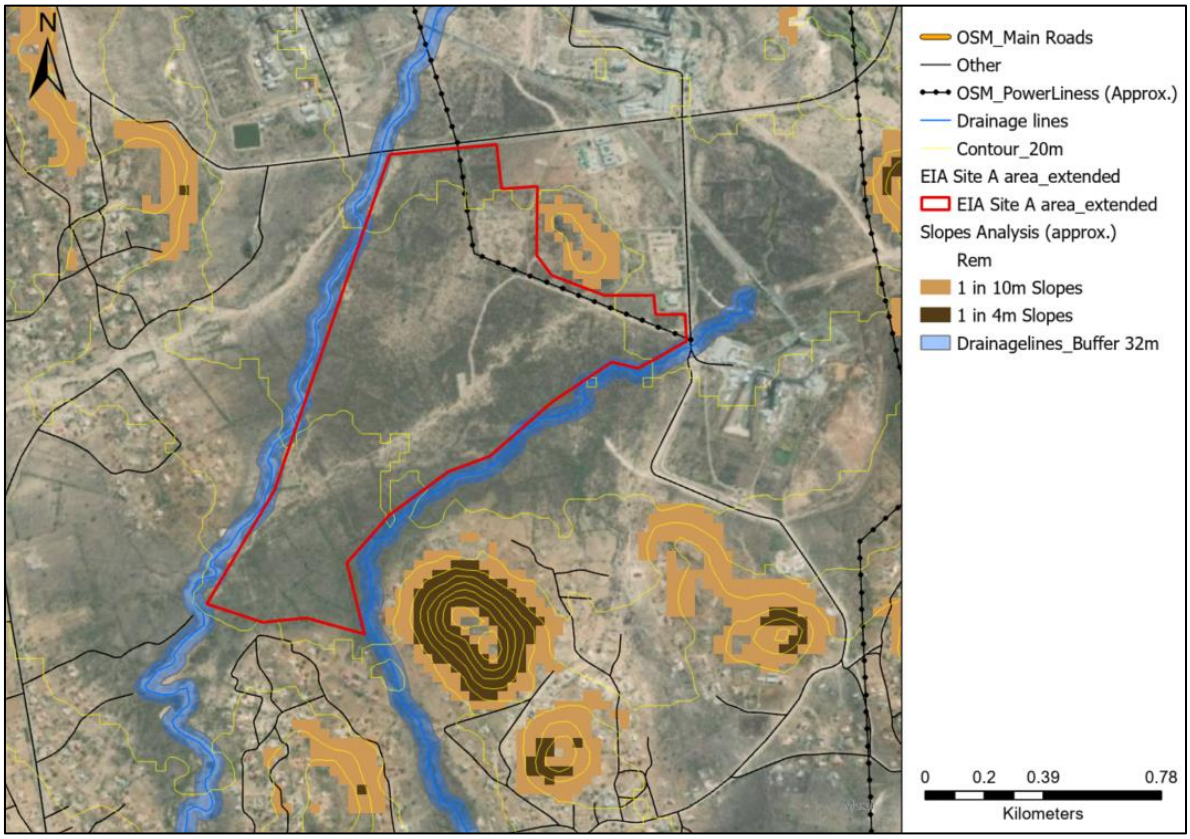


Figure 17: Key topographic features map.

6.2.2 Viewshed Analysis

A viewshed analysis was undertaken for the site making use of NASA SRTM 30m Digital Elevation Model data. An Offset value representing the height of the PV panels was used to represent the approximate height of the proposed development as reflected in the table below. The viewshed was also capped at a defined extent to take atmospheric influences into consideration where the landscape change would not be clearly visible from.

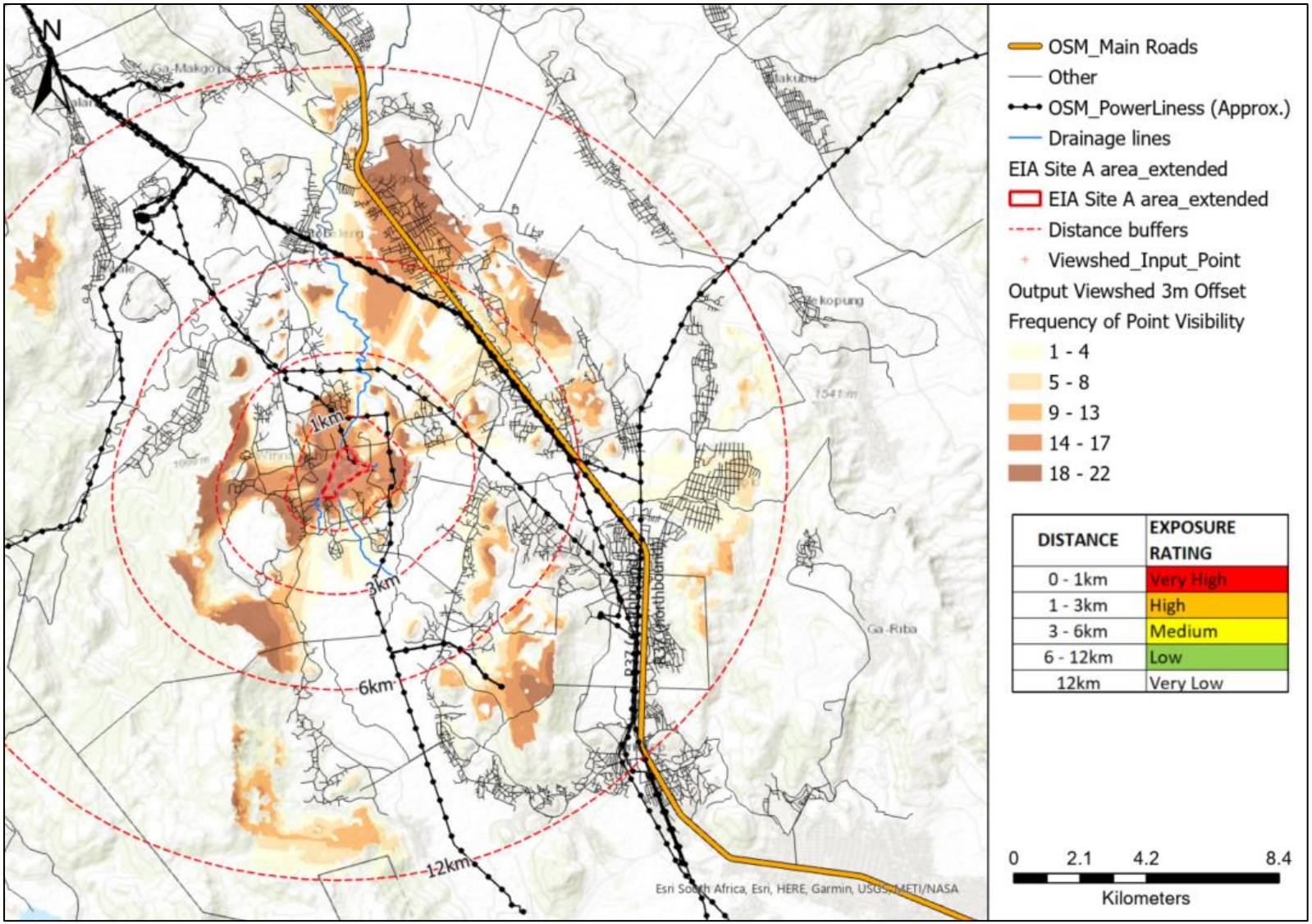
Table 12: Proposed Project Heights Table

Proposed Activity	Height (m)	Model Extent	Motivation
PV Panels	5m	16km	The larger massing effects created by the large surface area change increases the potential for wide area visibility.

PV Panel Viewshed Findings

As can be viewed in Figure 18 below, , the theoretical viewshed is relatively contained by the local topography, reducing the visual extent to the local level. This is due to the hilly landforms surrounding the site, that restricted the extent (especially to the southwest) as well as fragment the visibility of the proposed landscape change.

In terms of massing intensity, where the full PV area is viewed will be essentially contained to within the 3km distance area. **As a result of the topographically contained viewshed, the ZVI is described as Local.**



DISTANCE	EXPOSURE RATING
0 - 1km	Very High
1 - 3km	High
3 - 6km	Medium
6 - 12km	Low
12km	Very Low

Figure 18: Viewshed analysis map of both PV projects.

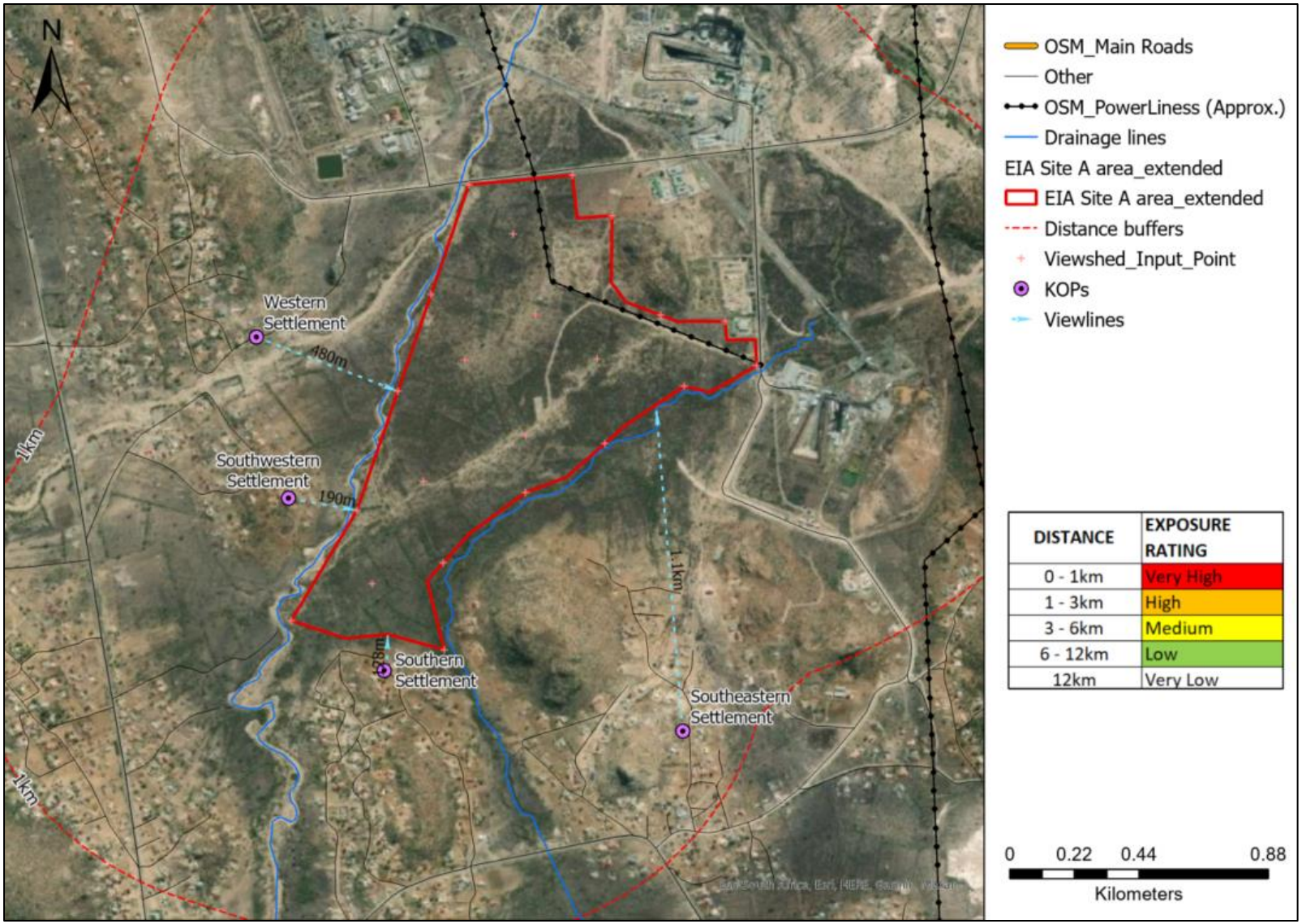


Figure 19: Receptor Key Observation Point and Visual Exposure Map.

6.3 Receptors and Key Observation Points

As defined in the methodology, KOPs are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. Within the ZVI, due to the **tribal settlement patterning, numerous receptors were identified with High Visual Exposure**. To better understand the nature of the landscape change as seen from this rural community, four KOP were defined based on the main views from the surrounding settlements:

- Western settlements.
- South-western settlement.
- Southern settlements,
- South-eastern settlements.

7 VISUAL RESOURCE MANAGEMENT

In terms of the VRM methodology, landscape character is derived from a combination of scenic quality, receptor sensitivity to landscape change, and distance of the proposed landscape modification from key receptor points. Making use of the key landscape elements defined in the landscape contextualisation sections above, landscape units are defined which are then rated to derive their intrinsic scenic value, as well as how sensitive people living in the area would be to changes taking place in these landscapes.

7.1 Physiographic Rating Units

The Physiographic Rating Units are the areas within the proposed development area that reflect specific physical and graphic elements that define a particular landscape character. These unique landscapes within the project development areas are rated to assess the scenic quality and receptor sensitivity to landscape change, which is then used to define a Visual Resource Management Class for each of the site's unique landscape/s. The exception is Class I, which is determined based on national and international policy / best practice and landscape significance and as such are not rated for scenic quality and receptor sensitivity to landscape change. Based on the SANBI vegetation mapping and the site visit to define key landscape features, the following broad-brush areas were tabled and mapped in Figure 20 below.

Table 13: Physiographic Landscape Rating Units.

Landscapes	Motivation
Sekhukhune Plains Bushveld (degraded)	Relatively flat terrain with degraded bushveld vegetation.
Riverine and drainage areas.	Areas associated with hydrological features.
Modified	Areas transformed.

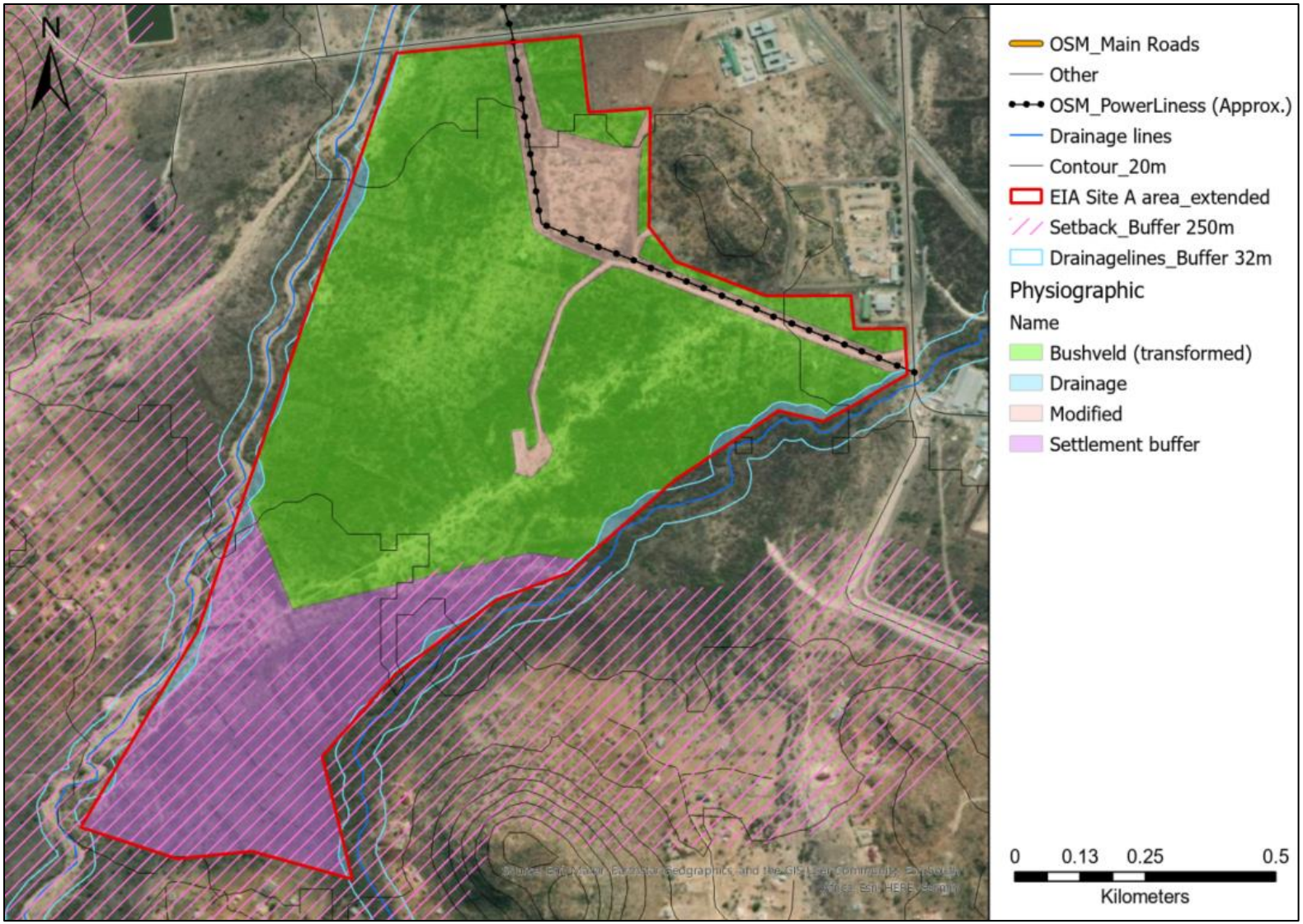


Figure 20: Physiographic Rating Units identified within the defined study area.

Table 14: Scenic Quality and Receptor Sensitivity Rating.

Landscape Rating Units	**Scenic Quality** A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11									**Receptor Sensitivity** H = High; M = Medium; L = Low						**VRM**	
Attribute	**Landform**	**Vegetation**	**Water**	**Colour**	**Scarcity**	**Adjacent Landscape**	**Cultural Modifications**	**Sum**	**Rating**	**Type of Users**	**Amount of Use**	**Public Interest**	**Adjacent Land Uses**	**Special Areas**	**Rating**	**Inventory Class**	**Management Class**
• Drainage lines • Significant river / streams and associated flood lines buffers • Any wetlands identified as significant in terms of the WULA process. • Any ecological areas (or plant species) identified as having a high significance. • Any heritage area identified as having a high significance.	**(Class I is not rated)**																**I**
Degraded Bushveld	1	3	1	2	1	2	0	10	C	M	M	L	M	L	**M**	**IV**	**III**
Transformed	1	1	0	1	1	2	-2	4	C	L	M	L	L	L	**L**	**IV**	**IV**
Settlement Visual Exposure Setback	1	3	1	2	1	2	0	10	C	H	H	M	M	H	**H**	**III**	**II**

Red colour indicates change in rating from Visual Inventory to Visual Resource Management Classes motivated in the following section.

The ***Scenic Quality*** scores are totalled and assigned an A (High scenic quality), B (Moderate scenic quality) or C (Low scenic quality) category based on the following split: *A= scenic quality rating of ≥19; B = rating of 12 – 18, C= rating of ≤11* (USDI., 2004).
Receptor Sensitivity levels are a measure of public concern for scenic quality. Receptor sensitivity to landscape change is determined by rating the key factors relating to the perception of landscape change in terms of Low to High.

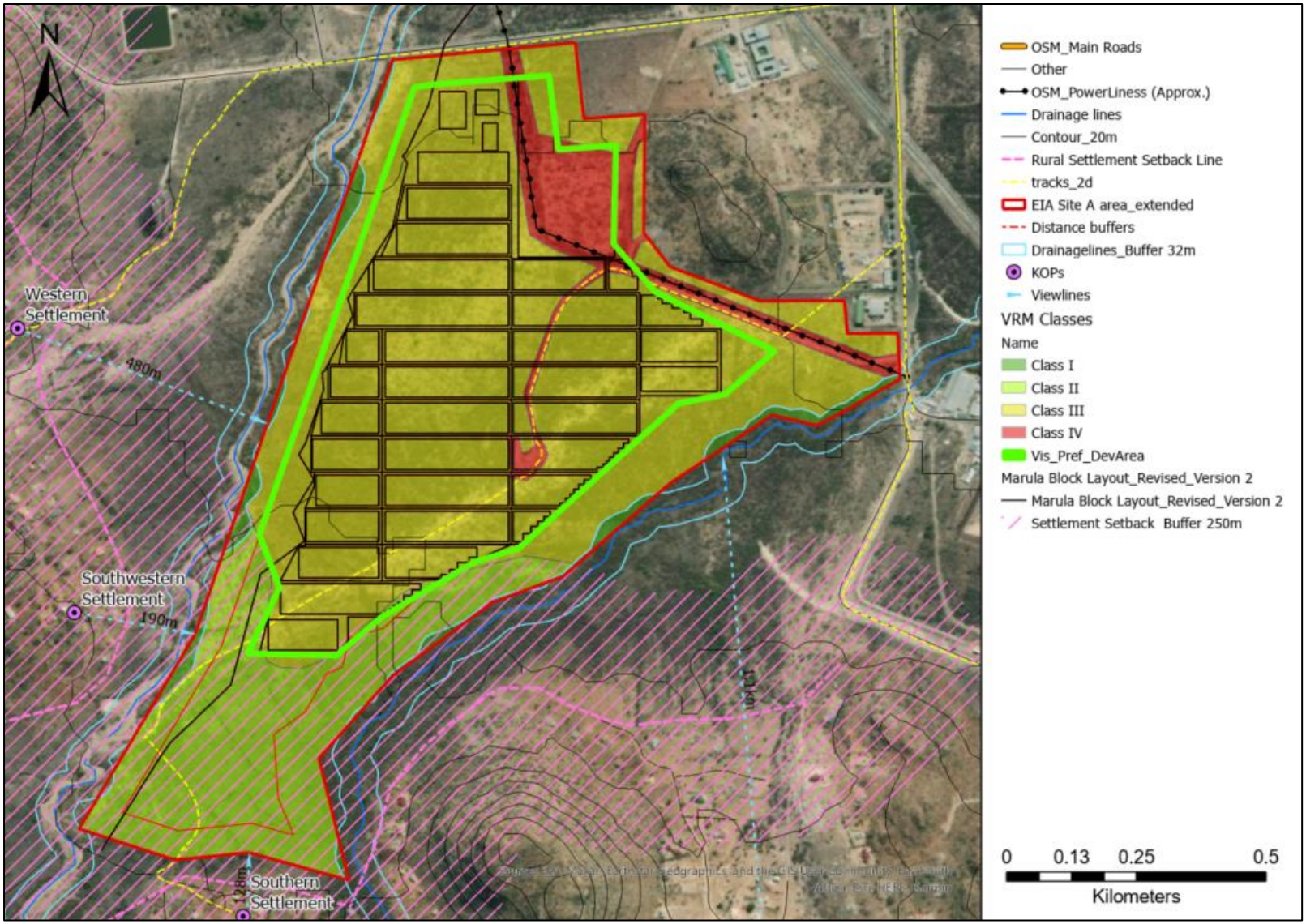


Figure 21: Visual Resource Management Classes map with development overlay.

7.2 Scenic Quality Assessment

The scenic quality of the proposed development site is rated Medium to Low. The flat terrain of the site with no water features and a predominantly single vegetation type reduces visual appeal. However, the Bushveld vegetation does have added value and creates colour contrast to the khaki-coloured veld grasses. Adjacent landscapes include the low hills which do add value and increase the landscape character. Cultural modifications are mining related in nature and detract from the rural residential sense of place. Due to the close proximity to the mine, the site is visually degraded to some degree, with the areas in closer proximity to the mining area depicting a degraded landscape.

7.3 Receptor Sensitivity Assessment

Receptor sensitivity to landscape changes is rated Medium. Sensitivity for the areas closer to the mine site is rated Low due to the mining sense of place. However, value is be provided to the local communities in terms of utilisation of the bushveld areas for grazing of livestock, buffering the industrialised landscapes are the mine. Receptors are mainly rural residential in nature and located to the west of the sites and are likely to be sensitive to landscape change in areas resulting in loss of close proximity communal lands. Due to the flat terrain and low vegetation, the amount of use of the site is rated Medium. Due to the mining sense of place associated with the Marula Platinum Mine, Public Interest in the landscape change is expected to be Low. Adjacent Land Users are likely to have Medium to Low levels of sensitivity to landscape change. Unless specified vegetation species are identified as Special Areas, no protected areas were identified on site.

7.4 Visual Resource Management (VRM) Classes

The BLM has defined four Classes that represent the relative value of the visual resources of an area and are defined in terms of the VRM Matrix as follows:

i. **Classes I and II** are the most valued
ii. **Class III** represent a moderate value
iii. **Class IV** is of least value

7.4.1 VRM Class I

Class I is assigned when legislation restricts development in certain areas. The visual objective is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. A Class I visual objective was assigned to the following features within the proposed development area due to their protected status within the South African legislation:

- Any river / streams and associated flood lines buffers identified as significant in terms of the WULA process.
- Any wetlands identified as significant in terms of the WULA process.
- Any ecological areas (or plant species) identified as having a high significance.
- Any heritage area identified as having a high significance.

7.4.2 VRM Class II

The Class II objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low. The proposed development may be seen but should not attract the attention of the casual observer, and should repeat the basic

elements of form, line, colour and texture found in the predominant natural features of the characteristic landscape.

- **250m Settlement Buffer**

Due to the close proximity of the PV site to the surrounding southern tribal settlement area, with potential loss of close proximity communal lands, this area is not recommended for development and Higher levels of Visual Intrusion are likely to take place.

7.4.3 VRM Class III

The Class III objective is to partially retain the existing character of the landscape, where the level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. The following landscape was defined as having Class III Visual Objectives where development would be most suitable:

- **Bushveld (defined as having some value by the botanical survey).**

Due to the close proximity of this area to the mining landscapes, as well as the semi-degraded state of the bushveld, this area is suitable for development with mitigation. Mitigation would need to restrict height such that the surrounding bushveld vegetation can offer some vegetation screening, as well as mitigate for glint and glare for western tribal settlement located on higher ground.

7.4.4 VRM Class IV

The Class IV objective is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the landscape can be high, and the proposed development may dominate the view and be the major focus of the viewer's (s') attention without ***significantly degrading the local landscape character and would be suitable without mitigation.***

Due to the degraded sense of place, the following areas were rated Class IV:

- **Mining associated transformation/ highly degraded vegetation areas.**

As these areas are already degraded and in very close proximity to the existing mine, there are suitable for development without mitigation.

8 VISUAL IMPACT ASSESSMENT

Impacts are defined in terms of the standardised impact assessment criteria provided by the environmental practitioner. Using the defined impact assessment criteria, the potential environmental impacts identified for the project were evaluated according to severity, duration, extent and significance of the impact. The potential occurrence and cumulative impact (as defined in the methodology) was also assessed. In order to better understand the nature of the severity of the visual impacts, a Contrast Rating exercise was undertaken, with photomontages provide to allow for an approximation of the landscape change.

8.1 Photomontages

A detailed model proof is undertaken for all photomontages and photographic depictions making use of ArcGIS Pro 3D Scene, as well as Affinity Designer / Photo to render accurate interpretations of landscape change.

It must be noted that the generated photomontages are not claiming to be 100% accurate, as there is some interpretation when matching the 3D model to the photograph. However, as a detailed model proof has been used that included 3D ArcGIS software, the validity of the generated photomontages can be defined as Near Accurate. As such, the photomontages/ photographic depictions are labelled as ***scientifically informed approximation and for visualisation purposes only***.

Figure 22: Photomontage generated of proposed PV Development as seen from Southwestern village settlement.

Figure 23: Photomontage generated of proposed PV Development footprint as seen from the western village settlement.

8.2 Contrast Rating

As indicated in the methodology, a contrast rating is undertaken to determine if the VRM Class Objectives are met. The suitability of a landscape modification is assessed by comparing and contrasting the existing receiving landscape to the expected contrast that the proposed landscape change will generate. This is done by evaluating the level of change to the existing landscape by assessing the line, colour, texture and form, in relation to the visual objectives defined for the area.

The following criteria are utilised in defining the degree of contrast (DoC):

- **None**: The element contrast is not visible or perceived.
- **Weak**: The element contrast can be seen but does not attract attention.
- **Moderate**: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong**: The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Table 15: Contrast Rating Key Observation Points Table

	Exposure			**Landscape Elements**					
Key Observation Point	**Distance**	**Exposure**	**Mitigation**	**Form**	**Line**	**Colour**	**Texture**	**Degree of Contrast**	**Visual Objectives Met?**
Southern grouping (Very High proximity)	50m – 100m	Very High	W/Out	S	S	S	S	S	N
			With	M	S	S	M	M	Y
Southwestern & Eastern Grouping (High proximity)	370m – 480m	Very High	W/Out	M	S	S	S	M	N
			With	W	S	M	M	M	Y

** S = Strong, M = Medium, W = Weak, N = None*

Southern grouping (Very High proximity)

The very close proximity of the PV panels will generate Strong levels of visual contrast as seen from the adjacent residential settlements, especially given the slightly elevated position of the dwellings that allow for an overlooking of the PV arrays, creating a large 3D space. With mitigation and allowing a 250m buffer from the residential settlements, the Line and Colour contrast would still be strong, but the landscape change would appear more two dimensional, with the continued growth of bushveld vegetation around the development site, allowing for some ground level (near ground level) screening. The setback also allows the proposed PV structures to be viewed as a component of the midground mining landscapes, where there is a higher Visual Absorption Capacity created by the structure forms, lines and textures. **Given the significance of the rural, tribal settlement pattern, mitigation is strongly recommended.**

Southwestern & Eastern Grouping (High proximity)

Although there is a 400m buffer between the receptors and the PV development site, the elevated perspective views overlooking the site, will still result in predominantly strong levels

of visual contrast. This will be more noticeable from the western, elevated settlements, where a wide area view creates very strong colour, texture and line contrast. With mitigation, the proposed PV development is located on closer visual proximity to the mine, where there is a higher Visual Absorption Capacity created by the structure forms, lines and textures. **Given the significance of the rural, tribal settlement pattern, mitigation is strongly recommended.**

8.3 Project Impact Ratings and Motivation

The following visual impacts could take place during the lifetime of the PV project:

Construction:

- Loss of site landscape character due to the removal of vegetation and the construction of the project infrastructure.
- Wind-blown dust due to the removal of large areas of vegetation.
- Possible soil erosion from temporary roads crossing drainage lines.
- Wind-blown litter from the laydown and construction sites.
- Movement of large earth moving equipment.

Operation:

- Massing effect in the landscape from a large-scale landscape modification.
- On-going soil erosion.
- On-going windblown dust.

Decommissioning:

- Movement of vehicles and associated dust.
- Wind-blown dust from the disturbance of cover vegetation / gravel.

Cumulative:

- A long-term change in land use setting a precedent for other similar types of renewable projects, resulting in a loss of scenic quality of the local cultural landscape.

By way of alternative assessment, the mitigated layout that includes the 250m setback from the rural settlements, was compared and contrasted against the full development layout (without the 250m setback).

Table 16: Construction Phase Impacts Table

Description of Impact		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Full Development Area**	**Mitigated Area**
Intensity	Severe change (Very high)	Moderate change (Medium)
Duration	Very Short-term (< 1 year)	Very Short-term (< 1 year)
Extent	Local area, far beyond site	Local area, far beyond site
Consequence	Medium	Low

Probability	Definite / Continuous (Very high)	Probable (High)
Significance	**Medium -**	**Low -**
Additional Assessment Criteria		
Degree to which impact can be reversed	*The PV landscape change is partially reversable as the panels can be removed, but the existing bushveld vegetation would be lost.*	
Degree to which impact may cause irreplaceable loss of resources	*High in that the existing rural, tribal settlement pattern that is a key component of the cultural landscape, would be degraded with loss of common land in close proximity to the southern located settlements.*	
Degree to which impact can be avoided	*Low: With the high levels of visual intrusion can reduced with the settlement setback, some degree of visual intrusion will remain.*	
Degree to which impact can be mitigated	*Medium to High: The high levels of visual intrusion can be reduced with the settlement setback. This will allow for the PV landscape change to be seen against the existing mining landscape and where there is a higher VAC level.*	
Cumulative Impact		
Extent to which a cumulative impact may arise	*Possible: It is possible that the development without mitigation could set a regional negative precedent for inappropriate development in tribal settlements. Retaining the setback buffer would allow existing communal lands around the settlements to be retained for subsistence farming/ communal grazing.*	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	High -	**Medium -**

Table 17: Operation Phase Impacts Table

Description of Impact		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operational	
Criteria	**Full Development Area**	**Mitigated Area**
Intensity	Severe change (Very high)	Moderate change (Medium)
Duration	Long-term (10 to 20 years)	Long-term (10 to 20 years)
Extent	Local area, far beyond site	Local area, far beyond site
Consequence	Very high	High
Probability	Definite / Continuous (Very high)	Possible / frequent (Medium)
Significance	**Very high -**	**Medium -**
Additional Assessment Criteria		
Degree to which impact can be reversed	*The PV landscape change is partially reversable as the panels can be removed, but the existing bushveld vegetation would be lost.*	

Degree to which impact may cause irreplaceable loss of resources	*High in that the existing rural, tribal settlement pattern that is a key component of the cultural landscape, would be degraded with loss of common land in close proximity to the southern located settlements. Without mitigation, Glint and Glare impacts could create visual discomfort to western village settlements.*	
Degree to which impact can be avoided	*Low: With the high levels of visual intrusion can reduced with the settlement setback, some degree of visual intrusion will remain.*	
Degree to which impact can be mitigated	*Medium to High: The high levels of visual intrusion can be reduced with the settlement setback. This will allow for the PV landscape change to be seen against the existing mining landscape and where there is a higher VAC level.*	
Cumulative Impact		
Extent to which a cumulative impact may arise	*Possible: It is possible that the development without mitigation could set a regional negative precedent for inappropriate development in tribal settlements. Retaining the setback buffer would allow existing communal lands around the settlements to be retained for subsistence farming/ communal grazing.*	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	High -	**Medium -**

Table 18: Decommissioning Phase Impacts Table

Description of Impact		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Decommissioning	
Criteria	**Full Development Area**	**Mitigated Area**
Intensity	Moderate change (Medium)	Moderate change (Medium)
Duration	Very Short-term (< 1 year)	Very Short-term (< 1 year)
Extent	Local area, far beyond site	Local area, far beyond site
Consequence	Low	Low
Probability	Probable (High)	Possible / frequent (Medium)
Significance	**Low -**	**Very Low -**
Additional Assessment Criteria		
Degree to which impact can be reversed	*The PV landscape change is partially reversable as the panels can be removed, but the existing bushveld vegetation would be lost.*	
Degree to which impact may cause irreplaceable loss of resources	*High in that the existing rural, tribal settlement pattern that is a key component of the cultural landscape, would be degraded with loss of common land in close proximity to the southern located settlements.*	
Degree to which impact can be avoided	*Low: The high levels of visual intrusion can be reduced with the settlement setback, some degree of visual intrusion will remain.*	

Degree to which impact can be mitigated	*Medium to High: The high levels of visual intrusion can be reduced with the settlement setback. This will allow for the PV landscape change to be seen against the existing mining landscape and where there is a higher VAC level.*	
Cumulative Impact		
Extent to which a cumulative impact may arise	*Possible: No effective rehabilitation and restoration of the site is likely to result in long term landscape degradation. With mitigation and rehabilitation and restoration, cumulative effects would be limited.*	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	**Low -**

9 ENVIRONMENTAL MANAGEMENT PLANNING

Table 19. Pre-Construction Phase EMP Table

Impact/ Aspect	**Mitigation/Management Actions**	***Responsibility***	***Methodology***	**Mitigation/Management Objectives and Outcomes**	***Frequency***
Large signage has the potential to create a visual nuisance.	• Signage on the road should be moderated in size and use natural colours, while still providing effective directions.	Project management and EPC	NA	Signage is efficient but not dominating for the casual observers.	NA
Un-necessary roads have the potential to create a visual disturbance long after the usage as past.	• Limit road access to an efficient minimum by coordinated planning between the project management and the environmental control officer.	Project management and EPC	Clear pre-planning is carried out with clear routing identification, and consequences for off-road driving.	The surrounding landscape remains rural and agricultural in landscape and land use.	As required.
Rural landscape change	• Restrict height of PV panels to 5m (recommendation). • Incorporate a 250m setback from the adjacent rural/ tribal settlements.	Project management and EPC	NA	Local landscape is modified but the Zone of Visual Influence is contained by local topography.	NA
Glint and Glare	• As G&G impacts could take place due to close proximity to rural settlements located west of the development on elevated ground, single-	Project management	NA	Glint and glare is reduced and such that only low intensity impacts occur.	NA

	axis trackers should be used.				

Table 20. Construction Phase EMP Table

Impact/ Aspect	**Mitigation/Management Actions**	***Responsibility***	***Methodology***	**Mitigation/Management Objectives and Outcomes**	***Frequency***
Topsoil loss can reduce the viability of rehabilitation measures and needs to be carefully managed if available.	• Topsoil excavated from the site should be stockpiled and utilised for rehabilitation of the site after construction.	Project management and EPC	As defined by the rehabilitation specialist.	Topsoil is utilised and no sterilization of topsoil takes place.	As required.
Un-necessary roads have the potential to create a visual disturbance long after the usage as past.	• Limit road access to an efficient minimum by coordinated planning between the project management and the environmental control officer.	Project management and EPC	Temporary roads should be well marked and should only cross drainage lines on areas identified as permanent road features where erosion and soil loss management can be contained. Noncompliance with road signage and utilisation of no authorised roads should become a finable offence.	The surrounding landscape remains rural and agricultural in landscape and land use.	As required.
Windblown dust and dust from moving vehicles have the potential to become a significant	• Set up a clear management plan with clear accountability structures with set	Project management and EPC (as the issue arises).	Should excessive dust be generated from the movement of vehicles on the roads such that the	Dust generated on site as well as on the access road to the site, is well managed and does not	On-going

nuisance factor to local residents around the site.	thresholds for triggering of mitigations. • Set up a liaison committee to engage with local settlements, with monthly communication with the local residents on the effectiveness of the dust management procedures.		dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorisation of the EPC.	become a nuisance factor for the workers or the surrounding settlements.	
Buildings painted bright colours can increase the visual presence of the structures in a rural landscape, creating higher levels of visual contrast and attracting the attention of the causal observer.	• The buildings should be painted a grey-brown colour (or other colour in keeping with the surrounding landscape) to assist in reducing colour contrast. • Sheet metal structures should make use of mid-grey colour, and preferable have a rough texture material. • To reduce colour contrast, if permitted by the Original Equipment Manufacturer, the BESS structure should preferably be painted a light brown colour so as to blend with the surrounding arid region landscapes.	Project management and EPC	At the commencement of construction, purchase order criteria for ordering paints and sheet metals need to be clearly defined.	Colour contrast generated from the buildings as seen from the roads is low and does not attract the attention of the casual observer.	Commencement of construction.
Light spillage from security lighting of structures can significantly	• Light spillage mitigation from security lighting	Project management and EPC	At the commencement of construction, purchase order criteria	Lights contrast generated from the buildings as seen from	Commencement of construction.

increase the visual impact of a project in a rural landscape.	should be implemented and monitored by the ECO during construction to ensure that light spillage does not create a glowing effect. • No overhead/ flood lighting of structures or areas. • No up lighting to be used.		for ordering of security lighting need to be clearly defined.	the roads is low and does not attract the attention of the casual observer.	
Long fencing lines has the potential to be visually dominating.	• Fencing should be simple and appear transparent from a distance and located around the immediate development footprint of the PV security area.	Project management and EPC	Clear planning of the laydown and construction areas are carried out with security fencing demarcated for construction areas.	Security fencing is kept to an effective minimum without jeopardizing security of the project.	At onset of project planning.
Litter has the potential to degrade landscape character and can be contained by fencing around the construction camp/ laydown.	• Littering should be a finable offence. • Fencing around the laydown should be diamond shaped to catch wind blown litter. The fences should be routinely checked for the collection of litter caught on the fence.	Project management and EPC	Littering rules need to be clearly defined and workers effectively informed of the consequences of littering.	Solid waste litter is effectively controlled and does not become a landscape degradation risk.	Checked bi-monthly
Cut and Fill areas can generate visual scarring in the landscape beyond the locality.	• Cut & Fill areas should be limited as much as possible, with specific detail placed on prevention of soil erosion.	Project management and EPC with inputs from rehabilitation specialist.	Clear methodology for rehabilitation and restoration is provided by the rehabilitation specialist. As soon as construction has	Cut/ fill scaring is limited and effectively managed and does not dominate the attention of the casual observer.	Commencement of construction. On-going

	• Slopes should not exceed 1 in 6m gradients and need to be rehabilitated to natural vegetation directly post construction.		concluded on the area at hand, rehabilitation processes need to commence.		

Table 21. Operational Phase EMP Table

Impact/ Aspect	**Mitigation/Management Actions**	***Responsibility***	***Methodology***	**Mitigation/Management Objectives and Outcomes**	***Frequency***
Compaction of larger areas can result in soil sterilisation and landscape degradation.	• Post construction, the laydown areas and other construction areas no longer needed for operational management, should be ripped (0.5m depth) to restore compacted topsoil, and then rehabilitated to natural vegetation under the supervision of the rehabilitation specialist.	Project management and EPC with inputs from rehabilitation specialist.	As defined by the rehabilitation specialist.	Soil sterilization does not take place and large degraded areas do not occur, with overall landscape integrity maintained.	On completion of construction phase. On-going
Light spillage from security lighting of structures can significantly increase the visual impact of a project in a rural landscape.	• Light spillage measures designed during pre-construction phase should be implemented and monitored by the ECO during construction to ensure that light spillage does not create a glowing effect.	Project management and EPC.	A review of the security lights at night is undertaken by the EPC to check that undue light spillage is not taking place without loss of security.	Lights contrast generated from the buildings as seen from the roads is low and does not attract the attention of the casual observer.	At commencement of Operation Phase.

Windblown dust and dust from moving vehicles have the potential to become a significant nuisance factor to local settlements around the site.	• Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorization of the ECO.	Project management and EPC (as the need arises).	Set up a clear management plan with clear accountability structures with set thresholds for triggering of mitigations.	Dust generated on site as well as on the access road to the site, is well managed and does not become a nuisance factor for the workers or the surrounding settlements.	On-going.

Table 22. Decommissioning Phase EMP Table

Impact/ Aspect	**Mitigation/Management Actions**	***Responsibility***	***Methodology***	**Mitigation/Management Objectives and Outcomes**	***Frequency***
Compaction of larger areas can result in soil sterilisation and landscape degradation.	• Post construction, the laydown areas and other construction areas no longer needed for operational management, should be ripped (0.5m depth) to restore compacted topsoil, and then rehabilitated to natural vegetation under the supervision of the rehabilitation specialist.	Project management and EPC with inputs from rehabilitation specialist.	As defined by the rehabilitation specialist.	Soil sterilisation does not take place and large degraded areas do not occur, with overall landscape integrity maintained.	Within 1 year of closure.
Old, unused structures have the potential to significantly degrade the landscape character.	• All structures not required for agricultural purposes post-closure should be removed and where	Project management and EPC	As defined by the rehabilitation specialist.	The post operation landscape reverts to rural agricultural without landscape degradation created by un-used/ old structures.	Within 1 year of closure.

	possible, recycled or reused. • Building structures should be broken down (including building foundations) • The rubble should be managed according to the National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA) and deposited at a registered landfill if it cannot be recycled or reused.				
Windblown dust and dust from moving vehicles have the potential to become a significant nuisance factor to local residents around the site and along the access road.	• Set up a clear management plan with clear accountability structures with set thresholds for triggering of mitigations.	Project management and EPC (as the issue arises).	Should excessive dust be generated from the movement of vehicles on the roads such that the dust becomes visible to the immediate surrounds, dust-retardant measures should be implemented under authorization of the EPC.	Dust generated on site as well as on the access road to the site, is well managed and does not become a nuisance factor for the workers or the surrounding settlements.	On-going

10 PRELIMINARY OPPORTUNITIES AND CONSTRAINTS

10.1 PV Site & Associated Infrastructure

10.1.1 Opportunities

- Close proximity to existing degraded landscapes associated with the Marula Platinum Mine.
- No significant landscape features on site.
- No eco-tourism related activities making use of the landscape resources associated with the site.

10.1.2 Constraints

- Without mitigation, High proximity to the PV development that will result on the loss of close proximity communal lands that add to the cultural landscape.
- The current bushveld areas add to the local sense of place.
- Some agricultural productivity from grazing of community livestock.

10.2 No-Go Option

10.2.1 Opportunities

- The current bushveld areas add to the local sense of place.
- Some agricultural productivity from grazing of community livestock.

10.2.2 Constraints

- Scenic quality degraded by the close proximity to the mining infrastructure.
- Vegetation is degraded.
- No significant landscape resources that could be used for eco-tourism in the future.

11 CONCLUSION

The recommendation of the Landscape and Visual Impact Assessment is that development should be authorised with mitigation. The scoping phase findings made recommendation for a setback of 250m from the western and southern village settlements to buffer the visual intrusion to some degree, allow for the existing bushveld vegetation around the site to provide some visual screening, as well as allow for the continued communal land uses in areas of close proximity to the tribal settlements. This recommendation was included in the design phase, and the 250m buffer excluded from the development. As the surrounding landscape is strongly defined by existing mining features, the proposed PV project would be viewed against this backdrop, and the remaining landscape resources would not be significantly degraded.

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13 ANNEXURE A: SITE VISIT PHOTOGRAPHS AND COMMENTS

The following photographs were taken during the field survey as mapped below. The text below the photograph describes the landscape and visual issues of the locality, if applicable.

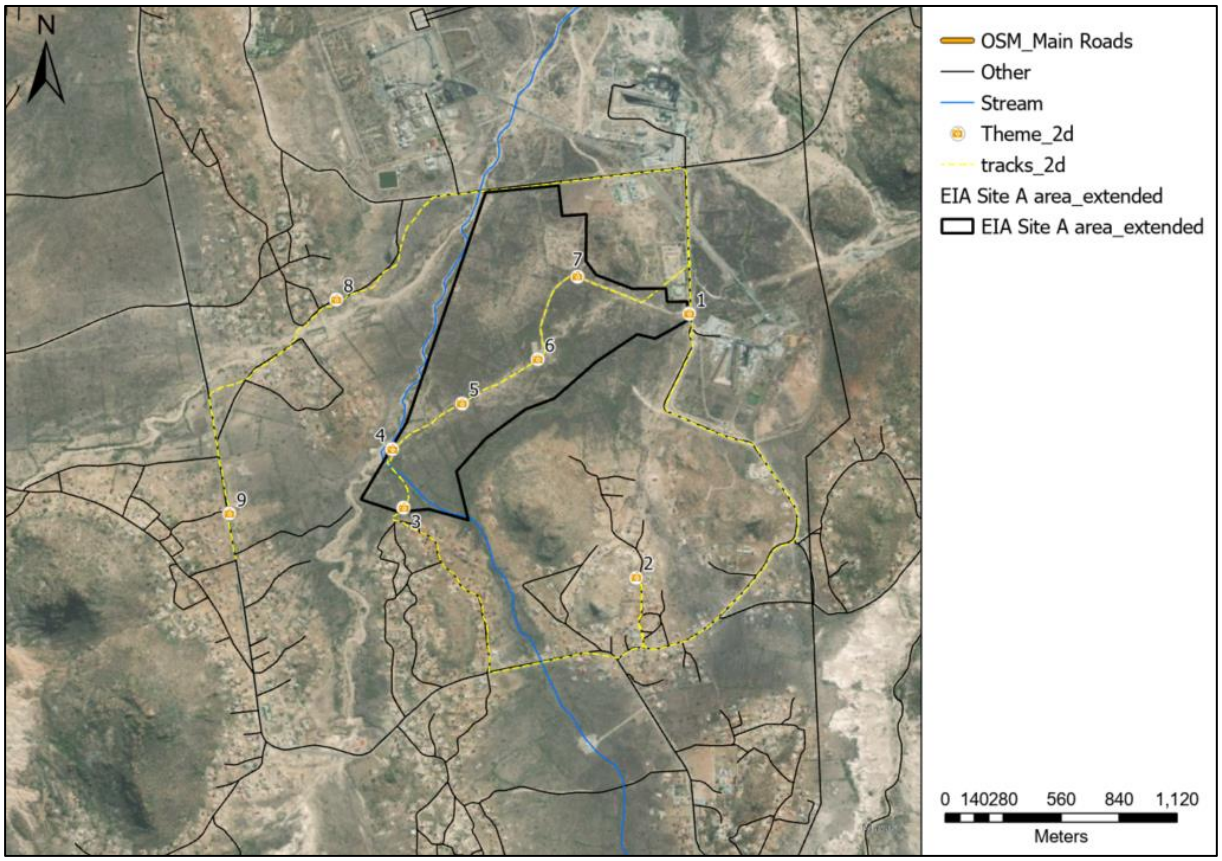


Figure 24: Site Survey Point Map

ID	1
PHOTO	Site
DIRECTION	S
COMMENT	Powerline and mining with low bush. Suitable

ID	2
PHOTO	Village view south
DIRECTION	NW
COMMENT	Set back buffer suitable

ID	3
PHOTO	Site
DIRECTION	E
COMMENT	Very high Visual Absorption Capacity due to proximity to settlement. Buffer 250m

ID	4
PHOTO	Site
DIRECTION	E
COMMENT	Close visual proximity to settlement. Buffer proposed

ID	5
PHOTO	Proposed set back point
DIRECTION	
COMMENT	

ID	6
PHOTO	Site modifications
DIRECTION	NW
COMMENT	Mining small impact

ID	7
PHOTO	Site modifications
DIRECTION	E
COMMENT	88kv powerlines x 2

ID	8
PHOTO	Villages
DIRECTION	NE
COMMENT	Buffer but suitable

ID	9
PHOTO	Main settlement access road
DIRECTION	N
COMMENT	Suitable as location as it is not overlooking due to its similar height

14 ANNEXURE B: SPECIALIST INFORMATION

14.1 Professional Registration Certificate

APHP

Association of Professional Heritage Practitioners

MEMBERSHIP CERTIFICATE

THIS CERTIFIES THAT

Stephen Stead

MEMBERSHIP NUMBER: 0063

has been awarded membership as a

PROFESSIONAL HERITAGE PRACTITIONER (PHP)

This membership is subject to the *Standards for Membership* and *Code of Conduct*, referred to in Sections 2 and 3 of the APHP Constitution respectively. The definition of a PHP may be found at: www.aphp.org.za/membership

Please contact us via info@aphp.org.za should further information be required.

THIS CERTIFICATE IS VALID FROM 1 JUNE 2022 – 1 JULY 2023

CHAIRPERSON

[Issued by the Association of Professional Heritage Practitioners Executive Committee]
Image Source: Photographer G McLachlan at central Kouga Mountains

Association of Professional Heritage Practitioners
info@aphp.org.za
www.aphp.org.za

14.2 Curriculum Vitae (CV)

1. **Position**: Owner / Director

2. **Name of Firm**: Visual Resource Management Africa cc *(www.vrma.co.za)*

3. **Name of Staff**: Stephen Stead

4. **Date of Birth**: 9 June 1967

5. **Nationality:** South African

6. **Contact Details:** **Tel: +27 (0) 44 876 0020**
   Cell: +27 (0) 83 560 9911
   Email: steve@vrma.co.za

7. **Educational qualifications**:
   - University of Natal (Pietermaritzburg):
   - Bachelor of Arts: Psychology and Geography
   - Bachelor of Arts (Hons): Human Geography and Geographic Information Management Systems

8. **Professional Accreditation**
   - Association of Professional Heritage Practitioners (APHP) Western Cape
     - Accredited VIA practitioner member of the Association (2011)

9. **Association involvement:**
   - International Association of Impact Assessment (IAIA) South African Affiliate
     - Past President (2012 - 2013)
     - President (2012)
     - President-Elect (2011)
     - Conference Co-ordinator (2010)
     - National Executive Committee member (2009)
     - Southern Cape Chairperson (2008)

10. **Conferences Attended:**
    - IAIAsa 2012
    - IAIAsa 2011
    - IAIA International 2011 (Mexico)
    - IAIAsa 2010
    - IAIAsa 2009
    - IAIAsa 2007

11. **Continued Professional Development:**
    - Integrating Sustainability with Environment Assessment in South Africa (IAIAsa Conference, 1 day)
    - Achieving the full potential of SIA (Mexico, IAIA Conference, 2 days 2011)
    - Researching and Assessing Heritage Resources Course (University of Cape Town, 5 days, 2009)

12. Countries of Work Experience:

- South Africa, Mozambique, Malawi, Lesotho, Kenya and Namibia

13. Relevant Experience:

Stephen gained six years of experience in the field of Geographic Information Systems mapping and spatial analysis working as a consultant for the KwaZulu-Natal Department of Health and then with an Environmental Impact Assessment company based in the Western Cape. In 2004 he set up the company Visual Resource Management Africa that specializes in visual resource management and visual impact assessments in Africa. The company makes use of the well-documented Visual Resource Management methodology developed by the Bureau of Land Management (USA) for assessing the suitability of landscape modifications. Stephen has assessed of over 150 major landscape modifications throughout southern and eastern Africa. The business has been operating for eighteen years and has successfully established and retained a large client base throughout Southern Africa which include amongst other, Rio Tinto (Pty) Ltd, Bannerman (Pty) Ltd, Anglo Coal (Pty) Ltd, Eskom (Pty) Ltd, NamSolar and Vale (Pty) Ltd, Ariva (Pty) Ltd, Harmony Gold (Pty) Ltd, Millennium Challenge Account (USA), Pretoria Portland Cement (Pty) Ltd

14. Languages:

- English – First Language
- Afrikaans – fair in speaking, reading and writing

15. Projects:

A list of ***some*** of the large-scale projects that VRMA has assessed has been attached below with the client list indicated per project (Refer to www.vrma.co.za for a full list of projects undertaken).

Table 23: VRM Africa Projects Assessments Table

YEAR	NAME	DESCRIPTION	LOCATION
2022	Sea Vista St Francis Bay	Resort	Eastern Cape (SA)
2022	Houthaalboomen PV	Solar Energy	North West (SA)
2022	Pofadder Wind x 3	Wind Energy	Northern Cape (SA)
2022	Lunsklip Wind Amend	Wind Energy	Western Cape (SA)
2022	Lunsklip Wind Grid Connect	Power line	Western Cape (SA)
2022	Elandsfontein PV	Solar Energy	North West (SA)
2022	Erf 1713 1717 UISP	Settlement	Western Cape (SA)
2022	Roan PV x 2	Solar Energy	North West (SA)
2021	Avondale Gordonia 132kV Power Line	Infrastructure	Northern Cape (SA)
2021	Maitland Mines Wedding Venue	Resort	Eastern Cape (SA)
2020	Humansdorp BESS	Battery Storage	Northern Cape (SA)
2020	Bloemsmond PV BESS x 5	Battery Storage	Northern Cape (SA)
2020	Mulilo Prieska BESS x 5	Battery Storage	Northern Cape (SA)
2020	Mulilo De Arr BESS x 3	Battery Storage	Northern Cape (SA)

2020	Sandpiper Estate	Residential	Western Cape (SA)
2020	Obetsebi Lampley Interchange	Infrastructure	Ghana
2019	Wolvedans Megadump Facility	Mining	Mpumalanga (SA)
2019	Port Barry Residential	Settlement	Western Cape (SA)
2019	Gamsberg Smelter	Plant	Northern Cape (SA)
2019	Sandpiper Nature Reserve Lodge	Residential	Western Cape (SA)
2019	Bloemsmond PV 4 - 5	Solar Energy	Northern Cape (SA)
2019	Mphepo Wind (Scoping Phase)	Wind Energy	Zambia
2018	Mogara PV	Solar Energy	Northern Cape (SA)
2018	Gaetsewe PV	Solar Energy	Northern Cape (SA)
2017	Kalungwishi Hydroelectric (2) and power line	Hydroelectric	Zambia
2017	Mossel Bay UISP (Kwanoqaba)	Settlement	Western Cape (SA)
2017	Pavua Dam and HEP	Hydroelectric	Mozambique (SA)
2017	Penhill UISP Settlement (Cape Town)	Settlement	Western Cape (SA)
2016	Kokerboom WEF * 3	Wind Energy	Northern Cape (SA)
2016	Hotazel PV	Solar Energy	Northern Cape (SA)
2016	Eskom Sekgame Bulkop Power Line	Infrastructure	Northern Cape (SA)
2016	Ngonye Hydroelectric	Hydroelectric	Zambia
2016	Levensdal Infill	Settlement	Western Cape (SA)
2016	Arandis CSP	Solar Energy	Namibia
2016	Bonnievale PV	Solar Energy	Western Cape (SA)
2015	Noblesfontein 2 & 3 WEF (Scoping)	Wind Energy	Eastern Cape (SA)
2015	Ephraim Sun SEF	Solar Energy	Northern Cape (SA)
2015	Dyasonsklip and Sirius Grid TX	Solar Energy	Northern Cape (SA)
2015	Dyasonsklip PV	Solar Energy	Northern Cape (SA)
2015	Zeerust PV and transmission line	Solar Energy	North West (SA)
2015	Bloemsmond SEF	Solar Energy	Northern Cape (SA)
2015	Juwi Copperton PV	Solar Energy	Northern Cape (SA)
2015	Humansrus Capital 14 PV	Solar Energy	Northern Cape (SA)
2015	Humansrus Capital 13 PV	Solar Energy	Northern Cape (SA)
2015	Spitzkop East WEF (Scoping)	Solar Energy	Western Cape (SA)
2015	Lofdal Rare Earth Mine and Infrastructure	Mining	Namibia
2015	AEP Kathu PV	Solar Energy	Northern Cape (SA)
2014	AEP Mogobe SEF	Solar Energy	Northern Cape (SA)
2014	Bonnievale SEF	Solar Energy	Western Cape (SA)
2014	AEP Legoko SEF	Solar Energy	Northern Cape (SA)
2014	Postmasburg PV	Solar Energy	Northern Cape (SA)
2014	Joram Solar	Solar Energy	Northern Cape (SA)
2014	RERE PV Postmasberg	Solar Energy	Northern Cape (SA)
2014	RERE CPV Upington	Solar Energy	Northern Cape (SA)
2014	Rio Tinto RUL Desalinisation Plant	Industrial	Namibia

2014	NamPower PV * 3	Solar Energy	Namibia
2014	Pemba Oil and Gas Port Expansion	Industrial	Mozambique
2014	Brightsource CSP Upington	Solar Energy	Northern Cape (SA)
2014	Witsand WEF (Scoping)	Wind Energy	Western Cape (SA)
2014	Kangnas WEF	Wind Energy	Western Cape (SA)
2013	Cape Winelands DM Regional Landfill	Industrial	Western Cape (SA)
2013	Drennan PV Solar Park	Solar Energy	Eastern Cape (SA)
2013	Eastern Cape Mari-culture	Mari-culture	Eastern Cape (SA)
2013	Eskom Pantom Pass Substation	Substation /Tx lines	Western Cape (SA)
2013	Frankfort Paper Mill	Plant	Free State (SA)
2013	Gibson Bay Wind Farm Transmission lines	Transmission lines	Eastern Cape (SA)
2013	Houhoek Eskom Substation	Substation /Tx lines	Western Cape (SA)
2013	Mulilo PV Solar Energy Sites (x4)	Solar Energy	Northern Cape (SA)
2013	Namies Wind Farm	Wind Energy	Northern Cape (SA)
2013	Rossing Z20 Pit and WRD	Mining	Namibia
2013	SAPPI Boiler Upgrade	Plant	Mpumalanga (SA)
2013	Tumela WRD	Mine	North West (SA)
2013	Weskusfleur Substation (Koeburg)	Substation /Tx lines	Western Cape (SA)
2013	Yzermyn coal mine	Mining	Mpumalanga (SA)
2012	Afrisam	Mining	Western Cape (SA)
2012	Bitterfontein	Solar Energy	Northern Cape (SA)
2012	Kangnas PV	Solar Energy	Northern Cape (SA)
2012	Kangnas Wind	Solar Energy	Northern Cape (SA)
2012	Kathu CSP Tower	Solar Energy	Northern Cape (SA)
2012	Kobong Hydro	Hydro & Powerline	Lesotho
2012	Letseng Diamond Mine Upgrade	Mining	Lesotho
2012	Lunsklip Windfarm	Wind Energy	Western Cape (SA)
2012	Mozambique Gas Engine Power Plant	Plant	Mozambique
2012	Ncondezi Thermal Power Station	Substation /Tx lines	Mozambique
2012	Sasol CSP Tower	Solar Power	Free State (SA)
2012	Sasol Upington CSP Tower	Solar Power	Northern Cape (SA)
2011	Beaufort West PV Solar Power Station	Solar Energy	Western Cape (SA)
2011	Beaufort West Wind Farm	Wind Energy	Western Cape (SA)
2011	De Bakke Cell Phone Mast	Structure	Western Cape (SA)
2011	ERF 7288 PV	Solar Energy	Western Cape (SA)
2011	Gecko Industrial park	Industrial	Namibia
2011	Green View Estates	Residential	Western Cape (SA)
2011	Hoodia Solar	Solar Energy	Western Cape (SA)
2011	Kalahari Solar Power Project	Solar Energy	Northern Cape (SA)
2011	Khanyisa Power Station	Power Station	Western Cape (SA)
2011	Olvyn Kolk PV	Solar Energy	Northern Cape (SA)

2011	Otjikoto Gold Mine	Mining	Namibia
2011	PPC Rheebieck West Upgrade	Industrial	Western Cape (SA)
2011	George Southern Arterial	Road	Western Cape (SA)
2010	Bannerman Etango Uranium Mine	Mining	Namibia
2010	Bantamsklip Transmission	Transmission	Eastern Cape (SA)
2010	Beaufort West Urban Edge	Mapping	Western Cape (SA)
2010	Bon Accord Nickel Mine	Mining	Mpumalanga (SA)
2010	Etosha National Park Infrastructure	Housing	Namibia
2010	Herolds Bay N2 Development Baseline	Residential	Western Cape (SA)
2010	MET Housing Etosha	Residential	Namibia
2010	MET Housing Etosha Amended MCDM	Residential	Namibia
2010	MTN Lattice Hub Tower	Structure	Western Cape (SA)
2010	N2 Herolds Bay Residental	Residential	Western Cape (SA)
2010	Onifin(Pty) Ltd Hartenbos Quarry Extension	Mining	Western Cape (SA)
2010	Still Bay East	GIS Mapping	Western Cape (SA)
2010	Vale Moatize Coal Mine and Railway	Mining / Rail	Mozambique
2010	Vodacom Mast	Structure	Western Cape (SA)
2010	Wadrif Dam	Dam	Western Cape (SA)
2009	Asazani Zinyoka UISP Housing	Residential Infill	Western Cape (SA)
2009	Eden Telecommunication Tower	Structure	Western Cape (SA)
2009	George SDF Landscape Characterisation	GIS Mapping	Western Cape (SA)
2009	George SDF Visual Resource Management	GIS Mapping	Western Cape (SA)
2009	George Western Bypass	Road	Western Cape (SA)
2009	Knysna Affordable Housing Heidevallei	Residential Infill	Western Cape (SA)
2009	Knysna Affordable Housing Hornlee Project	Residential Infill	Western Cape (SA)
2009	Rossing Uranium Mine Phase 2	Mining	Namibia
2009	Sun Ray Wind Farm	Wind Energy	Western Cape (SA)
2008	Bantamsklip Transmission Lines Scoping	Transmission	Western Cape (SA)
2008	Erf 251 Damage Assessment	Residential	Western Cape (SA)
2008	Erongo Uranium Rush SEA	GIS Mapping	Namibia
2008	Evander South Gold Mine Preliminary VIA	Mining	Mpumalanga (SA)
2008	George SDF Open Spaces System	GIS Mapping	Western Cape (SA)
2008	Hartenbos River Park	Residential	Western Cape (SA)
2008	Kaaimans Project	Residential	Western Cape (SA)
2008	Lagoon Garden Estate	Residential	Western Cape (SA)
2008	Moquini Beach Hotel	Resort	Western Cape (SA)
2008	NamPower Coal fired Power Station	Power Station	Namibia
2008	Oasis Development	Residential	Western Cape (SA)
2008	RUL Sulpher Handling Facility Walvis Bay	Mining	Namibia
2008	Stonehouse Development	Residential	Western Cape (SA)
2008	Walvis Bay Power Station	Structure	Namibia

2007	Calitzdorp Retirement Village	Residential	Western Cape (SA)
2007	Calitzdorp Visualisation	Visualisation	Western Cape (SA)
2007	Camdeboo Estate	Residential	Western Cape (SA)
2007	Destiny Africa	Residential	Western Cape (SA)
2007	Droogfontein Farm 245	Residential	Western Cape (SA)
2007	Floating Liquified Natural Gas Facility	Structure tanker	Western Cape (SA)
2007	George SDF Municipality Densification	GIS Mapping	Western Cape (SA)
2007	Kloofsig Development	Residential	Western Cape (SA)
2007	OCGT Power Plant Extension	Structure Power Plant	Western Cape (SA)
2007	Oudtshoorn Municipality SDF	GIS Mapping	Western Cape (SA)
2007	Oudtshoorn Shopping Complex	Structure	Western Cape (SA)
2007	Pezula Infill (Noetzie)	Residential	Western Cape (SA)
2007	Pierpoint Nature Reserve	Residential	Western Cape (SA)
2007	Pinnacle Point Golf Estate	Golf/Residential	Western Cape (SA)
2007	Rheebok Development Erf 252 Appeal	Residential	Western Cape (SA)
2007	Rossing Uranium Mine Phase 1	Mining	Namibia
2007	Ryst Kuil/Riet Kuil Uranium Mine	Mining	Western Cape (SA)
2007	Sedgefield Water Works	Structure	Western Cape (SA)
2007	Sulpher Handling Station Walvis Bay Port	Industrial	Namibia
2007	Trekkopje Uranium Mine	Mining	Namibia
2007	Weldon Kaya	Residential	Western Cape (SA)
2006	Farm Dwarsweg 260	Residential	Western Cape (SA)
2006	Fynboskruin Extension	Residential	Western Cape (SA)
2006	Hanglip Golf and Residential Estate	Residential	Western Cape (SA)
2006	Hansmoeskraal	Slopes Analysis	Western Cape (SA)
2006	Hartenbos Landgoed Phase 2	Residential	Western Cape (SA)
2006	Hersham Security Village	Residential	Western Cape (SA)
2006	Ladywood Farm 437	Residential	Western Cape (SA)
2006	Le Grand Golf and Residential Estate	Residential	Western Cape (SA)
2006	Paradise Coast	Residential	Western Cape (SA)
2006	Paradyskloof Residential Estate	Residential	Western Cape (SA)
2006	Riverhill Residential Estate	Residential	Western Cape (SA)
2006	Wolwe Eiland Access Route	Road	Western Cape (SA)
2005	Harmony Gold Mine	Mining	Mpumalanga (SA)
2005	Knysna River Reserve	Residential	Western Cape (SA)
2005	Lagoon Bay Lifestyle Estate	Residential	Western Cape (SA)
2005	Outeniquabosch Safari Park	Residential	Western Cape (SA)
2005	Proposed Hotel Farm Gansevallei	Resort	Western Cape (SA)
2005	Uitzicht Development	Residential	Western Cape (SA)
2005	West Dunes	Residential	Western Cape (SA)
2005	Wilderness Erf 2278	Residential	Western Cape (SA)

2005	Wolwe Eiland Eco & Nature Estate	Residential	Western Cape (SA)
2005	Zebra Clay Mine	Mining	Western Cape (SA)
2004	Gansevallei Hotel	Residential	Western Cape (SA)
2004	Lakes Eco and Golf Estate	Residential	Western Cape (SA)
2004	Trekkopje Desalination Plant	Structure	Namibia (SA)
1995	Greater Durban Informal Housing Analysis	Photogrammetry	KwaZulu-Natal (SA)

15 ANNEXURE C: GENERAL LIGHTS AT NIGHT MITIGATIONS

Mitigation:

- Effective light management needs to be incorporated into the design of the lighting to ensure that the visual influence is limited to the mine, without jeopardising project operational safety and security (See lighting mitigations by The New England Light Pollution Advisory Group (NELPAG) and Sky Publishing Corp in 14.2).
- Utilisation of specific frequency LED lighting with a green hue on perimeter security fencing.
- Directional lighting on the more exposed areas of operation, where point light source is an issue.
- No use of overhead lighting and, if possible, locate the light source closer to the operation.
- If possible, the existing overhead lighting method utilised at the mine should be phased out and replaced with an alternative lighting using closer to source, directed LED technology.

Mesopic Lighting

Mesopic vision is a combination of photopic vision and scotopic vision in low, but not quite dark, lighting situations. The traditional method of measuring light assumes photopic vision and is often a poor predictor of how a person sees at night. The light spectrum optimized for mesopic vision contains a relatively high amount of bluish light and is therefore effective for peripheral visual tasks at mesopic light levels. *(CIE, 2012)*

The Mesopic Street Lighting Demonstration and Evaluation Report by the Lighting Research Centre (LRC) in New York found that the 'replacement of white light sources (induction and ceramic metal halide) were tuned to optimize human vision under low light levels while remaining in the white light spectrum. Therefore, outdoor electric light sources that are tuned to how humans see under mesopic lighting conditions can be used to reduce the luminance of the road surface while providing the same, or better, visibility. Light sources with shorter wavelengths, which produce a "cooler" (bluer and greener) light, are needed to produce better mesopic vision. Based on this understanding, the LRC developed a means of predicting visual performance under low light conditions. This system is called the unified photometry system. Responses to surveys conducted on new installations revealed that area residents perceived higher levels of visibility, safety, security, brightness, and colour rendering with the new lighting systems than with the standard *High-Purity Standards* (HPS) systems. The new lighting systems used 30% to 50% less energy than the HPS systems. These positive results were achieved through tuning the light source to optimize mesopic vision. Using less wattage and photopic luminance also reduces the reflectance of the light off the road surface. Light reflectance is a major contributor to light pollution (sky glow).' *(Lighting Research Centre. New York. 2008)*

'Good Neighbour – Outdoor Lighting'

Presented by the New England Light Pollution Advisory Group (NELPAG) *(http://cfa/ www.harvard .edu /cfa/ps/nelpag.html)* and Sky & Telescope *(http://SkyandTelescope.com/).* NELPAG and Sky & Telescope support the International Dark-Sky Association (IDA) *(http://www.darksky.org/).*
(NELPAG)

What is good lighting? Good outdoor lights improve visibility, safety, and a sense of security, while minimizing energy use, operating costs, and ugly, dazzling glare.

Why should we be concerned? Many outdoor lights are poorly designed or improperly aimed. Such lights are costly, wasteful, and distractingly glary. They harm the night-time environment and neighbours' property values. Light directed uselessly above the horizon creates murky skyglow — the "light pollution" that washes out our view of the stars.

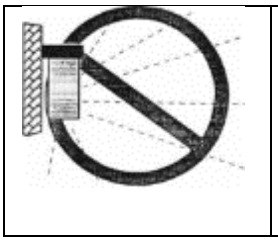
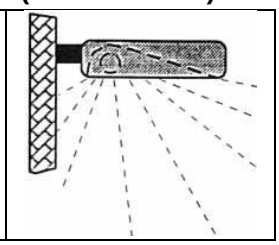
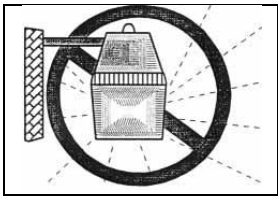
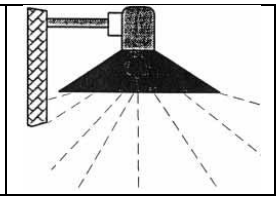
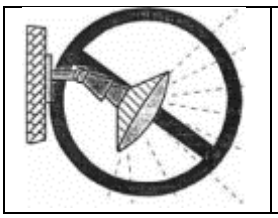
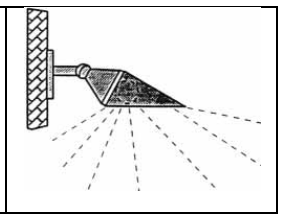
Glare Here's the basic rule of thumb: If you can see the bright bulb from a distance, it's a bad light. With a good light, you see lit ground instead of the dazzling bulb. "Glare" is light that beams directly from a bulb into your eye. It hampers the vision of pedestrians, cyclists, and drivers.

Light Trespass Poor outdoor lighting shines onto neighbours' properties and into bedroom windows, reducing privacy, hindering sleep, and giving the area an unattractive, trashy look.

Energy Waste Many outdoor lights waste energy by spilling much of their light where it is not needed, such as up into the sky. This waste results in high operating costs. Each year we waste more than a billion dollars in the United States needlessly lighting the night sky.

Excess Lighting Some homes and businesses are flooded with much stronger light than is necessary for safety or security.

Good and Bad Light Fixtures

Typical "Wall Pack"	**Typical "Shoe Box" (forward throw)**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down
Typical "Yard Light"	**Opaque Reflector (lamp inside)**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down
Area Flood Light	**Area Flood Light with Hood**
	
BAD Waste light goes up and sideways	**GOOD** Directs all light down

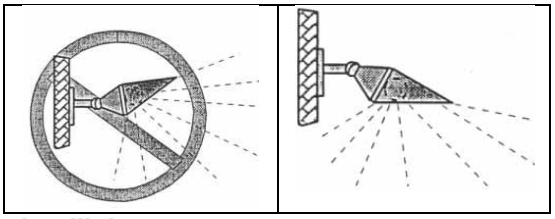
How do I switch to good lighting?

Provide only enough light for the task at hand; don't over-light, and don't spill light off your property. Specifying enough light for a job is sometimes hard to do on paper. Remember that a full Moon can make an area quite bright. Some lighting systems illuminate areas 100 times more brightly than the full Moon! More importantly, by choosing properly shielded lights, you can meet your needs without bothering neighbours or polluting the sky.

- Aim lights down. Choose “full-cut-off shielded” fixtures that keep light from going uselessly up or sideways. Full-cut-off fixtures produce minimum glare. They create a pleasant-looking environment. They increase safety because you see illuminated people, cars, and terrain, not dazzling bulbs.
- Install fixtures carefully to maximize their effectiveness on the targeted area and minimize their impact elsewhere. Proper aiming of fixtures is crucial. Most are aimed too high. Try to install them at night, when you can see where all the rays actually go. Properly aimed and shielded lights may cost more initially, but they save you far more in the long run. They can illuminate your target with a low-wattage bulb just as well as a wasteful light does with a high-wattage bulb.
- If colour discrimination is not important, choose energy- efficient fixtures utilising yellowish high-pressure sodium (HPS) bulbs. If “white” light is needed, fixtures using compact fluorescent or metal-halide (MH) bulbs are more energy-efficient than those using incandescent, halogen, or mercury-vapour bulbs.
- Where feasible, put lights on timers to turn them off each night after they are no longer needed. Put home security lights on a motion-detector switch, which turns them on only when someone enters the area; this provides a great deterrent effect!

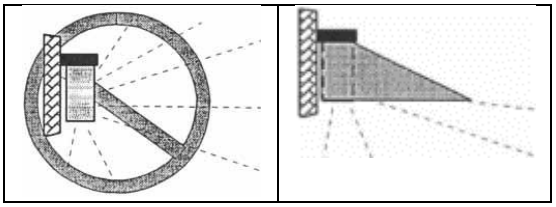
What You Can Do To Modify Existing Fixtures

Change this . . . to this (aim downward)



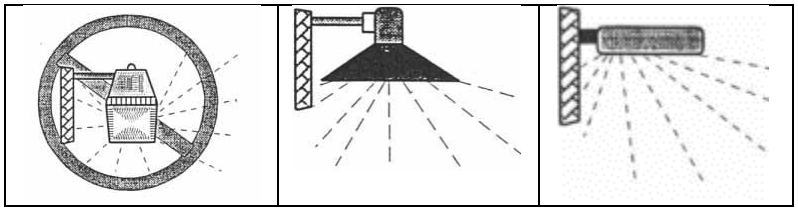
Floodlight:

Change this . . . to this (aim downward)



Wall Pack

Change this . . . to this or this



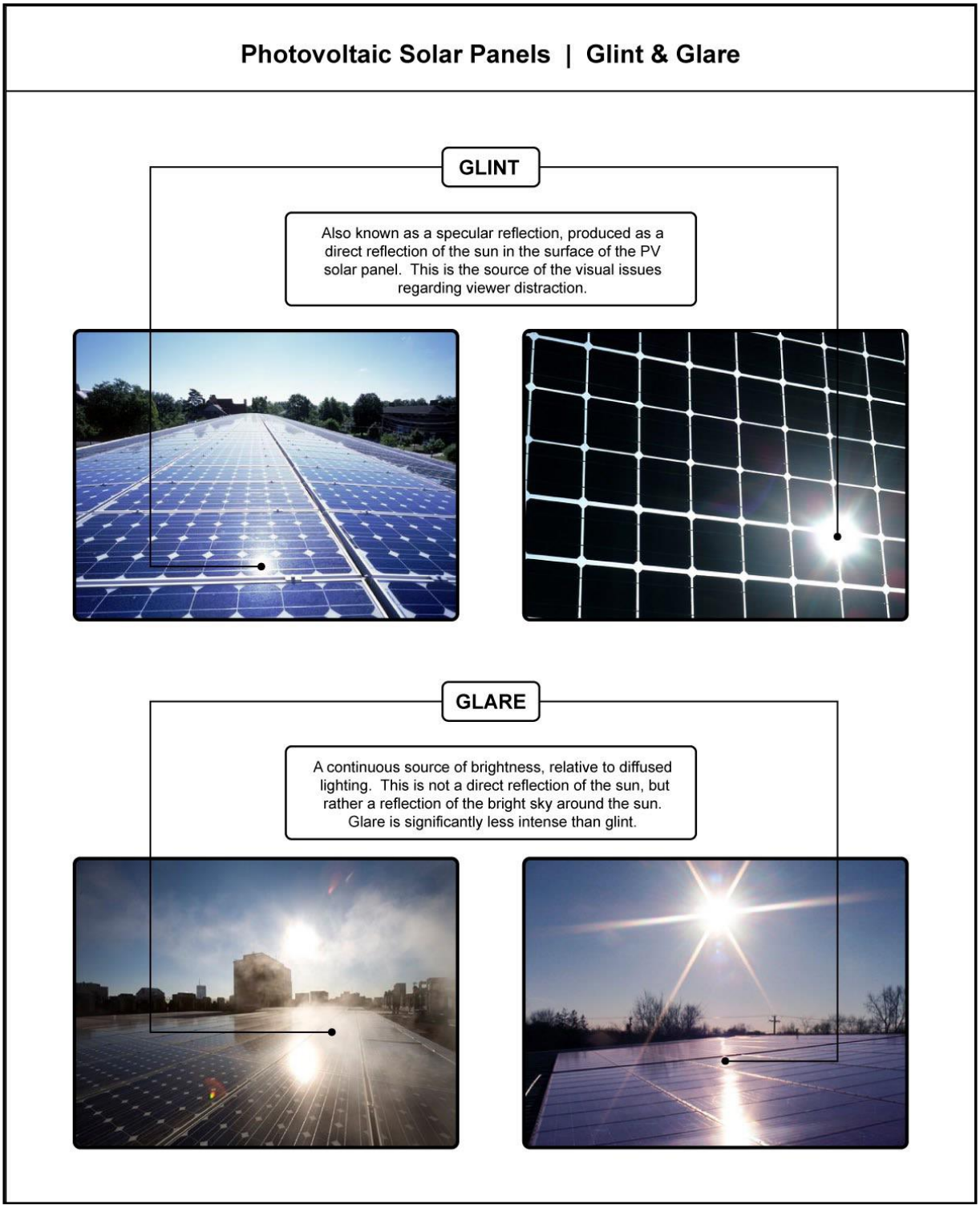
Yard Light | Opaque Reflector | Show Box

Replace bad lights with good lights.

You’ll save energy and money. You’ll be a good neighbour. And you’ll help preserve our view of the stars.

16 ANNEXURE D: GLINT AND GLARE

Diagram illustrating the potential effect of Glint and Glare from 'Sacramento Solar Highways Initial Study and Mitigated Negative Declaration.' (Sacramento Municipal Utility District)



17 ANNEXURE E: METHODOLOGY DETAIL

17.1 Baseline Analysis Stage

In terms of VRM methodology, landscape character is derived from a combination of ***scenic quality***, ***receptor sensitivity*** to landscape change and ***distance*** from the proposed landscape change. The objective of the analysis is to compile a mapped inventory of the visual resources found in the receiving landscape, and to derive a mapped Visual Resource sensitivity layer from which to evaluate the suitability of the landscape change.

17.1.1 Scenic Quality

The scenic quality is determined making use of the VRM Scenic Quality Checklist that identifies seven scenic quality criteria which are rated with 1 (low) to 5 (high) scale. The scores are totalled and assigned an A (High), B (Moderate) or C (low) based on the following split:
A= scenic quality rating of ≥19;
B = rating of 12 – 18,
C= rating of ≤11

The seven scenic quality criteria are defined below:

- **Land Form**: Topography becomes more of a factor as it becomes steeper, or more severely sculptured.
- **Vegetation**: Primary consideration given to the variety of patterns, forms, and textures created by plant life.
- **Water**: That ingredient which adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration.
- **Colour**: The overall colour(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.) are considered as they appear during seasons or periods of high use.
- **Scarcity**: This factor provides an opportunity to give added importance to one, or all, of the scenic features that appear to be relatively unique or rare within one physiographic region.
- **Adjacent Land Use**: Degree to which scenery and distance enhance, or start to influence, the overall impression of the scenery within the rating unit.
- **Cultural Modifications**: Cultural modifications should be considered and may detract from the scenery or complement or improve the scenic quality of an area.

17.1.2 Receptor Sensitivity

Receptor sensitivity to landscape change is determined by rating the following factors in terms of Low to High:

- **Type of Users**: Visual sensitivity will vary with the type of users, e.g. recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area on a regular basis may not be as sensitive to change.
- **Amount of Use**: Areas seen or used by large numbers of people are potentially more sensitive.
- **Public Interest**: The visual quality of an area may be of concern to local, or regional, groups. Indicators of this concern are usually expressed via public controversy created in response to proposed activities.

- **Adjacent Land Uses**: The interrelationship with land uses in adjacent lands. For example, an area within the viewshed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be as visually sensitive.
- **Special Areas**: Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and Critical Biodiversity Areas frequently require special consideration for the protection of their visual values.
- **Other Factors**: Consider any other information such as research or studies that include indicators of visual sensitivity.

17.1.3 Exposure

The area where a landscape modification starts to influence the landscape character is termed the Zone of Visual Influence (ZVI) and is defined by the U.K. Institute of Environmental Management and Assessment's (IEMA) *'Guidelines for Landscape and Visual Impact Assessment'* as 'the area within which a proposed development may have an influence or effect on visual amenity (of the surrounding areas).'

The inverse relationship of distance and visual impact is well recognised in visual analysis literature *(Hull, R.B. and Bishop, I.E., 1988)*. According to Hull and Bishop, exposure, or visual impact, tends to diminish exponentially with distance. The areas where most landscape modifications would be visible are located within 2 km from the site of the landscape modification. Thus, the potential visual impact of an object diminishes at an exponential rate as the distance between the observer and the object increases due to atmospheric conditions prevalent at a location, which causes the air to appear greyer, thereby diminishing detail. For example, viewed from 1000 m from a landscape modification, the impact would be 25% of the impact as viewed from 500 m from a landscape modification. At 2000m it would be 10% of the impact at 500 m.

Distance from a landscape modification influences the size and clarity of the landscape modification viewing. The Bureau of Land Management defines three distance categories:

i. ***Foreground / Middle ground***, up to approximately 6km, which is where there is potential for the sense of place to change;
ii. ***Background areas***, from 6km to 24km, where there is some potential for change in the sense of place, but where change would only occur in the case of very large landscape modifications; and
iii. ***Seldom seen areas***, which fall within the Foreground / Middle ground area but, as a result of no receptors, are not viewed or are seldom viewed.

17.1.4 Key Observation Points

During the Baseline Inventory Stage, Key Observation Points (KOPs) are identified. KOPs are defined by the Bureau of Land Management as the people (receptors) located in strategic locations surrounding the property that make consistent use of the views associated with the site where the landscape modifications are proposed. These locations are important in terms of the VRM methodology, which requires that the Degree of Contrast (DoC) that the proposed landscape modifications will make to the existing landscape be measured from these most critical locations, or receptors, surrounding the property. To define the KOPs, potential

receptor locations were identified in the viewshed analysis, and screened, based on the following criteria:

- Angle of observation.
- Number of viewers.
- Length of time the project is in view.
- Relative project size.
- Season of use.
- Critical viewpoints, e.g., views from communities, road crossings; and
- Distance from property.

17.2 Assessment and Impact Stage

The analysis stage involves determining whether the potential visual impacts from proposed surface-disturbing activities or developments will meet the management objectives established for the area, or whether design adjustments will be required. This requires a contrast rating to assess the expected DoC the proposed landscape modifications would generate within the receiving landscape in order to define the Magnitude of the impact.

17.2.1 Contrast Rating

The contrast rating is undertaken to determine if the VRM Class Objectives are met. The suitability of landscape modification is assessed by comparing and contrasting existing receiving landscape to the expected contrast that the proposed landscape change will generate. This is done by evaluating the level of change to the existing landscape by assessing the line, colour, texture and form, in relation to the visual objectives defined for the area. The following criteria are utilised in defining the DoC:

- **None**: The element contrast is not visible or perceived.
- **Weak**: The element contrast can be seen but does not attract attention.
- **Moderate**: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong**: The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

As an example, in a Class I area, the visual objective is to preserve the existing character of the landscape, and the resultant contrast to the existing landscape should not be notable to the casual observer and cannot attract attention. In a Class IV area example, the objective is to provide for proposed landscape activities that allow for major modifications of the existing character of the landscape. Based on whether the VRM objectives are met, mitigations, if required, are defined to avoid, reduce or mitigate the proposed landscape modifications so that the visual impact does not detract from the surrounding landscape sense of place.

Based on the findings of the contrast rating, the Magnitude of the Landscape and Visual Impact Assessment is determined.

17.2.2 Photomontages

As a component in this contrast rating process, visual representation, such as photo montages are vital in large-scale modifications, as this serves to inform Interested & Affected Parties and decision-making authorities of the nature and extent of the impact associated with the proposed project/development. There is an ethical obligation in this process, as visualisation can be misleading if not undertaken ethically. In terms of adhering to standards for ethical representation of landscape modifications, VRMA subscribes to the Proposed Interim Code of Ethics for Landscape Visualisation developed by the Collaborative for Advanced Landscape Planning (CALP) (Sheppard, 2000). This code states that professional presenters of realistic landscape visualisations are responsible for promoting full understanding of proposed landscape changes, providing an honest and neutral visual representation of the expected landscape, by seeking to avoid bias in responses and demonstrating the legitimacy of the visualisation process. Presenters of landscape visualisations should adhere to the principles of:

- Access to Information
- Accuracy
- Legitimacy
- Representativeness
- Visual Clarity and Interest

The Code of Ethical Conduct states that the presenter should:

- Demonstrate an appropriate level of qualification and experience.
- Use visualisation tools and media that are appropriate to the purpose.
- Choose the appropriate level of realism.
- Identify, collect and document supporting visual data available for, or used in, the visualisation process.
- Conduct an on-site visual analysis to determine important issues and views.
- Seek community input on viewpoints and landscape issues to address in the visualisations.
- Provide the viewer with a reasonable choice of viewpoints, view directions, view angles, viewing conditions and timeframes appropriate to the area being visualised.
- Estimate and disclose the expected degree of uncertainty, indicating areas and possible visual consequences of the uncertainties.
- Use more than one appropriate presentation mode and means of access for the affected public.
- Present important non-visual information at the same time as the visual presentation, using a neutral delivery.
- Avoid the use, or the appearance of, ‘sales’ techniques or special effects.
- Avoid seeking a particular response from the audience.
- Provide information describing how the visualisation process was conducted and how key decisions were taken (Sheppard, 2000).

17.1 SLR Impact Assessment Criteria

Impacts will be defined in terms of the standardised impact assessment criteria provided by the environmental practitioner.

Table 24: SLR Determining Consequence Table

PART B: DETERMINING CONSEQUENCE							
			EXTENT				
			A part of the site/property	Whole site	Beyond the site, affecting neighbours	Local area, extending far beyond site.	Regional/ National
			VL	L	M	H	VH
INTENSITY = VL							
DURATION	Very long	VH	Low	Low	Medium	Medium	High
	Long term	H	Low	Low	Low	Medium	Medium
	Medium term	M	Very Low	Low	Low	Low	Medium
	Short term	L	Very low	Very Low	Low	Low	Low
	Very short	VL	Very low	Very Low	Very Low	Low	Low
INTENSITY = L							
DURATION	Very long	VH	Medium	Medium	Medium	High	High
	Long term	H	Low	Medium	Medium	Medium	High
	Medium term	M	Low	Low	Medium	Medium	Medium
	Short term	L	Low	Low	Low	Medium	Medium
	Very short	VL	Very low	Low	Low	Low	Medium
INTENSITY = M							
DURATION	Very long	VH	Medium	High	High	High	Very High
	Long term	H	Medium	Medium	Medium	High	High
	Medium term	M	Medium	Medium	Medium	High	High
	Short term	L	Low	Medium	Medium	Medium	High
	Very short	VL	Low	Low	Low	Medium	Medium
INTENSITY = H							
DURATION	Very long	VH	High	High	High	Very High	Very High
	Long term	H	Medium	High	High	High	Very High
	Medium term	M	Medium	Medium	High	High	High
	Short term	L	Medium	Medium	Medium	High	High
	Very short	VL	Low	Medium	Medium	Medium	High
INTENSITY = VH							
DURATION	Very long	VH	High	High	Very High	Very High	Very High
	Long term	H	High	High	High	Very High	Very High
	Medium term	M	Medium	High	High	High	Very High
	Short term	L	Medium	Medium	High	High	High
	Very short	VL	Low	Medium	Medium	High	High

PART C: DETERMINING SIGNIFICANCE							
PROBABILITY (of exposure to impacts)	Definite/ Continuous	VH	Very Low	Low	Medium	High	Very High
	Probable	H	Very Low	Low	Medium	High	Very High
	Possible/ frequent	M	Very Low	Very Low	Low	Medium	High
	Conceivable	L	Insignificant	Very Low	Low	Medium	High
	Unlikely/ improbable	VL	Insignificant	Insignificant	Very Low	Low	Medium
			VL	L	M	H	VH
			CONSEQUENCE				

18 ANNEXURE F: DFFE DECLARATION OF INDEPENDENCE

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

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

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

PROJECT TITLE

Marula Mine Solar PV Facility

Kindly note the following:

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

Departmental Details

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

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

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

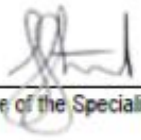
1. SPECIALIST INFORMATION

Specialist Company Name:	VRM Africa			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	0
Specialist name:	Stephen Stead			
Specialist Qualifications:	BA Honours Geography			
Professional affiliation/registration:	Association of Professional Heritage Practitioners			
Physical address:	Farm D3, Bossie Alleen Road, Moerasrivier			
Postal address:	P.O. Box 7233, Blanco			
Postal code:	6531	Cell:	0835609911	
Telephone:		Fax:		
E-mail:	steve@vrma.co.za			

2. DECLARATION BY THE SPECIALIST

I, Stephen Stead, declare that –

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



Signature of the Specialist

Visual Resource Management Africa

Name of Company:

15 November 2022

Date

3. **UNDERTAKING UNDER OATH/ AFFIRMATION**

I, Stephen Steyn, swear under oath / affirm that all the information submitted or tobe submitted for the purposes of this application is true and correct.

Signature of the Specialist

VPM Africa

Name of Company

15 Nov 22

Date

D L Harris CAPT

Signature of the Commissioner of Oaths

2022.11.15

Date

SUID-AFRIKAANSE POLISIEDIENS
STATION COMMANDER
COMMUNITY SERVICE CENTRE
2022 -11- 15
GEORGE
SOUTH AFRICAN POLICE SERVICE