

**PROPOSED DEVELOPMENT OF 6 HOLIDAY HOUSES
Remainder of Portion 4 and Portion 8, Rietvley 28KU,**

DEDET Reference 17/2/3/E-240

BASIC ASSESSMENT PROCESS

APPENDIX B.3.5 VISUAL ASSESSMENT

Prepared for submission to:

The Mpumalanga Department of Economic Development, Environment and Tourism

Prepared by:



On behalf of:

NDLOPFU SHARE BLOCK (PTY) LTD



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1. INTRODUCTION

1.1. Qualification and Experience of the Practitioner

Nuleaf Planning and Environmental, specialising in visual assessment, landscape and tourism service provision undertook this visual assessment.

Peter Velcich is a registered professional Landscape Architect (PrLArch) with a Masters Degree in Landscape Architecture and 22 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.

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.

1.2. Assumptions and Limitations

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

1.3. 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 Adapted from Oberholzer (2005).

- 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/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:

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

Rietvley 28KU is situated in Mpumalanga Province, bordering the Kruger National Park to the north. The farm shares a common boundary with the Umbabat Nature Reserve to the south and east, the Klaserie Nature Reserve to the west. The Timbavati Nature Reserve is located 5 km south of the farm. The Olifants River passes the farm less than 4km to the north.

The Remainder of Portion 4 and Portion 8 of Rietvley 28KU covers approximately 1331 ha of land, largely devoid of infrastructure, with the exception of a farmhouse and various outbuildings sheds and stores. Game drive tracks criss-cross the farm. See Figure 1.

The proposed project, for which Environmental Authorisation is required, includes the following basic activities

- Six new holiday homes with a maximum of 12 beds per holiday house.
- Short (100-400m) access tracks to each site.
- A short 100m gravel link road providing access from the neighbouring share block development, Ndolpfu Share Block Pty Ltd.



Photo 1: Typical site infrastructure – existing sheds and stores



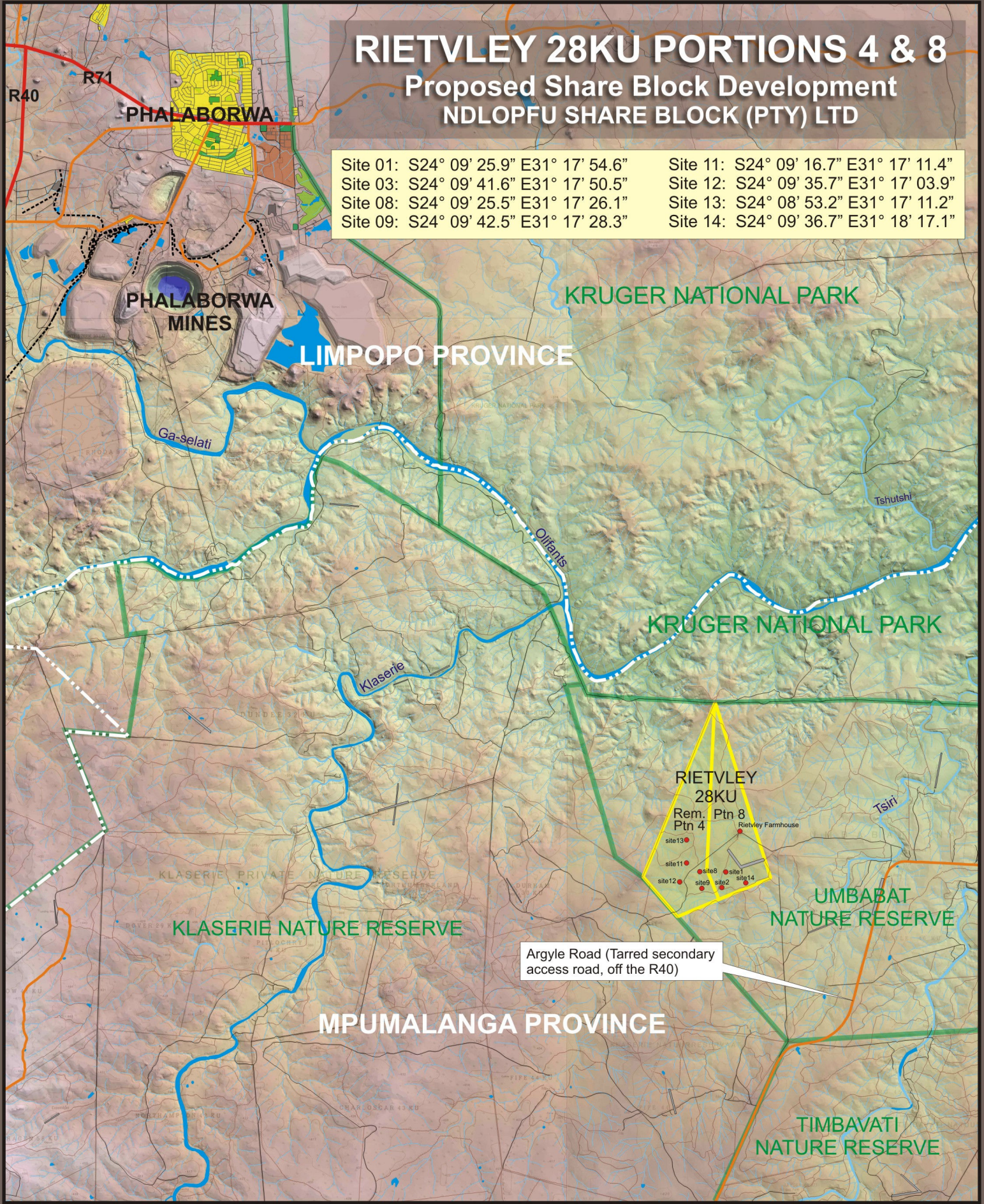
Photo 2: Typical site infrastructure – existing Rietvley farmhouse

RIETVLEY 28KU PORTIONS 4 & 8

Proposed Share Block Development
NDLOPFU SHARE BLOCK (PTY) LTD

Site 01: S24° 09' 25.9" E31° 17' 54.6"
 Site 03: S24° 09' 41.6" E31° 17' 50.5"
 Site 08: S24° 09' 25.5" E31° 17' 26.1"
 Site 09: S24° 09' 42.5" E31° 17' 28.3"

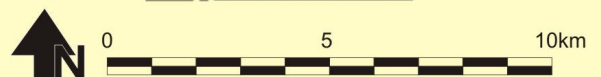
Site 11: S24° 09' 16.7" E31° 17' 11.4"
 Site 12: S24° 09' 35.7" E31° 17' 03.9"
 Site 13: S24° 08' 53.2" E31° 17' 11.2"
 Site 14: S24° 09' 36.7" E31° 18' 17.1"



- Arterial roads
- Secondary roads
- Streets
- Other access roads
- Tracks
- Railway line
- Perennial rivers
- Non perennial rivers
- Waterbodies

- Rietvley 28KU Rem Ptn 4 & Ptn 8 Boundary
- Proposed development sites
- Provincial boundary
- Boundary - protected areas
- High urban density
- Military base
- Landing strips

Fig. 1: Locality Map
October 2013



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 6 holiday houses on the Remainder of Portion 4 and Portion 8 of the farm Rietvley 28KU, Mpumalanga.

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

- The creation of a detailed digital terrain model (DTM) of the potentially affected environment using 5m 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.

Of relevance to this analysis is the following:

- Potential visual exposure;
- Visual distance and observer proximity to the proposed development;
- Visual absorption capacity (VAC) of the landscape; and
- Viewer Incidence and viewer perception.

Potential Visual Exposure:

In order to understand the Visual Exposure of the development, a viewshed analysis was undertaken at transmitter (development) offsets of 5m 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.

Visual Distance and Observer Proximity to the proposed development:

Within the visual exposure footprint, proximity radii were determined based on the anticipated visual experience of the observer over varying distances. The following factors are considered for the determination of appropriate proximity radii:

- The normal cone of vision for a stationary person, which is accepted to be 30 degrees in both the vertical and the horizontal fields. This cone of vision allows for no head or eye movement and no loss of focus of the object in question.

- The maximum horizontal extent or widest cross section of the proposed development that an observer will be able to perceive.
- The maximum height of the tallest infrastructure.

As the holiday homes will comprise smaller components (i.e. the individual buildings), the development will manifest as multiple smaller entities in the landscape. It follows that a larger single facility, will manifest a greater potential visual impact at any given distance, and the more visible the facility will be over larger 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.

The proximity radii used for this study, calculated from the boundary lines of the proposed sites, (100 m diameter circle) are shown on Figure 2 as follows:

- 0-500m - Short distance view where the development could dominate the frame of vision and constitute a high visual prominence.
- 500m – 1 km Medium distance views where the development could be easily and comfortably visible and constitute a moderate visual prominence.
- 1 – 2 km - Long distance view where the facility would become part of the visual environment, but could still be visible and recognisable. This zone constitutes a moderate to low visual prominence.
- 2 – 4 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

Visual Absorption Capacity (VAC) of the Landscape

The Visual Absorption Capacity of the landscape is a function of the type and character of the vegetation cover, as well as any other screening infrastructure that occurs within the study area.

4. THE AFFECTED ENVIRONMENT

The following is of relevance in terms of the affected environment:

Topography and hydrology:

- The farm straddles a local watershed between tributaries, which run roughly from south-west to north-east across the property. A small tributary of the Olifants River, the KuNtsheli River originates on the farm and drains north-east. This drainage line lies beyond any existing or proposed development.
- The major topographical feature on the farm is a primary, and numerous secondary, spurs trending northwest towards the Olifants River, or eastwards towards the Tsiri River. Between these spurs, are shallow valleys, some 30 to 40 meters below the ridge line of the spur, and a dendritic non-perennial drainage system.

Vegetation:

- The Veld Type occurring on Rietvley is transitional between the Mopane Bushveld and the closely neighbouring Sweet Lowveld Bushveld. Both these vegetation units are well protected within the Kruger National Park and are not under threat (Lotter, 2005).
- The vegetation of the farm is largely undisturbed / untransformed, with small pockets of disturbed bush (farmhouse, sheds, landing strip etc.).
- The development sites will be located within two plant community types, namely, the Red Bushwillow / Mopane community and the Mopane community.
- The Red Bushwillow / Mopane community is characterized with the following trees: *Acacia exuvialis*, *Acacia nigrescens*, *Bolusanthus speciosus*, *Cassia abbreviata*, *Colophospermum mopane*, *Combretum apiculatum*, *Commiphora africana*, *Commiphora mollis*, *Dalbergia melanoxylon*, *Euclea undulata*, *Grewia bicolor*, *Lannea stuhlmannii*, *Terminalia sericea*, *Peltophorum africanum* and *Ximenia americana*
- The Mopane community is characterized with the following trees: *Bolusanthus speciosus*, *Colophospermum mopane*, *Combretum imberbe*, *Euclea divinorum*, *Gymnosporia senegalensis*, *Manilkara mochisia*, *Philenoptera violacea*, *Pyrostria hystrix* and *Ziziphus mucronata*.

Land use:

- The farm is set aside for conservation and ecotourism, and lies within the 'Greater Kruger National Park' area. It therefore falls under the local jurisdiction of Mpumalanga Tourism and Parks Authority.
- There is no local resident population or populated place within the area other a number of renowned hospitality and tourism facilities, specifically lodges in the Klaserie to the west, and the Ndolpfu and Ntsiri Share Block developments to the south and east

The visual quality of the study area is high, generally as a result of the paucity of development and the large areas given over to conservation within the region.

5. ANTICIPATED VISUAL IMPACTS

Anticipated visual impact issues related to the proposed development of the six holiday homes include:

- The visibility of the houses to, and potential visual impact on, observers travelling along game drive routes within the Umbabat and Klaserie Nature Reserves
- The visibility of the houses to, and potential visual impact on residences, tourist camps and lodges within the Umbabat and Klaserie Nature Reserves, and specifically the Ndolpfu and Ntsiri Share Block Developments.
- The potential visual impact of the houses on the visual character of the landscape and sense of place of the region.
- The potential visual impact of lighting of the houses 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.

6. RESULTS

6.1 Potential visual exposure and viewer incidence or perception

The results of the viewshed analyses of the 6 proposed development sites are indicated on Figure 2. The Visual Exposure Combined Footprint, illustrated on Figure 2, demonstrates that the development of the six sites may be visible predominantly in areas situated between south, south-west, and west of the farm Rietvley 28KU. This includes areas within the Umbabat (south) and Klaserie Nature Reserves (south-west and west).

In terms of viewer incidence, the development could be visible from a number of game drive routes within the Ndlopfu Share Block Development and to a far lesser extent, the Klaserie Nature Reserve, and not at all within the Ntsiri Share Block Development area.

It is noteworthy that no camps, lodges and other tourist infrastructure are affected by the visual exposure footprint with the possible exception of a couple of units in Ndlopfu (within 2 km). As these receptors are related to eco-tourism, it may be assumed that any visual impact will be perceived as negative.

Note that the severity of the visual impact on visual receptors decreases with increased distance from the proposed facility.

6.2 Visual distance and observer proximity to the facility

Figure 2 illustrates range rings of $\frac{1}{2}$, 1, 2 and 4 km radii measured from the 6 proposed development sites, as well as a Visual Exposure Index. An area within a short to medium distance (<1km), falling within the visually exposed footprint, with a high viewer incidence (e.g. a tourist camp or road) 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.

The results of this exercise indicate that the area of potentially high visual impact, i.e. visually exposed areas within 2km of the development, is largely free of any noteworthy receptors (viewers), with the possible exception of one or two holiday homes in the Ndlopfu Share Block Development. It is anticipated that viewers at these facilities could *potentially* only see one of the proposed six sites.

Within the 2 to 4 km range ring, no noteworthy receptors are covered by the visual exposure footprint, with the exception of very limited sections of the game viewing track network on Ndlopfu.

6.3 Visual absorption capacity (VAC)

The aforementioned plant communities and associated tree species provide for a *high Visual Absorption Capacity (VAC)*. The VAC would be very effective in absorbing the visual impact of the proposed houses. Photos 3 and 4 illustrate this high VAC.

In order to objectively assess the visual absorption capacity of the vegetation, a nocturnal test was undertaken on site on the 8th January, as follows:

- A typical stretch of Mopane Woodland vegetation was selected for the test.
- Transmitter: A high powered (1 million candle power) spot light, as well as the headlights of a game drive vehicle, were focussed parallel to the ground in a predetermined direction. The spot light has held at a height of 3m above ground level.
- Observer: An observer moved away from the transmitter and noted the visual exposure of the transmitter over measured distances of 50m, 100m, 200m, and 500m.

Results: The test showed that the light sources (transmitters) were clearly visible at 50m, visible at 100m, and gradually becoming less visible, and in fact totally invisible at 200m.

It must be noted that the exercise was undertaken during summer, with foliage cover being at its most dense.

Conclusion: 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 Mopane Woodland on the farm Rietvley, is very high and effectively screens visual impact over 500m, even in late winter conditions.



Photo 3: High visual absorption capacity of the Mopani Bushveld vegetation type.



Photo 4: Typical two-spoor track through the Mopani Bushveld.

7. MITIGATION AND MANAGEMENT OF POTENTIAL IMPACTS

Mitigation and management of visual impacts needs to be considered for the planning, construction and operational phases of the project.

The following mitigation procedures and management measures are proposed:

- 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 (Photo 5).

- Materials
 - Non reflective finishing materials.
 - Thatched roofs.
 - Low tech, textured, natural.
 - As per approved palette.

- Lighting
 - No directional spotlights / 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).
 - If applicable, 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.

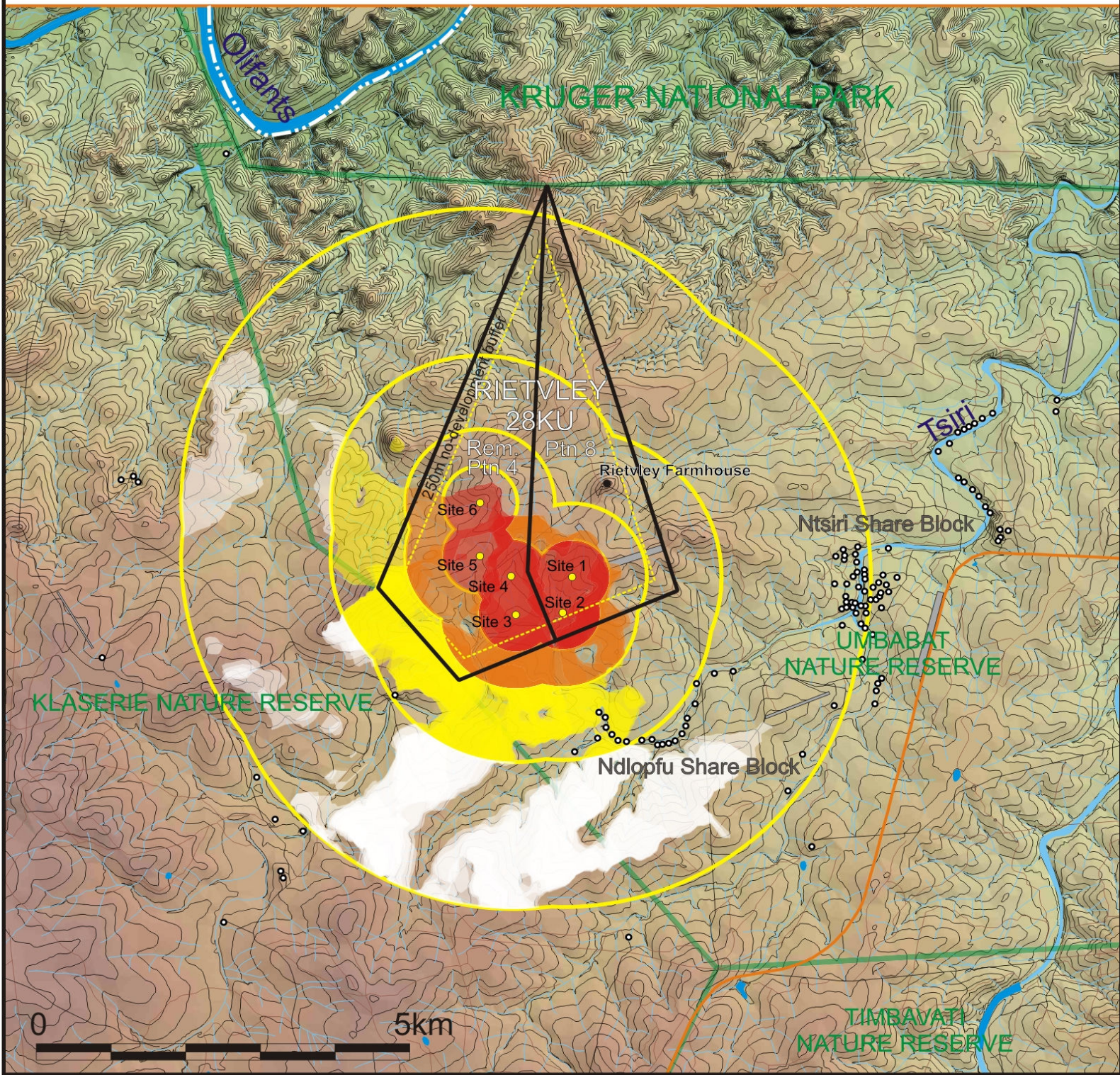


Photo 5: Proposed colour scheme (walls and roofs).

RIETVLEY 28KU REM. PTN. 4 & PTN. 8

Proposed Extension Share Block Development for
NDLOPFU SHARE BLOCK (PTY) LTD

Fig. 2: Visual Exposure- Proximity Radii
(Selected Sites) January 2014



0 5km

- Secondary roads
- Other access roads
- Tracks
- Contour line
- Perennial rivers
- Non perennial rivers
- Water bodies

- Rietvley 28KU Rem. Ptn. 4 & Ptn 8 Boundary
- Proposed development sites & alternatives
- Provincial boundary
- Boundary - protected areas
- Landing strips
- Adjacent residential / lodge sites (6km radius)
- 250m no-development buffer

Range rings 1/2, 1km, 2km, 4km radius

Visual Exposure Index (topography only)

1	3	6	High (visible within 500m. 1,3 or 6 sites visible)
1	3	6	Moderate / low (visible between 500m & 1km. 1,3 or 6 sites visible).
1	3	6	Very low (visible between 1 & 2 km. 1,3 or 6 sites visible).
1	3	6	Negligible (visible between 2 & 4 km).

8. IMPACT STATEMENT

The finding of the Viewshed Analysis undertaken for the proposed development of 6 holiday homes on the Remainder of Portion 4 and Portion 8 of the Farm Rietvley 28KU is that:

- the visual exposure footprint of the 6 proposed sites is very limited in extent, especially beyond the 2 km range;
- the visual exposure footprint illustrates that the proposed sites have been judiciously selected to ensure that they are visually secluded, with little or no impact on the surrounding camps, lodges and residences;
- the VAC of the natural vegetation is very high, and will effectively ameliorate the potential line of sight impacts related to the visual exposure footprint, and limit any potential impact to within 500m of each site;
- Furthermore, the severity of any potential visual impact can be further mitigated to acceptable levels by applying basic management and mitigation procedures tabulated under section 7.

It is concluded that no potential fatal flaws exist for the proposed development, and the expected visual issues are likely to be limited in both extent and magnitude. In this respect, no further assessment of visual impacts is recommended.

It is furthermore submitted that the development as proposed *will not result in any unacceptable visual impact on sensitive visual receptors or alter the visual quality of the landscape*. The development s proposed is supported from a visual perspective; subject to the implementation of the management and mitigation procedures.

REFERENCES/DATA SOURCES

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