

**Proposed Development Of A Timeshare Resort Located On Portion 101 Tenbosch Near The  
Crocodile River, Mpumalanga Province.**

**VISUAL IMPACT ASSESSMENT**

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## **1. INTRODUCTION**

### **1.1. Qualification and Experience of the Practitioner**

Peter Velcich of Nuleaf Planning and Environmental (Pty) Ltd, specialising in environmental planning, impact assessments, visual assessments, and landscape and tourism service provision, undertook this visual assessment.

Peter Velcich is a registered professional Landscape Architect (PrLArch) with a Master's Degree in Landscape Architecture and 26 years of experience. Peter is specialised in Environmental Planning and Management, with specific expertise in Environmental Impact Assessment, Visual Impact Assessment, Land Use and Master Planning. He has extensive practical knowledge in spatial analysis, environmental modelling and digital mapping.

Peter Velcich is familiar with the "Guidelines for Involving Visual and Aesthetic Specialists in the 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.

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. Assumptions and Limitations**

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

### **1.4. Level of Confidence**

Level of confidence<sup>1</sup> 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:

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<sup>1</sup> Adapted from Oberholzer (2005).

- 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/or 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/or 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 of the project and experience of this type of project by the practitioner is rated as **3**.

## 2. BACKGROUND

The affected property, Portion 101 Tenbosch Farm, 162 JU, is situated within the Nkomazi Local Municipality, in the Ehlanzeni District Municipality, approximately 15 km north west of Komatipoort and approximately 9 km east of Marloth Park.

The proposed development entails the construction of tourist accommodation in the form of a timeshare resort within the Portion 101 Tenbosch Farm, 162 JU adjacent to the Crocodile River. The timeshare will comprise between 60-100 chalets and a central complex inclusive of recreational facilities. A third of the existing water rights from the river will be converted to be used for the development. All associated civil infrastructure (water, electricity, waste treatment) will be included, as well as, internal access tracks.

The timeshare units will be located predominately along the northern border to the property, providing views of the Crocodile River and Kruger National Park beyond. Units will also be positioned around the existing farmhouses which will act as a central complex. Refer to figure 2.

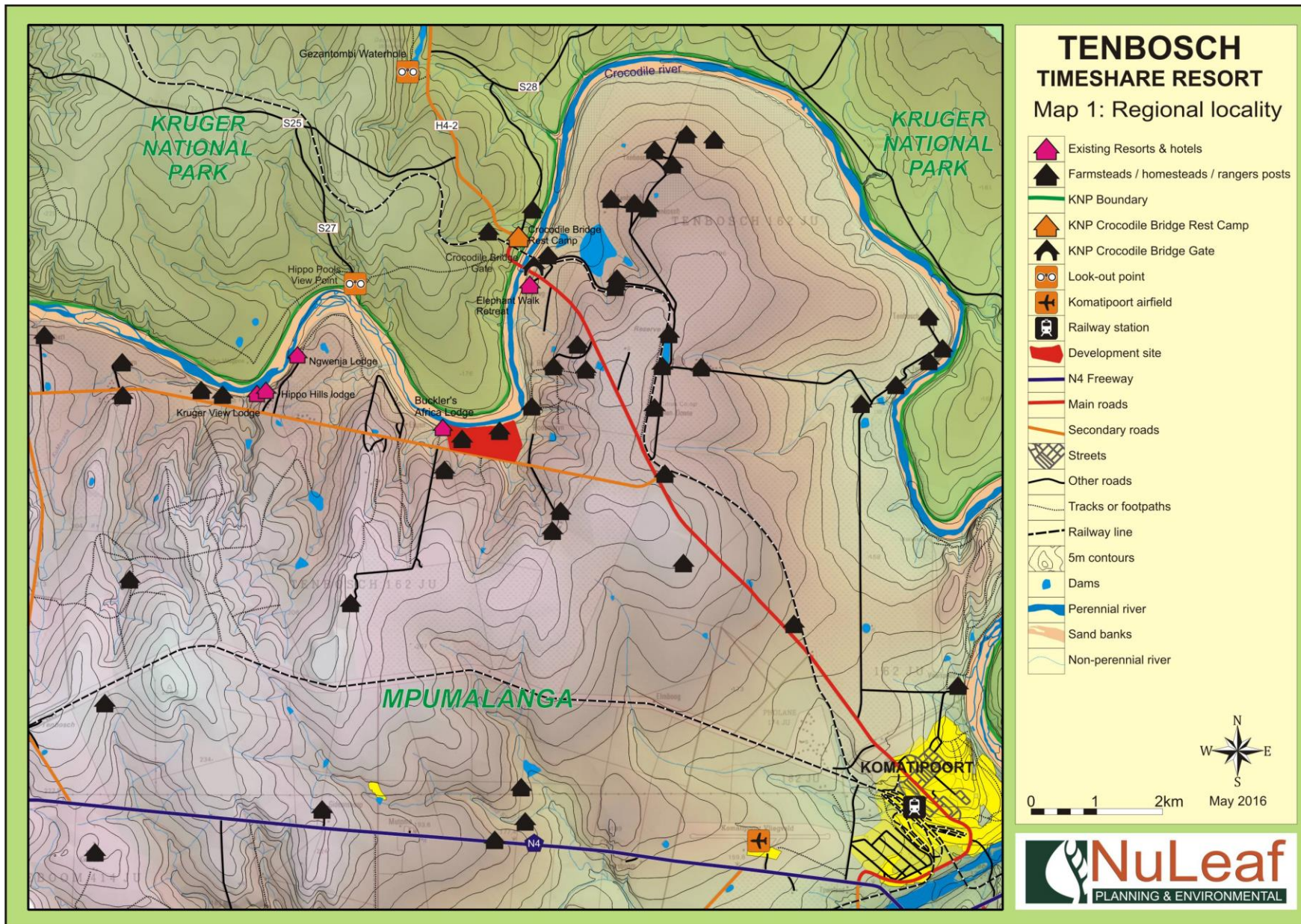


Figure 1: Orientation

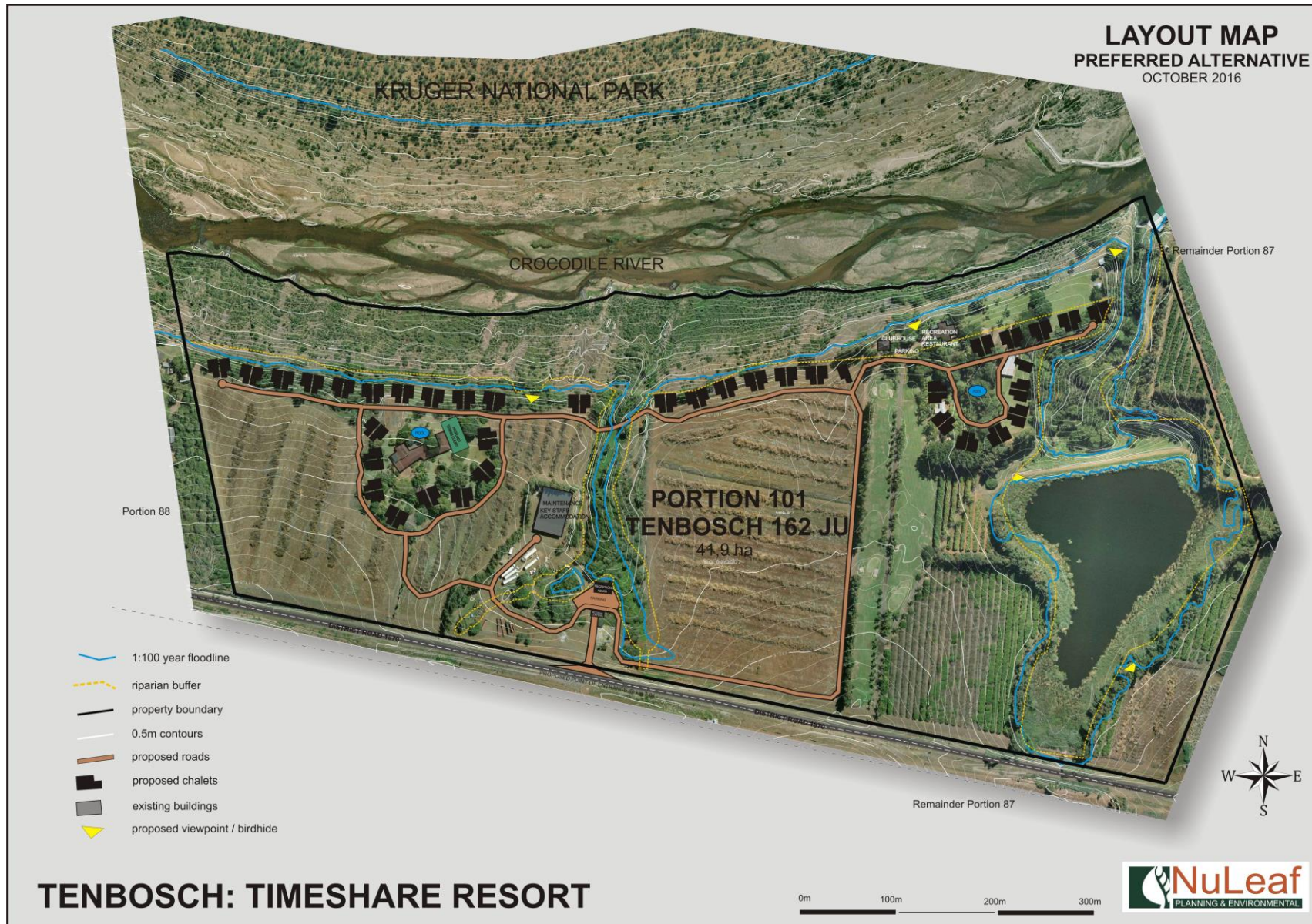


Figure 2: Preferred Layout

### **3. METHODOLOGY**

This Visual Assessment 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 of a timeshare resort on Tenbosch Farm.

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

- The creation of a digital terrain model (DTM) of the potentially affected environment using a minimum of 20 m interval contours;
- The sourcing of relevant spatial data, including cadastral features, vegetation types, land use activities, topographical features, site placement, etc.;
- The identification of sensitive environments or receptors upon which the proposed facility could have a potential 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.

This study sets out to identify the possible visual issues related to the proposed development of facilities and associated infrastructure, to offer potential mitigation measures where required and to make a recommendation in terms of additional study required.

The following methodology has been followed for the identification of potential visual impacts<sup>2</sup>:

- Determine potential visual exposure;
- Determine visual distance and observer proximity to the proposed development;
- Determine viewer incidence, perception and sensitivity;
- Determine visual absorption capacity (VAC) of the landscape;
- Determine the visual impact index and
- Determine the impact significance.

#### **3.1. Potential Visual Exposure**

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

Viewshed analyses of the proposed infrastructure indicates the potential visibility.

#### **3.2. Visual Distance and Observer Proximity**

Within the visual exposure footprint, proximity radii were determined based on the anticipated visual experience of the observer over varying distances. In this respect, the proximity radii are calculated as a function of the critical point at which an observer will be able to perceive the full extent of the facility within a normal 30 degree cone of vision.

#### **3.3. Viewer Incidence, Perception and Sensitivity**

The number of observers and their perception of the proposed lodges will influence potential 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 facility and its related infrastructure.

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<sup>2</sup> This methodology is adapted from that developed by MetroGIS, and detailed in Visual Impact Assessments undertaken by them.

### **3.4. Visual Absorption Capacity**

This is the capacity of the receiving environment to absorb the potential visual impact of the proposed infrastructure. 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 facility 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.

### **3.5. 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.

### **3.6. 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.

## **4. THE AFFECTED ENVIRONMENT**

The proposed development is situated on Portion 101 of the farm Tenbosch 162 JU, approximately 8 km north-west of the town of Komatipoort, Ehlanzeni District, Mpumalanga. The study area lies adjacent to the Kruger National Park boundary on the southern bank of the Crocodile River between the town of Marloth Park to the west and the Crocodile Bridge Gate to the east.

The study area is approximately 40 hectares in size, of which 30 ha is transformed. The remaining 10 ha comprises natural vegetation in varying degrees of disturbance or degradation.

The southern boundary of the farm is defined by a large secondary road, while the northern boundary is formed by the Kruger National Park and the Crocodile River. Cultivated farmlands lie to the east of the Tenbosch Farm and tourism accommodation lies to the west.

The topography within the study area comprises of fairly flat plains with open tree savanna. The mean annual precipitation is 634 mm.

Surface hydrology within the study area is dominated by the Crocodile River system. Additionally, two (2) drainage lines are located on the proposed site, one in the west and one in the eastern portion.

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*.



Majority of the proposed site is transformed through agriculture in the form of citrus orchards with existing infrastructure on the farm including two (2) farmhouses, a variety of sheds, and a golf course.

The town of Komatipoort is the largest populated place within the study area situated approximately 15 Km south east from the Tenbosch farm. Marloth Park is approximately 10 Km north west of the Tenbosch farm. Marloth Park is a wildlife sanctuary and holiday town.

The areas surrounding the proposed site consist of predominately cultivated lands and small homesteads. Overall, the population density within the study area is quite 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 3: Visual quality of the greater farm – established gardens



Figure 4: Visual quality of the greater farm – area where citrus trees have been removed



Figure 5: Visual quality of the greater farm – access road along the Crocodile River



Figure 6: Visual quality- adjacent tourism accommodation



Figure 7: Visual quality of the region (looking towards Kruger National Park in the north)



Figure 8: Visual quality of the region (looking towards Kruger National Park in the north)



Figure 9: Visual quality of the region (looking towards Buckler's Africa Lodge in the west)

## 5. ANTICIPATED VISUAL IMPACTS

Anticipated issues related to the potential visual impact of the proposed development of the timeshare resort and supporting infrastructure include the following:

- The visibility of the resort to, and potential visual impact on tourist camps and lodges within the immediate area.

- 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 proposed resort to, and potential visual impact on, protected and conservation areas (i.e. Kruger National park).
- The visibility of the resort to, and potential visual impact on observers travelling along local roads.
- The visibility of the resort to, and potential visual impact on residents of local settlements and homesteads.
- The visibility of the lodges to, and potential visual impact on residents of Komatipoort and Marloth Park.
- The potential visual impact of the resort on the visual character of the landscape and sense of place of the region.
- The potential visual impact of lighting of the resort at night on observers residing in close proximity to the development.
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts and inform the design process.

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.

## 6. RESULTS

### 6.1. Potential Visual Exposure

In order to understand the potential visual exposure of the proposed development, a viewshed analysis was undertaken, a transmitter (development) offset of 6m above average ground level (i.e. the approximate height of a pitch roof single storey building). 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.

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 development, therefore illustrating a worst-case scenario.

The results of the viewshed analyses of the alternative development sites are summarised below:

A time share resort consisting of between 60-100 chalets located on Tenbosch Farm will have a large core area of potential visual exposure on the project site itself and within a 1 Km radius thereof. Potential visual exposure within this zone is **high** in all directions with the exception of a small area to the south west which has no visual impact. Potential visual receptors within this zone are Buckler's Africa Lodge, an existing lodge, a farmstead and secondary and internal roads.

Potential visual exposure is **moderate** between 1 and 3 Km from the proposed timeshare resort, with visually exposed areas reduced in extent lying predominately to the north, north east and east and north west. Areas to the south and west are largely visually screened with small areas having a potential impact. Potential visual receptors include farmsteads/ homesteads in the north east and south east, existing lodges/ resorts in the north and north west, the Kruger National Park Crocodile Bridge Gate and internal access roads and tracks within the surrounding area and the Kruger National Park.

Potential visual exposure is low between 3 and 5 km from the proposed timeshare resort with very limited visually exposed areas lying to the north and north west. Areas to the east, south east, south, south west and west are visually screened. Potential visual receptors include the Kruger National Park Crocodile Bridge Rest Camp and a farmstead/homestead/ ranger camp in the north and limited game drive routes with the KNP. Refer to Figure 10.

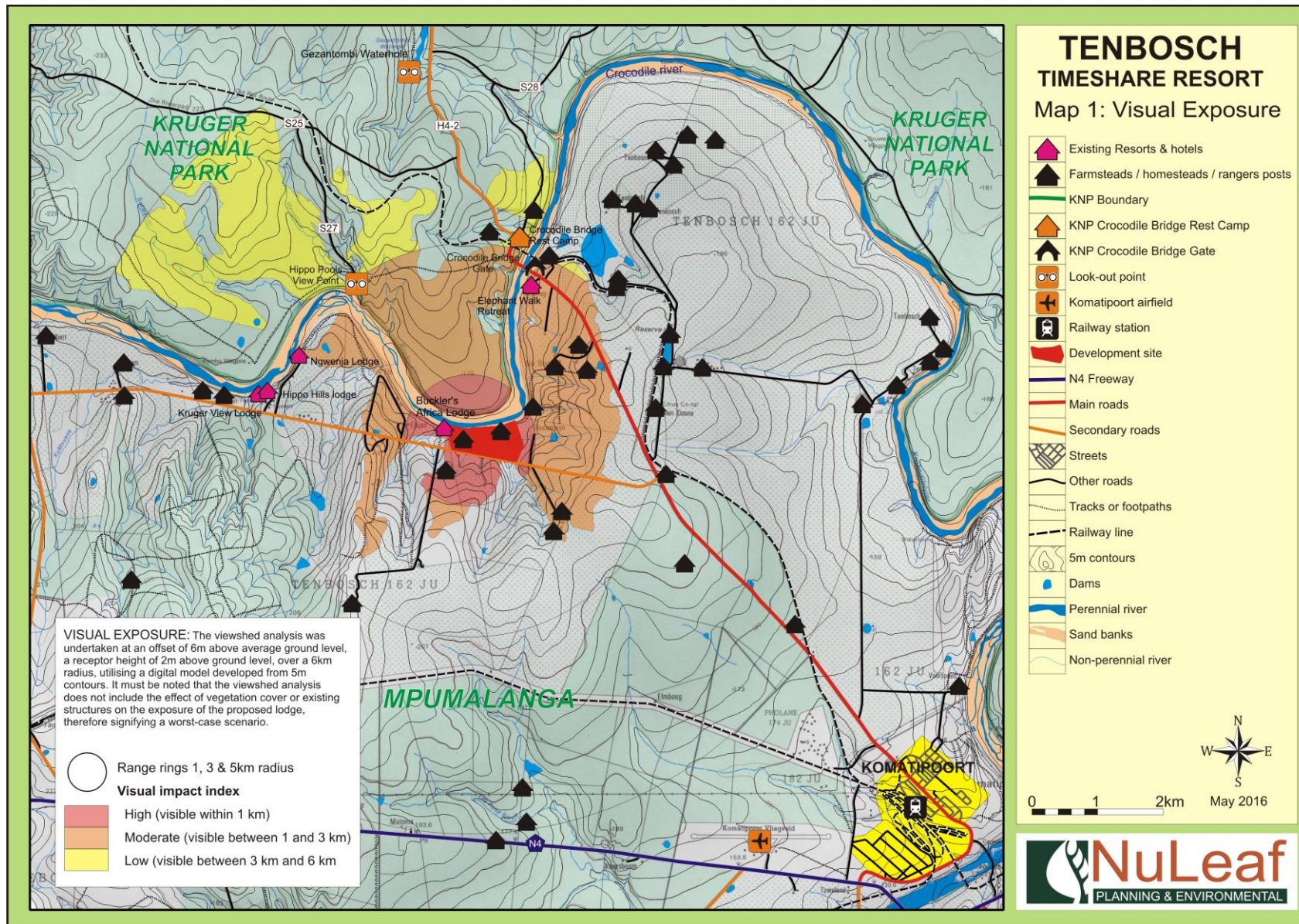


Figure 10: Visual exposure

## 6.2. Visual Distance and Observer Proximity

The proximity radii used for this study, calculated from the boundary lines of the proposed development footprint, are:

- 0-1 km: Short distance view where the development could dominate the frame of vision and constitute a high visual prominence.
- 1 to 3 km: Medium distance views where the development could be easily and comfortably visible and constitute a moderate visual prominence.
- 3 – 5 km: Long distance view where the facility would become part of the visual environment, but could not likely be visible or recognisable. This zone constitutes a very low visual prominence

Of note is that in general, the severity of the visual impact on visual receptors decreases with increased distance from the proposed development.

The results of this exercise indicate that the areas of potentially high visual impact, i.e. visually exposed areas within 1 km of the development, are largely free of any noteworthy receptors (viewers) with the exception of Buckler's Africa Lodge located adjacent to the affected property in the west and a farmstead/homestead located south west of the affected property.

Between the 1 to 3 Km range rings, many noteworthy receptors are found. These include farmsteads/homesteads, the KNP Crocodile Bridge Gate, existing lodges/ resorts and access roads and game drive routes within the KNP.

Visual receptors beyond the 3km range ring are limited to game drive tracks and the Crocodile Bridge rest camp, but these are less likely to be visually affected at this distance. Of note in this regard is that the proposed Timeshare Resort will be designed as a collection of smaller components which will manifest as multiple smaller entities in the landscape rather than a single mass. In general, a larger, single massed building will manifest as a greater potential visual impact at any given distance, and will generally be visible over larger distances.

## 6.3. Viewer Incidence, Perception and Sensitivity

Viewer incidence is expected to be the highest along the roads surrounding the proposed development area and the properties directly adjacent to the site. Second to these are homesteads in close proximity to the proposed site. Tourists using the roads, residents of the area and tourist accommodation are considered the most sensitive to visual intrusion as they will be exposed to visual intrusion during their rest and relaxation times.

Tourists within the neighbouring Kruger National Park, including visitors to the nearby lodges and tourists making use of internal game drive routes, represent additional visual receptors.

*In terms of perception, the public participation process undertaken by NuLeaf Planning and Environmental as part of the BAR Phase indicates an overall neutral perception with regards to visual concerns of the proposed project within the receiving environment, as no negative or positive comments were received.*

## 6.4. Visual Absorption Capacity

The proposed site was, up until recently, a functional citrus orchard. The western part of the property has since been cleared of all citrus trees, while the eastern portion is still largely intact. Due to the presence of two (2) homesteads on the property, there are also large manicured lawns and gardens as well as a small golf course. For these reasons, the overall visual absorption capacity (VAC) is *low-medium*.

The VAC along the secondary road is deemed to be low due to the vegetation being cleared.



Figure 11: Low VAC along the secondary road bordering the site

The vegetation bordering the proposed site in the north is fairly dense and undisturbed and it forms part of the riparian zone of the Crocodile River. The VAC here is considered to be *medium to high*.



Figure 12: Medium-High VAC along the Crocodile River

The VAC is deemed very low to the west of the proposed site, owing to the clearing of the citrus orchards.





Figure 13: Low VAC in the west

The VAC is considered high in the east due to the presence of orchard trees and dense vegetation.



Figure 14: High VAC in the east

The VAC would therefore be relatively effective in absorbing the visual impact of the proposed Timeshare Resort.

Erring on the side of caution, and with due consideration of local knowledge and experience, it is estimated that the visual absorption capacity of the local vegetation, will effectively screen visual impact between 500 m to 1000 m, even in late winter conditions.

The VAC of the site and its surrounds was based on the present day site conditions which represents a worst case scenario. Part of the proposed development plans are to replant the citrus orchards, thereby increasing the VAC of the site over the years.

## **7. MITIGATION AND MANAGEMENT OF POTENTIAL IMPACTS**

Mitigation and management of visual impacts needs to be considered as best practice for the planning, construction and operational phases of the proposed resort.

The following typical mitigation procedures and management measures are proposed:

### **7.1. Planning phase**

- Physical building limitations (height, footprint)
  - Limit and break up bulk (smaller individual buildings in favour of one large mass).
  - Single storey limit.
- Colours and textures
  - The colour and texture of the proposed structures must respond to the natural colours and textures of the environment.
  - In this regard, a colour palette is provided for the treatment of all exterior walls and roofs.
- Materials
  - Non reflective finishing materials must be used.
  - Thatched or timber cladded roofs preferable.
  - Textured, natural materials preferable.
- Lighting
  - No directional spotlights or floodlights will be permitted.
  - No coloured lights will be permitted, only 'cool white' lighting.
  - Minimum wattage and lumen in all light fixtures.
  - Exterior lights - make use of down-lighters, or shielded fixtures;
  - Limit the mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights.
  - Make use of Low Pressure Sodium lighting or other types of low impact lighting (spotlights).
- Roads and infrastructure
  - Implement an environmentally responsive planning approach to roads and infrastructure to limit cut and fill requirements. Plan with due cognisance of the topography.
  - Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.

### **7.2. Construction phase**

- Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
- Reduce the construction period through careful logistical planning and productive implementation of resources.
- Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.

- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
- Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
- Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
- Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
- Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.

### 7.3. Operational phase

- Maintain roads to forego erosion and to suppress dust.
- Monitor rehabilitated areas, and implement remedial action as and when required.
- Maintain the general appearance of the buildings and infrastructure (i.e. repaint or colour-treat as needed any painted and colour-treated infrastructure).

## 8. IMPACT STATEMENT

In general, it is submitted that although the construction, operation and night-time lighting of the proposed timeshare resort on Tenbosch Farm will have a visual impact on certain receptors within the surrounding region, this will not be extensive, and very few sensitive visual receptors are likely to be affected.

The proposed development is considered suitable for this context, and the proposed mitigation (Chapter 7) will go far in reducing the magnitude of visual impacts discussed by softening the appearance of the development.

A summary of anticipated visual impacts, assuming mitigation is followed, are as follows:

- The visibility of the resort to, and potential visual impact on tourist camps and lodges within the immediate area.  
*Medium to high visual impact.*
- The visibility of the lodges to, and potential visual impact on, observers travelling along game drive routes within the adjacent Kruger National Park.  
*Low visual impact. Mitigating factors in this regard, however, are the peripheral location of most of these tracks (relative to the reserve property) and the high VAC of the natural bush.*
- The visibility of the proposed resort to, and potential visual impact on, protected and conservation areas (i.e. Kruger National park).  
*Low visual impacts may be expected. Mitigating factors in this regard include the high VAC of the natural bush.*
- The visibility of the resort to, and potential visual impact on observers travelling along local roads.  
*Low visual impacts may be expected along sections of local and farm roads.*
- The visibility of the resort to, and potential visual impact on residents of local settlements and homesteads.  
*Low visual impacts are anticipated. Mitigating factors in this regard, however, include the visual distance of these homesteads from the proposed development sites and the high VAC of the natural bush.*
- The visibility of the lodges to, and potential visual impact on residents of Komatipoort and Marloth Park.

*Low visual impacts are anticipated. Mitigating factors in this regard, however, include the visual distance of these areas from the proposed development sites and the moderate VAC of the natural bush.*

- The potential visual impact of the resort on the visual character of the landscape and sense of place of the region.

*Negligible visual impacts are anticipated. The proposed development is contextually appropriate.*

- The potential visual impact of lighting of the resort at night on observers residing in close proximity to the development.

*Low visual impacts may be expected on above-mentioned sites and receptors. Lighting in this context is likely to be the greatest visual risk, so implementation of proposed mitigation is key.*

- Potential visual impacts associated with the construction phase.

*Low visual impacts may be expected on above-mentioned sites and receptors for a short period (i.e. the construction phase only).*

It is therefore concluded that **no potential fatal flaws exist** for the proposed development from a visual perspective, and that, subject to compliance with the listed mitigation measures, the expected visual issues are likely to be limited in both extent and magnitude to the point that they are not significant. The development as proposed *will not result in any unacceptable visual impact on sensitive visual receptors or alter the visual quality of the landscape*. In this respect, no further assessment of visual impacts is considered necessary.

Based on the above, it is the recommendation of the author that the proposed timeshare resort at Tenbosch Farm be supported from a visual perspective, subject to the implementation of the required and recommended optimisation and mitigation measures detailed in section 7.

## 9. REFERENCES/DATA SOURCES

Chief Director of Surveys and Mapping, varying dates. *1:50 000 Topo-cadastral Maps and Data*.

National Botanical Institute (NBI), 2004. *Vegetation Map of South Africa, Lesotho and Swaziland (Unpublished Beta Version 3.0)*

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