BASIC ASSESSMENT FOR THE DEVIATION OF THE 1 x 400kV PLUTO-MAHIKENG POWERLINE WITHIN JB MARKS LOCAL MUNICIPALITY UNDER THE DR. KENNETH KAUNDA DISTRICT MUNICIPALITY AND MAHIKENG LOCAL MUNICIPALITY WITHIN THE NGAKA MODIRI MOLEMA DISTRICT MUNICIPALITY, NORTHWEST PROVINCE



VISUAL IMPACT ASSESSMENT

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EXECUTIVE SUMMARY

Vhubvo Consultancy has been appointed by the National Transmission Company South Africa Limited SOC Ltd (hereafter referred to as NTCSA) to undertake the Basic Assessment for the deviation of the 1 x 400kV Pluto-Mahikeng Powerline within the JB Marks Local Municipality under the Dr. Kenneth Kaunda District Municipality and Mahikeng Local Municipality within the Ngaka Modiri Molema District Municipality in the North-West Province.

The above-mentioned project received Environmental Authorisation (EA) for the project on 4 February 2019 and valid for 5 years. The EA was subsequently extended for an additional five years and is now valid until the 4th of February 2029.

During the servitude acquisition phase, approximately 14km of the powerline was negotiated outside of the originally approved 2km Environmental Impact Assessment (EIA) corridor. As a result, a Basic Assessment (BA) process is required to obtain Environmental Authorisation for this deviation. Another short deviation of 45m is proposed near the Mahikeng Substation.

Outline Landscape Architects is an independent sub-consultant appointed to complete a Visual Impact Assessment. Neither the author, nor Outline Landscape Architects will benefit from the outcome of the project decision-making.

Kathrin Hammel, the principal Landscape Architect and Visual Specialist from Outline Landscape Architects undertook this Visual and Tourism Impact Assessment. She is a registered Professional Landscape Architect at the South African Council of Landscape Architects, SACLAP no 20162. Kathrin has been involved as Visual Impact Specialist since 2009.

This Visual Impact Assessment (VIA) is a specialist study that addresses the visual effects of the proposed power line on the receiving environment.

The project components that may cause a potential landscape and/or visual impact are construction camps, access roads and powerlines. The powerlines cause the greatest visual impact.

There are two deviations to the proposed powerline. A short deviation of 45m is proposed near the Mahikeng Substation. The second deviation is approximately 28km north-west of Carletonville and 10km north of the N14 on the section connecting Krugersdorp to Ventersdorp (Figure 1). Klerkskraal is the closest small settlement to the proposed deviation and is approximately 10km south of the proposed powerline.

The study area consists generally of open grassland landscapes, used for grazing and small sections of crop cultivation. Rocky ridges are found within the grassland landscape. A few farmsteads are found near the proposed line.

The proposed deviations to the Pluto-Mahikeng 400kV powerline and associated infrastructure has been evaluated against internationally accepted criteria to determine the impact they will have on the landscape character and the viewers that have been identified in the study area.

The impact of the proposed activities on visual receptors varies between residents, tourists and motorists. The proposed new powerline traverses' gently sloping landscape with little ability to absorb the visual impact. The landscape has relatively few residents that will be impacted as the majority of the line follows through agricultural land and open grassland areas. Very few tourists visit the area and motorists mainly pass through. The roads closest to the proposed deviation line are secondary, dirt roads, with low traffic.

If the mitigation measures are implemented and the recommendations are adhered to, the visual impact can be minimised.

SITE SENSITIVITY VERIFICATION

The national screening tool report for the site was generated on 05/02/2026 at 00:44:51, and no landscape or visual theme was specifically classified.

Landscape and Visual Screening Tool Vs Specialist Site Sensitivity Verification Outcomes

Aspect	Screening Tool Outcome	Outcome of the VIA	Relevant Section motivating verification
14km Deviation to the Pluto-Mahikeng 400kV Powerline	N/A	Medium	Section 6

Evaluation of proposed activities for the 14km Deviation of the Pluto-Mahikeng 400kV Powerline

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The visibility analyses consider worst-case scenarios, using line-of-sight, based on topography alone. The impacts for the construction phase are insignificant, while impacts for the operational phase are rated below.							
Visual Impact of proposed Activities							
14km Deviation to the Pluto-Mahikeng 400kV Powerline	No	Negative	2 (Local)	5 Permanent	6 Moderate	4 High	52 Moderate
	Yes	Negative	2 (Local)	5 Permanent	2 Low	4 High	36 Moderate

The Visual Impact Assessment Criteria for all activities as indicated in the table applies and is rated as per below:

Status of Impact:
The visual impact is assessed as either having a:

- Negative effect (i.e. at a cost to the environment),
- Positive effect (i.e. a benefit to the environment), or
- Neutral effect on the environment.

Scale/Extent of the Impact:

(1) Site (site only),
(2) Local (site boundary and immediate surrounds),
(3) Regional,

Duration of the Impact:
The length that the impact will last for is described as either:

(2) Short term (1-5 years),
(3) Medium term (5-15 years),
(4) Long term (ceases after the operational life span of the project),
(5) Permanent.

Magnitude of the Impact:
The intensity or severity of the impacts is indicated as either:

(2) Minor,
(4) Low,
(6) Moderate (environmental functions altered but continue),

(8) High (environmental functions temporarily cease), or
(10) Very high/unsure (environmental functions permanently cease).

Probability of Occurrence:
The likelihood of the impact actually occurring is indicated as either:
(1) Improbable (probability very low due to design or experience)
(2) Low probability (unlikely to occur),
(3) Medium probability (distinct probability that the impact will occur),
(4) High probability (most likely to occur), or
(5) Definite.

Significance of the Impact:
Based on the information contained in the points above, the potential impacts are assigned a significance rating (S). This rating is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact.
S= (E+D+M) P

The significance ratings are given below

- (<20) Negligible Impact
- (20-40) Low Impact (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- (40-60) Moderate Impact (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- (>60) High Impact (i.e. where the impact must have an influence on the decision process to develop in the area).

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LIST OF ABBREVIATIONS

EIA	Environmental Impact Assessment.
FHWA	Federal Highway Administration of the United States Department of Transportation. The publishers of the guide "*Visual Impact Assessment for High Projects*" 1981.
LCA	Landscape Character Assessment.
LT	Landscape Type
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment.
ULI	Urban Land Institute
ZVI	Zone of Visual Influence.

STRUCTURE OF THE REPORT

In terms of the NEMA 2014 EIA Regulations contained in GN R982 of 04 December 2014 (as amended) all specialist studies must comply with Appendix 6 of the NEMA 2014 EIA Regulations GN R982 of 04 December 2014.

Information to be included in specialist reports.

Legal Requirement		**Relevant Section in Specialist study**
(1)	A specialist report prepared in terms of these Regulations must contain-	
	details of-	
	(i) the specialist who prepared the report; and	Professional Experience and Section 1
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Professional Experience and Section 1
	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Declaration of Independence
	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1 and 3
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 2
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6
	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2
	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 2
	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 6
	an identification of any areas to be avoided, including buffers;	N/A
	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;	N/A
	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2
	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 6
	any mitigation measures for inclusion in the EMPr;	Section 8
	any conditions for inclusion in the environmental authorisation;	N/A
	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
	a reasoned opinion	Section 6

Legal Requirement		Relevant Section in Specialist study
	whether the proposed activity, activities or portions thereof should be authorised;	Section 6
	regarding the acceptability of the proposed activity or activities; and	Section 6 and 8
	if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Section 6 and 8
	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not Applicable
	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not Applicable
	any other information requested by the competent authority.	Not Applicable
(2)	Where a government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

1. INTRODUCTION

Vhubvo Consultancy has been appointed by the National Transmission Company South Africa Limited SOC Ltd (hereafter referred to as NTCSA) to undertake the Basic Assessment for the deviation of the 1 x 400kV Pluto-Mahikeng Powerline within the JB Marks Local Municipality under the Dr. Kenneth Kaunda District Municipality and Mahikeng Local Municipality within the Ngaka Modiri Molema District Municipality in the North-West Province.

The Pluto-Mahikeng 400 kV powerline received Environmental Authorisation (EA) for the project on 4 February 2019 and valid for 5 years. The EA was subsequently extended for an additional five years and is now valid until the 4th of February 2029.

During the servitude acquisition phase, approximately 14km of the powerline was negotiated outside of the originally approved 2km Environmental Impact Assessment (EIA) corridor. As a result, a Basic Assessment (BA) process is required to obtain Environmental Authorisation for these deviations.

Outline Landscape Architects is an independent sub-consultant appointed to complete a Visual Impact Assessment. Neither the author, nor Outline Landscape Architects will benefit from the outcome of the project decision-making.

Kathrin Hammel, the principal Landscape Architect and Visual Specialist from Outline Landscape Architects undertook this Visual Impact Assessment. She is a registered Professional Landscape Architect at the South African Council of Landscape Architects, SACLAP no 20162. Kathrin has been involved as Visual Impact Specialist since 2009.

This Visual Impact Assessment (VIA) is a specialist study and addresses the visual effects of the proposed line on the receiving environment.

1.1. BACKGROUND AND BRIEF

This report investigates if the deviation indicates any material changes that have occurred since the original authorisation and whether additional mitigation measures are required.

The assessment includes:

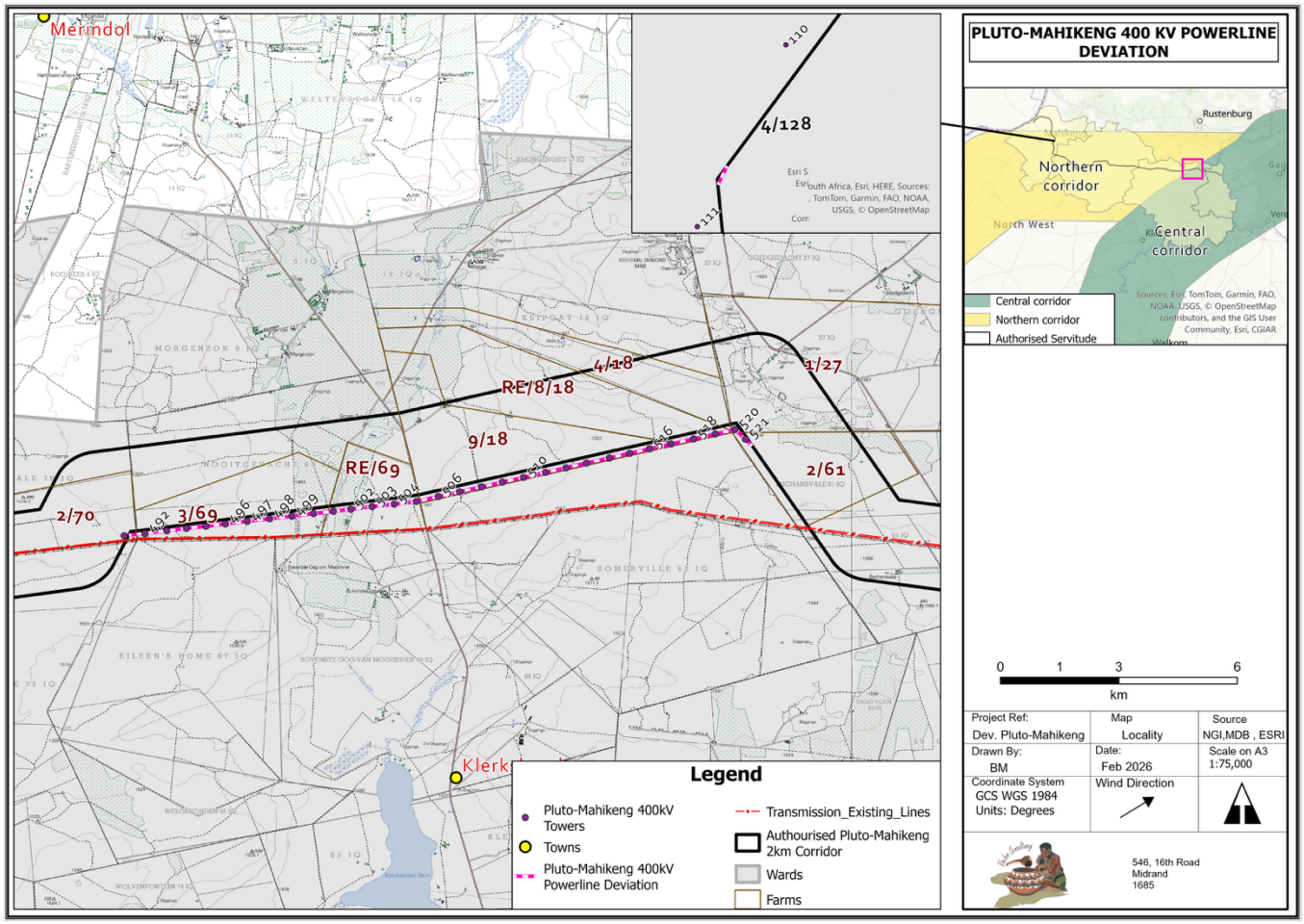
- A Site Sensitivity Verification.
- Determination of the extent of the study area.
- Description of the proposed project and the receiving environment.
- Identification and description of the landscape character of the study area.
- Identification of the elements of particular visual value and -quality that could be affected by the proposed project.
- Identification of landscape- and visual receptors in the study area that will be affected by the proposed project and assess their sensitivity.
- Assessment of the significance of the landscape- and visual impacts.
- Recommendations of mitigation measures to reduce and/or alleviate the potential adverse landscape- and visual impacts.
- A cumulative impact assessment for relevant developments within a 30 km radius.

1.2. STUDY AREA

The study area is within the JB Marks Local Municipality under the Dr Kenneth Kaunda District Municipality and Mahikeng Local Municipality within the Ngaka Modiri Molema District Municipality in the North-West Province.

There are two deviations to the proposed powerline. A short deviation of 45m is proposed to the east of Mahikeng near the Mahikeng Substation. The second deviation is approximately 28km north-west of Carletonville and 10km north of the N14 on the section connecting Krugersdorp to Ventersdorp (Figure 1). Klerkskraal is the closest small settlement to the proposed deviation and is approximately 10km south of the proposed deviation of the powerline.

Figure 1: Locality Plan



2. STUDY APPROACH

2.1. INFORMATION BASE

This assessment was based on information from the following sources:

- Environmental Authorisation, Environmental Impact Assessment, Visual Impact Assessment and Screening Report.
- Topographical maps, Google Earth Imagery and GIS generated data were sourced from the Surveyor General, and EcoGIS (2026) respectively.
- A site visit was conducted on the 28th of February 2026.
- Professional judgement based on experience gained from similar projects.

- Literature research on similar projects.

2.2. ASSUMPTIONS AND LIMITATIONS

This assessment was undertaken during the conceptual stage of the project and is based on information available at the time.

- The exact alignment of the proposed line and position of the pylons have been determined. The visibility results have been generated from the positions of the pylon alignment as provided.
- This level of assessment excludes surveys to establish viewer preference and thereby their sensitivity. Viewer sensitivity is determined by means of a commonly used rating system (Table 14).

2.3. LEVEL OF CONFIDENCE

The level of confidence assigned to the findings of this assessment is based on:

- The level of information available and/or understanding of the study area (rated 2); and
- The information available and/or knowledge and experience of the project (rated 3).

This visual impact assessment is rated with a general confidence level of 6. This rating indicates that the author's general confidence in the accuracy of the findings is *high* (Table 13). Where the confidence level of specific findings is not regarded as high, it is noted in the last column of each impact assessment table.

2.4. METHOD

A broad overview of the approach and methodology used in this assessment is provided below:

- The extent of the study area is determined and indicated in Figure 1, indicating the proposed deviations.
- The project components and activities are described and assessed as potential elements of visual and landscape impacts.
- The receiving environment is described in terms of its prevailing landscape- and visual character.
- Landscape- and visual receptors that may be affected by the proposed project are identified and described.
- Mitigation measures are proposed to reduce adverse impacts.
- The findings of the study are documented in this Visual Impact Assessment.

3. PROJECT DESCRIPTION

3.1. OVERVIEW OF DEVELOPMENT

The Scope of Work includes the assessment of the 14km deviation of the 400kV Pluto-Mahikeng Powerline.

3.2. PROJECT COMPONENTS AND ACTIVITIES

Each project component and activity will affect the receiving environment differently and is therefore discussed separately. The following project components will occur during the construction and operational phases of the project and are identified as elements that may cause a potential landscape and/or visual impact:

3.2.1. CONSTRUCTION CAMPS AND LAY-DOWN YARDS

Temporary construction camps will be present for the duration of the construction period. The appointed contractor will set up construction camp along the alignment where practical. The material lay-down yards are expected to be located adjacent to the construction camp and will serve as storage areas for the construction material and equipment.

3.2.2. ACCESS ROADS

Where no access roads are available and vehicular access is required, roads will be constructed. Access may be by means of a two-track dirt road or a cleared corridor. It is expected that roads will be rehabilitated after the construction phase or maintained to facilitate access during periodic maintenance visits. The work includes the installation of gates where the line crosses the farm boundaries.

3.3. VISUAL CHARACTERISTICS OF PROJECT COMPONENTS

Visual character is based on human perception and the observer's response to the relationships between and composition of the visible project components. The powerline, i.e., the towers and the cables suspended between each tower, is the most visible permanent project component and is discussed in this section.

The transmission towers have an industrial character enforced by the double steel pole and the electrical cables between the towers. The entire power line will be perceived as a rhythmic arrangement of vertical towers forming a linear element through the landscape. The electrical cables emphasise the linear character of the powerline but are easily absorbed in the background when viewed from distances greater than 1km.

4. SITE SENSITIVITY VERIFICATION

The national screening tool report for the site was generated on 05/02/2026 at 00:44:51, and no landscape or visual theme was specifically classified.

Table 1: Landscape and Visual Screening Tool Vs Specialist Site Sensitivity Verification Outcomes

Aspect	Screening Tool Outcome	Outcome of the VIA	Relevant Section motivating verification
14km Deviation to the Pluto-Mahikeng 400kV Powerline	N/A	Medium	Section 6

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

Landscape and visual impacts may result from changes to the landscape. A distinction should be made between impacts on the visual resource (landscape) and on the viewers. The former are impacts on the physical landscape that may result in changes to landscape character while the latter are impacts on the viewers themselves and the views they experience.

5.1. VISUAL RESOURCE

Visual resource is an encompassing term relating to the visible landscape and its recognisable elements, which through their co-existence, result in a particular landscape character.

5.1.1. LANDSCAPE CHARACTER

The study area consists generally of open grassland landscapes, used for grazing and small sections of crop cultivation. Rocky ridges are found within the grassland landscape.

The broad-scale vegetation type is Carletonville Dolomite Grassland. The proposed deviation crosses through a small section of Rand Highveld Grassland (Figure 2). This grassland type may consist of endangered species and more common species such as *Themeda triandra* and *Hyparrhenia hirta*. There are very few trees and mostly clusters of small Searsia and Ziziphus trees are found in the study area.

Farm homesteads are scattered throughout the study area, and the landscape is generally degraded around these settlements.

The landscape character does not change considerably through the study area. The study area is divided into distinct landscape types, which are areas within the study area that are relatively homogenous in character (Swanwick, 2002). Landscape types are distinguished by differences in topographical features, vegetation communities and patterns, land use and human settlement patterns.

5.1.2. VISUAL CHARACTER

Visual character is based on human perception and the observer's response to the relationships between and composition of the landscape, the land uses and identifiable elements in the landscape. The description of the visual character includes an assessment of the scenic attractiveness regarding those landscape attributes that have aesthetic value and contribute significantly to the visual quality of the views, vistas and/or viewpoints of the study area.

The overall landscape is a gently sloping open grassland landscape with rocky ridges. The dominant land uses are livestock farming and crop cultivation. A few farmsteads are found in the study area.

Small towns serve the farming communities and are surrounded by higher density informal settlements. The small towns and surrounding areas are often degraded and vary from quaint towns to towns that are not visually pleasing, desolate and degraded.

5.1.2.1 Visual Value

Visual value relates to those attributes of the landscape or elements in the landscape to which people attach values that, though not visually perceivable, still contribute to the value of the visual resource. These visual values are derived from ecological, historical, social and/or cultural importance and are described in terms of their uniqueness, scarcity, and naturalness and/or conservation status. The importance of visual value of a landscape or element in the landscape is measured against its value on an international, national and local level.

The region is known for the grassland landscapes and gently sloping landscape, with few rocky ridges. The general vegetation is low-growing, and few trees exist providing little to no screening for the proposed development.

Most parts of the study area have undergone little or no change due to human intervention but remain under constant pressure by over-grazing and infrastructure expansion. The landscape cannot be described as an unspoilt, pristine landscape.

5.1.2.2 Visual Quality

Visual quality is a qualitative evaluation of the composition of landscape components and their excellence in scenic attractiveness. Many factors contribute to the visual quality of the landscape and are grouped under the following main categories (Table 2) that are internationally accepted indicators of visual quality (FHWA, 1981):

Table 2: Criteria of Visual Quality (FHWA, 1981)

INDICATOR	CRITERIA
Vividness	The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.
Intactness	The integrity of visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment.
Unity	The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony of inter-compatibility between landscape elements.

The landscape is allocated a rating from an evaluation scale of 1 to 7 and divided by 3 to get an average. The evaluation scale is as follows: Very Low =1; Low =2; Moderately Low =3; Moderate =4; Moderately High =5; High =6; Very High =7.

The regional landscape is assessed against each indicator separately. All three indicators should be *high* to obtain a *high* visual quality. The evaluation is summarised in Table 3.

Table 3: Visual Quality of the regional landscape

VIVIDNESS	INTACTNESS	UNITY	VISUAL QUALITY
3	3	3	Moderately low

The moderately low visual quality can be attributed to the large expanses of undeveloped landscapes but with signs of environmental degradation.

5.1.2.3 Visual absorption capacity

Visual Absorption Capacity (VAC) signifies the ability of the landscape to accept additional human intervention without serious loss of character and visual quality or value. VAC is founded on the characteristics of the physical environment such as:

- Degree of visual screening:
  A degree of visual screening is provided by landforms, vegetation cover and/or structures such as buildings. For example, a high degree of visual screening is present in an area that is mountainous and is covered with a forest compared to an undulating and mundane landscape covered in grass.
- Terrain variability:
  Terrain variability reflects the magnitude of topographic elevation and diversity in slope variation. A highly variable terrain will be recognised as one with great elevation differences and a diversity of slope variation creating talus slopes, cliffs and valleys. An undulating landscape with a monotonous and repetitive landform will be an example of a low terrain variability.
- Land cover:

Land cover refers to the perceivable surface of the landscape and the diversity of patterns, colours and textures that are presented by the particular land cover (i.e., urbanised, cultivated, forested, etc.)

A basic rating system is used to evaluate the three VAC parameters. The values are relative and relate to the type of project that is proposed and how it may be absorbed in the landscape (Table 4). A three-value range is used; three (3) being the highest potential to absorb an element in the landscape and one (1) being the lowest potential. The values are counted together and categorised in a *high*, *medium* or *low* VAC rating.

Table 4: Regional Visual Absorption Capacity evaluation

VISUAL SCREENING	TERRAIN VARIABILITY	LAND COVER	VAC
1	1	2	low

The VAC of the study area is considered low and does not provide good overall screening capacity for this project. The low VAC relates to the gently sloping topography with low-growing vegetation.

The regular forms and associated vertical posture of the proposed power line will not be easily absorbed into the landscape and topography. The less prominent project components such as access roads are expected to be visually absorbed to a large degree in the landscape.

Figure 2: Vegetation Map

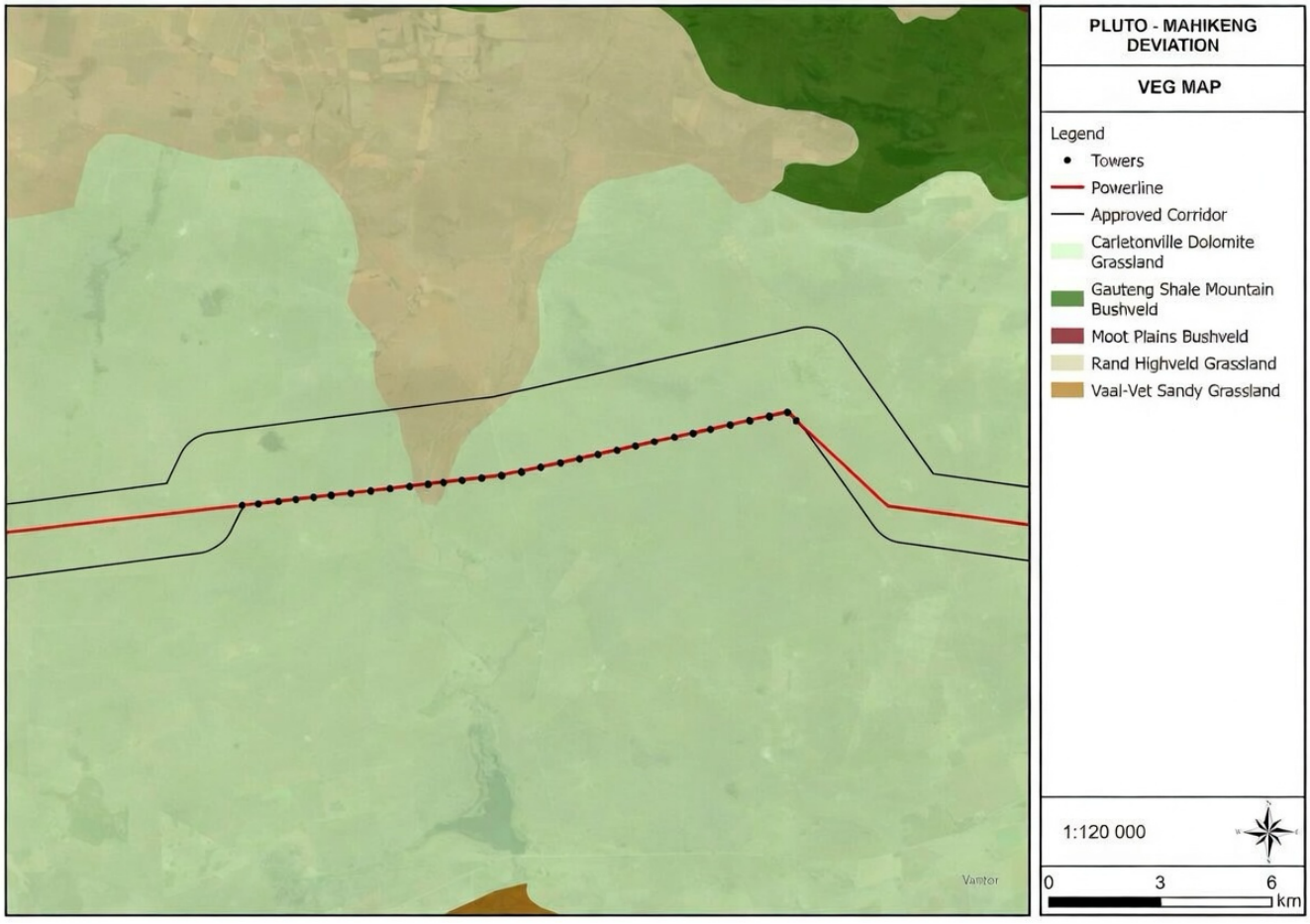


Figure 3: Elevation Map

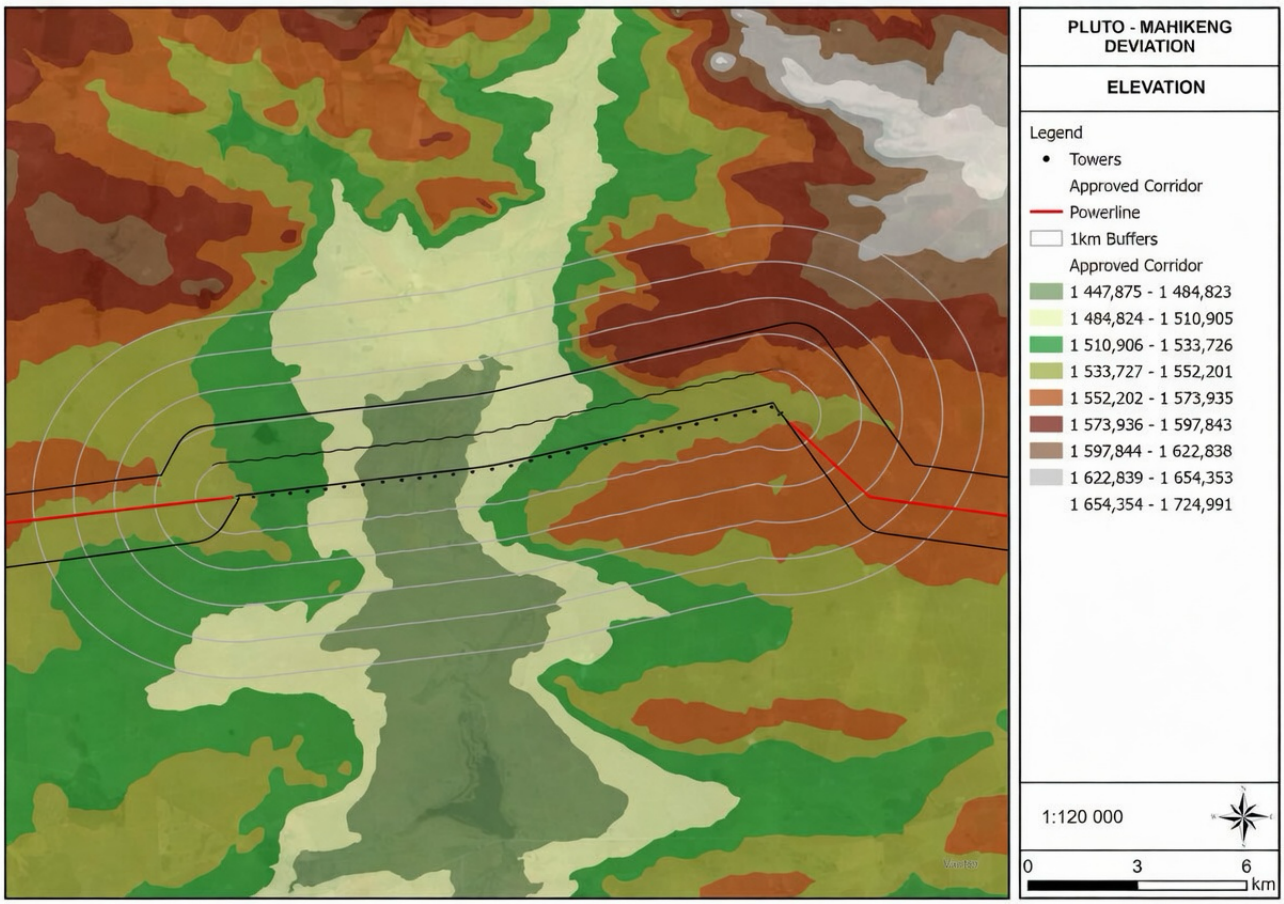


Figure 4: Land Cover Map

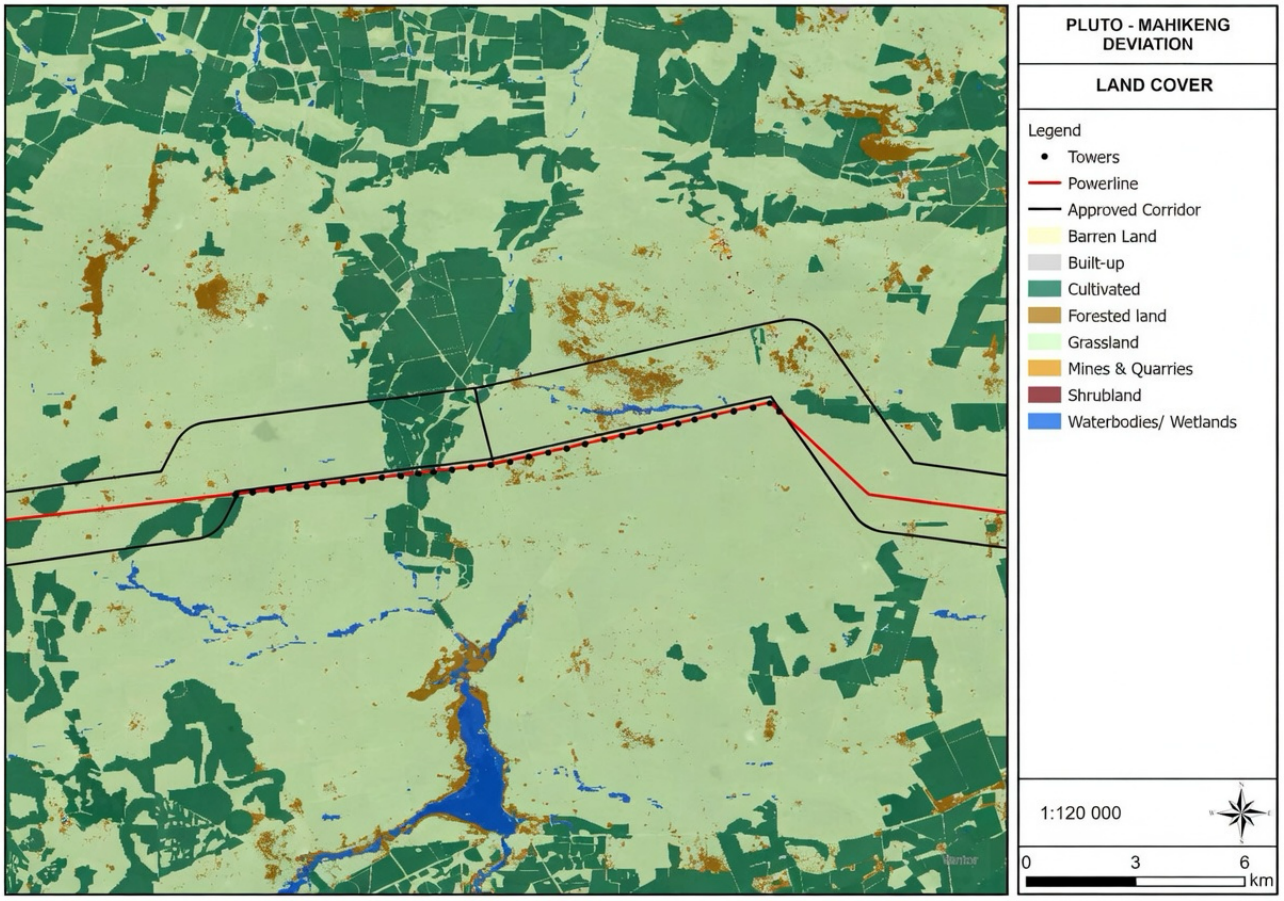


Figure 4: Landscape Character and Visual Observations from Site Visit



Intersection at N14 and secondary road – view towards north to site



Landscape character – grassland and small shrubby trees



Proposed crossing of deviation line on secondary road



Existing powerlines in grassland landscape 700m south of proposed line



View towards the east of existing powerline.



View towards the west of the existing powerline

6. IMPACT ASSESSMENT

The significance of impacts is a comparative function relating to the severity of the identified impacts on the respective receptors. The significance of an impact is considered *high* should a *highly* sensitive receptor be exposed to a *highly* severe impact (Table 5).

Table 5: Significance of impacts

RECEPTOR SENSITIVITY	IMPACT SEVERITY		
	LOW	MEDIUM	HIGH
LOW	No significance	Low	Low
MEDIUM	Low	Medium	Medium
HIGH	Low	Medium	High

6.1. SIGNIFICANCE OF LANDSCAPE IMPACT

6.1.1. LANDSCAPE CHARACTER SENSITIVITY

The sensitivity of the landscape character is an indication of "…the degree to which a particular landscape can accommodate change from a particular development, without detrimental effects on its character" (GLVIA, 2002). A landscape with a *high* sensitivity would be one that is greatly valued for its aesthetic attractiveness and/or have ecological, cultural or social importance through which it contributes to the inherent character of the visual resource.

The majority of the study area is considered to have medium landscape character sensitivity due to the expanses of open grassland landscape, the few small settlements in the landscape, the generally moderate visual quality and low tourism value. There is low terrain variability in the study area and thus a low VAC can be expected. Generally, the vegetation cover is of low height shrubs and grassland, which will provide low visual screening for the proposed power line.

There has not been much human induced activities and interventions to have impacted significantly on the original landscape character. There are existing powerlines, infrastructure, and roads, etc., that can be classified as landscape disturbances and elements that cause a reduction in the condition of the affected landscape type and negatively affect the quality of the visual resource.

There are two private nature reserves directly south of the proposed powerline, namely the Somerville Private Nature Reserve and the Fred Coetzee Private Nature Reserve. These reserves provide protection to the unique grassland vegetation.

The assessment of the landscape is substantiated through professional judgement and informed reasoning which is based on the landscape character assessment in Section 5. A landscape sensitivity rating was adapted from GOSW (2006) (Table 6) and applied in the classification of the study area into different sensitivity zones.

The landscape character sensitivity for the study area is considered to have a moderate sensitivity.

Table 6: Landscape character sensitivity rating (Adapted from GOSW, 2006)

	DESCRIPTION
Low sensitivity	These landscapes are likely to: ° Have distinct and well-defined landforms; ° Have a strong sense of enclosure; ° Provide a high degree of screening; ° Have been affected by extensive development or man-made features; ° Have reduced tranquillity; ° Are likely to have little inter-visibility with adjacent landscapes; and ° Exhibit no or a low density of sensitive landscape features that bare visual value.
Moderate sensitivity	These landscapes are likely to: ° Have a moderately elevated topography with reasonably distinct landforms that provides some sense of enclosure; ° Have been affected by several man-made features; ° Have limited inter-visibility with adjacent landscapes; and ° Exhibit a moderate density of sensitive landscape features that bare visual value.
High sensitivity	These landscapes are likely to: ° Consist mainly of undulating plains and poorly defined landforms; ° Be open or exposed with a remote character and an absence of man-made features; ° Are often highly visible from adjacent landscapes; and ° Exhibit a high density of sensitive landscape features that bare visual value.

6.1.2. SEVERITY OF POTENTIAL LANDSCAPE IMPACTS

Landscape impacts are alterations to the fabric, character, visual quality and/or visual value which will either positively or negatively affect the landscape character. During the construction and operational phases, the project components are expected to impact on the landscape character of the landscape types it traverses. The magnitude/severity of this intrusion is measured against the scale of the project, the permanence of the intrusion and the loss in visual quality, -value and/or VAC.

The below table (Table 7) indicates the significance of the impact on the landscape with and without mitigation.

Table 7: Landscape impact – Altering the landscape character

LANDSCAPE IMPACT								
Activity	**Nature of Impact**	**Extent of Impact**	**Duration of Impact**	**Severity of Impact**	**Probability of Impact**	**Significance without Mitigation**	**Significance with Mitigation**	**Level of Confidence**
Construction phase								
14km Deviation of the 400kV Pluto-Mahikeng power line	Negative Impact on the visual quality of the landscape due to the presence of foreign elements and a loss of vegetation cover.	Localised impacts over an extensive area	Permanent if not mitigated	Medium	Highly Probable	Moderate	Low	High
Operational phase								
14km Deviation of the 400kV Pluto-Mahikeng power line	Negative Impact on the visual quality of the landscape due the presence of a transmission line.	Regional	Permanent	Medium	Definite	High	Moderate	High

Construction phase

The activities that are expected to cause landscape impacts and that are associated with the construction phase, are the establishment of construction camps, construction of access roads and the clearance of the servitude. These activities will create surface disturbances which will result in the removal of vegetation and the exposure of the underlying soil.

The extent of the disturbances will generally affect a relatively small footprint area. Access roads to the towers are expected to be a two-track dirt road which will create minimum disturbance. During construction, the area around the individual towers will be disturbed. Vegetation will be trampled and may take years to recover.

The construction camps and lay-down yards are anticipated to disturb a much larger area. The size and location of the construction camps will play a major role in the severity of the landscape impact. Due to a lack of technical information, two options are considered namely, the location of construction camps in remote, virgin land, or in adjacent existing settlements. The initial presence of a construction camp in an undeveloped landscape will cause a temporary and localised alteration to the landscape character. A construction camp located in or adjacent to an existing settlement will be easily associated with the town and therefore the presence of the town, mitigates the impact. The mitigating result is most effective, the bigger the settlement is.

The complete removal of vegetation will result in disturbed areas of exposed soil and difference in texture for both scenarios. The exposed soil and change in texture will contrast severely with the intact vegetation around the disturbance footprint and servitudes.

Considering the low VAC throughout most of the study area, the undeveloped condition of great parts of the landscape and the moderate recovery rate of the endemic vegetation, the *severity of landscape impact* during the construction stage is expected to be *moderate to high* for the proposed deviation. Surface disturbances can be minimised through, for example, utilising existing roads.

The *severity of the landscape impact* can however be mitigated to a moderately low severity for the proposed deviation. Sensitive placement of the construction camps, limited surface disturbance and prompt rehabilitation are prerequisite conditions if the severity of impact is to be reduced.

Operational phase

Surface disturbances created during construction may remain for an extended period during the operational phase. These are seen as residual affects carried forward from the construction phase and can be mitigated if treated appropriately during the construction phase.

An additional impact will be caused as a result of the presence of the completed power line, i.e. that of the evenly spaced towers. The industrial character and the near monumental vertical scale of the towers (30m for the proposed 400kV transmission lines) will not easily be absorbed into the relatively flat landscape character that prevails through most of the study area.

The open grassland character and relatively low vegetation allow for little absorption of the towers into the landscape. However, the pristine character of a small portion of the study area will need to be protected as it is vulnerable to human intervention. It is considered as a landscape amenity that provides the study area with a unique and valued sense of place. This quality of the landscape will be moderately affected with the presence of a transmission line of this scale and extent. The impact can however also be mitigated due to the corridor around the deviation, which allows for placement of the power line in an area that will cause the least impact.

6.2. SIGNIFICANCE OF VISUAL IMPACTS

6.2.1. VIEWER SENSITIVITY

Within the receiving environment, specific viewers (visual receptors) experience different views of the visual resource and value it differently. They will be affected because of alterations to their views due to the proposed project. The visual receptors are grouped according to their similarities. The visual receptors included in this study are:

- Residents
- Tourists
- Motorists

To determine visual receptor sensitivity a commonly used rating system is utilised. This is a generic classification of visual receptors and enables the visual impact specialist to establish a logical and consistent visual receptor sensitivity rating for viewers who are involved in different activities without engaging in extensive public surveys.

6.2.1.1 Residents

Residents of the affected environment are classified as visual receptors of *high* sensitivity owing to their sustained visual exposure to the proposed development as well as their attentive interest towards their living environment.

6.2.1.2 Tourists

Tourists are regarded as visual receptors of exceptional *high* sensitivity. Their attention is focused on the landscape which they essentially utilise for enjoyment purposes and appreciation of the quality of the landscape.

6.2.1.3 Motorists

Motorists are generally classified as visual receptors of *low* sensitivity due to their momentary view and experience of the proposed development. As a motorist's speed increases, the sharpness of lateral vision declines, and the motorist tends to focus on the line of travel (USDOT, 1981). This adds weight to the assumption that under normal conditions, motorists will show *low* levels of sensitivity as their attention is focused on the road and their exposure to roadside objects is brief.

Motorists on the scenic routes in the study area will present a higher sensitivity. Their reason for being in the landscape is similar to that of the tourists and they will therefore be categorised as part of the tourist viewer group.

6.2.2. SEVERITY OF POTENTIAL VISUAL IMPACTS

Severity of visual impact refers to the magnitude of change to specific visual receptor's views and/or experience of the landscape. Severity of visual impact is influenced by the following factors:

- The **viewer's exposure** to the project:
  - Distance of observers from the proposed project.
  - The visibility of the proposed project (ZVI).
  - Number of affected viewers.
  - Duration of views to the development experienced by affected viewers.
- Degree of **visual intrusion** created by the project.

Empirical research indicates that the visibility of a transmission tower and hence the severity of visual impact, decreases as the distance between the observer and the tower increases. The landscape type, through which the transmission line crosses, can mitigate the severity of visual impact through topographical or vegetative screening. Bishop *et al* (1988) noted that in some cases the tower may dominate the view for example, silhouetted against the skyline, or in some cases be absorbed in the landscape. A complex landscape setting with a diverse land cover and topographical variation has the ability to decrease the severity of visual impact more than a mundane landscape (Bishop *et al*, 1985).

The Zone of Visual Influence (ZVI) is determined through a Geographical Information System (GIS). The result reflects a shaded pattern which identifies the areas that are expected to experience views of the proposed alignments. The ZVI is limited to 5km from the proposed deviation.

A visibility analysis has been completed for the proposed alignment. According to Bishop *et al* (1988), visual receptors within 1 km from the alignments are most likely to experience the highest degree of visual intrusion, hence contributing to the severity of the visual impact. This is considered as the zone of highest visibility after which the degree of visual intrusion decreases rapidly at distances further away.

In order to assess the extent and degree of visibility in the visual envelope, a Geographical Information System (GIS) was utilized. A visibility analysis was performed which provides the following information (Figure 6):

- The areas within the visual envelope that may experience views of the proposed project; and
- The degree of visibility in terms of the percentage of the proposed project that will be visible from a specific location.

The GIS performs an analysis for a series of elevated observer points which represents the height of the entire power line in a digital elevation model (DEM). This results in a visibility map with the degree of visibility illustrated by a colour.

The visibility analysis considers worst-case scenarios, using line-of-sight, based on topography alone. The screening capability of vegetation is not captured in the base model of the DEM and is therefore not considered in these results.

6.2.2.1 *Potential visual impacts on Residents*

Table 8: Potential visual impacts on residents

VISUAL IMPACT ON RESIDENTS								
Activity	**Nature of Impact**	**Extent of Impact**	**Duration of Impact**	**Severity of Impact**	**Probability of Impact**	**Significance without Mitigation**	**Significance with Mitigation**	**Level of Confidence**
Construction phase								
14km Deviation of the 400kV Pluto-Mahikeng power line	Negative – Construction camp and lay-down yard may cause unsightly views	Local	Medium	Moderate	Probable	Moderate	Low	High
Operational phase								
14km Deviation of the 400kV Pluto-Mahikeng power line	Negative – The presence of a power line intrudes on existing views and spoils the open panoramic views of the landscape.	Regional	Permanent	Moderate	Definite	Moderate	Low	High

The study area has a low population with small rural settlements and farmsteads with moderately populated towns and informal settlements. Klerkskraal is the closest settlement to the proposed deviation of the line. The proposed powerline does not traverse directly past any farmstead or settlement. The closest resident is approximately 700m north of the line.

The rural settlements and farming communities are normally situated along main transportation routes, near agricultural areas or adjacent rivers or water resources. There will be a low number of affected viewers across the study areas.

Construction phase

During the construction phase, unsightly views may be created by the presence of the construction camp and the lay-down yards. The duration of the potential visual impact will be temporary which will result in an anticipated *low* significance of visual impact for all the alternatives. The visual exposure to the construction activity will be limited.

The uncertainty pertaining to the number, location and size of the construction camps relates to a low level of confidence in the assessment of the visual impact. The cleared site, construction camp and material lay-down yards will appear unsightly and out of character. Large scale construction elements, such as cranes, will be highly visible and increase awareness of the construction activity over a considerable area. The visual intrusion caused during the construction stage will be moderate but will be temporary in nature.

Operational phase

There are few residents of the farming communities along the proposed corridor of the power line that may experience a low degree of visual intrusion. The population is low along the proposed powerline deviation.

The Visual Absorption Capacity (VAC) of the landscape of the proposed power line is low and does not significantly decrease the severity of the visual impact (*Bishop et al, 1985*) by creating a backdrop. The steel frames of the towers (especially the cross-rope suspension type) present a degree of visual permeability, and hence a low degree of visual obstruction. This characteristic of the towers allows it to readily blend into the background colours and patterns of the landscape. This results in a reduced ZVI because the visibility of the individual towers is limited to a smaller distance.

The majority of the study area has a slight undulating topography as well as grassland and shrubland vegetation, with few cultivated fields with low-growing crops and very few trees. It is apparent from existing power lines that one is visually exposed to the line in close proximity of the line, but the impact is absorbed into the distance by the landscape. The presence of existing lines also mitigates the impact as residents are already accustomed to a similar structure. Therefore, the significance of the impact can be regarded as low.

6.2.2.2 Potential visual impacts on tourists

Table 9: Potential visual impacts on tourists

VISUAL IMPACT ON TOURISTS								
Activity	**Nature of Impact**	**Extent of Impact**	**Duration of Impact**	**Severity of Impact**	**Probability of Impact**	**Significance without Mitigation**	**Significance with Mitigation**	**Level of Confidence**
Construction phase								
14km Deviation of the 400kV Pluto-Mahikeng power line	Negative – Construction camp and lay-down yard may cause unsightly views	Local	Temporary	Low	Probable	Low	Low	High
Operational phase								
14km Deviation of the 400kV Pluto-Mahikeng power line	Negative – The presence of a power line intrudes on existing views and spoils the open panoramic views of the landscape.	Regional	Permanent	Low	Probable	Low	Low	High

The most sensitive viewers looking onto the powerlines besides residents, are tourists and the views to the project from residential properties, tourist destinations and natural conservation areas. Tourism is an industry based primarily on the subjective perspectives of visitors to an area. In destinations where tourism is focused on outdoors or based on natural elements, the tourism value rests largely on the experience which can be provided.

Tourism activities are mostly linked with the private game farms that occur across the study area. No tourist establishments were identified within the study area of the proposed deviation of the powerline.

Construction phase

The temporary duration of the construction phase is not expected to cause major visual impacts. The location, number and size of the construction camps and lay-down yards will be crucial in regulating the impact. Detail information is not available, and it is anticipated that the visual impact will occur localised and that a small number of tourists will be adversely affected by these project components during construction.

Their exposure to possible unsightly views of the construction camps and the associated activity will however be minimal and localised.

The potential visual impact on tourists during the construction phase of the proposed project can be mitigated with relative ease. The greatest factor to consider is the location of the construction camp.

Operational phase

The entire study area is considered to have low tourism and recreational potential. There are private game farms, but no large national parks in the area. The proposed deviation of the power line does not cross any main thoroughfare road to other prominent holiday destinations.

Few tourists may be affected during their visit to the study area. Areas around natural resources should be protected, where there may be potential for tourism and recreational activities. The presence of a power line in the existing landscape areas will spoil the picturesque views that are experienced over the valleys and plains, especially when in close proximity to the power lines.

The presence of the power line in the field of the tourists will only have a high significance on tourists in near proximity to the power line, which will be mainly along main transportation routes and at destinations such as game farms and lodges, which have not been identified.

The severity of the visual impact of the power lines on tourists will be low, causing a low visual impact

6.2.2.3 *Potential visual impacts on motorists*

Table 10: Potential visual impacts on motorists

VISUAL IMPACT ON MOTORISTS								
Activity	**Nature of Impact**	**Extent of Impact**	**Duration of Impact**	**Severity of Impact**	**Probability of Impact**	**Significance without Mitigation**	**Significance with Mitigation**	**Level of Confidence**
Construction phase								
14km Deviation of the 400kV Pluto-Mahikeng power line	Negative – Construction camp and lay-down yard may cause unsightly views	Local	Temporary	Moderate	Probable	Moderate	Low	High
Operational phase								
14km Deviation of the 400kV Pluto-Mahikeng power line	Negative – The presence of a power line intrudes on existing views and spoils the open panoramic views of the landscape.	Regional	Permanent	Moderate	Definite	Moderate	Low	High

The main road in the study area is the N14 connecting Krugersdorp to Ventersdorp. Public views to the proposed power line deviation are along the main public roads but the N14 is approximately 10km to the south of the road and motorists will not be visually affected.

The secondary road network in the study area carries a much lower volume of motorists. Their duration of views will be temporary, and it is expected that the visual intrusion that they will experience will be low.

Construction phase

The potential visual impact that may be experienced by motorists during the construction phase is considered to be minimal. Limited information is available, and the number, location and size of the construction camps and lay-down yard are essential for accurately assessing the visual impact.

The presence of the construction camp and lay-down yard may create unsightly views. Motorists' visual exposure to the impact will be brief and the severity of visual impact will be *low*. The significance of the potential visual impact is expected to be *low*.

Operational phase

The severity and significance of the visual impact for the proposed deviation of the powerline on motorists will be low. The majority of the line traverses along secondary roads, with low volumes of traffic and motorists. The speed at which motorists travel has a moderating effect on the severity of the visual impact and further reduces visual exposure. Regular users and viewers are accustomed to existing powerlines which also mitigates the visual impact of the new proposed powerlines.

7. CUMULATIVE IMPACTS

The NEMA EIA Regulations of 2014 (GNR 326, 2017) determines under Appendix 1 that the Environmental Impact Report must include an assessment of each identified potentially significant impact and risks incl. (i) cumulative impacts.

Appendix 6 of the NEMA EIA Regulations, dictating the content requirements of Specialist Reports under section 1, subsection cA and cB, determines that the specialist report, amongst others, must also include a description of existing impacts on the application site including cumulative impacts of the proposed development and levels of acceptable change.

The NEMA EIA Regulations interprets cumulative impacts as 'determine the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.'

The EIA has traditionally focussed primarily on examining the direct environmental effects of a single development. Each development, when assessed on its own, may produce impacts that are socially acceptable. However, when the effects of the numerous single developments are combined, these impacts may become cumulatively significant.

There is a sustainable development imperative for decision makers to consider projects within the spatial context of other known and planned developments. The DFFE guideline for renewable energy projects sets the spatial extent for the EIA cumulative assessment stating that other similar large-scale projects must be considered within a 30km radius of the application.

Large-scale powerline infrastructure identified between the Pluto and Watershed Substations (substations nearest to the 14km deviation) within 30km radius of the project include:

1. Main Infrastructure:
    - 400 kV Pluto–Mahikeng transmission line (main trunk)
2. Substation nodes
    - Watershed MTS (existing hub)
    - Nguni (planned)
    - Watershed C (planned expansion)
    - Mahikeng (future major hub)
3. Sub-transmission
    - 132 kV double-circuit lines (renewable + regional feeders)
4. Grid integration
    - Links tied to Medupi integration network (regional reinforcement)

Table 11: Impact table for cumulative impact

Nature of the Impact		Impact Rating Criteria					
		Status	**Extent**	**Duration**	**Magnitude**	**Probability**	**Significance**
Cumulative visual impacts of proposed projects	Impact in isolation	Negative	2 Local	4 Long-term	6 Moderate	4 High	48 Moderate
	Cumulative impact	Negative	3 Regional	4 Long-term	6 Moderate	4 High	52 Moderate

Proposed mitigation measures include retaining the natural vegetation adjacent to the developments. If vegetation is removed or damaged, new endemic and indigenous vegetation should be re-established and rehabilitated.

8. RECOMMENDED MITIGATION MEASURES

The aim of mitigation is to reduce or alleviate the intrusive contrast between the proposed project components and activities, and the receiving landscape to a point where it is acceptable to visual and landscape receptors.

Mitigation measures as stated in Part B Section 1 of the Generic EMPR's for Powerline and Substations must be implemented.

8.1. GENERAL

- Where areas are going to be disturbed through the destruction of vegetation, for example the establishment of the construction camp, the vegetation occurring in the area to be disturbed must be salvaged and kept in a controlled environment such as a nursery, for future re-planting in the disturbed areas as a measure of rehabilitation.

8.2. TRANSMISSION TOWERS

- The preferred type of tower is the compact cross-rope suspension tower. This tower type is the most permeable and creates an extremely low degree of visual obstruction.

- Avoid changing the alignment's direction too often in order to minimise the use of the self-supporting strain tower. This tower type is the most visually intrusive as the steel lattice structure is denser than the other two tower types, hence creating more visual obstruction.
- Rehabilitate disturbed areas around pylons as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil.

8.3. ACCESS ROUTES

- Make use of existing access roads where possible.
- Where new access roads are required, the disturbance area should be kept to a minimum. A two-track dirt road will be the most preferred option.
- Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation.
- Avoid crossing over or through ridges, rivers, pans or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover.
- Maintain no or minimum cleared road verges.
- Access routes should be located on the perimeter of disturbed areas such as cultivated/fallow lands as not to fragment intact vegetated areas.
- If it is necessary to clear vegetation for a road, avoid doing so in a continuous straight line. Alternatively, curve the road in order to reduce the visible extent of the cleared corridor.

8.4. CLEARED SERVITUDES

- Locate the alignment and the associated cleared servitude so as to avoid the removal of established vegetation.
- Avoid a continuous linear path of cleared vegetation that would strongly contrast with the surrounding landscape character. Feather the edges of the cleared corridor to avoid a clearly defined line through the landscape.

8.5. CONSTRUCTION CAMPS AND LAY DOWN YARDS

- If practically possible, locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation like for example naturally bare areas.
- Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors.
- Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance.
- Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2m height.
- Keep the construction camps away from existing residents and especially lodges and tourist venues.

9. SPECIALIST OPINION AND CONCLUSION

The Visual Impact Assessment for the 14km deviation of the 400kV Pluto-Mahikeng powerline has been informed by the approved Environmental Authorisation, Environmental Impact Assessment, specifically the Visual Impact Assessment Report for the entire line, and the Screening Tool Report.

The assessment has focussed on changes to the visual environment since the initial Environmental Authorisation was granted and it can be confirmed that no major changes have occurred since the original authorisation and no additional mitigation measures are required.

The proposed 14km deviation of the Pluto-Mahikeng 400kV powerline and associated infrastructure has been evaluated against internationally accepted criteria to determine the impact they will have on the landscape character and the viewers that have been identified in the study area.

The impact of the proposed activities on visual receptors varies between residents, tourists and motorists. The proposed new power line traverses' gently sloping landscape with little ability to absorb the visual impact. The landscape has relatively few residents that will be impacted as the majority of the line follows through agricultural land and open areas. Very few tourists visit the area and motorists mainly pass through.

If the mitigation measures are implemented and the recommendations are adhered to, the visual impact can be minimised.

Table 12: Evaluation of proposed activities for the 14km Deviation of the Pluto-Mahikeng 400kV Powerline

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
The visibility analyses consider worst-case scenarios, using line-of-sight, based on topography alone. The impacts for the construction phase are insignificant, while impacts for the operational phase are rated below.							
Visual Impact of proposed Activities							
14km Deviation to the Pluto-Mahikeng 400kV Powerline	No	Negative	2 (Local)	5 Permanent	6 Moderate	4 High	52 Moderate
	Yes	Negative	2 (Local)	5 Permanent	2 Low	4 High	36 Moderate

The Visual Impact Assessment Criteria for all activities as indicated in the table applies and is rated as per below:

Status of Impact:
The visual impact is assessed as either having a:

- Negative effect (i.e. at a cost to the environment),
- Positive effect (i.e. a benefit to the environment), or
- Neutral effect on the environment.

Scale/Extent of the Impact:

(1) Site (site only),
(2) Local (site boundary and immediate surrounds),
(3) Regional,

Duration of the Impact:
The length that the impact will last for is described as either:

(2) Short term (1-5 years),
(3) Medium term (5-15 years),
(4) Long term (ceases after the operational life span of the project),
(5) Permanent.

Magnitude of the Impact:
The intensity or severity of the impacts is indicated as either:

(2) Minor,
(4) Low,

(6) Moderate (environmental functions altered but continue),
(8) High (environmental functions temporarily cease), or
(10) Very high/unsure (environmental functions permanently cease).

Probability of Occurrence:
The likelihood of the impact actually occurring is indicated as either:
(1) Improbable (probability very low due to design or experience)
(2) Low probability (unlikely to occur),
(3) Medium probability (distinct probability that the impact will occur),
(4) High probability (most likely to occur), or
(5) Definite.

Significance of the Impact:
Based on the information contained in the points above, the potential impacts are assigned a significance rating (S). This rating is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact.
S= (E+D+M) P

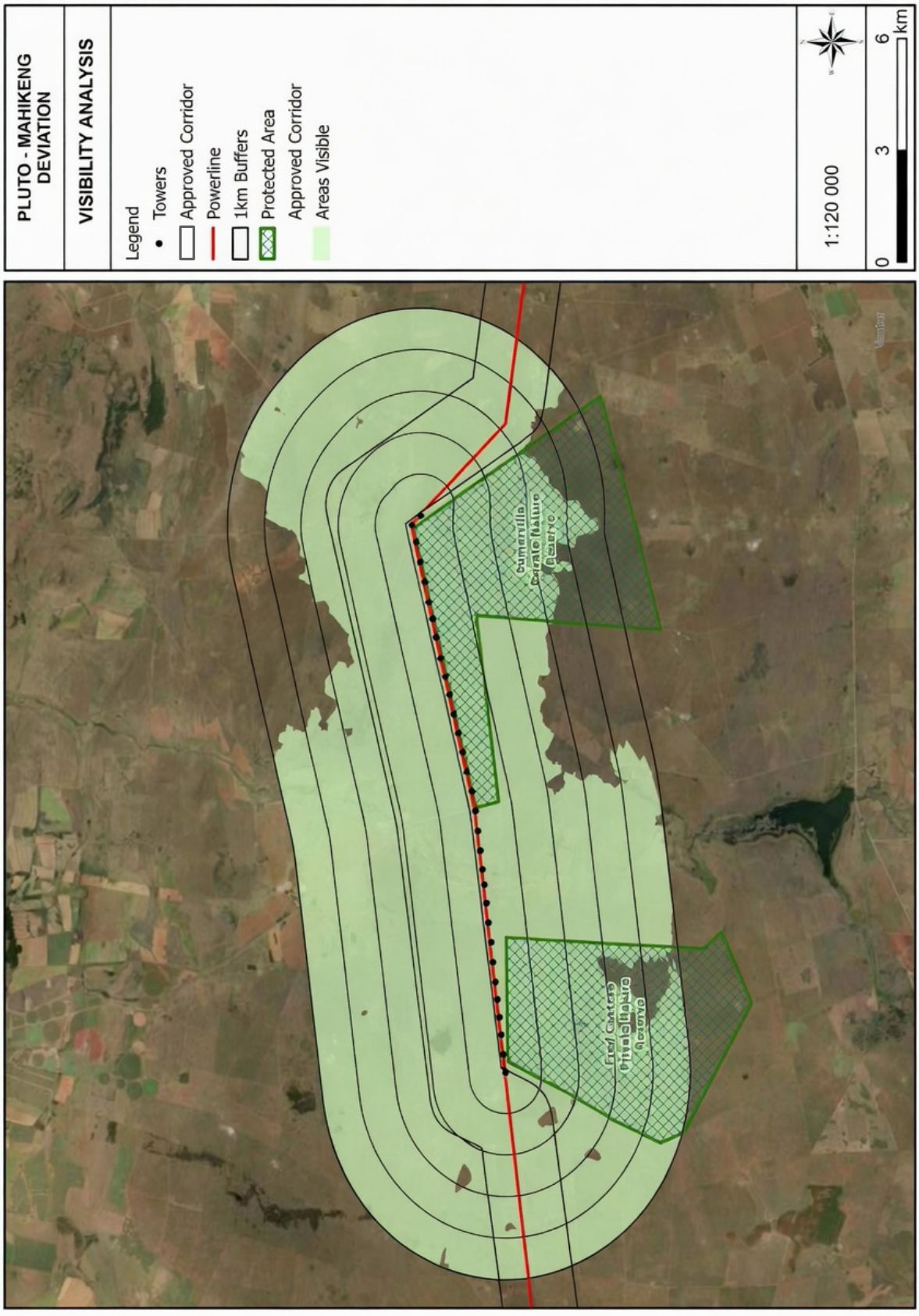
The significance ratings are given below

- (<20) Negligible Impact
- (20-40) Low Impact (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- (40-60) Moderate Impact (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- (>60) High Impact (i.e. where the impact must have an influence on the decision process to develop in the area).

APPENDIX 1

Figure 6 reflects the results of a visibility analysis, carried out using GIS software. The results provide a clear interpretation of the extent of the visual influence and also provide an indication of the land use that can be expected in the affected areas.

Figure 6: Visibility Analysis: Pluto-Mahikeng 400kV Power Line Deviation



GLOSSARY OF TERMS

Aesthetics	The science or philosophy concerned with the quality of sensory experience. (ULI, 1980)
Horizon contour	A line that encircles a development site and that follows ridgelines where the sky forms the backdrop, and no landform is visible as a background. This is essentially the skyline that when followed through the full 360-degree arc as viewed from a representative point on the site defines the visual envelope of the development. This defines the boundary outside which the development would not be visible.
Landscape characterisation/ character	This covers the gathering of information during the desktop study and field survey work relating to the existing elements, features, and extent of the landscape (character). It includes the analysis and evaluation of the above and the supporting illustration and documentary evidence.
Landscape condition	Refers to the state of the landscape of the area making up the site and that of the study area in general. Factors affecting the condition of the landscape can include the level maintenance and management of individual landscape elements such as buildings, woodlands etc and the degree of disturbance of landscape elements by non-characteristics elements such as invasive tree species in grassland or car wrecks in a field.
Landscape impact	Changes to the physical landscape resulting from the development that include the removal of existing landscape elements and features, the addition of new elements associated with the development and altering of existing landscape elements or features in such a way as to have a detrimental effect on the value of the landscape.
Landscape unit	A landscape unit can be interpreted as an "outdoor room" which are enclosed by clearly defined landforms or vegetation. Views within a landscape unit are contained and face inward.
Sense of place	That distinctive quality that makes a particular place memorable to the visitor, which can be interpreted in terms of the visual character of the landscape. A more emotive sense of place is that of local identity and attachment for a place "*which begins as undifferentiated space* [and] *becomes place as we get to know it better and endow it with value*" (Tuan 1977)[1].
Viewer exposure	The extent to which viewers are exposed to views of the landscape in which the proposed development will be located. Viewer exposure considers the visibility of the site, the viewing conditions, the viewing distance, the number of viewers affected the activity of the viewers (tourists or workers) and the duration of the views.
Viewer sensitivity	The assessment of the receptivity of viewer groups to the visible landscape elements and visual character and their perception of visual quality and value. The sensitivity of viewer groups depends on their activity and awareness within the affected landscape, their preferences, preconceptions and their opinions.

[1] Cited in Climate Change and Our 'Sense of Place', http://www.ucsusa.org/greatlakes/glimpactplace.html

Visual absorption capacity (VAC)	The inherent ability of a landscape to accept change or modification to the landscape character and/or visual character without diminishment of the visual quality or value, or the loss of visual amenity. A high VAC rating implies a high ability to absorb visual impacts while a low VAC implies a low ability to absorb or conceal visual impacts.
Visual amenity	The notable features such as hills or mountains or distinctive vegetation cover such as forests and fields of colour that can be identified in the landscape and described. Also included are recognised views and viewpoints, vistas, areas of scenic beauty and areas that are protected in part for their visual value.
Visual character	This addresses the viewer response to the landscape elements and the relationship between these elements that can be interpreted in terms of aesthetic characteristics such as pattern, scale, diversity, continuity and dominance.
Visual contour	The outer perimeter of the visual envelope determined from the site of the development. The two-dimensional representation on plan of the horizon contour.
Visual contrast	The degree to which the physical characteristics of the proposed development differ from that of the landscape elements and the visual character. The characteristics affected typically include: • Volumetric aspects such as size, form, outline and perceived density. • Characteristics associated with balance and proportion such scale, diversity, dominance, continuity. • Surface characteristics such as colour, texture, reflectivity; and • Luminescence or lighting.
Visual envelope	The approximate extent within which the development can be seen. The extent is often limited to a distance from the development within which views of the development are expected to be of concern.
Visual impact	Changes to the visual character of available views resulting from the development that include obstruction of existing views; removal of screening elements thereby exposing viewers to unsightly views; the introduction of new elements into the view shed experienced by visual receptors and intrusion of foreign elements into the view shed of landscape features thereby detracting from the visual amenity of the area.
Visual impact assessment	A specialist study to determine the visual effects of a proposed development on the surrounding environment. The primary goal of this specialist study is to identify potential risk sources resulting from the project that may impact on the visual environment of the study area, and to assess their significance. These impacts include landscape impacts and visual impacts.
Visual quality	An assessment of the aesthetic excellence of the visual resources of an area. This should not be confused with the value of these resources where an area of low visual quality may still be accorded a high value. Typical indicators used to assess visual quality are vividness, intactness and unity. For more descriptive assessments of visual quality attributes such as variety, coherence, uniqueness, harmony, and pattern can be referred to.

Visual receptors	Includes viewer groups such as the local community, residents, workers, the broader public and visitors to the area, as well as public or community areas from which the development is visible. The existing visual amenity enjoyed by the viewers can be considered a visual receptor such that changes to the visual amenity would affect the viewers.
Zone of visual influence	The extent of the area from which the most elevated structures of the proposed development could be seen and may be considered to be of interest (see visual envelope).

LEVEL OF CONFIDENCE

Table 13: Confidence level chart and description

CONFIDENCE LEVEL CHART				
		Information, knowledge and experience of the **project**		
		3b	2b	1b
Information, and knowledge of the **study area**	3a	9	6	3
	2a	6	4	2
	1a	3	2	1

3a – A *high* level of information is available of the **study area** in the form of recent aerial photographs, GIS data, documented background information and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.

2a – A *moderate* level of information is available of the **study area** in the form of aerial photographs GIS data and documented background information, and a moderate knowledge base could be established during site visits, surveys etc. Accessibility to the study area was acceptable for the level of assessment.

1a – *Limited* information is available of the **study area,** and a poor knowledge base could be established during site visits and/or surveys, or no site visit and/or surveys were carried out.

3b – A *high* level of information and knowledge is available of the **project** in the form of up-to-date and detailed engineering/architectural drawings, site layout plans etc. and the visual impact assessor is well experienced in this type of project and level of assessment.

2b – A *moderate* level of information and knowledge is available of the **project** in the form of conceptual engineering/architectural drawings, site layout plans etc. and/or the visual impact assessor is moderately experienced in this type of project and level of assessment.

1b – *Limited* information and knowledge is available of the **project** in the form of conceptual engineering/architectural drawings, site layout plans etc. and/or the visual impact assessor has a low experience level in this type of project and level of assessment. (Adapted from Oberholzer. B, 2005)

VISUAL RECEPTOR SENSITIVITY

Table 14: Visual receptor sensitivity

VISUAL RECEPTOR SENSITIVITY	DEFINITION (BASED ON THE GLVIA 2ND ED PP90-91)
Exceptional	Views from major tourist or recreational attractions or viewpoints promoted for or related to appreciation of the landscape, or from important landscape features.
High	Users of all outdoor recreational facilities including public and local roads or tourist routes whose attention or interest may be focussed on the landscape. Communities where the development results in changes in the landscape setting or valued views enjoyed by the community. Residents with views affected by the development.
Moderate	People engaged in outdoor sport or recreation (other than appreciation of the landscape);
Low	People at their place of work or focussed on other work or activity. Views from urbanised areas, commercial buildings or industrial zones. People travelling through or passing the affected landscape on transport routes.
Negligible (Uncommon)	Views from heavily industrialised or blighted areas

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SPECIALIST CV

Curriculum Vitae

Kathrin Hammel-Louw

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Personal Information

Surname: Hammel-Louw

Name: Kathrin

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Tertiary Education: University of Pretoria

Degree completed: *Baccalaureus Scientiae in Landscape Architecture (BSc L.Arch) in 2001*

Degree completed: *Magister in Landscape Architecture (ML(Prof)) in 2003*

Publications: Landscape SA; May/June 2013 No.53; Onderstepoort Residence Campus

Landscape SA; March/April 2015 No.64; University of Pretoria: Men's Residence New Walkway

ProLandscaper Nov/Dec 2015 "Walk this Way".

Awards: ILASA Award of Excellence 2015: University of Pretoria TuksMonate Dining Hall and Promenade

Just Trees Awards 2015: Best use of trees in a landscape design for the University of Pretoria TuksMonate Dining Hall and Promenade

Additional Qualifications: NQF Level 7 EPWP Extended Public Works Certificate: Develop and promote labour-intensive construction strategies.

Professional Activities: Professional Member of the *South African Council for the Landscape Architectural Profession* (SACLAP Registration Number: 20162)

Member of ILASA (Institute for Landscape Architects of South Africa)

Work Experience: **1. Outline Landscape Architects**

Member and Professional Landscape Architect (From July 2009 to date)

Outline Landscape Architects has been working on the following Visual Impact Assessments and Tourism Impact Assessments:

Recent Visual Impact Assessment:

- NTCSA Aurora-Juno 2nd 765kV Powerline, Western Cape
- NTCSA Perseus-Zeus Powerline, Mpumalanga to Free State Province
- NTCSA Gamma-Grassridge Powerline, Northern Cape and Eastern Cape Province
- Khanyazwe Flexpower Gas-to-Power Plant, Malelane, Mpumalanga
- Mulilo Solar and BESS Developments, Beaufort West, Springbok, Kenhardt, Upington, Lime Acres, Potchefstroom, Carletonville, Vanderbijlpark
- Eskom Poseidon 400kV MTS, Visrivier, Eastern Cape
- Mmbebane Township, Thabazimbi, Limpopo Province
- Two Rivers Mine Infrastructure Expansion, Steelpoort, Limpopo Province
- Springs Hybrid Hydrogen Electricity Facility, Springs, Gauteng
- Allied Green Energy Solar Farms, Koedoeskop, Limpopo Province
- Eskom Aries-Kronos 400kV Powerline Deviation Eskom, Northern Cape
- Eskom Sorata MTS Strengthening Project, Free State and Kwa-Zulu Natal
- Eskom Hydra-Kronos 400kV Powerline, Northern Cape
- Eskom Foskor-Merensky Visual Impact Assessment Report, Limpopo
- Eskom Butterworth-Idutywa 132kV Powerline, Eastern Cape
- Eskom Mercury-Umtu 765kV Powerline, North-West & Northern Cape Province
- Reebok Hotel Development Visual Impact Assessment Report, Mossel Bay, Western Cape
- DNG Gas-to-Power Facilities and Associated Infrastructure in Coega, Mossel Bay and Malelane
- Exxaro Belfast and Dorstfontein Expansion Project and New Railway Siding, Emalahleni Local Municipality, Mpumalanga Province
- Eskom Aggeneis - Helios 400kV Powerline, Northern Cape

Recent Tourism Assessment:

- NTCSA Gamma-Grassridge Powerline, Northern Cape and Eastern Cape Province
- Khanyazwe Flexpower Gas-to-Power Plant, Malelane, Mpumalanga
- Eskom Aries-Kronos 400kV Powerline Deviation Eskom, Northern Cape
- Reebok Hotel Development Eco-Tourism Impact Assessment Report, Mossel Bay, Western Cape
- Eskom Foskor-Merensky Tourism Impact Assessment Report, Limpopo

2. Gemma Landscape Architects
Principal Landscape Architect (December 2007 – June 2009)
3. Newtown Landscape Architects
Landscape Architect (January 2004 – June 2004 and January 2005 – December 2007)
4. Faktorgruen Landschaftsarchitekten Buero, Rottweil, Germany
Candidate Landscape Architect (June 2004 – December 2004)

Part-time Work: **UP Department of Architecture (2009-2014)**
ONT 202 Design Studio Assistant, PWT 312 Planting Design Lecturer