



forestry, fisheries & the environment

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REPUBLIC OF SOUTH AFRICA

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SPECIALIST DECLARATION FORM – AUGUST 2023

Specialist Declaration form for assessments undertaken for 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)

REPORT TITLE

BASIC ASSESSMENT PROCESS AND WATER USE LICENSE APPLICATION FOR THE PROPOSED CONSTRUCTION OF THE IMPALA ZIRCON TEMPORARY BY-PASS 132KV LINE WITH ASSOCIATED INFRASTRUCTURE WITHIN THE UMHLATHUZE MUNICIPALITY IN KWA-ZULU NATAL

Kindly note the following:

1. This form must always be used for assessment that are in support of 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 August 2023. 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.dffe.gov.za/documents/forms>.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with 'the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the act, when applying for environmental authorisation - GN 320/2020', where applicable.

1. SPECIALIST INFORMATION

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SPECIALIST DECLARATION FORM – AUGUST 2023

2. DECLARATION BY THE SPECIALIST

I, Kathrin Hammel-Louw declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. “the Protocols”) and in Government Notice No. 1150 of 30 October 2020.
- 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 NEMA Act.



Signature of the Specialist

Outline Landscape Architects

Name of Company:

02 Jul 2026

Date

SPECIALIST DECLARATION FORM – AUGUST 2023

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, _ Kathrin Hammel-Louw_____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

Outline Landscape Architects

Name of Company

2026/07/02

Date



Signature of the Commissioner of Oaths

02 Jul 2026

Date

**BASIC ASSESSMENT PROCESS AND WATER USE LICENSE APPLICATION FOR THE PROPOSED
CONSTRUCTION OF THE IMPALA ZIRCON TEMPORARY BY-PASS 132KV LINE WITH ASSOCIATED
INFRASTRUCTURE WITHIN THE UMHLATHUZE MUNICIPALITY IN KWA-ZULU NATAL**



**VISUAL IMPACT ASSESSMENT
PREPARED FOR:**



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APRIL 2026

OUTLINE REF: VIA IZ

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EXECUTIVE SUMMARY

Selahle Consultancy and Projects (SCP) has been appointed by Eskom to undertake the Basic Assessment (BA) and Water Use License Application (WULA) for the proposed construction of the Impala-Zircon Temporary By-Pass 132kV Line with associated infrastructure within the Umhlathuze Municipality in Kwa-Zulu Natal.

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 that addresses the visual effects of the proposed by-pass of the 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.

The Impala-Zircon powerline is about 10km from the coast and is exposed to both industrial and coastal pollution. Due to the close proximity to the coast, this line is experiencing severe corrosion on tower members and deterioration on tower foundations. A bypass is required in order to continue with the major maintenance of the line and reduce the number of outages required.

A temporary 6.01km 132kv line bypass using triple wood pole structures will be constructed. The bypass will be in use for a period of 3 years. The bypass will be built on wooden poles as a temporary option which will allow the construction of the main line.

The overall landscape is a relatively flat plain of agricultural crops. The dominant land uses are sugar cane cultivation and timber plantations.

Madlankala and Bhiliya are two smaller residential areas within the study area, where viewers may be visually affected by the temporary by-pass of the powerline. These areas are degraded and polluted, with no visual cohesion.

The Visual Impact Assessment for the temporary by-pass of the 132kV Impala-Zircon 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 temporary by-pass of the power line traverses' flat landscape with moderate ability to absorb the visual impact. The landscape has residents that may be impacted, but the majority of the line follows through agricultural land and cultivated 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.

SITE SENSITIVITY VERIFICATION

The national screening tool report for the site was generated 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
Impala-Zircon Temporary By-pass of 132kV Powerline	N/A	Medium to Low	Section 6

Evaluation of proposed activities for the temporary by-pass of the Impala-Zircon 132kV 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							
Impala-Zircon Temporary By-pass of 132kV Powerline	No	Negative	2 (Local)	3 Medium	6 Moderate	4 High	44 Moderate
	Yes	Negative	2 (Local)	3 Medium	2 Low	4 High	28 Low

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 <i>“Visual Impact Assessment for High Projects”</i> 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 <i>gazetted</i> 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

Selahle Consultancy and Projects (SCP) has been appointed by the Eskom to undertake the Basic Assessment (BA) and Water Use License Application (WULA) for the proposed construction of the Impala-Zircon Temporary By-Pass 132kV Line with associated infrastructure within the Umhlathuze Municipality in Kwa-Zulu Natal.

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

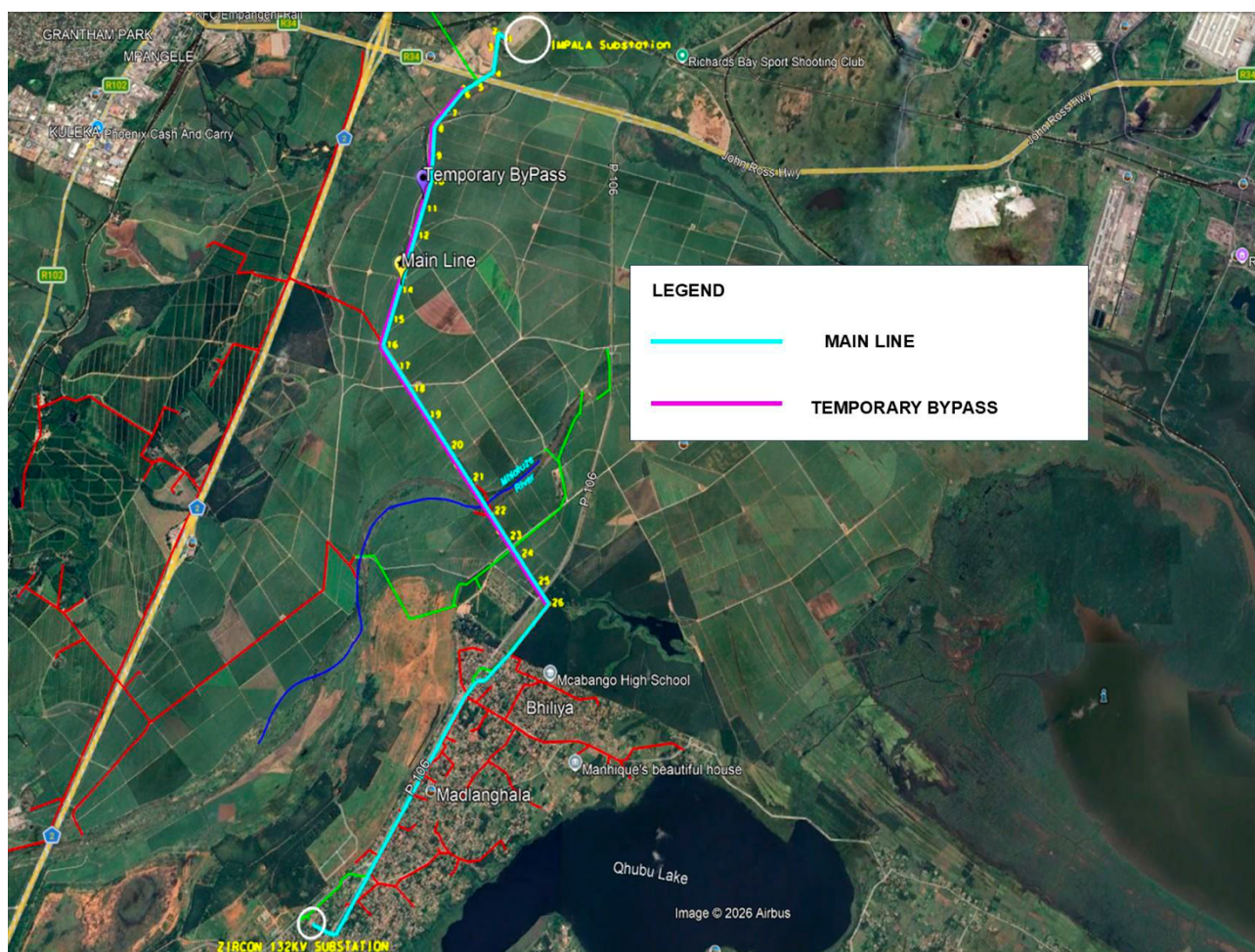
This report investigates if the deviation indicates any material changes that have occurred since the original authorisation and whether additional mitigation measures are required.

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 Umhlathuze Municipality in Kwa-Zulu Natal. The site is between Richards Bay and Empangeni. The proposed 6km temporary by-pass runs in a south-easterly direction from the N2, crossing cultivated fields, across the secondary P106 road and ends just north of Lake Qube. The temporary by-pass is proposed alongside the existing 132kV powerline (Figure 1).

Figure 1: Locality Plan

2. STUDY APPROACH

2.1. INFORMATION BASE

This assessment was based on information from the following sources:

- Topographical maps, Google Earth Imagery and GIS generated data were sourced from the Surveyor General, and EcoGIS (2026) respectively.
- A site visit.
- 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 deviation.
- 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

Impala Zircon 132kV Line is in the Empangeni Sector under Richards Bay CNC. The total line length (T1 - T44) is approximately 10,582 km but Eskom is only responsible for about 7.6km of this line (T1-T29). The rest of the line (T30 - T44) belongs to the uMhlathuze Municipality.

Impala Zircon 132kV line is a radial line with no back feeding capabilities, with a customer base of 6062. It feeds Cygnus Substation which supplies all the Esikhaweni networks, uMhlathuze Municipality and Lake Qube water pump (LPU).

The line is about 10km from the coast and is exposed to both industrial and coastal pollution. Due to the close proximity to the coast this line is experiencing severe corrosion on tower members and deterioration on tower foundations. A bypass is required in order to continue with the Major Maintenance of the line and reduce the number of outages required.

A temporary 6.01km 132kv line bypass using triple wood pole structures will be constructed. The bypass will be in use for a period of 3 years. The bypass will be built on wooden poles as a temporary option which will allow the construction of the main line. The main line is due for major maintenance and is critically operated with potential safety impact to people, environment, and plantations.

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. 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 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 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
Impala-Zircon Temporary By-pass of 132kV Powerline	N/A	Medium to Low	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 broad-scale vegetation type is historically Maputoland Coastal Belt and Non-terrestrial (Estuarine Functional Zone) which consists of marsh vegetation (Figure 2). There is no natural vegetation remaining.

The study area consists generally of cultivated fields and plantations. Sugar cane is the dominant crop and thrives in the fertile soils.

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 relatively flat plain of agricultural crops. The dominant land uses are sugar cane cultivation and timber plantations.

Madlankala and Bhiliya are two smaller residential areas within the study area, where viewers may be visually affected by the temporary by-pass of the powerline. These areas are degraded and polluted, with no visual cohesion.

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 cultivated landscapes and relatively flat landscape. The general vegetation is of medium height, especially when the sugar cane is mature. There are large evergreen trees along roads and between houses in the township that provide screening for the proposed development.

The study area has undergone major changes due to human intervention. There are very few small pockets left of pristine landscape which remain under constant pressure by infrastructure expansion.

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
2	2	3	Low

The low visual quality can be attributed to the large expanses of developed landscapes 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
2	1	2	Medium

The VAC of the study area is considered medium and provides moderate overall screening capacity for this project. The medium VAC relates to the gently sloping topography with evergreen trees that may provide screening.

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

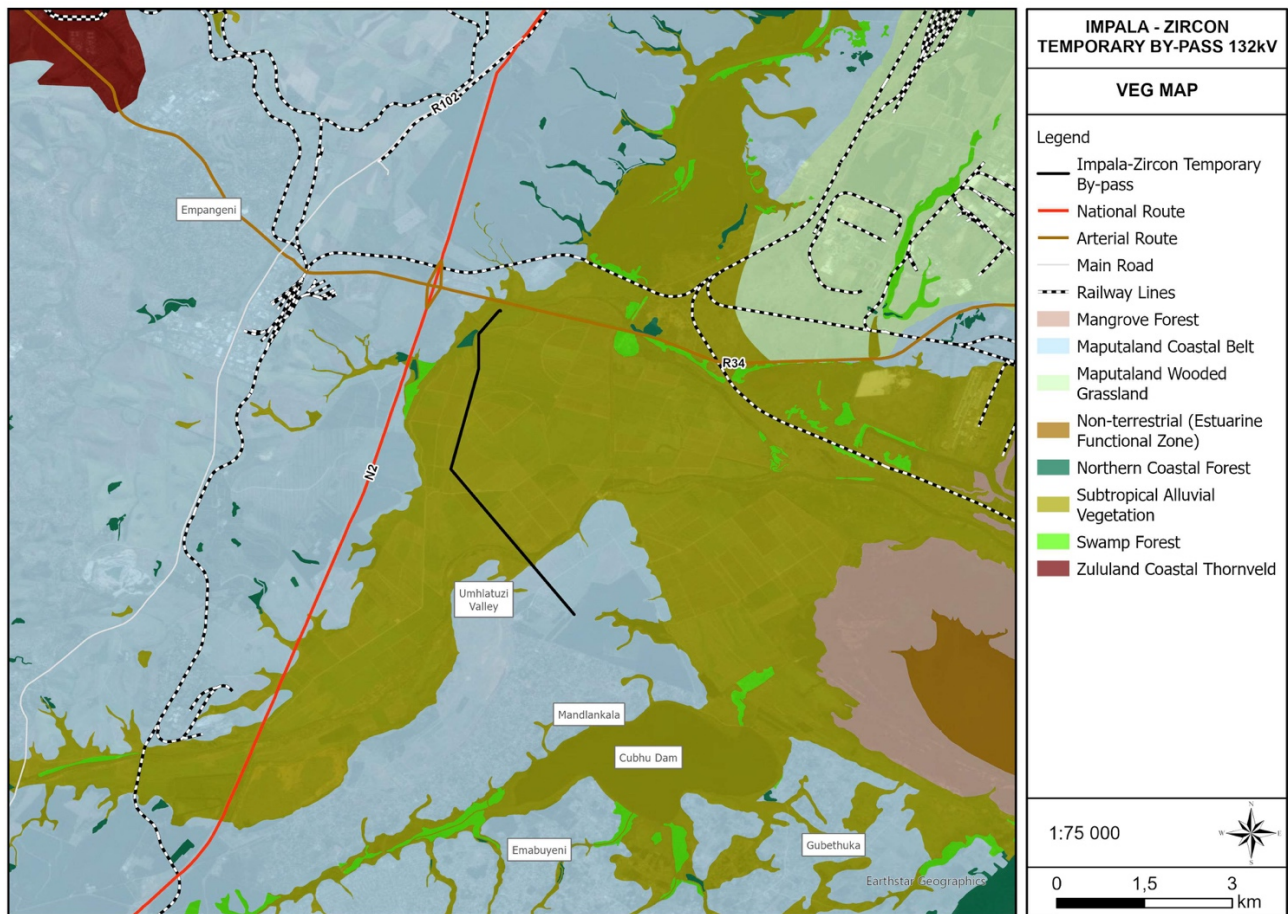


Figure 3: Elevation Map

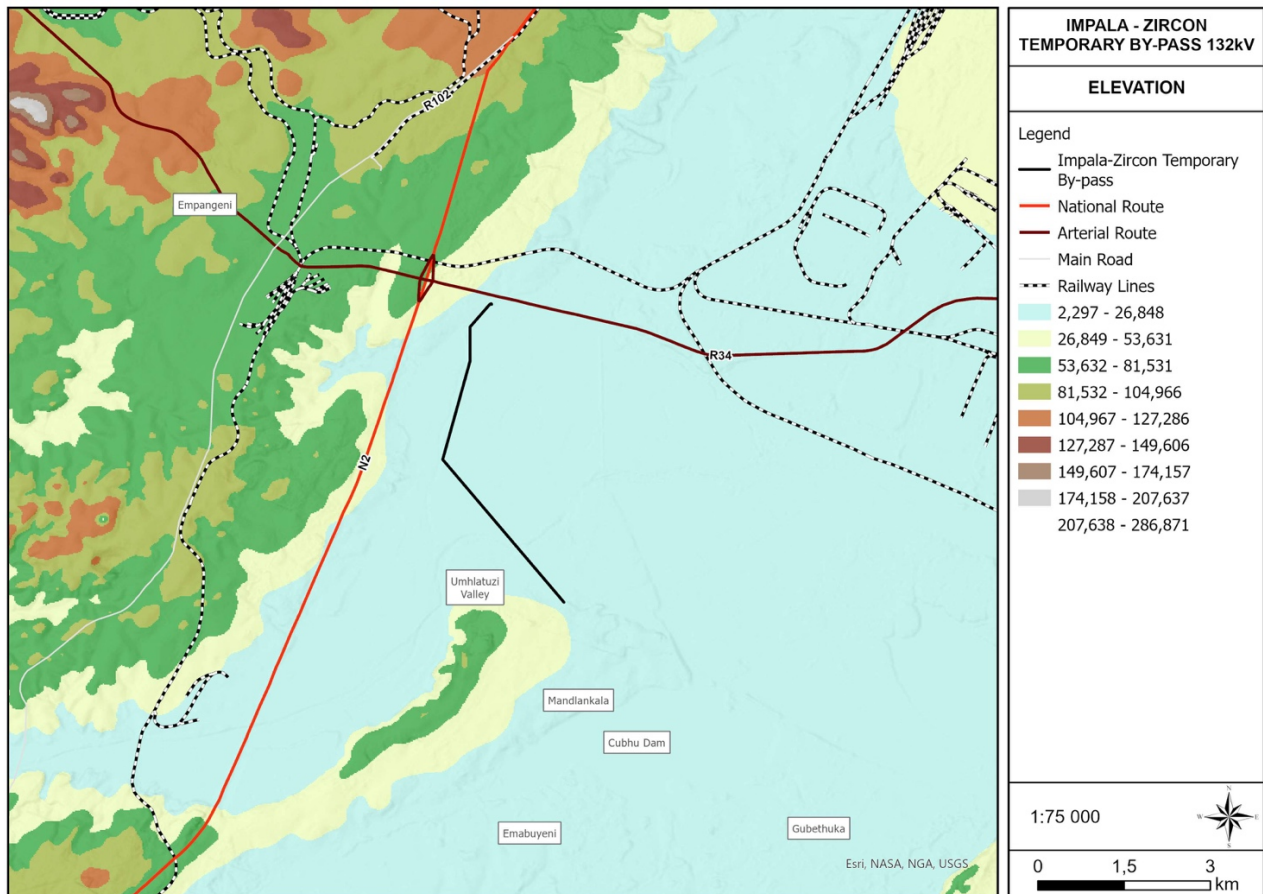


Figure 4: Land Cover Map

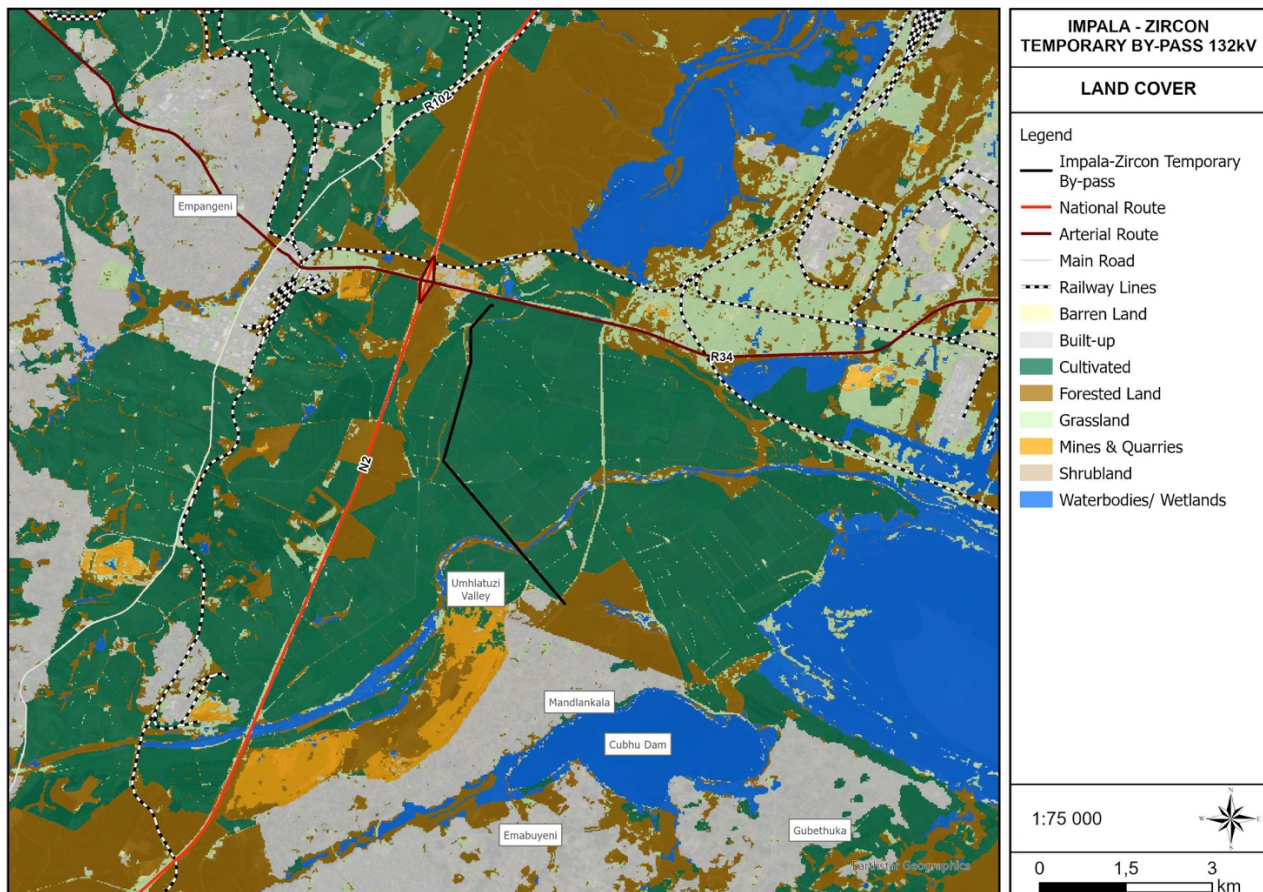


Figure 5: Landscape Character and Visual Observations



Impala Substation



View south towards the site from the R34 with crossing of existing Impala-Zircon powerlines



View to the north from R34 – existing powerlines



View towards the west from the N2



Landscape character – existing powerlines crossing sugar cane fields





View from P106 towards Madlankala



Existing Impala-Zircon 22kV powerline in Madlankala



View towards the south at crossing of P106



View towards the north of the existing powerline from the P106

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 to low landscape character sensitivity due to the industrial and agricultural 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. Generally, the vegetation cover is of medium height crops and large trees, which will provide moderate visual screening for the proposed power line and therefore a medium to low VAC can be expected.

There has been a lot of human induced activities and interventions that 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.

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 low 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								
Impala-Zircon Temporary By-pass of 132kV Powerline	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	Temporary	Medium	Probable	Moderate	Low	High
Operational phase								
Impala-Zircon Temporary By-pass of 132kV Powerline	Negative Impact on the visual quality of the landscape due to the presence of a power line.	Localised impact	Temporary	Medium	Definite	Moderate	Low	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. 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. The exposed soil and change in texture will contrast severely with the intact vegetation around the disturbance footprint and servitudes.

Considering the moderate VAC throughout most of the study area, the developed condition of great parts of the landscape and the crop vegetation, which is replanted regularly, the *severity of landscape impact* during the construction stage is expected to be *moderate* for the proposed by-pass. Surface disturbances can be minimised through, for example, utilising existing roads.

The *severity of the landscape impact* can however be mitigated to a low severity for the proposed by-pass. 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 vertical scale of the towers (20m for the proposed 132kV power line) will not easily be absorbed into the relatively flat landscape character that prevails through most of the study area.

The cultivated landscape character and moderately high vegetation allow for some absorption of the towers into the landscape. The by-pass is a replacement of an existing line. This acts as a mitigating factor as viewers are already accustomed to the presence of the power line. The quality of the landscape will be minimally affected with the presence of a by-pass of the power line of this scale and extent.

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 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 distribution 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 temporary by-pass.

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								
Impala-Zircon Temporary By-pass of 132kV Powerline	Negative – Construction camp and lay-down yard may cause unsightly views	Local	Temporary	Moderate	Probable	Moderate	Low	High
Operational phase								
Impala-Zircon Temporary By-pass of 132kV Powerline	Negative – The presence of a power line intrudes on existing views and spoils the open panoramic views of the landscape.	Local	Temporary	Moderate	Definite	Moderate	Low	High

The study area is located between the highly populated towns of Richards Bay and Empangeni, but these residents are a distance further than 3km away from the proposed deviation of the power line. The temporary by-pass ends approximately 600m north of Madlankala.

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 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

The existing power line traverses through Madlankala. Residents are already accustomed to the presence of a power line in their views, and this acts as a mitigating factor.

The Visual Absorption Capacity (VAC) of the landscape of the proposed power line by-pass is moderate and does slightly decrease the severity of the visual impact (*Bishop et al, 1985*) by creating a backdrop. The timber frames of the towers 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 mostly flat topography with cultivated fields with medium-growing crops and some large evergreen trees that can provide screening. 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								
Impala-Zircon Temporary By-pass of 132kV Powerline	Negative – Construction camp and lay-down yard may cause unsightly views	Local	Temporary	Low	Probable	Low	Low	High
Operational phase								
Impala-Zircon Temporary By-pass of 132kV Powerline	Negative – The presence of a power line intrudes on existing views and spoils the open panoramic views of the landscape.	Local	Temporary	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.

Even though Richards Bay is a coastal town, it has an industrial character due to large industries and the port.

No tourist establishments were identified within the study area of the proposed temporary by-pass 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. 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. The proposed temporary by-pass 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 tourist destinations, 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								
Impala-Zircon Temporary By-pass of 132kV Powerline	Negative – Construction camp and lay-down yard may cause unsightly views	Local	Temporary	Moderate	Probable	Moderate	Low	High
Operational phase								
Impala-Zircon Temporary By-pass of 132kV Powerline	Negative – The presence of a power line intrudes on existing views and spoils the open panoramic views of the landscape.	Local	Temporary	Moderate	Definite	Moderate	Low	High

Public views to the proposed by-pass of the power line are along the main roads. The main road in the study area is the N2 and the R34 connecting Richards Bay to Empangeni. A secondary road, the P106, leads to Madlankala, and runs parallel to the proposed by-pass of the powerline. The N2 also runs parallel to the powerline but the powerline is approximately 1km to the east of the road. The existing Impala-Zircon powerline crosses the R34 and the temporary by-pass starts 150m south of the R34.

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.

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 temporary by-pass of the powerline on motorists will be low. Regular users and viewers are accustomed to the existing powerlines which mitigates the visual impact of the proposed temporary by-pass of powerlines. The speed at which motorists travel has a moderating effect on the severity of the visual impact and further reduces visual exposure.

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 within 30km radius of the project include:

Within an approximate 30 km radius of the Impala Substation and the associated Impala–Zircon 132 kV distribution corridor near Richards Bay, there is a dense concentration of major Eskom and industrial power infrastructure. The following large-scale infrastructure was identified:

Major Substations

- Impala 275kV Substation - primary regional distribution hub linked to Avon, Invubu, Zircon and industrial loads.
- Athene 400kV Substation - key 400 kV switching node serving the Richards Bay industrial complex.
- Zircon 132kV Substation - connected directly via the Impala/Zircon 132 kV line.
- Invubu Substation — integrated into the regional 400 kV distribution network.

- Ngoye 88kV Substation
- Empangeni 132kV Substation
- Logan 132kV Substation

Major Transmission and Distribution Lines Identified

The Eskom distribution mapping around Richards Bay shows several high-capacity corridors intersecting or running close to the Impala–Zircon line:

- Impala / Zircon 132 kV Line
- Impala / Invubu 275 kV Lines (1 & 2)
- Avon / Impala 275 kV Lines (1 & 2)
- Athene / Pegasus 400 kV Lines (1 & 2)
- Athene / Invubu 400 kV Line
- Athene / Umfolozi 400 kV Line
- Alusaf Hillside / Athene 132 kV Line
- Cygnus / Zircon 132 kV Line
- Impala / Nseleni 132 kV Line

Heavy Industrial Power Consumers / Embedded Infrastructure

Large industrial users and dedicated substations within the same distribution zone include:

- Alusaf Hillside 132kV Substation linked to the Hillside aluminium smelter complex.
- Alusaf Bayside 132kV Substation
- Richards Bay Coal Terminal industrial supply corridor.
- South32 Hillside Aluminium with extremely high electrical demand (~1100 MW reported historically).

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	4 Low	4 High	40 Moderate
	Cumulative impact	Negative	2 Local	4 Long-term	4 Low	4 High	40 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. 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 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.

8.3. 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.

8.4. 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.

9. SPECIALIST OPINION AND CONCLUSION

The Visual Impact Assessment for the temporary by-pass of the 132kV Impala-Zircon 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 temporary by-pass of the power line traverses' flat landscape with moderate ability to absorb the visual impact. The landscape has residents that may be impacted, but the majority of the line follows through agricultural land and cultivated 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 6km Temporary By-pass of the Impala-Zircon 132kV 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							
Impala-Zircon Temporary By-pass of 132kV Powerline	No	Negative	2 (Local)	3 Medium	6 Moderate	4 High	44 Moderate
	Yes	Negative	2 (Local)	3 Medium	2 Low	4 High	28 Low

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.

$$S = (E + D + M) P$$

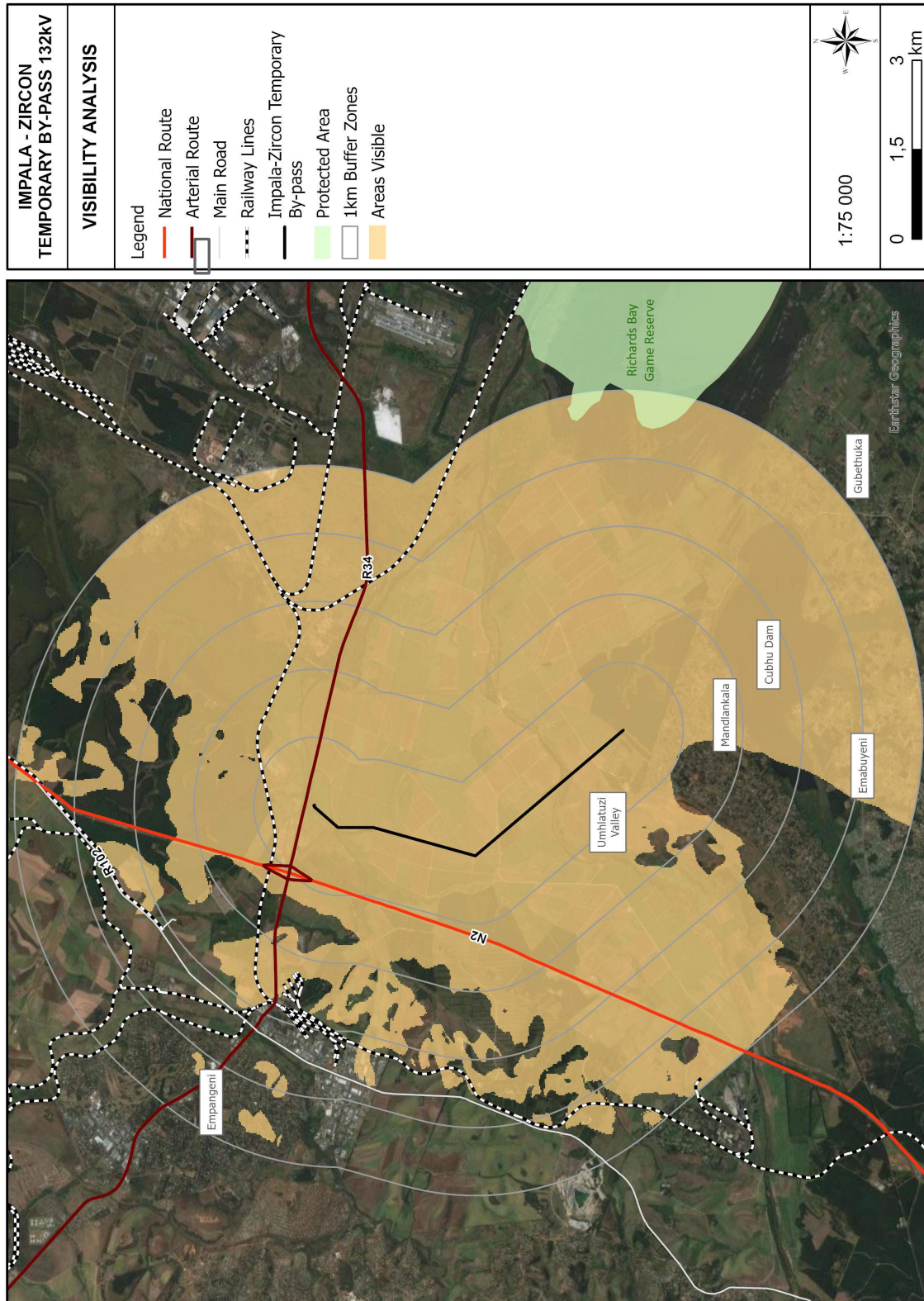
The significance ratings are given below

- (<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: Impala-Zircon 132kV Temporary By-Pass Power Line



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 “ <i>which begins as undifferentiated space [and] becomes place as we get to know it better and endow it with value</i> ” (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		
Information, and knowledge of the study area		3b	2b	1b
	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

REFERENCES

- Low, B and Rebelo, G. 1998. Vegetation of South Africa, Lesotho and Swaziland. Department of Environmental Affairs and Tourism, Pretoria.
- BLM (Bureau of Land Management). (1986). Handbook H-8431-1, Visual Resource Contrast Rating. U.S. Department of the Interior BLM. <http://www.blm.gov/nstc/VRM/vrmsys.html>
- Government Office of the Southwest - England (2006). Using landscape sensitivity for renewable energy. Revision 2010 – Empowering the region [Online]. http://www.oursouthwest.com/revision2010/lca_methodology_windbiomass.doc [Accessed 8 November 2006]
- Landscape Institute and the Institute of Environmental Assessment and Management. (2002). Guidelines for Landscape and Visual Impact Assessment (GLVIA). Second Edition, E & FN Spon Press.
- Oberholzer, B. (2005). Guideline for involving visual and aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 R. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.
- Swanwick, C. Department of Landscape, University of Sheffield and Land Use Consultants. (2002). Landscape Character Assessment: Guidance for England and Scotland. The Countryside Agency / Scottish Natural Heritage.
- Van Riet, W., Claassens, P., Van Rensburg, J., Van Viegen, T., Du Plessis, L. 1997. *Environmental Potential Atlas for South Africa*. The Department of Environmental Affairs and Tourism in conjunction with The Geographic Information Systems Laboratory CC and the University of Pretoria. J.L. van Schaik.
- Van Rooyen, M.W. 2002. Management of the old field vegetation in the Namaqua National Park, South Africa: conflicting demands of conservation and tourism. Published paper from *The Geographical Journal*, Vol. 168, No.3, September 2002, pp. 211-223.
- U.S.D.O.T., Federal Highway Administration, Office of Environmental Policy. (March 1981). Visual Impact Assessment for Highway Projects. U. S. Department of Transportation Washington D. C.
- Urban Land Institute, 1980. Visual Resource Management 0510-1: Environmental Comment (May 1980). Washington D.C.