

**PROPOSED EXTENSIONS TO PESTANA KRUGER LODGE LOCATED
OUTSIDE OF THE KRUGER NATIONAL PARK, MPUMALANGA
PROVINCE**

*ON PORTION 21 OF THE FARM RIVERSIDE, 173 JU, LOCATED IN THE EHLANZENI
DISTRICT MUNICIPALITY, MPUMALANGA PROVINCE*

VISUAL IMPACT ASSESSMENT

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1 INTRODUCTION

1.1 QUALIFICATION AND EXPERIENCE OF THE PROFESSIONAL TEAM

NuLeaf Planning and Environmental (Pty) Ltd, specialising in Visual Impact Assessment, undertook this visual assessment.

The team undertaking the visual assessment has extensive practical knowledge in spatial analysis, environmental modelling and digital mapping, and applies this knowledge in various scientific fields and disciplines. The expertise of these practitioners is often utilised in Environmental Impact Assessments, State of the Environment Reports and Environmental Management Plans.

The visual assessment team is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes" (Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning) and utilises the principles and recommendations stated therein to successfully undertake visual impact assessments. Although the guidelines have been developed with specific reference to the Western Cape province of South Africa, the core elements are more widely applicable.

Derrick Peacock Associates, appointed NuLeaf Planning and Environmental as an independent specialist consultant to undertake the visual impact assessment. Neither the author, nor NuLeaf Planning and Environmental will benefit from the outcome of the project decision-making.

1.2 LEGAL FRAMEWORK

The following legislation and guidelines have been considered in the preparation of this report:

- The Environmental Impact Assessment Amendment Regulations, 2010;
- Guideline on Generic Terms of Reference for EAPs and Project Schedules (DEADP, Provincial Government of the Western Cape, 2011).
- Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (DEADP, Provincial Government of the Western Cape, 2005).

1.3 INFORMATION BASE

This assessment was based on information from the following sources:

- Topographical maps and GIS generated data were sourced from the Surveyor General, Surveys and Mapping in Mowbray, Cape Town;
- Observations made and photographs taken during site visits;
- Professional judgement based on experience gained from similar projects; and
- Literature research on similar projects.

1.4 ASSUMPTIONS AND LIMITATIONS

This assessment was undertaken during the planning stage of the project and is based on information available at that time. This Visual Impact Assessment and all associated mapping has been undertaken according to the worst-case scenario.

1.5 LEVEL OF CONFIDENCE

Level of confidence¹ is determined as a function of:

- The information available, and understanding of the study area by the practitioner:
 - **3:** A high level of information is available of the study area and a thorough knowledge base could be established during site visits, surveys etc. The study area was readily accessible.
 - **2:** A moderate level of information is available of the study area 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.
 - **1:** 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.

- The information available, understanding of the project and experience of this type of project by the practitioner:
 - **3:** A high level of information and knowledge is available of the project and the visual impact assessor is well experienced in this type of project and level of assessment.
 - **2:** A moderate level of information and knowledge is available of the project and the visual impact assessor is moderately experienced in this type of project and level of assessment.
 - **1:** Limited information and knowledge is available of the project and the visual impact assessor has a low experience level in this type of project and level of assessment.

These values are applied as follows:

Table 1: Level of Confidence

| Information on the study area | Information on the project & experience of the practitioner | | | |
|-------------------------------|---|----------|----------|----------|
| | | 3 | 2 | 1 |
| 3 | | 9 | 6 | 3 |
| 2 | | 6 | 4 | 2 |
| 1 | | 3 | 2 | 1 |

*The level of confidence for this assessment is determined to be **9** and indicates that the author's confidence in the accuracy of the findings is high:*

- The information available, and understanding of the study area by the practitioner is rated as **3** and
- The information available, understanding and experience of this type of project by the practitioner is rated as **3**.

¹ Adapted from Oberholzer (2005).

2 METHODOLOGY

The study was undertaken using Geographic Information Systems (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed development. A detailed Digital Terrain Model (DTM) for the study area was created from 5m interval contours from the National Geo-spatial Information data supplied by the Department: Rural Development and Land Reform.

The approach utilised to identify potential issues related to the visual impact included the following activities:

- The creation of a detailed digital terrain model (DTM) of the potentially affected environment;
- The sourcing of relevant spatial data. This includes cadastral features, vegetation types, land use activities, topographical features, site placement, etc.;
- The identification of sensitive environments upon which the proposed development could have a potential visual impact;
- The creation of viewshed analyses from the proposed development area in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses take into account the dimensions of the proposed structures.

This report (visual impact assessment) sets out to identify and quantify the possible visual impacts related to the proposed expansions of the existing Pestana Kruger Lodge (including related infrastructure), as well as, offer potential mitigation measures, where required.

The following methodology has been followed for the assessment of visual impact²:

- **Determine potential visual exposure**

The visibility or visual exposure of any development is the point of departure for the visual impact assessment. It stands to reason that if the proposed development were not visible, no impact would occur.

Viewshed analyses of the proposed development indicate the potential visibility.

- **Determine visual distance and observer proximity to the development**

In order to refine the visual exposure of the development on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence.

Proximity radii for the proposed alignment corridors are created in order to indicate the scale and viewing distance of the development and to determine the prominence thereof in relation to their environment.

² This methodology is adapted from that developed by MetroGIS, and detailed in numerous Visual Impact Assessments undertaken by them (2010-2014).

The visual distance theory and the observer's proximity to the development are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed development.

- **Determine viewer incidence, perception and sensitivity**

The number of observers and their perception of a development determine the concept of visual impact. If there are no observers, then there would be no visual impact. If the visual perception of a structure is favourable to all observers, then the visual impact would be positive.

It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed development and its related infrastructure.

It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind, and purpose of sighting which would create a myriad of options.

- **Determine the visual absorption capacity**

This is the capacity of the receiving environment to absorb the potential visual impact of the proposed development. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.

The digital terrain model utilised in the calculation of the visual exposure of the development does not incorporate the potential visual absorption capacity (VAC) of the natural vegetation of the region. It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover and other landscape characteristics.

- **Determine the visual impact index**

The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the magnitude of each impact.

- **Determine impact significance**

The potential visual impacts identified and described are quantified in their respective geographical locations in order to determine the significance of the anticipated impact. Significance is determined as a function of extent, duration, magnitude and probability.

3 PROJECT DESCRIPTION

The proposed development entails the expansion of Pestana Kruger Lodge, outside the Kruger National Park. All associated civil infrastructure (water, electricity and waste treatment) will be included.

The proposed extension will consist of the following:

- 35 chalet blocks totalling 124 units
- Viewpoints/ bird hides
- Recreational facilities e.g. swimming pools, clubhouses etc.

Refer to **Figure 1 and 2 (locality and layout)**.

The affected property, Portion 21 of the Farm Riverside, 173 JU, is situated within the Nkomazi local Municipality, in the Ehlanzeni District Municipality, approximately 3 km north east of Malelane.

4 SCOPE OF WORK

The scope of work for this assessment includes the determination of the potential visual impacts in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation of the proposed expansions of the existing Pestana Kruger Lodge. Mitigation measures are recommended where appropriate.



Map 1: Locality map of the broader study area



Figure 1: Lodge layout

5 THE AFFECTED ENVIRONMENT

The proposed development is situated on Pestana Kruger Lodge which is located on the R570 Riverside Rd, Malelane and is within the Nkomazi Local Municipality, in the Ehlanzeni District Municipality, Mpumalanga. Pestana Kruger Lodge is approximately 800m north east from Malelane Gate, Kruger National Park and 3 km north east of Malelane.

The eastern boundary of the farm is defined by a regional road (R570), while the western boundary is formed by the Kruger National Park and the Crocodile River. Cultivated farmlands and tourism accommodation surrounds the property (Leopard Creek lies to the north).

Surface hydrology within the study area is dominated by the Crocodile River system, located to the west of the proposed site. Additionally, three (3) water courses are located within the proposed study area – these are riparian areas and a wetland.



Figure 2: Surface hydrology of the site (Crocodile River)



Figure 3: Surface hydrology of the site

Land cover within the study area is characterised by a moderately developed shrub layer and a dense herbaceous layer. Land use is deemed predominately cultivation and sports and recreation.

The town of Malelane is the largest populated town just outside the study area and is situated approximately 3 km south west from the site. Marloth Park is approximately 26 Km north east of the site. Marloth Park is a wildlife sanctuary and holiday town.

The areas surrounding the proposed site consist of predominately cultivated lands, tourism resorts and small residential areas. Overall, the population density within the study area is low.

The visual quality of the broader study area is high, generally as a result of the lack of development and the large areas given over to conservation within the region. There is no evidence of widespread erosion or natural degradation, and development, where this occurs, is domestic in scale.



Figure 4: Topography of the site and surrounds



Figure 5: Topography of the site and surrounds



Figure 6: Visual quality of the region (along the Crocodile River)



Figure 7: Existing Pestana Kruger Lodge buildings from the Malelane Bridge



Figure 8 and 9: Existing Pestana Kruger Lodge buildings from inside the development



6 ANTICIPATED ISSUES RELATED TO VISUAL IMPACT

Anticipated issues related to the potential visual impact the proposed expansion of the Pestana Kruger Lodge include the following:

- The visibility of the development to, and potential visual impact on tourist camps and lodges within the immediate area (Leopard Creek).
- The visibility of the lodges to, and potential visual impact on, observers travelling along game drive routes within the adjacent Kruger National Park.
- The visibility of the development to, and potential visual impact on users of roads and observers residing within the study area.
- The visibility of the development to sensitive visual receptors within the region.
- The visibility of the proposed development to, and potential visual impact on protected and conservation areas (i.e. Kruger National Park).
- The potential visual impact associated with the construction of the development on receptors in close proximity.
- The potential visual impact of safety and security lighting of the development at night on receptors in close proximity.
- The potential visual impact of the development on the visual character of the landscape and sense of place of the region.
- The potential visual impact on tourist access routes and tourist destinations within the region.
- The potential cumulative visual impacts of the development within the study area.

Of those listed above, the main concerns regarding visual impact in the context of this development relate to the potential visual impact that the development will have on sensitive visual receptors, namely, neighbouring eco-tourism lodges situated along the Crocodile River and the adjacent Kruger National Park. In addition, visual impacts may also be experienced by nearby communities and commuters (especially tourists) traveling on local roads.

7 RESULTS

7.1 VISUAL DISTANCE AND OBSERVER PROXIMITY

NuLeaf Planning and Environmental determined proximity offsets based on the anticipated visual experience of the observer over varying distances. In general, the severity of the visual impact on visual receptors decreases with increased distance from the proposed development.

Therefore, in order to refine the visual exposure of the development on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for the proposed development.

Proximity radii for the proposed development site are created in order to indicate the scale and viewing distance of the development and to determine the prominence of the structures in relation to their environment.

The proximity radii will be based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger facilities and downwards for smaller facilities (i.e. depending on the size and nature of the proposed development).

Typically, the proximity radii, calculated from the boundary of the property, would be as follows for the proposed expansion of the existing Pestana Kruger Lodge:

- 0 – 1 km - Short distance views where the development would be easily and comfortably visible and recognisable.
- 1 – 3 km - Medium distance view where the development would become part of the visual environment, but could still be visible and recognisable.
- 3 - 5 km - Long distance view where the development might be visible, although this is unlikely.

7.2 POTENTIAL VISUAL EXPOSURE

The results of the viewshed analysis and potential observer proximity for the proposed expansion of the existing Pestana Kruger Lodge is shown on **Map 2**.

In order to understand the potential visual exposure of the proposed expansion, a viewshed analysis was undertaken, a transmitter (development) offset of 5 m above average ground level (i.e. the approximate height of a double storey building with a flat roof). This was done in order to determine the general visual exposure of the area under investigation, simulating the proposed structures associated with the development. A receptor height of 2m above average ground level was used. Refer to **Map 2**.

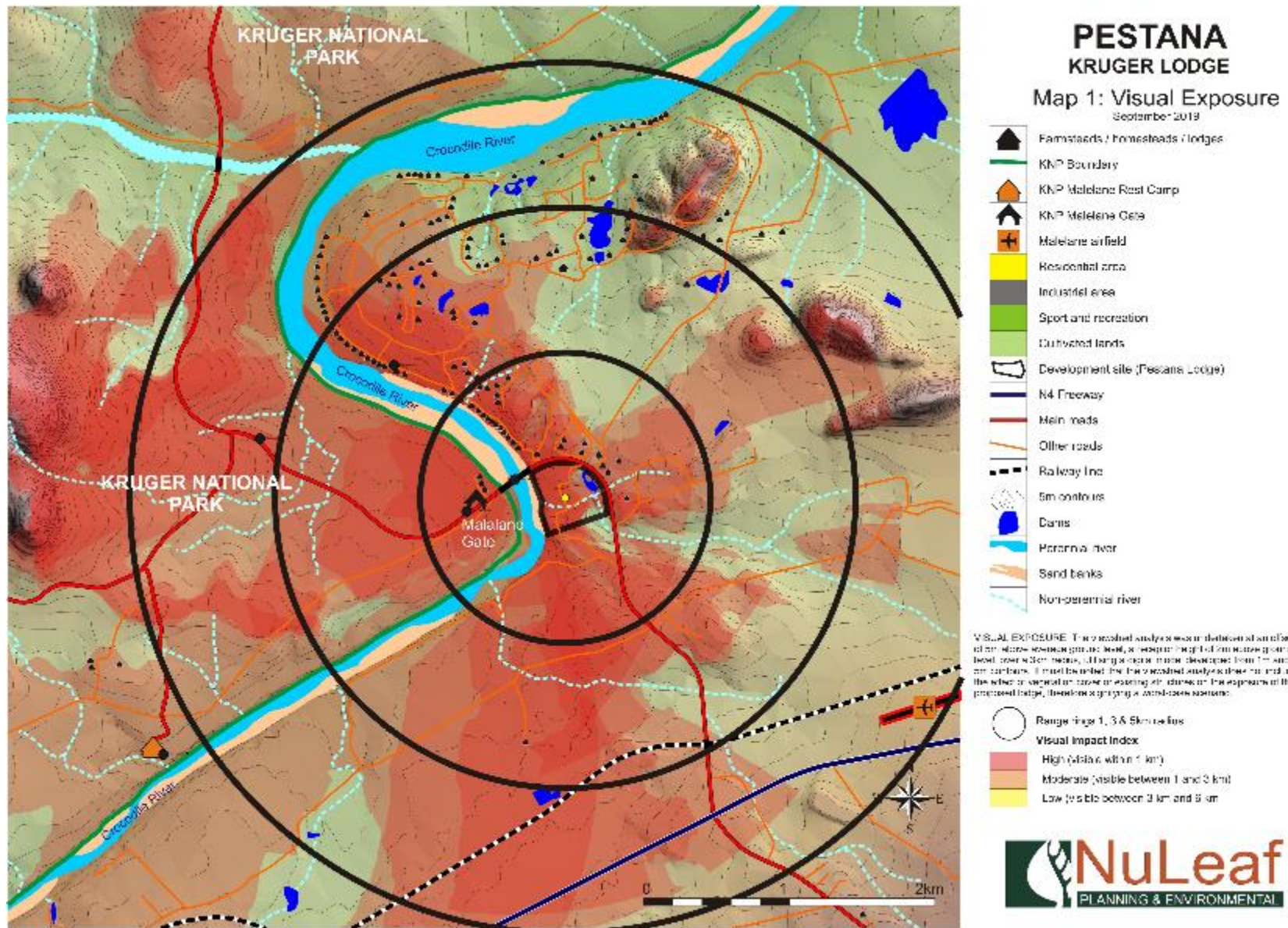
The analysis does not include the potential shielding effect (i.e. VAC) of existing environment, and does not take into consideration the limitations of the human eye, therefore signifying a worst-case scenario.

Potential visual exposure is concentrated on the site itself and within the area in the immediate vicinity thereof. Potential visual exposure within 1km from the site is high, with no visually non-exposed areas. Sensitive visual receptors in this area include mainly the existing Pestana Kruger Lodge users, Leopard Creek users, Malelane Gate, portions of the Kruger National Park (KNP), several farmsteads, as well as, local road users (R570). The close proximity of the proposed development to the Crocodile River effectively means that visual exposure of the proposed expansion along its banks is guaranteed.

The extent of potential visual exposure is significant between 1km and 3km from the site. Within this zone, visually exposed areas are located mostly to the north west, west, south west and south. Visually screened areas lie to the north and east of the site. Sensitive visual receptors such as Leopard Creek users, farmsteads and users of local roads are likely to be affected. A large portion of the Kruger National Park, located to the west of the site, will also be visually affected. However, a main tourist road (Malelane Skukuza Road) is located in this area of the KNP, which thereby drastically increases the likelihood of visual receptors occurring in this area.

Between 3km and 5km from the site, potential visual exposure decreases in extent. These visually exposed areas lie mostly to the north west, west, south west and south. Roads, farmsteads and users of tourist roads in the Kruger National Park have been identified as potential sensitive visual receptors.

Beyond 5km from the site, potential visual exposure is very limited, with visually exposed areas lying to the west and south of the site, however, it is highly unlikely that this visual exposure will take place.



Map 2: Potential visual exposure of the proposed Pestana Kruger Lodge Expansion

7.3 VIEWER INCIDENCE, PERCEPTION AND SENSITIVITY

It is necessary to identify areas of high viewer incidence, and to classify certain areas according to the observer's visual sensitivity towards the proposed development.

Viewer incidence is highest within the local built up areas. Second to these, are the roads surrounding the site. As such tourists using the roads and residents of the area are considered most sensitive to visual intrusion, as they will be exposed to visual intrusion during their rest and relaxation times.

Tourists and residential receptors in natural contexts are more sensitive than those in more built-up contexts, due to the absence of visual clutter in these undeveloped and undisturbed areas.

Receptors within built up areas are less sensitive to potential visual impact due to the presence of structures, infrastructure and general visual clutter. Those dwelling on the periphery may be more aware of visual intrusion and may thus be considered somewhat more sensitive.

Viewer perception regarding this proposed development appears to be neutral. The project does not appear to be controversial, and to the knowledge of the author, there are no action groups or individuals opposing the development.

Considering the proximity of the development to the Kruger National Park, it is expected that any potential visual impact within this protected area would be viewed in a negative light. Visual impact within Leopard Creek would also be negative. Therefore, viewer perception of receptors north and north west of the site is also considered to be negative.

7.4 VISUAL ABSORPTION CAPACITY

Visual Absorption Capacity (VAC) is the capacity of the receiving environment to absorb the potential visual impact of the proposed development. VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

The VAC would also be high where the environment can readily absorb the development in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a development contrasting markedly with one or more of the characteristics of the environment would be low.

The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and development decreases.

Overall, the Visual Absorption Capacity (VAC) of the site and surrounds is *low*, due mainly to the nature of the vegetation and development, as well as the presence of the existing Pestana Kruger Lodge (i.e. cleared bushveld vegetation and high roof pitches). Where the natural vegetation has been cleared or burnt, VAC is low. However, where the natural bushveld vegetation is still mainly intact, VAC is moderate.



Figure 10: Moderate VAC of the natural bush



Figure 11: Low VAC of the cleared area

Of note is that there is already a visual disturbance on site with regards to the presence of the existing Pestana Kruger Lodge. Therefore, low VAC is considered for all potential visual receptors, with the exception of densely vegetated areas in close proximity to the proposed site. As such, VAC will not be taken into account within the entire study area in the Assessment of Visual Impacts to follow.

7.5 VISUAL IMPACT INDEX

For the purpose of this study, separate visual exposure, viewer incidence/perception and visual distance maps were generated for various points within the property where the expansion is to take place. Refer to maps 3-7. Here the weighted impact and the likely areas of impact have been indicated as a visual impact index.

Values have been assigned for each potential visual impact per data category and merged in order to calculate the visual impact index. An area with short distance, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This helps in focussing the attention to the critical areas of potential impact when evaluating the issues related to the visual impact.

The visual impact index for the proposed expansion is further described as follows:

- The visual impact index map indicates a core zone of **high** visual impact within 1km of the proposed development.

Sensitive visual receptors within this zone are limited to residents of farmsteads in the area, visitors to Leopard Creek and current Pestana Kruger Lodge guests.

Other sensitive visual receptors within this zone comprise mainly of road users (R570) to the east of the site and tourists visting Kruger National Park via the Malelane Gate. However, with the presence of the existing Pestana Kruger Lodge a visual impact within this zone is already existing.

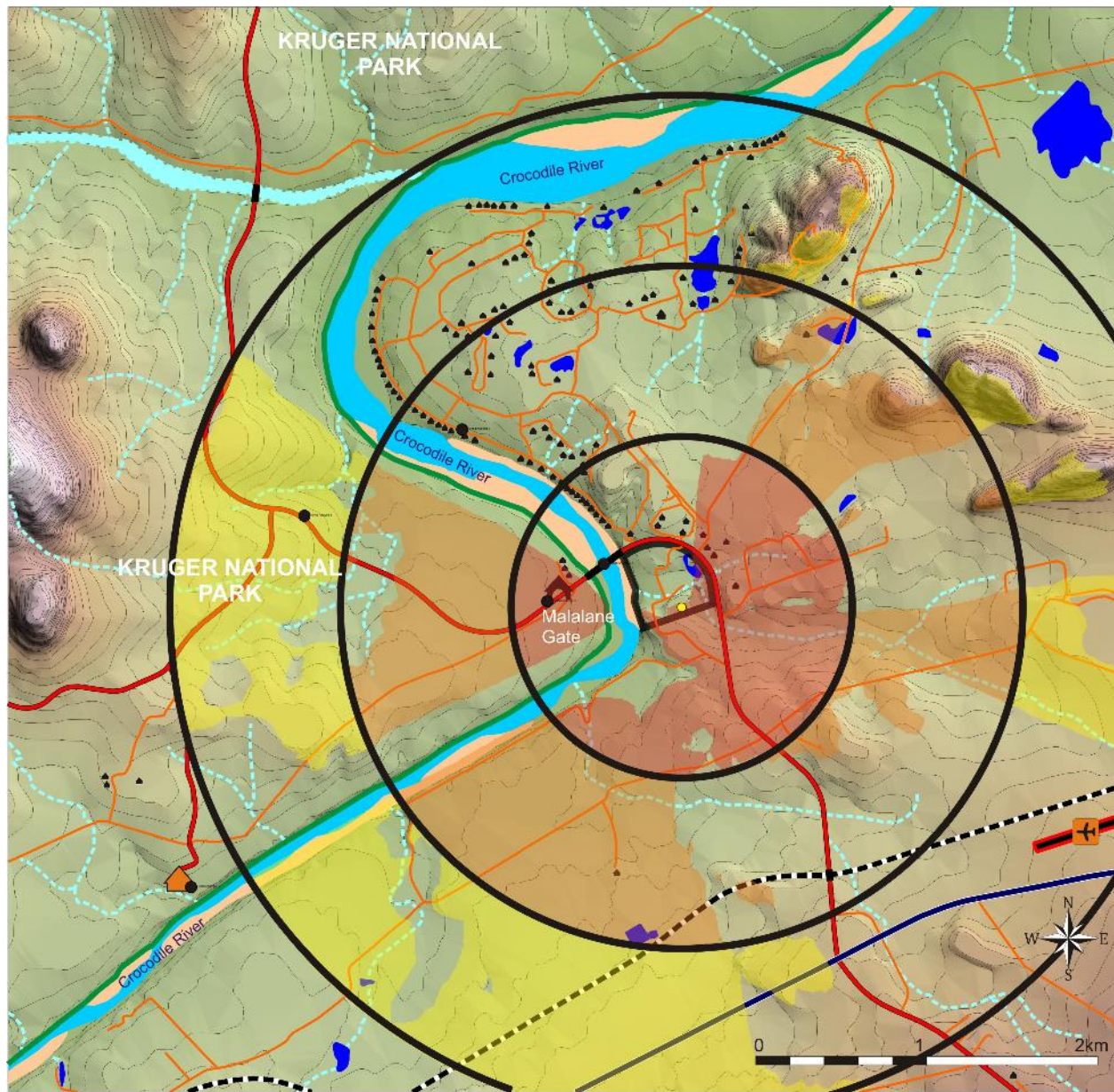
- Anticipated visual impact is **moderate** between 1km and 3km of the proposed development.

Sensitive visual receptors within this zone include visitors to the KNP (especially visitors using the Malelane Skukuza main road).

Other sensitive visual receptors within this zone comprise mainly of visitors to Leopard Creek, particularly along the Crocodile River in the area. However, with the presence of the existing Pestana Kruger Lodge a visual impact within this zone is already existing.

- Between 3km and 5km of the proposed expansion, the extent of potential visual impact is significantly reduced in the north and east, however, to the west visual exposure is widely spread in the KNP. Visual impacts, where they occur within this zone are likely to be **low**.

Sensitive visual receptors at this distance include tourists along section of tourist road in the Kruger National Park. However, with the presence of the existing Pestana Kruger Lodge a visual impact within this zone is already existing.



**PESTANA
KRUGER LODGE**
Map 1: Visual Impact
South Eastern portion of the property

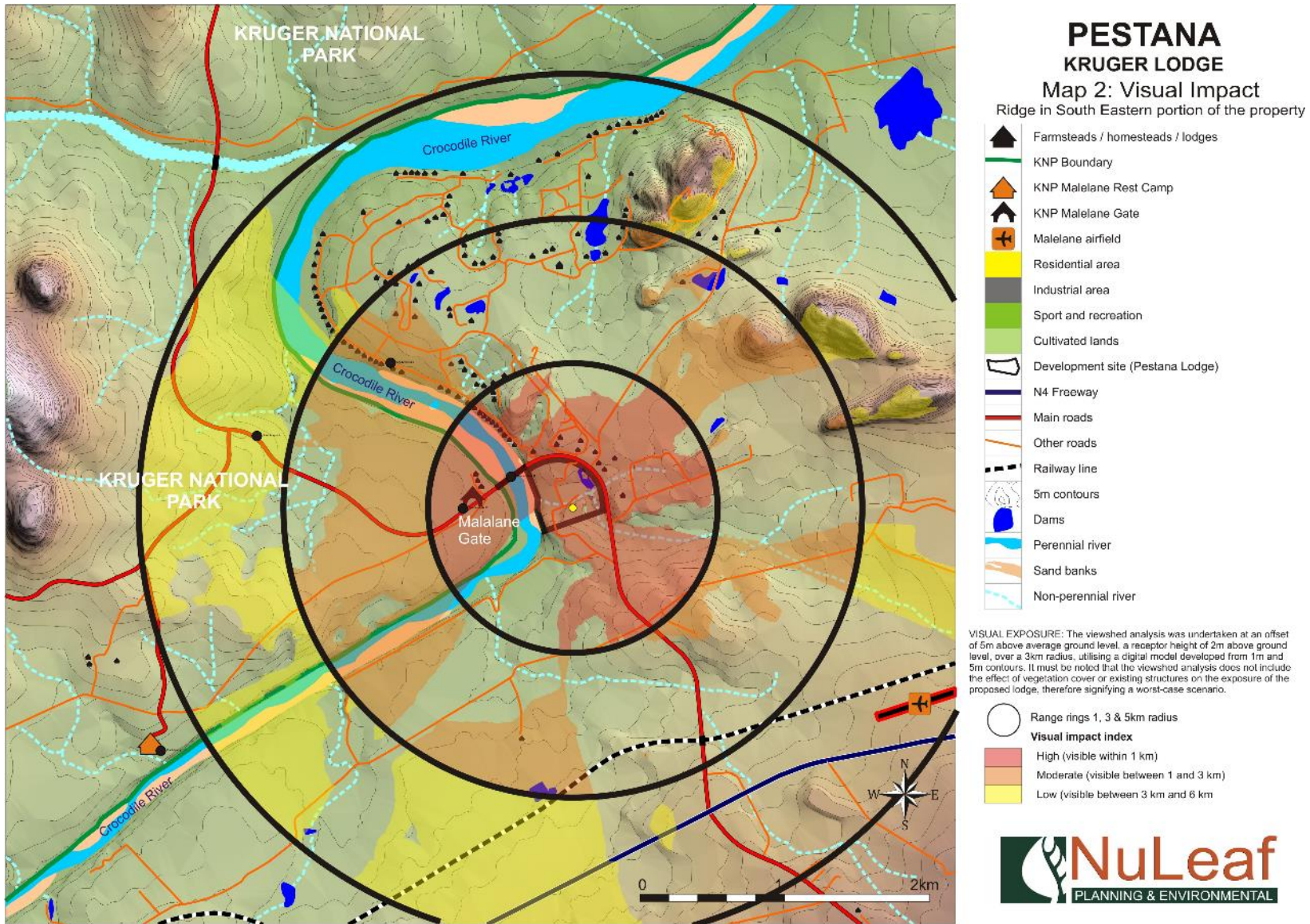
- Farmsteads / homesteads / lodges
- KNP Boundary
- KNP Malalane Rest Camp
- KNP Malalane Gate
- Malalane airfield
- Residential area
- Industrial area
- Sport and recreation
- Cultivated lands
- Development site (Pestana Lodge)
- N4 Freeway
- Main roads
- Other roads
- Railway line
- 5m contours
- Dams
- Perennial river
- Sand banks
- Non-perennial river

VISUAL EXPOSURE: The viewshed analysis was undertaken at an offset of 5m above average ground level, a receptor height of 2m above ground level, over a 3km radius, utilising a digital model developed from 1m and 5m contours. It must be noted that the viewshed analysis does not include the effect of vegetation cover or existing structures on the exposure of the proposed lodge, therefore signifying a worst-case scenario.

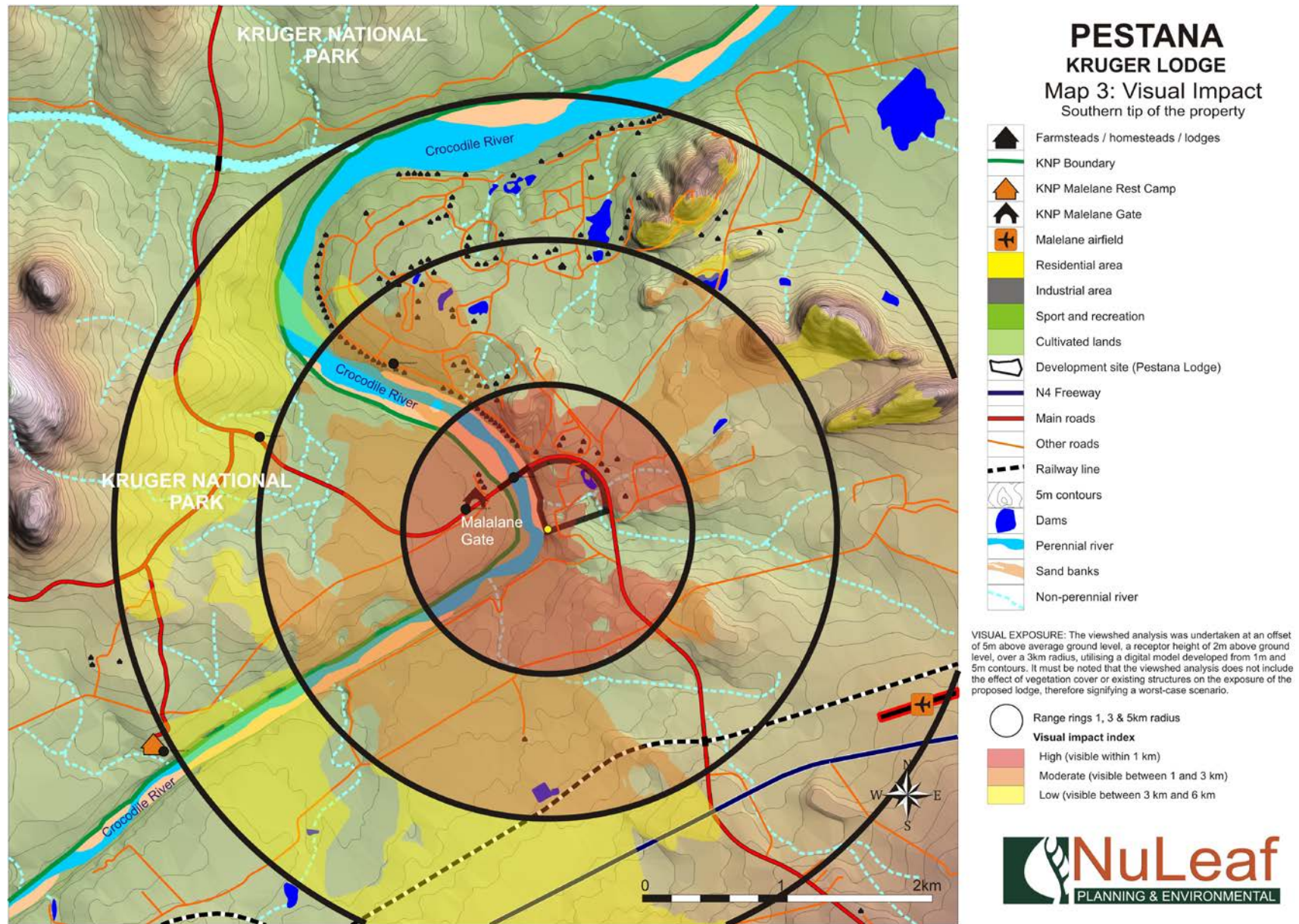
- Range rings 1, 3 & 5km radius
- Visual impact index**
- High (visible within 1 km)
- Moderate (visible between 1 and 3 km)
- Low (visible between 3 km and 6 km)



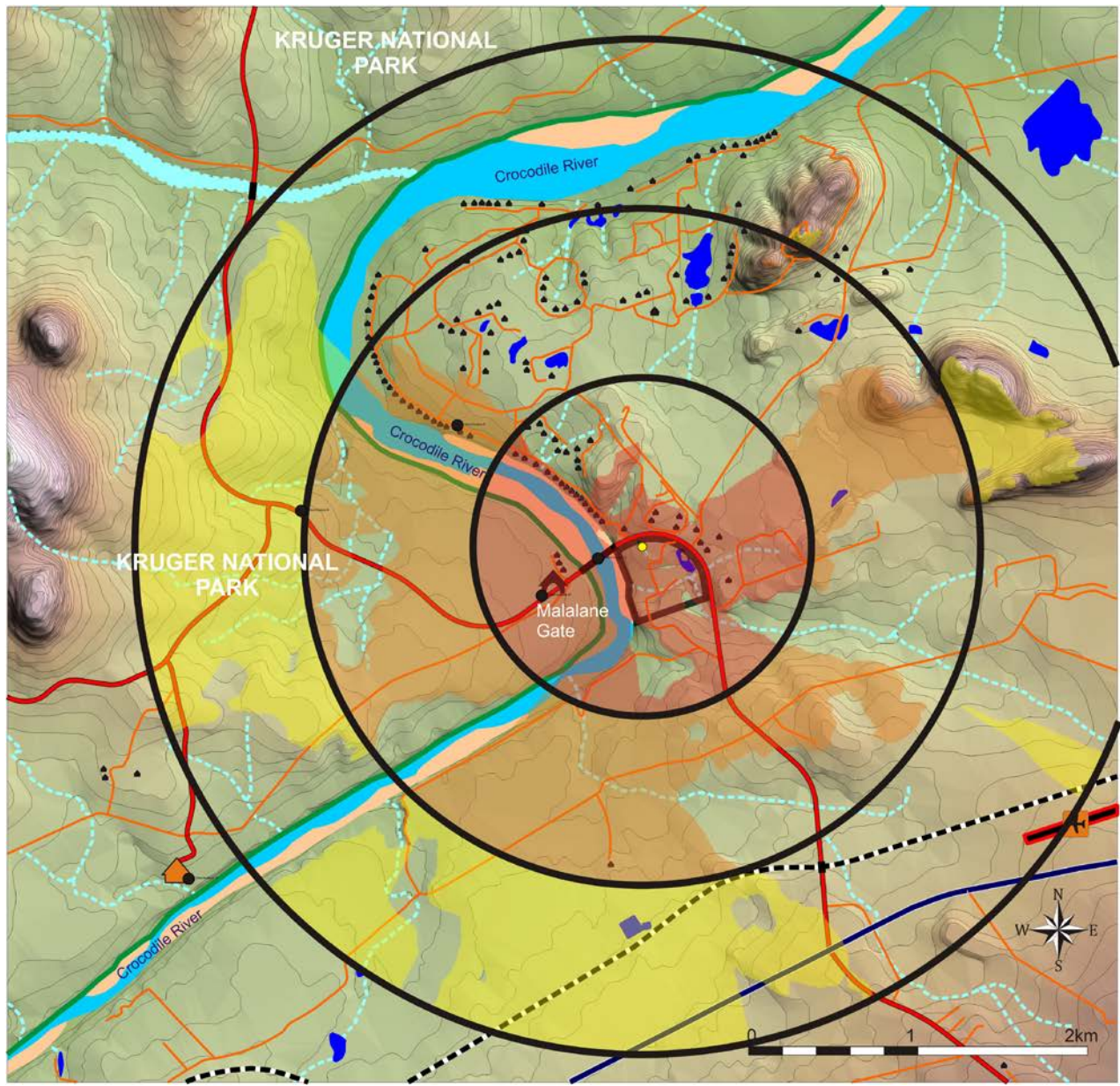
Map 3: Visual Impact Index – South Eastern portion of the property



Map 4: Visual Impact Index – Ridge in South Eastern Portion of the property



Map 5: Visual Impact Index – Southern tip of the property



**PESTANA
KRUGER LODGE**
Map 4: Visual Impact
North Western portion of the property

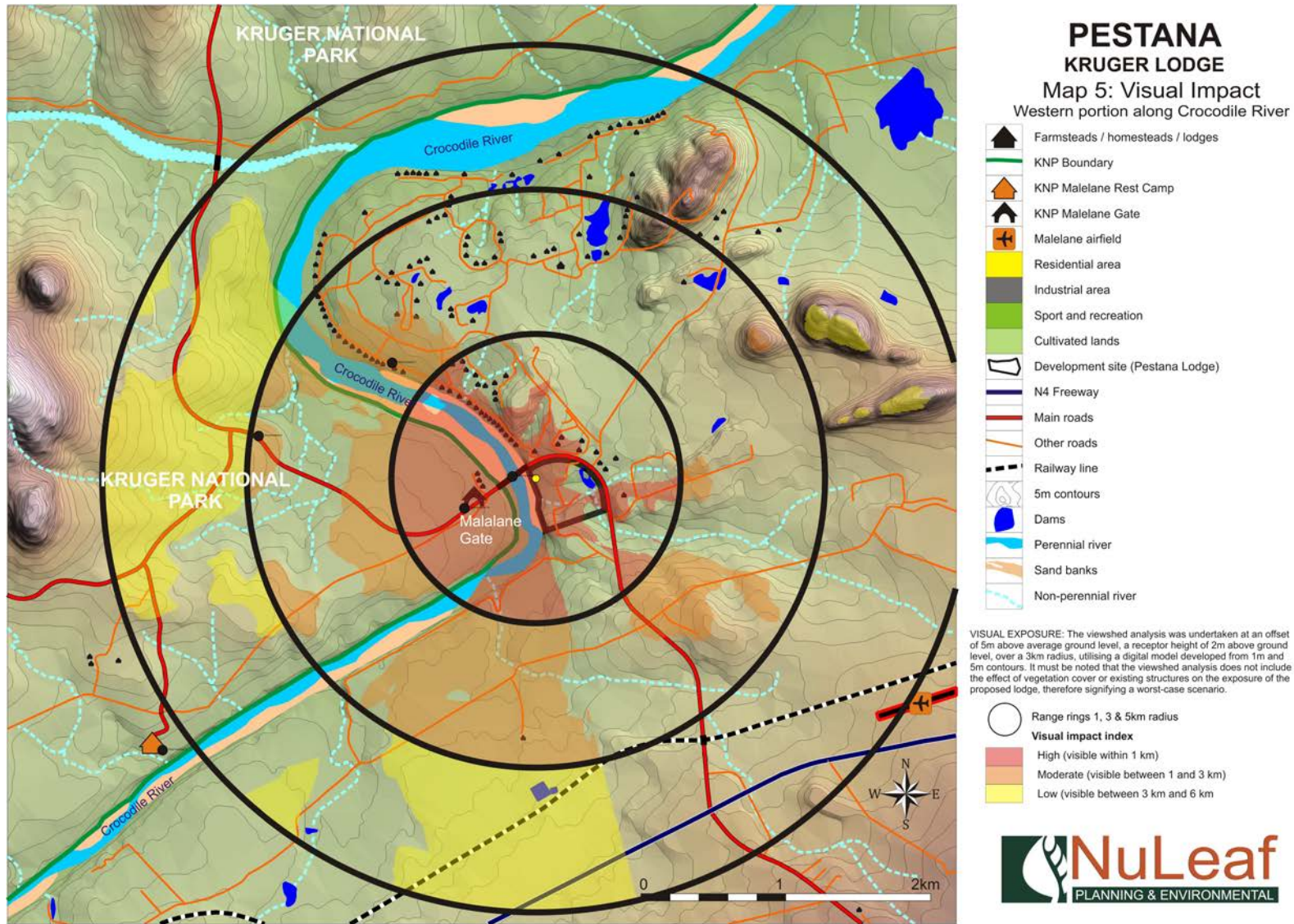
- Farmsteads / homesteads / lodges
- KNP Boundary
- KNP Malelane Rest Camp
- KNP Malelane Gate
- Malelane airfield
- Residential area
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VISUAL EXPOSURE: The viewshed analysis was undertaken at an offset of 5m above average ground level, a receptor height of 2m above ground level, over a 3km radius, utilising a digital model developed from 1m and 5m contours. It must be noted that the viewshed analysis does not include the effect of vegetation cover or existing structures on the exposure of the proposed lodge, therefore signifying a worst-case scenario.

- Range rings 1, 3 & 5km radius
- Visual impact index**
- High (visible within 1 km)
- Moderate (visible between 1 and 3 km)
- Low (visible between 3 km and 6 km)



Map 6: Visual Impact Index – North Western portion of the property



Map 7: Visual Impact Index – Western portion along Crocodile River

7.6 VISUAL IMPACT ASSESSMENT: METHODOLOGY

The previous section of the report identified specific areas where likely visual impacts would occur. This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues related to the visual impact.

The methodology for the assessment of potential visual impacts states the **nature** of the potential visual impact (e.g. the visual impact on users of major roads in the vicinity of the proposed development) and includes a table quantifying the potential visual impact according to the following criteria:

- **Extent** - international (very high = 5), national (high = 4), regional (medium = 3), local (low = 2) or site specific (very low = 1)
- **Duration** - very short (0-1 yrs = 1), short (2-5 yrs = 2), medium (5-15 yrs = 3), long (>15 yrs = 4), and permanent (= 5)
- **Magnitude** - None (= 0), minor (= 2), low (= 4), medium/moderate (= 6), high (= 8) and very high (= 10). This value is read off the Visual Impact Index maps.
- **Probability** – very improbable (= 1), improbable (= 2), probable (= 3), highly probable (= 4) and definite (= 5)
- **Status** (positive, negative or neutral)
- **Reversibility** - reversible (= 1), recoverable (= 3) and irreversible (= 5)
- **Significance** - low, medium or high

The **significance** of the potential visual impact is equal to the **consequence** multiplied by the **probability** of the impact occurring, where the consequence is determined by the sum of the individual scores for magnitude, duration and extent (i.e. **significance = consequence (magnitude + duration + extent) x probability**).

The significance weighting for each potential visual impact (as calculated above) is as follows:

- <30 points: Low (where the impact would not have a direct influence on the decision to develop in the area)
- 31-60 points: Medium/moderate (where the impact could influence the decision to develop in the area)
- >60: High (where the impact must have an influence on the decision to develop in the area)

7.7 VISUAL IMPACT ASSESSMENT: PRIMARY IMPACTS

7.7.1 POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE PROPOSED DEVELOPMENT.

The proposed lodge expansions, as well as, all site-associated infrastructure such as electrical powerlines are taken into account during the impact assessment. Since the height of the associated infrastructure is unlikely to exceed the expected height of the proposed development, the visual exposure of these components will fall within the viewsheds generated for the development.

Access roads will be required during both the construction and operational phase of the development. These access roads have the potential of manifesting as landscape scarring, and thus represent a potential visual impact within the viewshed areas. However, as access roads and servitudes have no elevation or height, so the visual impact of this associated infrastructure will be absorbed by the visual impact of the primary development.

The visual impact sensitive visual receptors (i.e. users of roads and guests of the existing Pestana Kruger Lodge and Leopard Creek) in close proximity to the proposed development (i.e. within 1km) are expected to be of **high** significance before and after mitigation. The Pestana expansion is not likely to have or pose a new visual impact, however, it would likely only contribute to the cumulative visual impact already experienced by sensitive visual receptors from the existing Pestana Lodge.

The table below illustrates this impact assessment.

Table 2: Impact table summarising the significance of sensitive visual receptors in close proximity to the proposed development

| | | |
|--|------------------------|------------------------------|
| Nature of Impact: Visual impact on the users of roads and timeshare owners/guest of the existing Pestana Lodge, in close proximity to the proposed development | | |
| | No mitigation | Mitigation considered |
| Extent | Local (2) | Local (2) |
| Duration | Permanent (5) | Permanent (5) |
| Magnitude | High (8) | High (8) |
| Probability | Definite (5) | Probable (4) |
| Significance | High (75) | High (60) |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |
| Mitigation / Management: | | |
| <u>Planning:</u> | | |
| ➤ Respond to the natural environment during the planning of buildings and infrastructure. | | |
| ➤ Consolidate development and make use of already disturbed sites rather than pristine areas. | | |
| ➤ Do not exceed 2 storey heights for all structures. | | |
| ➤ Retain all large trees and protected species as identified, and adapting the development footprint to accommodate these. | | |
| ➤ Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. | | |
| ➤ Retain buffer areas (wetland, river and other sensitive vegetation zones) as natural pockets within the development plan. | | |
| ➤ Retain vegetation in all areas outside of actual built footprints wherever possible. | | |
| ➤ Soften hard spaces and parking areas through the retention of existing vegetation or | | |

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|--|
| <p>the introduction of appropriate indigenous planting.</p> <ul style="list-style-type: none"> ➤ Make use of earth tones and natural materials rather than primary colours and high-tech finishes. ➤ Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes. ➤ Avoid large areas of un-shaded reflective surface. ➤ Avoid the placement of unsightly services and infrastructure in visually prominent areas. ➤ Appropriate placement and screening of service areas. <p><u>Construction:</u></p> <ul style="list-style-type: none"> ➤ Rehabilitate all construction areas. ➤ Ensure that vegetation is not cleared unnecessarily to make way for infrastructure. <p><u>Operations:</u></p> <ul style="list-style-type: none"> ➤ Maintain the general appearance of the development as a whole. ➤ Monitor rehabilitated areas, and implement remedial action as and when required. |
| <p>Cumulative impacts:</p> <p>The Pestana expansion is not likely to have or pose a new visual impact, however, it would likely contribute to the cumulative visual impact already experienced by sensitive visual receptors from the existing Pestana Lodge.</p> |
| <p>Residual impacts:</p> <p>N/A</p> |

7.7.2 POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS WITHIN THE REGION

The visual impact on sensitive visual receptors (i.e. users of roads and residents of farmsteads) within the region (i.e. beyond the 1km offset) is expected to be of **moderate** significance, and may be mitigated to **low**.

The table below illustrates this impact assessment.

Table 3: Impact table summarising the significance of visual impacts on sensitive visual receptors within the region

| | | |
|---|------------------------|------------------------------|
| Nature of Impact: | | |
| Visual impact on users of secondary roads as well as residents of farmsteads on the periphery of the 1km offset. | | |
| | No mitigation | Mitigation considered |
| Extent | Regional (3) | Regional (3) |
| Duration | Permanent (5) | Permanent (5) |
| Magnitude | Moderate (6) | Low (4) |
| Probability | Probable (3) | Improbable (2) |
| Significance | Moderate (42) | Low (24) |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |
| Mitigation / Management: | | |
| <u>Planning:</u> | | |
| <ul style="list-style-type: none"> ➤ Respond to the natural environment during the planning of buildings and infrastructure. ➤ Consolidate development and make use of already disturbed sites rather than pristine areas. ➤ Do not exceed 2 storey heights for all structures. ➤ Retain all large trees and protected species as identified, and adapting the development footprint to accommodate these. ➤ Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. ➤ Retain buffer areas (wetland, river and other sensitive vegetation zones) as natural pockets within the development plan. ➤ Retain vegetation in all areas outside of actual built footprints wherever possible. | | |

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| <ul style="list-style-type: none"> ➤ Soften hard spaces and parking areas through the retention of existing vegetation or the introduction of appropriate indigenous planting. ➤ Make use of earth tones and natural materials rather than primary colours and high-tech finishes. ➤ Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes. ➤ Avoid large areas of un-shaded reflective surface. ➤ Avoid the placement of unsightly services and infrastructure in visually prominent areas. ➤ Appropriate placement and screening of service areas. <p>Construction:</p> <ul style="list-style-type: none"> ➤ Rehabilitate all construction areas. ➤ Ensure that vegetation is not cleared unnecessarily to make way for infrastructure. <p>Operations:</p> <ul style="list-style-type: none"> ➤ Maintain the general appearance of the development as a whole. ➤ Monitor rehabilitated areas, and implement remedial action as and when required. |
| <p>Cumulative impacts: The Pestana expansion is not likely to have or pose a new visual impact, however, it would likely contribute to the cumulative visual impact already experienced by sensitive visual receptors from the existing Pestana Lodge.</p> |
| <p>Residual impacts: N/A</p> |

7.7.3 POTENTIAL VISUAL IMPACT ON CONSERVATION AREAS WITHIN THE REGION

The Kruger National Park forms the western boundary of the site. Of particular concern would be the potential visual impact on observers travelling along the game drive routes (Malelane Skukuza Road) within the Kruger National Park.

The potential visual impact on protected and conservation areas (i.e. Kruger National Park) is expected to be of **High** significance both before mitigation and **Moderate** significance after mitigation. The table below illustrates this impact assessment.

The table below illustrates this impact assessment.

Table 4: Impact table summarising the significance of visual impacts on conservation areas within the region

| | | |
|--|----------------------|------------------------------|
| Nature of Impact: | | |
| Potential visual impact on conservation areas within the region | | |
| | No mitigation | Mitigation considered |
| Extent | Regional (2) | Regional (2) |
| Duration | Permanent (5) | Permanent (5) |
| Magnitude | High (8) | Moderate (6) |
| Probability | Highly Probable (4) | Probable (3) |
| Significance | High (60) | Moderate (39) |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |
| Mitigation / Management: | | |
| <u>Planning:</u> | | |
| <ul style="list-style-type: none"> ➤ Respond to the natural environment during the planning of buildings and infrastructure. ➤ Consolidate development and make use of already disturbed sites rather than pristine areas. ➤ Do not exceed 2 storey heights for all structures. ➤ Retain all large trees and protected species as identified, and adapting the | | |

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| <p>development footprint to accommodate these.</p> <ul style="list-style-type: none"> ➤ Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. ➤ Retain buffer areas (wetland, river and other sensitive vegetation zones) as natural pockets within the development plan. ➤ Retain vegetation in all areas outside of actual built footprints wherever possible. ➤ Soften hard spaces and parking areas through the retention of existing vegetation or the introduction of appropriate indigenous planting. ➤ Make use of earth tones and natural materials rather than primary colours and high-tech finishes. ➤ Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes. ➤ Avoid large areas of un-shaded reflective surface. ➤ Avoid the placement of unsightly services and infrastructure in visually prominent areas. ➤ Appropriate placement and screening of service areas. <p><u>Construction:</u></p> <ul style="list-style-type: none"> ➤ Rehabilitate all construction areas. ➤ Ensure that vegetation is not cleared unnecessarily to make way for infrastructure. <p><u>Operations:</u></p> <ul style="list-style-type: none"> ➤ Maintain the general appearance of the development as a whole. ➤ Monitor rehabilitated areas, and implement remedial action as and when required. <p>Cumulative impacts: The Pestana Kruger Lodge expansion is not likely to have or pose a new visual impact, however, it would likely contribute to the cumulative visual impact already experienced by sensitive visual receptors from the existing Pestana Kruger Lodge.</p> <p>Residual impacts: N/A</p> |
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7.7.4 POTENTIAL VISUAL IMPACT OF CONSTRUCTION ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE DEVELOPMENT

During the construction period there will be an increase in heavy vehicles utilising the roads to the construction sites that may cause, at the very least, a visual nuisance to other road users, Pestana guests, Leopard Creek users and landowners in the area. Mitigation entails proper planning, management and rehabilitation of all construction sites to forego visual impacts.

The table below illustrates the assessment of the anticipated visual impact of construction on sensitive visual receptors in close proximity to the proposed development. Visual impacts are likely to be of **moderate** significance, and may be mitigated to **low**.

Table 5: Impact table summarising the significance of visual impact of construction on visual receptors in close proximity to the proposed development

| | | |
|---|----------------------|------------------------------|
| Nature of Impact: Visual impact of construction activities, vehicles and dust on sensitive visual receptors in close proximity to the proposed development. | | |
| | No mitigation | Mitigation considered |
| Extent | Local (2) | Local (2) |
| Duration | Short term (2) | Short term (2) |
| Magnitude | Very High (10) | High (8) |
| Probability | Definite (5) | Highly Probable (4) |
| Significance | High (70) | Moderate (48) |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |

Mitigation / Management:

Planning:

- Respond to the natural environment during the planning of buildings and infrastructure.
- Consolidate development and make use of already disturbed sites rather than pristine areas.
- Do not exceed 2 storey heights for all structures.
- Retain all large trees and protected species as identified, and adapting the development footprint to accommodate these.
- Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.
- Retain buffer areas (wetland, river and other sensitive vegetation zones) as natural pockets within the development plan.
- Retain vegetation in all areas outside of actual built footprints wherever possible.
- Soften hard spaces and parking areas through the retention of existing vegetation or the introduction of appropriate indigenous planting.
- Make use of earth tones and natural materials rather than primary colours and high-tech finishes.
- Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes.
- Avoid large areas of un-shaded reflective surface.
- Avoid the placement of unsightly services and infrastructure in visually prominent areas.
- Appropriate placement and screening of service areas.

Construction:

- Rehabilitate all construction areas.
- Ensure that vegetation is not cleared unnecessarily to make way for infrastructure.

Operations:

- Maintain the general appearance of the development as a whole.
- Monitor rehabilitated areas, and implement remedial action as and when required.

Cumulative impacts:

None.

Residual impacts:

None, provided rehabilitation works are carried out as specified.

7.7.5 POTENTIAL VISUAL IMPACT OF LIGHTING AT NIGHT ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE DEVELOPMENT

The natural areas surrounding the proposed activity represent a low incidence of light sources, resulting in a low level of existing light impact outside of Leopard creek and Malelane.

The use of floodlights and high impact lights would create light trespass in an otherwise dark environment. This would be especially problematic for sensitive receptors in close proximity, especially receptors of farmsteads. It is also important to note that the eco-tourist destinations within close proximity to the proposed infrastructure (i.e. Kruger National Park and Leopard Creek) may experience potential negative impact if the lighting for the facility is not responsively and sensitively designed. The use of floodlights and high mast lights would create light trespass and sky glow for sensitive receptors in close proximity.

In addition to the above, sky glow is the condition where the night sky is illuminated when light reflects off particles in the atmosphere such as moisture, dust or smog. The sky glow intensifies with the increase in the amount of light sources. Each new light source, especially upwardly directed lighting, contributes to the increase in sky glow.

The table below illustrates the assessment of the anticipated visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed

development. Visual impacts are likely to be of **moderate** significance, and may be mitigated to **low**.

Table 6: Impact table summarising the significance of visual impact of lighting at night on visual receptors in close proximity to the proposed development

| | | |
|--|------------------------|------------------------------|
| Nature of Impact: Visual impact of direct lighting and sky glow on sensitive visual receptors in close proximity to the proposed development. | | |
| | No mitigation | Mitigation considered |
| Extent | Local (2) | Local (2) |
| Duration | Permanent (5) | Permanent (5) |
| Magnitude | Moderate (6) | Low (4) |
| Probability | Probable (3) | Improbable (2) |
| Significance | Moderate (39) | Low (22) |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |
| Mitigation: <u>Planning & operation:</u> | | |
| <ul style="list-style-type: none"> ➤ Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). ➤ Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights. ➤ Make use of minimum lumen or wattage in fixtures. ➤ Make use of down-lighters, or shielded fixtures. ➤ Make use of Low Pressure Sodium lighting or other types of low impact lighting. ➤ Make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. | | |
| Cumulative impacts: The Pestana expansion is likely to contribute to a regional increase in lighting impact. | | |
| Residual impacts: N/A | | |

7.8 VISUAL IMPACT ASSESSMENT: SECONDARY IMPACTS

7.8.1 POTENTIAL VISUAL IMPACT ON THE VISUAL CHARACTER AND SENSE OF PLACE OF THE REGION.

Sense of place refers to a unique experience of an environment by a user based on his or her cognitive experience of the place. Visual criteria, and specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.) play a significant role.

A visual impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

In general the landscape character of the greater study area presents as natural with both commercial and subsistence agricultural activities adjacent to the site. The site itself is largely disturbed with an existing Lodge development already on it. The visual quality of the region is generally high and large tracts of intact vegetation characterise most of the visual environment to the east, south and west of the study area. The Kruger National Park, located to the west of the site, contributes significantly to the high quality of the visual environment and sense of place within the region. As such, the entire study area is considered sensitive to new visual impacts, however, the Pestana expansion is not likely to have, or pose, a

new visual impact, but would rather be more likely to contribute to the cumulative visual impact already experienced by sensitive visual receptors from the existing Pestana Kruger Lodge. The key visual experience is linked to the use of the road network and associated views of the surrounding landscape.

The anticipated visual impact on the visual character and sense of place of the study area is expected to be of **moderate** significance.

The table below illustrates the assessment of this anticipated impact.

Table 7: Impact table summarising the significance of visual impacts on landscape character and sense of place within the region

| Nature of Impact: | | |
|---|------------------------|------------------------------|
| Visual impact of the proposed development on the visual quality of the landscape and sense of place of the region | | |
| | No mitigation | Mitigation considered |
| Extent | Regional (3) | N/A |
| Duration | Permanent (5) | N/A |
| Magnitude | Moderate (6) | N/A |
| Probability | Improbable (2) | N/A |
| Significance | Moderate (39) | N/A |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |
| Mitigation / Management: | | |
| <u>Planning:</u> | | |
| <ul style="list-style-type: none"> ➤ Respond to the natural environment during the planning of buildings and infrastructure. ➤ Consolidate development and make use of already disturbed sites rather than pristine areas. ➤ Do not exceed 2 storey heights for all structures. ➤ Retain all large trees and protected species as identified, and adapting the development footprint to accommodate these. ➤ Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. ➤ Retain buffer areas (wetland, river and other sensitive vegetation zones) as natural pockets within the development plan. ➤ Retain vegetation in all areas outside of actual built footprints wherever possible. ➤ Soften hard spaces and parking areas through the retention of existing vegetation or the introduction of appropriate indigenous planting. ➤ Make use of earth tones and natural materials rather than primary colours and high-tech finishes. ➤ Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes. ➤ Avoid large areas of un-shaded reflective surface. ➤ Avoid the placement of unsightly services and infrastructure in visually prominent areas. ➤ Appropriate placement and screening of service areas. | | |
| <u>Construction:</u> | | |
| <ul style="list-style-type: none"> ➤ Rehabilitate all construction areas. ➤ Ensure that vegetation is not cleared unnecessarily to make way for infrastructure. | | |
| <u>Operations:</u> | | |
| <ul style="list-style-type: none"> ➤ Maintain the general appearance of the development as a whole. ➤ Monitor rehabilitated areas, and implement remedial action as and when required. | | |
| Cumulative impacts: | | |
| The Pestana expansion is not likely to have or pose a new visual impact, however, it would likely contribute to the cumulative visual impact already experienced by sensitive visual receptors from the existing Pestana Lodge. | | |

Residual impacts:

N/A

7.8.2 POTENTIAL VISUAL IMPACT ON TOURIST ACCESS ROUTES AND OTHER TOURIST DESTINATIONS WITHIN THE REGION

The greater region is generally seen as having a high scenic value and tourism value potential. Outside of towns, the landscape is characterised by wide-open spaces with a high visual quality and strong sense of place. The roads in the region are considered to be routes that are likely to carry tourists.

In terms of tourist destinations and accommodation, Malelane and its surrounding area is known to host a relatively high concentration of attractions and overnight facilities. Although all of these facilities have not been specifically mapped, they are known to occur, and are likely to coincide with homesteads and farmsteads in close proximity to the site.

The anticipated visual impact of the proposed activity on tourist access routes and tourist destinations (i.e. attractions and accommodation) within the region is therefore expected to be of **moderate** significance. The table below illustrates the assessment of this anticipated impact.

Table 8: Impact table summarising the significance of visual impacts on tourist access routes and other tourist destinations within the region

| Nature of Impact: | | |
|---|------------------------|------------------------------|
| Visual impact of the proposed development on tourist access routes and other tourist destinations within the region | | |
| | No mitigation | Mitigation considered |
| Extent | Regional (3) | N/A |
| Duration | Permanent (5) | N/A |
| Magnitude | Moderate (6) | N/A |
| Probability | Probable (3) | N/A |
| Significance | Moderate (42) | N/A |
| Status (positive or negative) | Negative | Negative |
| Reversibility | Recoverable (3) | Recoverable (3) |
| Irreplaceable loss of resources? | No | No |
| Can impacts be mitigated? | Yes | |
| Mitigation / Management: | | |
| <u>Planning:</u> | | |
| <ul style="list-style-type: none"> ➤ Respond to the natural environment during the planning of buildings and infrastructure. ➤ Consolidate development and make use of already disturbed sites rather than pristine areas. ➤ Do not exceed 2 storey heights for all structures. ➤ Retain all large trees and protected species as identified, and adapting the development footprint to accommodate these. ➤ Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. ➤ Retain buffer areas (wetland, river and other sensitive vegetation zones) as natural pockets within the development plan. ➤ Retain vegetation in all areas outside of actual built footprints wherever possible. ➤ Soften hard spaces and parking areas through the retention of existing vegetation or the introduction of appropriate indigenous planting. ➤ Make use of earth tones and natural materials rather than primary colours and high-tech finishes. ➤ Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes. ➤ Avoid large areas of un-shaded reflective surface. | | |

| |
|---|
| <ul style="list-style-type: none"> ➤ Avoid the placement of unsightly services and infrastructure in visually prominent areas. ➤ Appropriate placement and screening of service areas. <p><u>Construction:</u></p> <ul style="list-style-type: none"> ➤ Rehabilitate all construction areas. ➤ Ensure that vegetation is not cleared unnecessarily to make way for infrastructure. <p><u>Operations:</u></p> <ul style="list-style-type: none"> ➤ Maintain the general appearance of the development as a whole. ➤ Monitor rehabilitated areas, and implement remedial action as and when required. |
| <p><i>Cumulative impacts:</i> The Pestana expansion is not likely to have or pose a new visual impact, however, it would likely contribute to the cumulative visual impact already experienced by sensitive visual receptors from the existing Pestana Lodge.</p> |
| <p><i>Residual impacts:</i> N/A</p> |

8 IMPACT STATEMENT

In light of the results and findings of the Visual Impact Assessment undertaken for the proposed Pestana Kruger Lodge expansion, it is acknowledged that the receiving environment will be visually transformed to a certain degree.

Photo simulations illustrating the visual impact of the development pre-mitigation and post-mitigation are included below. Refer to **Figure 12** and **13**. Provided that the mitigation measures as listed in Section 7 above are implemented the development is supported for a visual perspective.

All impacts above are determined to have a post mitigation significance of moderate or low. In addition, none are considered to be fatal flaws from a visual perspective. This is based on the relatively low density of visual receptors within the study area, the relatively contained extent of the development and the possibility of mitigating the visual impacts expected.



Figure 12: Photo simulation pre-mitigation measures



Figure 13: Photo simulation post-mitigation measures

9 CONCLUSION AND RECOMMENDATIONS

The construction and operation of the proposed Pestana Kruger Lodge expansion will have a visual impact on the scenic resources of the study area especially on the KNP, Leopard Creek and the existing Pestana Kruger Lodge guests. However, this is not likely to be a new visual impact, seeing as Pestana Kruger Lodge has been in operation for years.

However, mitigation of some of the visual impact is possible and will go far in reducing the magnitude of visual impacts discussed by softening the appearance of the development within its context. The recommendations made should be followed and the mitigation implemented on an ongoing basis.

Considering all factors, it is concluded that the development is appropriate within its context from a visual perspective, and that the anticipated visual impacts are neither unacceptable in nature nor excessive in magnitude. Potential visual impacts are therefore not considered to be a fatal flaw for this development.

Based on the above, it is the recommendation of the author that the proposed expansion of Pestana Kruger Lodge be supported from a visual perspective, subject to the implementation of the required and recommended optimisation and mitigation measures.

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