

**ECO-TOURISM IMPACT ASSESSMENT FOR THE PROPOSED KHANYAZWE FLEXPPOWER PLANT PROJECT, MALELANE, WITHIN THE JURISDICTION OF THE NKOMAZI LOCAL MUNICIPALITY IN THE MPUMALANGA PROVINCE**

**PREPARED FOR:**



NSOVO ENVIRONMENTAL CONSULTING  
CONTACT: MUNYADZIWA RIKHOTSO  
TEL: 071 602 2369  
WEB: WWW.NSOVO.CO.ZA  
EMAIL: MUNYADZI@NSOVO.CO.ZA

**PREPARED BY:**



**OUTLINE LANDSCAPE ARCHITECTS cc**  
815 GOVERNMENT AVENUE  
EASTWOOD, PRETORIA  
0083

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## EXECUTIVE SUMMARY

Nsovo Environmental Consulting has been appointed by Khanyazwe Flexpower (Pty) Ltd as the independent environmental consultant to undertake the Environmental Impact Assessment (EIA) process for the proposed development of the Khanyazwe Flexpower Plant and associated infrastructure in Malelane within the jurisdiction of the Nkomazi Local Municipality in the Mpumalanga Province.

Outline Landscape Architects was requested to compile an Eco-Tourism Impact Assessment (TIA) for the project. This TIA is a specialist study that addresses the effects of the proposed development of the energy plant and associated infrastructure on tourism within the study area.

Khanyazwe Flexpower (Pty) Ltd (hereafter referred as KFP) is proposing to develop, construct and operate a (maximum) 800MW natural gas-fired power plant using either gas engines (of Internal Combustion Engines (ICE)) or Combined Cycle Gas Turbines (CCGT)). KFP will source gas from the Republic of Mozambique Pipeline Investments Company (ROMPCO), which has an existing gas pipeline that connects Mozambique's Pande Temane gas fields to Sasol's operations in South Africa, as well as several industrial and retail customers. Alternative sources of gas if gas from the existing Pande Temane fields is not sufficient may include imported LNG projects being developed by Matola, which is able to provide additional gas into the ROMPCO pipeline. KFP is proposing the development of approximately two 500m 275kV and 132kV overhead powerlines from the proposed power plant to the existing Eskom Khanyazwe substation. The power plant will provide a mid-merit power profile to the national grid.

The study area varies between pristine natural bushveld landscape and degraded rural villages and towns surrounding major mining centers.

The project components that may cause a potential negative impact on the aesthetics of the landscape, which may affect tourists, are construction camps, access roads, and power lines. The power lines cause the greatest intrusion on landscape views.

The impact on eco-tourism of the Khanyazwe Flexpower Plant has been evaluated and is regarded as having a moderate impact on tourism. The KFP is not in the direct line of sight of any eco-tourism establishment. Eco-tourism developments rely on wild, unspoilt landscapes and visitors do not want their views to be obstructed by industrial, large-scale powerline structures. The guesthouses close to the site are within suburban settings. The important views of the lodges and estates to the north on the banks of the Crocodile River are focused to the north into the Kruger National Park. Tourists may intermittently be exposed to the KFP, especially when travelling to their destinations.

The views from the Malelane Satellite Camp, within the Kruger National Park are towards the south onto Malelane town. Malelane has industries, including sugar mills, which will mitigate the presence of the new KFP plant.

If strict mitigation measures are implemented and the recommendations are adhered to, impact on eco-tourism can be minimised in the critical areas of the route.

### Evaluation of the Significance of Impacts on Eco-tourism

Issue	Corrective measures	Impact rating criteria					Significance
		Status	Extent	Duration	Magnitude	Probability	
<b>Impact on Existing Eco-Tourism Establishments</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	8 High	4 High	64 High
	Yes	Negative	3 (Regional)	5 Permanent	6 Moderate	4 High	56 Moderate
<b>Visual Impact on Tourists and Travelers</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	8 High	4 High	64 High
	Yes	Negative	3 (Regional)	5 Permanent	6 Moderate	4 High	56 Moderate
<b>Impact on Protected Areas</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	8 High	4 High	64 High
	Yes	Negative	3 (Regional)	5 Permanent	6 Moderate	4 High	56 Moderate
<b>Impact on Sense of Place</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	6 Moderate	3 Medium	42 Medium
	Yes	Negative	3 (Regional)	5 Permanent	4 Low	2 Low	24 Low
<b>Impact of Dust/Noise Pollution during Construction</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	6 Moderate	2 Low	30 Medium
	Yes	Negative	3 (Regional)	5 Permanent	4 Low	2 Low	24 Low
<b>Poaching of Animals</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	6 Moderate	3 Medium	42 Medium
	Yes	Negative	3 (Regional)	5 Permanent	4 Low	2 Low	24 Low

The following rating system was applied to each impact identified:

#### 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)
- Neutral effect on the environment

#### Extent of the Impact:

- (1) Site (site only),
- (2) Local (site boundary and immediate surrounds),
- (3) Regional,
- (4) National, or
- (5) International.

#### Duration of the Impact:

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

- (1) Immediate (<1 year)
- (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:

- (0) none,
- (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:

- (0) None (the impact will not occur),
- (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:

- (<30) low (i.e. where this impact would not have a direct influence on the decision to develop in the area)
- (30-60) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
- (>60) high (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**

<b>BEEP</b>	Biodiversity Environmental Education Programme
<b>CMC</b>	Co-Management Committee
<b>DEA</b>	Department of Environmental Affairs
<b>EIA</b>	Environmental Impact Assessment
<b>GIS</b>	Geographical Information Systems
<b>IDP</b>	Integrated Development Plan
<b>IES</b>	Integrated Ecotourism Solutions
<b>IMP</b>	Integrated Management Plan
<b>IUCN</b>	World Conservation Union (as commonly referenced)
<b>NAA</b>	National Accommodation Association
<b>RSA</b>	Republic of South Africa
<b>SANParks</b>	South African National Parks
<b>SAT</b>	South African Tourism
<b>TIA</b>	Eco-Tourism Impact Assessment

<b>VIA</b>	Visual Impact Assessment
<b>NEMA</b>	National Environmental Management Act, No 107 of 1998
<b>NEMBA</b>	National Environmental Management: Biodiversity Act, No. 10 of 2004
<b>NEMPAA</b>	National Environmental Management: Protected Areas Act, No. 57 of 2003
<b>NHRA</b>	National Heritage Resources Act, No. 25 of 1999
<b>WHCA</b>	World Heritage Convention Act, No. 49 of 1999

## 1. INTRODUCTION

Nsovo Environmental Consulting has been appointed by Khanyazwe Flexpower (Pty) Ltd as the independent environmental consultant to undertake the Environmental Impact Assessment (EIA) process for the proposed development of the Khanyazwe Flexpower Power Plant and associated infrastructure in Malelane within the jurisdiction of the Nkomazi Local Municipality in the Mpumalanga Province.

Outline Landscape Architects was appointed as an independent sub-consultant to complete an Eco-Tourism Impact Assessment. This Eco-Tourism Impact Assessment (TIA) is a specialist study that forms part of the EIA and addresses the impact of the proposed line on the eco-tourism industry and tourism establishments in the area.

Kathrin Hammel, the principal Landscape Architect and Eco-Tourism Impact Specialist from Outline Landscape Architects undertook this Eco-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 Eco-Tourism Impact Specialist since 2009.

Neither the author, nor Outline Landscape Architects will benefit from the outcome of the project decision-making.

### 1.1. BACKGROUND AND BRIEF

The Eco-Tourism Impact Assessment (TIA) focuses on the potential impacts of the Khanyazwe Flexpower on existing and future tourism operations in the project area. Tourists in the study area generally visit the area for stop-overs to the pristine, natural environments of the Kruger National Park and beaches in Mozambique.

This TIA will consider the following aspects:

- Determination of the status of tourism within and in close proximity to the study area.
- Description of the proposed project and the landscape quality of the environment.
- Identification and description of the eco-tourism industry of the study area.
- Identification of the attractions of particular tourism value and -quality that could be affected by the proposed project.
- Assessment of the significance of the impacts of the development on eco-tourism.
- Recommendations of mitigation measures to reduce and/or alleviate the potential adverse impacts on eco-tourism.

### 1.2. STUDY AREA

The proposed project will be in an urban area in Malelane town and is within agricultural lands, on Portions 1, 4, and 116 of Farm Malelane 389 FP, situated approximately 2 km away from the Kruger National Park and within 2 km of the Malelane Central Business District within the jurisdiction of the Nkomazi Local Municipality in the Mpumalanga Province of South Africa.



Figure 1: Locality Map

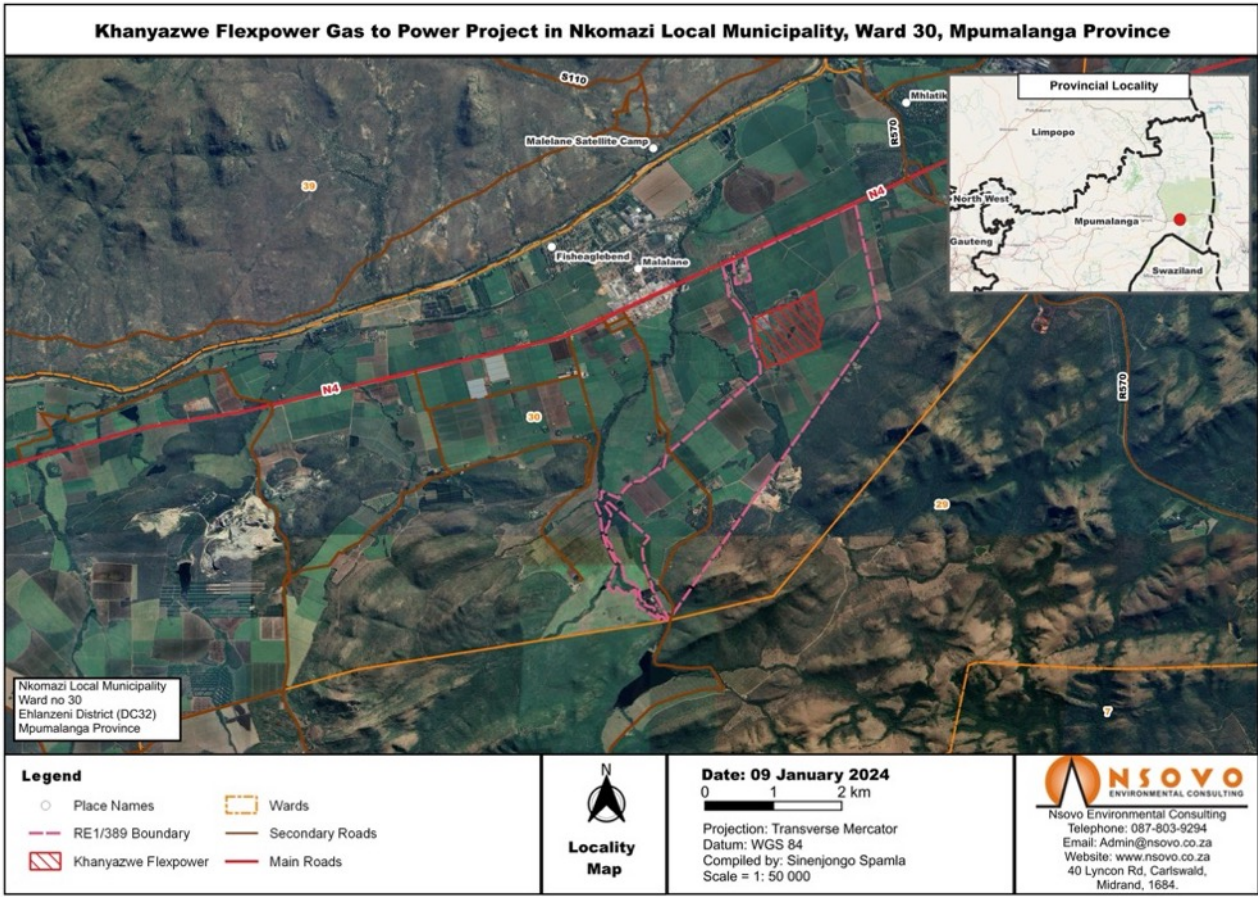


Figure 2: Site Layout



## 2. STUDY APPROACH

### 2.1. INFORMATION BASE

This assessment was based on information from the following sources:

- Topographical maps and GIS generated data and Google Earth images were sourced.
- The site visit was conducted on the 3rd of May 2024.
- 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 are not yet determined.

### 2.3. 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 KFP.
- The project components and activities are described and assessed as potential elements of impacts on eco-tourism establishments.
- Existing information is reviewed from literature, geographic data and applicable tourism websites.
- A baseline search of existing tourist attractions and establishments was undertaken.
- Mitigation measures are proposed to reduce adverse impacts.
- The findings of the study are documented in this Eco-Tourism Impact Assessment.

## 3. PROJECT DESCRIPTION

### 3.1. OVERVIEW OF DEVELOPMENT

Khanyazwe Flexpower (Pty) Ltd (hereafter referred as KFP) is proposing to develop, construct and operate a (maximum) 800MW natural gas-fired power plant using either gas engines (of Internal Combustion Engines (ICE)) or Combined Cycle Gas Turbines (CCGT)). KFP will source gas from the Republic of Mozambique Pipeline Investments Company (ROMPCO), which has an existing gas pipeline that connects Mozambique's Pande Temane gas fields to Sasol's operations in South Africa, as well as several industrial and retail customers. Alternative sources of gas, if gas from the existing Pande Temane fields is not sufficient, may include imported LNG projects being developed by Matola, which is able to provide additional gas into the ROMPCO pipeline. KFP is proposing the development of approximately two 500m 275kV and 132kV overhead powerlines from the proposed power plant to the existing Eskom Khanyazwe substation. The power plant will provide a mid-merit power profile to the national grid.

The proposed development will include the construction and assembly of the following associated infrastructures:

- Gas turbines for the generation of electricity through the use of natural gas

- Heat recovery steam generators (HRSG) to capture heat from high-temperature exhaust gases to produce high-temperature and high-pressure dry steam to be utilised in the steam turbines.
- Steam turbines for the generation of additional electricity through the use of dry steam generated by the HRSG.
- Bypass stacks associated with each gas turbine.
- Medium Speed Gas Engines for the generation of electricity through the use of natural gas.
- Waste storage facilities (general and oily water)
- Clustered exhaust stacks for the discharge of combustion gases into the atmosphere.
- Dirty water retention dams and clean water dams.
- Firewater tanks.
- Storm water channels.
- Waste storage facilities (general and hazardous).
- Exhaust stacks for the discharge of combustion gases into the atmosphere.
- A water treatment plant for the treatment of raw water into potable water and the production of demineralised water (for steam generation).
- Water pipelines from the power block to the station's boundary fence and water tanks to transport and store water of both industrial quality and potable quality.
- Dry-cooled system consisting of air-cooled condenser fans situated in fan banks.
- LV and MV switch gear rooms.
- Control room.
- Closed fin-fan coolers to cool lubrication oil for the gas and steam turbines.
- A gas pipeline from the power block to the station's boundary fence and a gas pipeline supply conditioning process facility for the conditioning and measuring of natural gas before being supplied to the gas turbines.
- Ancillary infrastructure, including access roads, warehousing, buildings, access control facilities and workshop area, storage facilities, emergency backup generators, firefighting systems, laydown areas, and 275/132kV switchyard.
- A power line to connect the project to the national grid to evacuate the generated electricity.
- LNG liquefaction, storage, and regassification infrastructure with associated LNG truck loading and unloading facilities.

## **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 camps along the alignment where practical. The material lay-down yards are expected to be located adjacent to the construction camps and will serve as storage areas for the construction material and equipment (Figure 2). Typical construction equipment could include items as shown in Figure 3.

### **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.

### **3.2.3. POWER STATION**

There is one proposed site for the KFP. The placement and orientation of the power station will be important to minimise the visual impact as far as possible.

### **3.2.4. OVERHEAD POWERLINES**

Approximately two 500m 275 and/or 132kV overhead power lines will be constructed from the power station to the existing Eskom Khanyazwe substation.

The structural alternatives i.e., cross-roped suspension type, self-supporting type or guyed V-towers, have not been finalised. The selection of pylons to be used must take the potential visual impact into consideration.

## 4. ECO-TOURISM IN THE STUDY AREA

Eco-tourism refers to nature-based forms of tourism where the main motivation of the tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in the area. Eco-tourism focuses on conservation of the natural environment, with low-impact tourist behaviour. There is a support for local conservation efforts and a sensitivity and appreciation for local cultures and communities.

Many tourism initiatives, when they are not planned and managed sensitively, threaten the natural eco-systems and local cultures, leading to environmental degradation. On the other hand, growth in the tourism industry can create positive opportunities to enhance the environment and produce revenue for the protection of natural areas and the upliftment of the local communities.

Mpumalanga Province is one of South Africa's top tourist destinations, attracting local and international tourism. It is referred to as "The Place of the Rising Sun" and few regions match the extraordinary and diverse beauty of the Lowveld and escarpment ([www.mpumalanga.com](http://www.mpumalanga.com)).

Mpumalanga covers nearly 80 000 km<sup>2</sup> from rolling highlands to the lofty escarpment and the lush wetlands. The Mpumalanga Tourism Authority has created seven regions with specially marked routes that invite the visitor to the spectacular Mpumalanga province on an unforgettable journey of the seven regions of Mpumalanga and the "must-see" attractions.

Mpumalanga Province offers tourists a unique and unforgettable experience, from the bushveld landscapes to the escarpment with the start of the Drakensberg mountains. The landscape provides vast open spaces and provides serenity to its visitors. These landscapes are convenient to navigate for mainstream tourists, as there are many resorts, world-class tourist destinations, and many tour operators to choose from. Tourist accommodation options range from luxury to budget options, attracting tourists from all backgrounds.

The most prominent national park in the study area is the Kruger National Park. Malelane, where the site is located, is directly south of the Kruger National Park. It is also the gateway to tourist attractions in Mozambique.

### 4.1. ECO-TOURISM IN MALELANE

Tourism infrastructure expanded rapidly in the late 1990's when the N4 road, as it is known today, was upgraded and became a toll road. A government project was launched which saw significant growth in the area, known as the Maputo Corridor, with big corporations settling in the area. Malelane Gate was then named as one of the main entrances to the Kruger National Park. This led to a drastic increase in tourism in the area and many lodges were established. These include Malelane Lodge, Pestana Lodge and many bed and breakfasts (B&B's). Sun International bought Malelane Lodge and Spar and Pick 'n Pay also invested in branches of their retail shops in the area, new shopping centres were established.

This was beneficial to the area, in particular the agricultural sector. Rather than buying goods from far away suppliers Spar and Pick 'n Pay bought from local farmers. This had an added benefit that farmers now had a stable market where their goods could be sold. Unsurprisingly tourists of the area also bought goods from the new shops rather than bringing in their own goods from afar.

Due to the increase of tourist activities in the area, many contractors were brought in to meet the demands of new developments in the area. Malelane town grew as many people were now living in the town or nearby because their jobs entailed them working at lodges or similar establishments in the immediate area. This boosted the local economy greatly and local shops benefited from the new influx of trade. More trade also came from Mozambique after the civil war.

Future developments saw sections of the Kruger National Park being outsourced to large companies and corporations. This had both negative and positive effects on the region. By outsourcing sections of the Kruger National Park, the companies involved could attract more foreign tourists. Tourists injected large amounts of foreign money into the area's economy.

The development of the Leopard Creek Golf Club and housing estate aided in giving the local economy a boost. An added bonus to this was the revenue brought in from golf tournaments, such as the Sunshine Tour's Alfred Dunhill Championship, and was beneficial to the town. More lodges and B&B's were also built in the area.

The nearest B&B's are the Cycas Guesthouse to the north and the Elegant Guest House to the west of the site.

The main view of the Elegant Guesthouse is to the south and a river, and trees screen the guesthouse from the KFP. Cycas Guesthouse and numerous other guesthouses are in town, in a suburban built-up setting and views to the KFP are screened by other buildings and the N4.

Many exclusive lodges and golf estates are located on the banks of the Crocodile River south of the border of the Kruger National Park. The lodges are facing to the north with views towards the river, away from Malelane and KFP. Also, the topography and trees provide screening towards the KFP.

The Malelane Satellite Camp is a camp within the Kruger National Park that may be affected by the proposed KFP. The views from the Malelane Satellite Camp are towards the south onto Malelane town. Malelane has industries, including sugar mills, which will mitigate the presence of the new KFP plant.

The Kruger National Park is the premier or flagship park in South Africa, which places certain obligations on this park towards the management of biodiversity and ecotourism. It is in many senses the pride and joy of an increasing percentage of locals and tends to attract ongoing and often intense interest by concerned citizens, tourists and civil society. Apart from its biodiversity value, it has cultural resource conservation obligations due to the presence of important archaeological relics.

**Figure 3: Landscape Character (Malelane Town)**



Figure 4: Elegant Guest House (west of the site)



Figure 5: Cycas Guest House (north of the site)



Figure 6: Paradise Creek (east of the site on R61)



**Figure 7: Pestana Kruger Lodge (view to the north onto the Crocodile River)**



**Figure 8: Lodges from Crocodile Bridge**



**Figure 9: Malelane Country Club**





## 4.2 VISUAL RESOURCE

Eco-tourism largely relies on the landscape character and visual resource of the area. 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.

A distinction should be made between impacts on the visual resource (landscape) and on the viewers. The proposed development causes impacts on the physical landscape that may result in changes to landscape character which may impact on the viewers themselves and the views they experience.

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 VAC of the study area is considered low and provides low overall screening capacity for this project. The low VAC relates to the flat topography and low-growing vegetation. The moderate VAC relates to low structures such as the above ground gas pipeline that can be absorbed by the landscape. Ancillary infrastructure is also expected to be absorbed into the landscape and surrounding infrastructure associated with the substation.

The site has a relatively high VAC regarding views from the Kruger National Park to the site. There are many hills and koppies and large trees providing screening for viewers looking towards the proposed development.

## 5 IMPACT ASSESSMENT

### 5.1 IDENTIFICATION OF IMPACTS

Potential impacts on the tourism industry identified for the project include the following:

- Impacts on existing ecotourism establishments that have been developed based on the pristine natural environment.
- Impacts on management activities in proclaimed Protected Areas.
- Visual Impacts on tourists and visitors traveling along roads to their respective destinations.
- Impacts on the sense of place for tourists.
- Dust/noise pollution on tourism products during the construction phase.
- Poaching of animals from hunting properties could increase during the construction phase.

### 5.2 METHODOLOGY

The following rating system was applied to each impact identified:

#### **Significance of the Impact:**

Based on the information contained in the points below, 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:

- (<30) low (i.e. where this impact would not have a direct influence on the decision to develop in the area)
- (30-60) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated)
- (>60) high (i.e. where the impact must have an influence on the decision process to develop in the area)

#### **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.

#### **Extent of the Impact:**

- (1) Site (site only),
- (2) Local (site boundary and immediate surrounds),
- (3) Regional,
- (4) National, or
- (5) International.

#### **Duration of the Impact:**

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

- (1) Immediate (<1 year)
- (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:

- (0) none,
- (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:

- (0) None (the impact will not occur),
- (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.

### 5.3 SIGNIFICANCE OF IMPACTS ON ECO-TOURISM

Table 1: Significance of Impacts on Eco-tourism

Issue	Corrective measures	Impact rating criteria					Significance
		Status	Extent	Duration	Magnitude	Probability	
<b>Impact on Existing Eco-Tourism Establishments</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	6 Moderate	4 High	56 Moderate
	Yes	Negative	3 (Regional)	5 Permanent	4 Low	4 High	48 Moderate
<b>Visual Impact on Tourists and Travelers</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	6 Moderate	4 High	56 Moderate
	Yes	Negative	3 (Regional)	5 Permanent	4 Low	4 High	48 Moderate
<b>Impact on Protected Areas</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	6 Moderate	4 High	56 Moderate
	Yes	Negative	3 (Regional)	5 Permanent	4 Low	4 High	48 Moderate
<b>Impact on Sense of Place</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	6 Moderate	3 Medium	42 Medium
	Yes	Negative	3 (Regional)	5 Permanent	4 Low	2 Low	24 Low
<b>Impact of Dust/Noise Pollution during Construction</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	6 Moderate	2 Low	30 Medium
	Yes	Negative	3 (Regional)	5 Permanent	4 Low	2 Low	24 Low
<b>Poaching of Animals</b>							
Khanyazwe Flexpower Plant and Associated Infrastructure	No	Negative	3 (Regional)	5 Permanent	4 Low	3 Medium	36 Medium
	Yes	Negative	3 (Regional)	5 Permanent	4 Low	2 Low	24 Low

## 5.4 SIGNIFICANCE OF VISUAL IMPACTS

The Visual Impact Assessment also compiled by Outline Landscape Architects was used for this section.

### 5.4.1 LANDSCAPE CHARACTER SENSITIVITY

The majority of the study area is considered to have moderate landscape character sensitivity due to the surrounding natural landscape and high tourism value. The proposed site, is however, environmentally degraded and is mostly used for agriculture. There is also an industrial character, with the Khanyazwe Substation and powerlines crossing the landscape. There are industries associated with agriculture such as sugar mills and processing plants. The relatively flat and level landscape provides minimal visual screening. The vegetation in the surrounding areas is savanna landscape with medium sized trees and grass which is mostly dormant in winter and does not afford much screening. The area directly surrounding the site is agriculture, with sugar cane being the most dominant crop that was noted during the site visit.

Previous human induced activities and interventions have impacted significantly on the original landscape character. In this case, industrial and existing infrastructure, including power lines, roads, and residential developments 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.

### 5.4.2 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 Visual Absorption Capacity.

The relatively flat topography of the site and low vegetation allow for little absorption of the KFP into the landscape. However, the areas surrounding the site have a developed character and has been exposed to human intervention. The Kruger National Park to the north, is considered a landscape amenity that provides the study area with a unique and valued sense of place. This quality of the landscape will be minimally affected with the presence of the KFP, as it is a distance away and not in the direct line of site of any of the tourist establishments. The impact can be further mitigated by screening of the KFP with trees.

#### 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 and the construction of the infrastructure. These activities will create surface disturbances which will result in the removal of vegetation and the exposure of the underlying soil. The exposed soil and change in texture will contrast severely with the intact vegetation around the disturbance footprint.

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. Accurate technical information is not available for the construction camps but due to the industrial character and ongoing construction of the area, the construction camp may be easily associated with existing activities and therefore mitigates the impact considerably.

Considering the low VAC throughout most of the study area, the developed condition of great parts of the landscape and the relatively high recovery rate of the vegetation, the *severity of the landscape impact* during the construction stage is expected to be *moderate*.

Sensitive placement of the construction camps, limited surface disturbance and prompt rehabilitation can reduce the severity of the impact.

The *severity of the landscape impact* for the development of the infrastructure is expected to be moderate. All surface activities will be visible from a certain distance from the site, however due to the existing industrial developments and Khanyazwe Substation the visual impact on tourists is expected to be less significant.

#### Operational phase

All operational activities will be visible from a certain distance from the development. It may pose a visual impact to residents that look onto the site and road users that regularly use the N4 highway and R570 regional road.

Surface disturbances that occur during construction may remain for an extended period during the operational phase. These are seen as residual effects carried forward from the construction phase and can be completely or substantially mitigated if treated appropriately during the construction phase.

The main impact will be caused as a result of the presence of the completed infrastructure and the buildings. The existing industrial activities and visual association will help to reduce the impact.

Lighting on the power plant at night, will have a high visual impact to viewers within close proximity to the development. The assumption can be made that as the building is visible during the day, the same applies during the night with lighting.

#### Closure phase

Upon possible closure and end of life of activities, rehabilitation of affected areas will take place and visual aesthetics will be improved. Minimal negative residual impact is expected on visual aspects.

### 5.4.3 TOURIST 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.

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. Tourists within 1 km from the KFP 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.

#### 5.4.3.1 Potential visual impacts on tourists

**Table 2: Potential visual impacts on tourists**

Potential Visual Impact on Tourists							
Activities	Corrective Measures	Impact Rating Criteria					Significance S=(E+D+M)P
		Nature	Extent (E)	Duration (D)	Magnitude (M)	Probability (P)	
Khanyazwe Flexpower Plant	No	Negative	2 Local	4 Long term	6 Moderate	4 High	48 medium
	Yes	Negative	2 Local	4 Long term	4 Low	3 Medium	30 medium

The entire regional area is considered to have moderate to high tourism potential and tourists pass through Malelane when entering or exiting the Kruger National Park from the Malelane gate. The N4 highway that passes the proposed area is the main access route to the Mozambique - South Africa border. There are numerous guest houses in Malelane. It is evident from the Visibility Analysis and Viewer Sensitivity in the Visual Impact Assessment that the power plant and overhead power lines will be visible from some roads in the southern parts of the Kruger National Park. The digital analysis does not take vegetation into consideration, especially large trees present that do provide screening towards the plant.

The surrounding mountains with natural landscape and agricultural fields has aesthetic value and there are also nature-based economic activities such as eco-tourism establishments in the area. The topographical features must be utilized when selecting the location of the power plant and overhead lines to minimize visual impact and intrusions.

The proposed power plant will not be seen in isolation but within the context of the existing Khanyazwe Substation.

#### 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 very small number of tourists will be adversely affected by these project components during construction.

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 camps.

#### Operational phase

Tourists travelling to the Kruger National Park and Mozambique will be affected by the visual intrusion when passing through the study area. Although it is difficult to pinpoint particular locations in the study area that are of specific value, the areas next to the roads will be most important.

The industrial and agricultural landscape of that stretch of the N4, with large existing developments, will lessen the visual impact, as the association of the area is industrial in nature.

Tourists within the Kruger National Park may have momentary views of the development from the southern roads close to Malelane Gate. But high trees and koppies provide screening and views are expected to be intermittent. Other industrial developments are visible from this area of the Kruger National Park and the sense of wild remoteness is diminished.

The Malelane Satellite Camp is the only overnight camp in the Kruger National Park that may be affected by the view onto the plant and night lighting from the power plant. The camp already experiences visual intrusion as it looks onto Malelane.

The severity of the visual impact of the power plant and building infrastructure on tourists will be moderate, causing moderate visual impact.

## 6 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.

### 6.1 GENERAL

- Natural screening should be created at ecotourism establishments, which may have their views impacted on by the construction or operational phases of the project.
- Endemic plants should be salvaged, if possible, where areas are going to be disturbed through the destruction of vegetation, for example, the establishment of the construction camp, and kept in a controlled environment such as a nursery, for future re-planting in the disturbed areas as a measure of rehabilitation.

### 6.2 POWERLINES

- Avoid, as much as possible, 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.

### 6.3 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, as much as possible, 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.

### 6.4 CLEARED SERVITUDES

- Locate the alignment and the associated cleared servitude so as to avoid the removal of established vegetation.
- Avoid, as much as possible, 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.

### 6.5 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.
- Keep the construction camps away from existing residents and especially lodges and tourist venues.

## 6.6 MITIGATION OF IMPACTS ON ECO-TOURISM

- Establish an ecotourism/conservation forum for the project by engaging with all tourism associations (local and provincial) to ensure that ongoing communication is provided to all role-players and to ensure that all ecotourism products are aware of the construction timeframes. This will enable ecotourism destinations to plan accordingly in terms of occupancies and potential down times.
- Provide a dedicated contact point for the purpose of providing an opportunity for product owners to obtain information on the project and to provide information on impacts or problems on an ongoing basis. A response structure should also be setup to support this contact point. This will enable localized impacts to be mitigated more effectively and efficiently.
- All impacts on fauna or flora within high conservation/ecotourism value land should be rehabilitated immediately to a completely natural state. This should be done by managing removed vegetation in a manner which can be re-planted.
- Compile booklets which interpret the project and where the power is going and what value the project is adding to the local and provincial economy. Very often, when eco-tourists see the value in a development project, they are willing to accept the associated impact on the environment.

## 7 CONCLUSION

The impact on eco-tourism of the Khanyazwe Flexpower Plant has been evaluated and is regarded as having a moderate impact on tourism. The KFP is not in the direct line of sight of any eco-tourism establishment. Eco-tourism developments rely on wild, unspoilt landscapes and visitors do not want their views to be obstructed by industrial, large-scale powerline structures. The guesthouses close to the site are within suburban settings. The important views of the lodges and estates to the north on the banks of the Crocodile River are focused to the north into the Kruger National Park. Tourists may intermittently be exposed to the KFP, especially when travelling to their destinations.

The views from the Malelane Satellite Camp, within the Kruger National Park are towards the south onto Malelane town. Malelane has industries, including sugar mills, which will mitigate the presence of the new KFP plant.

If strict mitigation measures are implemented and the recommendations are adhered to, impact on eco-tourism can be minimised in the critical areas of the route.



## GLOSSARY OF TERMS

**Adventure Tourism:** Consists of practicing any sports or adventure activity in a rural environment. But it often refers to traveling with the goal of practicing sports activities which require a great effort and an excellent physical condition. These activities are usually risky, but they reward tourists with many experiences filled with excitement, adventure and adrenaline in a direct contact with nature, taking the responsibility to preserve natural resources.

**Agritourism:** Agritourism consists of traveling to farming establishments in order to enjoy their natural, cultural and productive values. This service is provided in typical rural buildings which have been especially equipped to accommodate tourists, but which also are a home to farming families. These buildings are called tourist ranches or farmhouses.

**Biodiversity / Biological Diversity:** Means the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems (as per the National Environmental Management: Biodiversity Act, No. 10 of 2004).

**Buffer Zone (Protected Area):** Means an area surrounding a protected area which has restrictions placed on its use or where collaborative projects and programmes are undertaken to afford additional protection to the reserve.

**Ecotourism:** Means the travel to natural areas to learn about the way of life and cultural history of people, the natural history of the environment, while taking care not to change the environment and contributing to the economic welfare of the local people (MDTP - adapted from a definition of ecotourism by Hecto Ceballos Lascurain).

**Ecosystem:** Means a dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit (as per National Environmental Management: Protected Areas Act, No. 57 of 2003).

**Heritage-based Resources:** Means natural and / or cultural resources which are utilized in a tourism experience.

**Local Community:** Means any community of people living or having rights or interests in a distinct geographical area (as per the National Environmental Management: Protected Areas Act, No. 57 of 2003).

**Management:** In relation to a protected area or an area established for the purposes of ecotourism, includes control, protection, conservation, maintenance and rehabilitation of the protected area with due regard to the use and extraction of biological resources, community-based practices and benefit sharing activities in the area in a manner consistent with the Biodiversity Act (as per the National Environmental Management: Protected Areas Act, No. 57 of 2003).

**Nature Conservation:** Means the conservation of naturally occurring ecological systems, the sustainable utilization of indigenous plants and animals therein, and the promotion and maintenance of biological diversity.

**Natural Heritage:** As defined in Article 2 of the World Heritage Convention Act, 49 of 1999: “natural heritage” is considered as consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view, geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation, natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.

**Protected Area:** Means any of the protected areas referred to in section 9 of the National Environmental Management: Protected Areas Act No. 57 of 2003.

**Stakeholders / Interested Parties:** These are interested individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

**Sustainable:** In relation to the use of a biological resource, means the use of such resource in a way and at a rate that would not lead to its long-term decline; would not disrupt the ecological integrity of the ecosystem in which it occurs; and would ensure its continued use to meet the needs and aspirations of present and future generations of people (as per National Environmental Management: Biodiversity Act, No. 10 of 2004).

**Wilderness Area:** Means “an area designated .....for the purpose of retaining an intrinsically wild appearance and character, or capable of being restored to such and which is undeveloped and roadless, without permanent improvements or human habitation” as defined by the National Environmental Management: Protected Areas Act No. 57 of 2003.

<b>Aesthetics</b>	The science or philosophy concerned with the quality of sensory experience. (ULI, 1980)
<b>Horizon contour</b>	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.
<b>Landscape characterisation/ character</b>	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.
<b>Landscape condition</b>	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.

<b>Landscape impact</b>	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.
<b>Landscape unit</b>	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.
<b>Sense of place</b>	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) <sup>1</sup> .
<b>Viewer exposure</b>	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.
<b>Viewer sensitivity</b>	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.
<b>Visual absorption capacity (VAC)</b>	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.
<b>Visual amenity</b>	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.
<b>Visual character</b>	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.
<b>Visual envelope</b>	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.

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

<b>Visual impact</b>	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.
<b>Visual impact assessment</b>	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.
<b>Visual quality</b>	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.
<b>Visual receptors</b>	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.
<b>Zone of visual influence</b>	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).

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