Report:

Visual impact assessment for the proposed development of erf 2003, Wilderness

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Paul Buchholz is a geographic information science (GIS) and environmental specialist with more than 20 years of experience working on multidisciplinary environmental and engineering projects. He worked as a geographic information science and environmental specialist for two international multi-disciplinary engineering firms. He is currently an independent environmental and geographic information science consultant servicing a wide range of clients through consulting and project management support.

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Paul Buchholz (Visual Impact Assessment Specialist)

- I, Paul Buchholz, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017.
- I act as the independent specialist in this application.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity.
- I will comply with the Act, Regulations and all other applicable legislation.
- I have no, and will not engage in, conflicting interests in the undertaking of the activity.
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3 May 2024

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GLOSSARY

Aesthetics	Relates to the pleasurable characteristics of a physical environment as perceived through the five senses of sight, sound, smell, taste, and touch.
Adverse visual impact	Any modification in landforms, water bodies, vegetation or any introduction of structures which negatively impacts the visual character of the landscape and disrupts the harmony of the basic elements (i.e. form, line, colour and texture).
Basic elements	The four design elements (form, line, colour and texture) which determine how the character of a landscape is perceived.
Contrast	Opposition or unlikeness of different forms, lines, colours or textures in a landscape and therefore the degree to which project components visually differs from its landscape setting.
Colour	The property of reflecting light of a particular intensity and wavelength (or a mixture of wavelengths) to which the eye is sensitive. It is the major visual property of surfaces.
Form	The mass or shape of an object(s) which appears unified, such as a vegetative opening in a forest, a cliff formation or a water tank.
Integration	The degree to which a development component can be blended into the existing landscape without necessarily being screened from view.
Interfluve	The area of higher ground which separates two rivers/watercourses which flow into the same drainage system
Key viewing locations	One or more points on a travel route, use area or a potential use area, where the view of a management activity would be most revealing.
Landscape character	The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, colour and texture. These factors give the area a distinctive quality which distinguishes it from its immediate surroundings.
Landscape features	Land and water form, vegetation and structures which compose the characteristic landscape.
Line	The path (real or imagined) that the eye follows when perceiving abrupt differences in form, colour or texture. Within landscapes, lines may be found as ridges, skylines, structures, changes in vegetative types or individual trees and branches.
Micro-topography	Small scale variations in the height and roughness of the ground surface; in the context of this report the definition includes structures such as buildings and larger-sized vegetation that can restrict views
Mitigation measures	Methods or procedures designed to reduce or lessen the adverse impacts caused by management activities.
Mountain, hill or ridge	Is a physical landscape feature, elevated above the surrounding landscape. It includes the foot/base, slopes and crest of the mountain, hill or ridge
Rehabilitation	A management alternative and/or practice which restores landscapes to a desired scenic quality.
Ridgelines	Ridgelines are defined as the line formed by the meeting of the tops of sloping surfaces of land. Significant ridgelines are ridgelines which, in general, are highly visible and dominate the landscape.

Scale	The proportionate size relationship between an object and the surroundings in which the object is placed.
Sense of place	The unique quality or character of a place, whether natural, rural or urban and relates to uniqueness, distinctiveness or strong identity. It is also sometimes referred to as genius loci meaning 'spirit of the place.
Texture	The visual manifestations of the interplay of light and shadow created by the variations in the surface of an object or landscape.
Visual modification	A measure of the visual interaction between a development and the landscape setting within which it is located.
Viewshed	The creation of a computer-generated probable viewshed to define the extent to which the planned infrastructure is visible from key viewing locations.
Visual Sensitivity	The degree to which a change to the landscape will be perceived adversely.
Visual Impact	A measure of joint consideration of both visual sensitivity and visual modification

1. INTRODUCTION

1.1 General

Visual impact assessments should not be an obstacle in the approval process of a proposed development. Visual input, especially at the early concept stage of the project, can play an important role in helping to formulate design alternatives, as well as minimising impacts, and possibly even costs, of the project.

It is in the nature of visual and scenic resources to include abstract qualities and connotations that are by their nature difficult to assess or quantify as they often have cultural or symbolic meaning. An implication of this is that impact ratings cannot simply be added together. Instead, the assessment relies on the evaluation of a wide range of considerations, both objective and subjective, including the context of the proposed project within the surrounding area.

The analysis of the interaction between the existing visual environment and the planned infrastructure provides the basis for determining visual impacts and mitigation strategies. This visual impact assessment provides an overview of the landscape character of the locality and assesses the degree to which the proposed development would be visually appropriate.

1.2 Methodology

1.2.1 The sequence of work employed in this study

A desktop survey using 1:50,000 topographical survey maps, Google Earth, and ArcMap (Esri, ArcGIS software) was undertaken. Following the desktop information gathering process, a site visit was conducted to test the conclusions of the terrain analysis, identify receptors and appraise the local landscape.

The methodology employed by this visual assessment is based on the following methodologies:

- The United States Department of Agriculture: Forestry Service - *Landscape Aesthetics*.
- The United States Bureau of Land Management Visual Resources Management.
- The Landscape Institute and the Institute of Environmental Management & Assessment - Guidelines for Landscape and Visual Impact Assessment; and
- The Provincial Government of the Western Cape's Guideline for involving visual and aesthetic specialists in EIA processes and the Guidelines for Landscape

1.2.2 Written and drawn material was made available

- Architectural drawings and 3D models
- Site development plan
- Specialist reports

1.2.3 Receiving site

The receiving site was assessed, and areas of the locality from where the development appeared to be likely visible, adjacent lands, and local roads.

This study was conducted in May 2024. The weather on the days of the site visit was clear and open. A photographic survey of the site and surrounding areas was carried out.

The visual assessment was undertaken using standard criteria such as geographic view-sheds and viewing distances as well as qualitative criteria such as compatibility with the existing landscape character and settlement pattern. Potentially sensitive areas were assessed, and mitigation measures were evaluated.

1.3 Assumptions and limitations

It should be noted that the 'experiencing' of visual impacts is subjective and largely based on the perception of the viewer or receptor. The presence of a receptor in an area potentially affected by the proposed development does not thus necessarily mean that a visual impact would be experienced.

Value can be placed in a landscape in terms of its aesthetic quality, or in terms of its sense of identity or sense of place with which it is associated. If no such values are held with respect to a landscape, there is less likely to be a perception of a visual impact if the landscape becomes subject to visual alteration. Development within a landscape may not be perceived negatively at all if the development is associated with progress or upliftment of the human condition.

The perception of visual impacts is thus highly subjective and involves 'value judgements' on behalf of the receptor. The context of the landscape character, the scenic/aesthetic value of an area, and the types of land use practised tend to affect the perception of whether landscape change (through development) would be considered an unwelcome intrusion.

The abovementioned landscape values can be interlinked, but can also be conflicting, e.g. amenity values associated with a landscape held by a certain group of people as described above may conflict with economic values associated with the market or development possibility of the landscape that is held by others. It is in this context that visual impact associated with a potential development often arises as an issue in environmental impact assessments.

1.3.1 Data

The best currently and readily available datasets were utilized for the visual impact assessment. It is important to note that variations in the quality, format and scale of available datasets could limit the scientific confidence levels of the visual impact assessment outcomes.

1.3.2 Visualisation

It must be remembered that any visualisation (3D models, photomontages, photos and maps) of complex natural and man-made elements produce perceptions, interpretations and value judgements that are not always consistent with those that would be produced by actual encounters with the elements represented. Visualisations should, therefore, be considered an approximation of the three-dimensional visual experiences that an observer would receive in the field and must be subjected to subsequent field testing and verification.

Photomontage is the superimposition of an image onto a photograph to create a realistic representation of proposed or potential changes to any view. The overall aim of photography and photomontage is to represent the landscape context under consideration and the proposed development, both as accurately as is practical. It must be kept in mind that the human eye sees differently than a camera lens, both optically and figuratively.

The focusing mechanisms of human eyes and camera lenses are different. Human vision is binocular, and dynamic compared to a camera that tends to flatten an image.

2. APPLICABLE POLICIES AND GUIDELINES

Several government policies and plans, guidelines, environmental management instruments and other decision-making instruments are relevant to the site and development and have been reviewed. These include:

2.1 The Western Cape Provincial Spatial Development Framework (PSDF)

Makes provision for:

- the protection and sustainable use of Landscape and Scenic Resources,
- the protection, management and enhancement of the provinces Sense of Place, Heritage and Cultural Landscape

2.2 he George Municipality Spatial Development Framework

The George Spatial Development Framework (GSDF) states that the impact of developments on visual landscapes and corridors must be minimized.

The GSDF recognizes the following:

- Valuable view corridors, undeveloped ridgelines, cultural landscape assets and existing vistas should not be compromised by any development proposal or cumulative impact of development proposals. The proportion of urban development up the slope of a prominent hill or mountain should not degrade its aesthetics/visual value.
- Developments higher than the 280m contour line or on slopes steeper than 1:4 must be prevented.
- Scenic routes provide public access to the enjoyment of the landscapes located in the municipal area. The routes and the land use alongside these routes should be managed in such a way as to not compromise the views offered but to mark and celebrate the landscapes and the origins or nature of their significance.

2.3 The George Municipality Landscape Characterisation Visual Resources Management Analysis

The George Municipality's Landscape Characterisation Visual Resource Management Analysis (2009) determines visually sensitive areas in the George landscape and must be applied to manage the visual impacts of development.

The George Municipality's Landscape Characterisation Visual Resource Management Analysis states the following:

- Significant view corridors add value to George's sense of place and create a perception of space by focusing on views outside of the built-up envelope.
- The road systems in the Garden Route are a vital component of the tourism economy as they create scenic view corridors. View corridors are linear geographic areas that are visible to users of the route, usually situated along movement routes such as the Seven Passes Road to Knysna.
- A Class I Visual Resource Management is assigned to those areas where a management or specialist decision has been made to maintain a natural landscape. Significant ridgelines within the George municipal area have been allocated a Class 1 rating.

2.4 The Garden Route Environmental Framework

This document provides baseline data on the Topographical, Visual and 'Sense of Place' aspects in the Garden Route, the sensitivity, constraints and development guidelines for the area assist in informing decision-making.

Management Guidelines are provided for Ecologically Sensitive Geographical Areas. Of particular reference to this report are the guidelines for development in:

- Topographically Sensitive Geographical Areas.
- Conservation and Protected Areas; and

- Visually Sensitive Landscape Geographical Areas.

Risks include:

- Erosion of steep slopes.
- The potential for visual and light pollution.
- Destruction of visual topographical quality.
- Development impact of sensitive topographical features and landscapes.
- Inappropriate large-scale development.
- Sprawling urbanization; and
- Large-scale change of land use developments outside of the urban edge.

Objectives include:

- Maintain the integrity of the Garden Route Landscape.
- Limit development on steep slopes.
- Enhance and protect the topographical landscape backdrop to the Garden Route.
- Manage development on steep slopes, discouraging development.
- Limit development densities.
- Retain the 'sense of place' of villages and hamlets.
- Enforce building control and aesthetics.
- Protect the 'sense of place' of the Garden Route.
- Protect and enhance the visual quality of prominent tourism routes, meanders and nodes.
- Protect the visual integrity of the South African National Park asset, as well as provincial nature reserves; and
- Limit and prohibit development on prominent visually sensitive and exposed features.

2.5 Heritage and Scenic Resources: Inventory and Policy Framework for the Western Cape

The study provides input on cultural and scenic resources and provides a guide for the identification and conservation of these resources. The report focuses on the broader regional scale rather than the local landscapes or individual site scales and is, therefore, an overview rather than a detailed inventory of cultural and scenic resources.

2.6 DEA&DP Guideline for Management of Development on Mountains, Hills & Ridgelines

Key decision-making criteria regarding development on mountains, hills and ridges, relevant to this visual impact assessments, are:

- to avoid inappropriate development (i.e. intrusive and consumptive development) on mountains, hills and ridges taking into account the character of the existing environment.
- to ensure that where development does take place, that its layout and design takes account of sensitive features and environmental constraints, thereby promoting environmentally sensitive development of projects on mountains, hills and ridges where development is authorized.
- to preserve landform features through ensuring that the siting of facilities is related to environmental resilience and visual screening capabilities of the landscape.
- to ensure that the scale, density and nature of the developments are harmonious and in keeping with the sense of place and character of the area.

Environmental characteristics such as steep slopes (steeper than 1:4) and development on the crest of a mountain, hill or ridge will serve as key indicators of environmental sensitivity.

3. PROJECT DESCRIPTION

3.1 Project location

Wilderness Erf 2003 is currently zoned "Open Space Zone III (OSZIII)" in terms of the George Integrated Zoning Scheme by Law, 2017 and is 2,8135 Ha in extent. The Erf is located on the slopes overlooking the sea just to the west of Wilderness. This is just inland of the N2 National Road between Wilderness and George. The Kaaiman's River mouth is a short distance south-west of the site, and Map of Africa is just to the north. It is accessed from Remskoen Road, which branches off of Heights Road, which is the road between Wilderness and the Seven Passes Road.

3.2 Development description

The development entails the construction of one (1) main dwelling house and to allow for four (4) self-catering 2-storey tree-top pods (Figure 1,2 & 3) with a package plant sewer system **or** the alternative one (1) option that allows for five (5) pods with a septic tank sewer system (Figure 4) and a final alternative that only includes the main dwelling (Figure 5). The remainder of the property will be preserved, remain untouched forest and continue to be utilised for conservation purposes.

The pods will be of steel, glass, wood and be constructed on stilts about 2m above ground level so that the forest floor is left mostly intact and has views of the ocean. The style of the pods and the main house will be modern but light to fit in with the natural environment. The maximum height for the proposed dwelling will be ±8.5m above NGL or as determined by the Municipality.

The property will be fenced along the western boundary with clear-vue fencing for safety for tourists and the owners. No physical boundaries will be erected along the property boundaries as per requirements from George Municipality restricting the movement of natural fauna.

Access to Erf 2003 is obtained from the existing access servitude that runs over Hoekwil Erf 317 & the existing access servitude road that runs over Wilderness Erf 2002. These access servitudes are accessed directly off the public road 'Remskoen Street' that runs along the northern boundary of Hoekwil Erf 317. This road is also the access road to the 'The Map of Africa' lookout point. There will be a designated parking area in the northwestern section of the property that also makes provision for a total of eight (8) vehicles.

From the parking areas and the main dwelling house, there will be wooden decking walkways 0.5m above the forest floor meandering through the trees to the pods, hence no roads will be developed on the property.

Figure 1: Front view of pod enclosed by vegetation

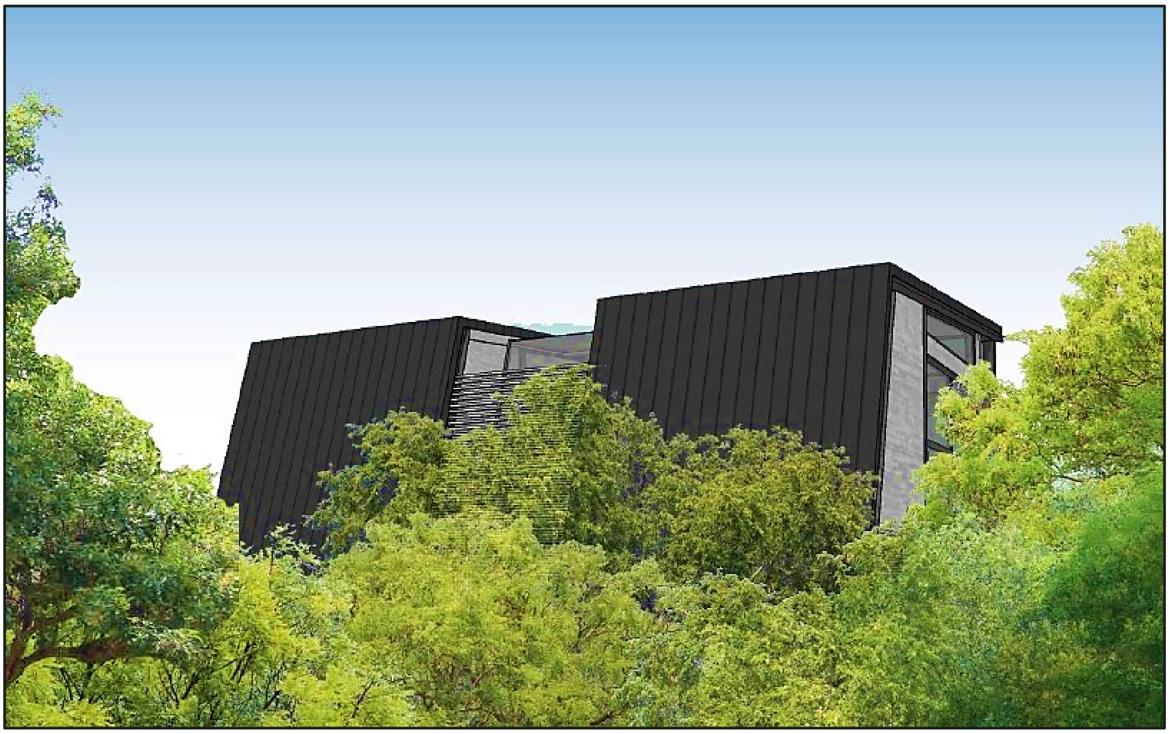

Figure 2: Pods viewed form the back

Figure 3: Preferred development layout

Figure 4: Alternative 1 development layout

Figure 5: Alternative 2 development layout

4. METHODOLOGY

It is in the nature of visual and scenic resources to include abstract qualities and connotations that are by their nature difficult to assess or quantify as they often have cultural or symbolic meaning. It is necessary therefore to include both quantitative criteria (such as viewing distances), and qualitative criteria (such as sense of place), in visual impact assessments.

An implication of this is that impact ratings cannot simply be added together. Instead, the assessment relies on the evaluation of a wide range of considerations, both objective and subjective, including the context of the proposed project within the surrounding area. The phrase “beauty is in the eye of the beholder” is often quoted to emphasize the subjectivity in undertaking a visual impact assessment.

The analysis of the interaction between the existing visual environment (landscape character and sense of place) and the planned infrastructure provides the basis for determining visual impacts and mitigation strategies. This is completed by defining the visual effect of the planned infrastructure and visual sensitivity of viewing locations to determine impact.

The evaluation of the existing visual environment consists of the assessment of both the landscape setting and key viewing locations within it. The landscape setting can be defined in terms topography, vegetation, hydrology and land-use features. These elements define the existing visual character of the landscape with which the planned infrastructure interacts.

The use of the basic elements of form, line, colour and textures has become the standard in describing and evaluating landscapes. Modifications in a landscape which repeat the landscape’s basic design elements are said to be in harmony with their surroundings. Modifications which do not harmonize, often look out of place and are said to contrast or stand out in unpleasing ways.

Value can be placed in a landscape in terms of its aesthetic quality, or in terms of its sense of identity or sense of place with which it is associated. If no such values are held with respect to a landscape, there is less likely to be a perception of a visual impact if the landscape becomes subject to visual alteration. Development within a landscape may not be perceived negatively at all if the development is associated with progress or upliftment of the human condition.

The perception of visual impacts is thus highly subjective and thus involves ‘value judgements’ on behalf of the receptor. The context of the landscape character, the scenic / aesthetic value of an area, and the types of land use practised tend to affect the perception of whether landscape change (through development) would be considered to be an unwelcome intrusion. Sensitivity to visual impacts is typically most pronounced in areas set aside for the conservation of the natural environment (such as protected natural areas or conservancies), or in areas in which the natural character or scenic beauty of the area acts as a drawcard for visitors (tourists) to visit an area, and accordingly where amenity and utilitarian ecological values are associated with the landscape.

When landscapes have a highly natural or scenic character, amenity values are typically associated with such a landscape. Structural features such as power lines and other electricity transmission developments and related infrastructure are not a feature of the natural environment but are rather representative of human (anthropogenic) change to a landscape.

Thus, when placed in a largely natural landscape, such structural features can be perceived to be highly incongruous in the context of the setting, especially if they affect or change the visual quality of a landscape. It is in this context of incongruity with a natural setting that new developments are often perceived to be a source of visual impact.

4.1 Observer locations

Observer locations (views from communities, major roads, conservation areas etc.) are those areas where people (receptors) are likely to obtain a view of the planned infrastructure. These viewing locations have different significance based on numerous factors, collectively evaluated though land use and viewing distance to the planned infrastructure.

The selection of the key viewing locations is based on their location within the defined view-shed where they would have a clear view of the planned infrastructure.

Factors that will be considered in selecting the key viewing locations are:

- **The angle of observation -** The apparent size of a project is directly related to the angle between the viewer's line-of-sight and the slope upon which the planned infrastructure is to take place. As this angle nears 90 degrees (vertical and horizontal), the maximum area is viewable.
- **Numbers of viewers -** Areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increase.
- **Length of time the project is in view -** If the viewer has only a brief glimpse of the planned infrastructure, the contrast may not be of great concern. If, however, the planned infrastructure is subject to view for a long period, as from an overlook, the contrast may be very significant.
- **Distance from the project -** The greater the viewing distances, the lower the visual sensitivity. The visual modification of a development is assumed to be the highest when the observer is very close to it and has a direct line of sight. The visual modification then decreases with distance and is also known as distance decay (Hull & Bishop, 1988).
- **Field of vision -** The visual impact of a development can be quantified to the degree of influence on a person’s field of vision both horizontally and vertically. The visual impact of a development will vary according to the proportion in which a development impacts on the central field of vision. Within the central field of vision images are sharp, depth perception occurs and colour discrimination is possible. Developments, which take up less than 5% of the central field of vision, are usually insignificant in most landscapes (Human Dimension and Design, 1979).
- **Visibility -** Viewed by the human eye 1.8 m from the ground across a “flat” surface such as the sea, the horizon will be of the order of 6 km distant, due to the curvature of the earth. Viewed at an elevation of 60 m, the horizon will be of the order of 32 km distant and from the top of a 1000 m mountain, the horizon will be at a distance of approximately 113 km. A tall structure standing above the horizon would, of course, increase these distances significantly; for example, for an observer at 1.8 m who is viewing a man-made structure 50 m tall, the effective distance to the horizon is 34 km and for a 100 m structure the distance is 46 km (Miller & Morrice, no date). In addition, mist, haze or other atmospheric conditions may significantly affect visibility (Hill et al, 2001).

4.2 Visual sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different land-use areas in the vicinity of a development.

The degree of visual sensitivity of an area is closely related to the aesthetic quality of the area, as well as to the value placed in the aesthetic quality of the landscape but is also related to the area’s socio-economic profile. In this regard, residential, tourist and/or recreation areas generally have a higher visual sensitivity than other land use areas (e.g. industrial, agricultural or transport corridors), because they use the scenic amenity values of the surrounding landscape and may be used as part of a leisure experience and often over extended viewing periods.

It is important to note that the presence of natural / perceived natural and rural elements or areas within the landscape as viewed from the surrounds of the project area can engender perceptions of aesthetic quality or value to the landscape. Many studies of landscape conservation have highlighted the value placed by people in rural or natural landscapes. A rural landscape can be defined as an area where an interaction between humans and nature over time has led to the development of a landscape that has its characteristics, and which is a middle ground between an urban landscape and wilderness, consisting of human activities that are related to the natural environment, such as agriculture and pastoral activities (Mazehan et al, 2013). A natural landscape, as defined in this report is close in appearance to how the landscape would appear without human alteration – i.e. mimicking or closely resembling that of a wilderness.

Placing value in a landscape is a psychological and cultural practice; values and meanings are not intrinsic to the landscape, but rather they are phenomena created by humans through their cultural practices (Pun, 2004). It is thus important to note that perceptions of a landscape may not be universally shared, and different individuals or groups of people may perceive or treat the same landscape differently, in turn ascribing different values and meanings to it (Pun, 2004). Values and meanings ascribed by local people may not be evident to an outsider.

There are different types of values that can be placed on a landscape; i.e. economic values (e.g. the relevance of the landscape for business enterprises, or the market possibility of products from the landscape), amenity values (values related to the non-material benefits associated with it) and security values (Pun, 2004). Amenity values can be subdivided into different sub-categories; "intrinsic" ecological value, scientific and educational value, aesthetical and recreational value, and orientational and identity value.

Landscapes and the viewing of landscapes have also been shown to have positive psychological and health benefits; Velarde et al (2007), have shown through an examination of various environmental psychology studies that visual exposure to natural landscapes (e.g. by means of viewing natural landscapes during a walk, or viewing from a window) generally has a beneficial impact on human health (e.g. reduced stress, facilitating recovery from illness, and behavioural changes that improve mood and general well-being).

Landscape as a source of beauty is prevalent within the arts and is a strong drawcard for recreational activities. In addition, the landscape is an element in the ability of people to orient themselves and is strongly related to people's cultural identity and sense of place. It is in this context that value is placed in natural or rural landscapes, and it follows that such value would be placed on views in an area such as the study area which is largely natural, and which has high aesthetic value by virtue of its scenic nature.

The above values can be interlinked, but can also be conflicting, e.g. amenity values associated with a landscape held by a certain group of people as described above may conflict with economic values associated with the market or development possibility of the landscape that is held by others. It is in this context that visual impact associated with a potential development often arises as an issue in environmental impact assessments.

The latter three sub-categories of amenity value described above – aesthetic, identity and psychological health value are typically involved in the perception of visual impact and constitute the elements of the 'visual sensitivity' associated with that landscape, as development within a landscape can change the landscape to the degree to which the amenity value associated with a landscape would be considered to be degraded or no longer present.

Visual sensitivity may range from high to low, depending on the following additional factors:

- **The visual absorption capacity** - The potential of the landscape to conceal the proposed project will reduce or increase visual sensitivity.
- **Viewing distance** – The greater the viewing distance, the lower the visual sensitivity. The visual modification of a development is assumed to be the highest when the observer is very close to it and has a direct line of sight. The visual modification decreases with distance and is also known as distance decay (Hull & Bishop 1988).
- **Length of time** the project is in view - If the viewer has only a brief glimpse of the planned infrastructure, the contrast may not be of great concern and the visual sensitivity low. If, however, the planned

infrastructure is subject to view for a long period, as from an overlook, the contrast may be very significant.

- **General orientation** - General orientation of residences to landscape areas affected by a project. Residential, tourist and/or recreation areas with a strong visual orientation towards the planned infrastructure (i.e. those with areas such as living rooms and/or verandas orientated towards it), will have a higher visual sensitivity than those not orientated towards the planned infrastructure.
- **Relative planned infrastructure size -** The contrast created by the project is directly related to its size and scale as compared to the surroundings in which it is placed.
- **Type of users -** Visual sensitivity will vary with the type of users. Recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area regularly may not be as sensitive to change.
- **Numbers of viewers -** Areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increases.
- **Adjacent land uses -** The inter-relationship with land uses in adjacent lands can affect the visual sensitivity of an area. For example, an area within the view-shed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be visually sensitive.
- **Special areas -** Management objectives for special areas such as natural areas, wilderness areas, conservation areas, scenic areas, scenic roads or trails frequently require special consideration for the protection of the visual values. This does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting. The management objectives for these areas may be used as a basis for assigning sensitivity levels.

Landscapes are subdivided into three (3) distanced zones based on relative visibility from travel routes or observation points (receptors). The three zones are:

- Foreground-Middle ground Zone - This is the area that can be seen from each travel route for a distance of 0 to 5 kilometres where management activities might be viewed in detail. The outer boundary of this distance zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape. In some areas, atmospheric conditions can reduce visibility and shorten the distance normally covered by each zone.
- Background Zone - This is the remaining area which can be seen from each travel route to approximately 24 kilometres but does not include areas in the background which are so far distant that the only thing discernible is the form or outline. To be included within this distance zone, vegetation should be visible at least as patterns of light and dark.
- Seldom-Seen Zone - These are areas that are not visible within the foreground-middle ground and background zones and areas beyond the background zones.

Land-use areas are generally characterised in terms of low, moderate or high visual sensitivity, as follows:

- Low visual sensitivity - industrial areas, local roads, mining and degraded areas.
- Moderate visual sensitivity - tourist roads, major roads, sporting or recreational areas and places of work.
- High visual sensitivity - rural residences, recreation areas, conservation areas, scenic routes or trails.

4.3 Visual modification

Visual modification is a measure of the level of visual contrast and integration of the planned infrastructure with the existing landscape.
An existing landscape has certain visual characteristics expressed through the visual elements of form, shape, line colour and texture. A development that has different visual characteristics than the existing landscape will create contrast with the existing landscape. If similar infrastructure already forms part of the existing landscape, the visual effects of the planned infrastructure will borrow visual character from these operations, reducing visual modification.

The degree to which the visual characteristics of the planned infrastructure contrast with the existing landscape will determine the level of visual modification. For example, a newly created mine will have a high visual modification due to strong contrast. An extension of operations in an existing mine will have a lesser visual modification. A successfully rehabilitated mine area will also have a lower visual modification due to limited contrast with the existing landscape.

Similarly, a project is said to be integrated with the existing landscape based on issues of scale, position in the landscape and contrast. High visual integration is achieved if a development is dominated by the existing landscape and is of small scale and/or limited contrast.

The level of visual modification generally decreases with distance and is categorised as follows:

- **Negligible (or very low) level of visual modification** – where the development is distant and/or relates to a small proportion of the overall view-shed.
- **Low level of visual modification -** where there are minimal visual contrast and a high level of integration of form, line, shape, pattern, colour or texture values between the development and the landscape. In this situation, the development may be noticeable but does not markedly contrast with the landscape.
- **Moderate level of visual modification -** where a component of the development is visible and contrasts with the landscape, while at the same time achieving a level of integration. This occurs where surrounding topography, vegetation or existing modified landscape provide some measure of visual integration or screening.
- **High level of visual modification** - where the major components of the development contrast strongly with the existing landscape and demand attention.

The following factors must be considered when applying visual modification categories:

- **Length of time the project is in view -** If the viewer has only a brief glimpse of the project, the contrast may not be of great concern. If, however, the project is subject to view for a long period, from a viewing location, the contrast may be very significant.
- **Relative size or scale -** The contrast created by the project is directly related to its size and scale as compared to the surroundings in which it is placed.
- **Recovery time -** The amount of time required for successful re-vegetation should be considered. Recovery usually takes several years and goes through several phases (e.g. bare ground to grasses, to shrubs, to trees, etc.). It may be necessary to conduct contrast ratings for each of the phases that extend over long time periods. Those conducting contrast ratings should verify the probability and timing of vegetative recovery.
- **Atmospheric conditions -** The visibility of planned infrastructure due to atmospheric conditions, such as air pollution or natural haze, should be considered
- **Motion -** Movement such as waterfalls, vehicles or plumes draw attention to a project.
- **Form -** Contrast in form results from changes in the shape and mass of landforms or structures. The degree of change depends on how dissimilar the introduced forms are to those continuing to exist in the landscape.
- **Line -** Contrasts in line result from changes in edge types and interruption or the introduction of edges, bands, and silhouette lines. New lines may differ in their sub-elements (boldness, complexity, and orientation) from existing lines.
- **Colour -** Changes in value and hue tend to create the greatest contrast. Other factors such as chroma, reflectivity and colour temperature, also increase the contrast.
- **Texture -** Noticeable contrast in texture usually stems from differences in the grain, density and internal contrast. Other factors such as irregularity and directional patterns of texture should also be considered.

5. VISUAL ASSESSMENT OF THE SITE AND PROPOSED DEVELOPMENT

The DEA&DP Guideline for involving visual & aesthetic specialists in EIA processes Document provides a number of criteria that relate specifically to Visual Impact Assessments namely:

- Visibility of the project.
- Visual exposure.
- Visual sensitivity of the area.
- Visual sensitivity of receptors.
- Visual Absorption Capacity; and
- Visual Intrusion.

It is recommended that the proposed project should be assessed against these criteria before attempting to assess the visual impact of the proposed development.

5.1 Description of the affected area and the scenic resources

The development is situated in the Garden Route, in the southeastern extent of the Western Cape. The area is a scenic, coastal area with a rich, visual diversity. This diverse and beautiful coastal area is a landscape formed over millions of years and numerous sea-level changes. The Outeniqua mountain, which consists of hard and folded Table Mountain Quartzite, forms a majestic backdrop to a coastal platform, in the north (Figure 6).

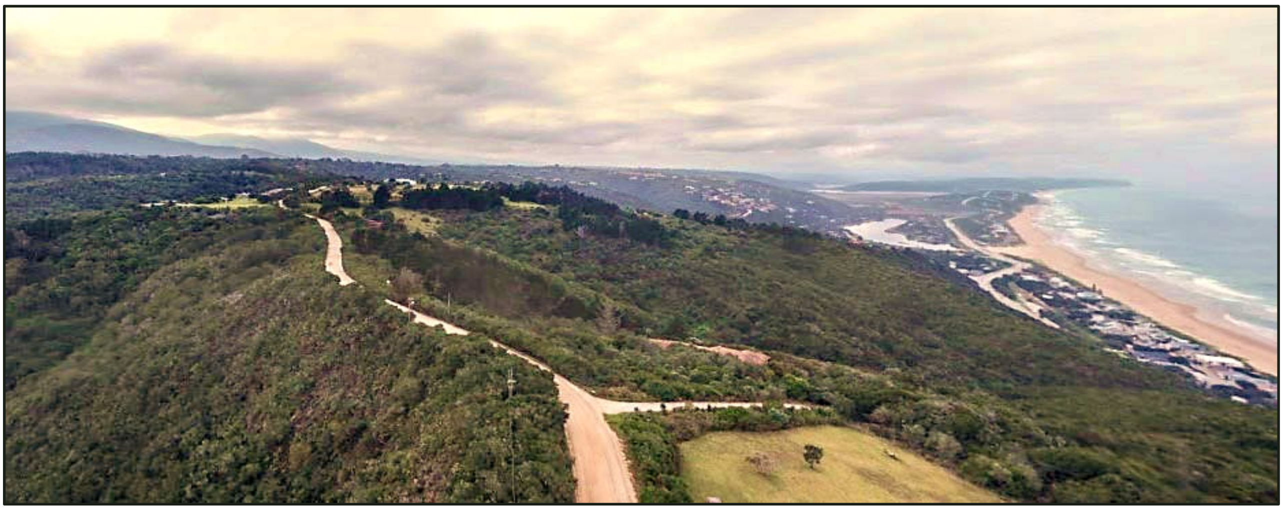

Figure 6: A view of the coastal area

From: The Garden Route Environmental Framework (2010)

"The landscape of the Garden Route comprises an intricate mosaic of landforms, which further supports its diverse ecological features. These features extend from coastal features, through to the lake system, framed by the backdrop of the high Outeniqua mountains. The area is similarly dissected by numerous rivers draining the highlands to the coast. The coastal landscape is characterised by sensitive foredune systems which are prone to erosion, and which perform critical ecological functions, and which similarly are sought after for residential property development. The area is characterised by cover sands on steep slopes surrounding the lakes and estuaries, which are unstable and unsuitable for development activity.

and

The Garden Route has been named as such due to the visual and aesthetic quality attached to the region. Similarly, the region is considered as one of the most scenic in the country, attracting significant numbers of domestic and international tourist throughout the year. This asset is, unfortunately, one of the regions limiting factors. Due to the *perceived high - quality of life associated with the region underpinned by scenic topography, quaint villages and hamlets, large tracts of natural open space systems supported by an extensive national park system (Garden Route National Park); the Garden Route has become the ideal location of retired individuals from the larger cities, as well as a growing international interest. This insatiable demand for development land for residential and tourism use is limited by the biophysical, physical and aesthetic constraints of the area. It is indeed the case of the "exact reasons for the attraction could become its downfall".*

The proposed development takes full advantage of the Garden Routes scenic qualities as mentioned above (Figure 6).

5.2 Surrounding land uses

The proposed development is located in an area where a strong holiday/resort character predominates. It is fairly homogenously developed with residential and resort uses, wedged between the sea and the coastal plateau slopes (Figure 6).

The proposed development site is surrounded by natural areas, areas degraded by invasive alien trees, and small pockets of urban areas along the coastline. (Figure 6).

5.3 Topography

All three proposed development layout alternatives are located on the eastern facing slope (138m above sea level) of the property and below the ridgeline with a drainage valley passing through the centre of it in a south-easterly direction. The average height of the property above sea level varies between 84 – 144m (Figures 8).

5.4 Local vegetation

The proposed development will be located within an area of coastal thicket / forest. The entire site is currently in a natural state and the imagery. Surrounding areas consist mostly of the same type of vegetation, except for the grassy old lands to the west. The vegetation map of South Africa (SANBI, 2018) shows that the entire property falls within Garden Route Shale Fynbos. It is described structurally as tall, dense proteoid and ericaceous fynbos in wetter areas, and graminoid fynbos (or shrubby grassland) in drier areas. Observations on the ground and the botanical assessment of the property show that it is not fynbos vegetation but some form of woodland or forest (Figure 7).

The vegetation on the site is tall (8-12m), multilayered afrotemperate forests with some Goukamma Dune Thicket components and a relatively open understorey. According to the botanical assessment no yellowoods occur on the site suggesting that it is not a typical forest but it does include *Gerbera cordata* and *Streptocarpus rexii* that are listed as biogeographically important taxa for Southern Afrotemperate Forest. The site has many of the taller woody species typical of Goukamma Dune Thicket, but the structure and understorey of Southern Afrotemperate Forest (Figure 7).

Figure 7: Local vegetation

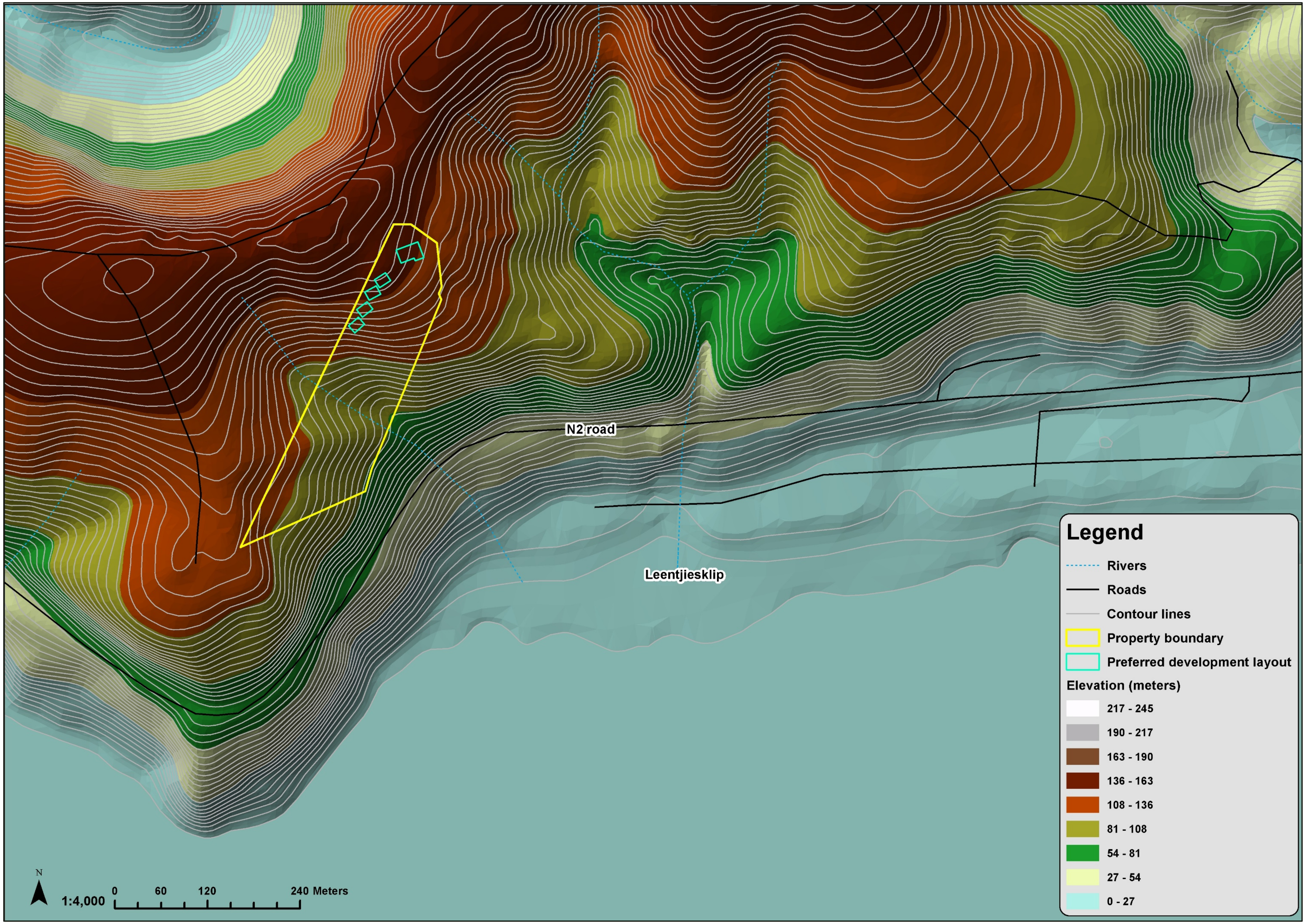

Figure 8: Topography

6. PROBABLE VIEW CATCHMENT AND LINE OF SIGHT

6.1 Probable view catchment

Slope and aspect are very important in the context of views. Topography expressed in the form of slope and aspect can perform an important role in limiting views or 'focusing' views in a certain direction. Viewers located low down within an enclosed valley would experience a limited visual envelope or viewshed, as the rising topography around them would prevent wider views of the surrounding terrain beyond the immediate valley.

Similarly, an object placed lower down in such an enclosed valley would have a limited viewshed, being shielded or partly shielded by the terrain surrounding it. A viewer located on a hill slope with a certain aspect would only be able to view the surrounding terrain in the direction of the aspect of the slope. Conversely, a viewer on a higher-lying interfluve will be exposed to potentially wide-ranging views over the surrounding terrain, and large objects placed in these terrain settings could similarly be visible from a wide area.

The micro-topography within the landscape setting in which the viewer and object are located is also important. The presence of micro-topographical features and objects such as buildings or vegetation that would screen views from a receptor position to an object can remove any visual impact factor associated with it.

Fischer (1995) analysed the effects of data errors on viewsheds (view catchment) calculated by Geographic Information Systems and has shown that the calculations are extremely sensitive to small errors in the data and the resolution of the data and the errors in viewer location and elevation. Other studies have also shown that a viewshed calculated using the same data but with eight different Geographic Information Systems can produce eight different results.

Hankinson (1999) also states that viewshed are never accurate, and they contain several sources of error and may not always be feasible to separate these errors or to estimate their size and potential effects. It is, therefore, better to describe a viewshed analysis as a probable view catchment that must be subjected to subsequent field testing and verification.

A probable view catchment can be based on topography only and shows areas that will be screened by intervening hills, mountains etc. A probable topographic (digital terrain relief model) view catchment does not consider heterogeneous and complex natural and man-made elements in the surrounding landscape. A digital terrain model (DTM) can be created from existing contour data. A view catchment based on a digital surface model (DSM) does consider intervening vegetation, buildings or small variations in topography, such as road cuttings (Figure 16). Digital surface models are expensive and not a viable option for small projects.

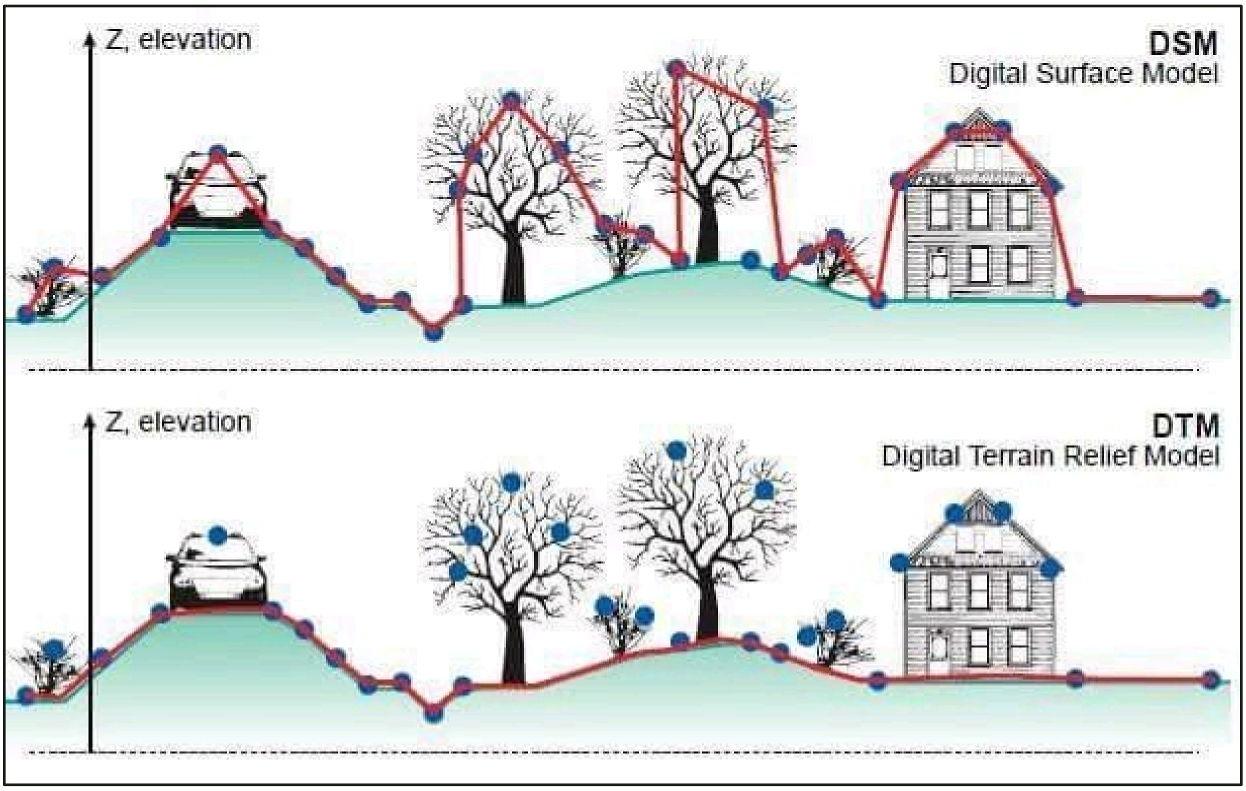

Figure 9: Terrain models

Therefore, a probable catchment is a conservative assessment of those areas that may be visually impacted by the planned infrastructure. Increasing the sophistication/accuracy of the probable viewshed by the addition of data (DSM) on complex natural and man-made elements in the landscape is desirable, but it will introduce further errors of detail and interpretation in the view catchment analysis.

The probable view catchments for all three proposed development layouts are based on existing available topographic data (1m contours) and vegetation data (Figure 10-12).

7. VISIBILITY OF THE PROPOSED DEVELOPMENT

7.1 Zone of visual influence

The geographical area from which the proposed development will theoretically be visible, or probable view catchment, is dictated by topography. Theoretically, the development site could be seen from surrounding areas. However, distance, developments, houses and vegetation will reduce the actual view catchment that the proposed development site will have, to a much smaller area (zone of visual influence).

Based on the information gathered from the various observer locations the zone of visual influence was determined for the preferred development layout (Figure 10). It spans an area of approximately 0.4 km south, 0.06 km west, 0.4 km north and 2.2 km to the east. According to the specific criteria for visual impact assessments, the visibility of the site is local, being visible from an area less than 5km away.

The alternative 1 development layout spans an area of approximately 0.4 km south, 0.06 km west, 0.4 km north and 2.2 km to the east (Figure 11). According to the specific criteria for visual impact assessments, the visibility of the site is local, being visible from an area less than 5km away.

The alternative 2 development layout spans an area of approximately 0.07 km south, 0.03 km west, 0.3 km north and 2.2 km to the east (Figure 12). According to the specific criteria for visual impact assessments, the visibility of the site is local, being visible from an area less than 5km away.

7.2 Receptors

The level of visual impact considered acceptable is dependent on the type of receptors. The following receptor sensitivity ratings were considered:

- High sensitivity – e.g. residential areas, nature reserves and scenic routes or trails
- Moderate sensitivity – e.g. sporting or recreational areas, or places of work
- Low sensitivity – e.g. industrial, or degraded areas

Highly sensitive receptors of the proposed development site include the N2 road and the narrow area along the beach including the built up area along Sands road stretching from Leentjies Klip to the parking area at the NSRI building.

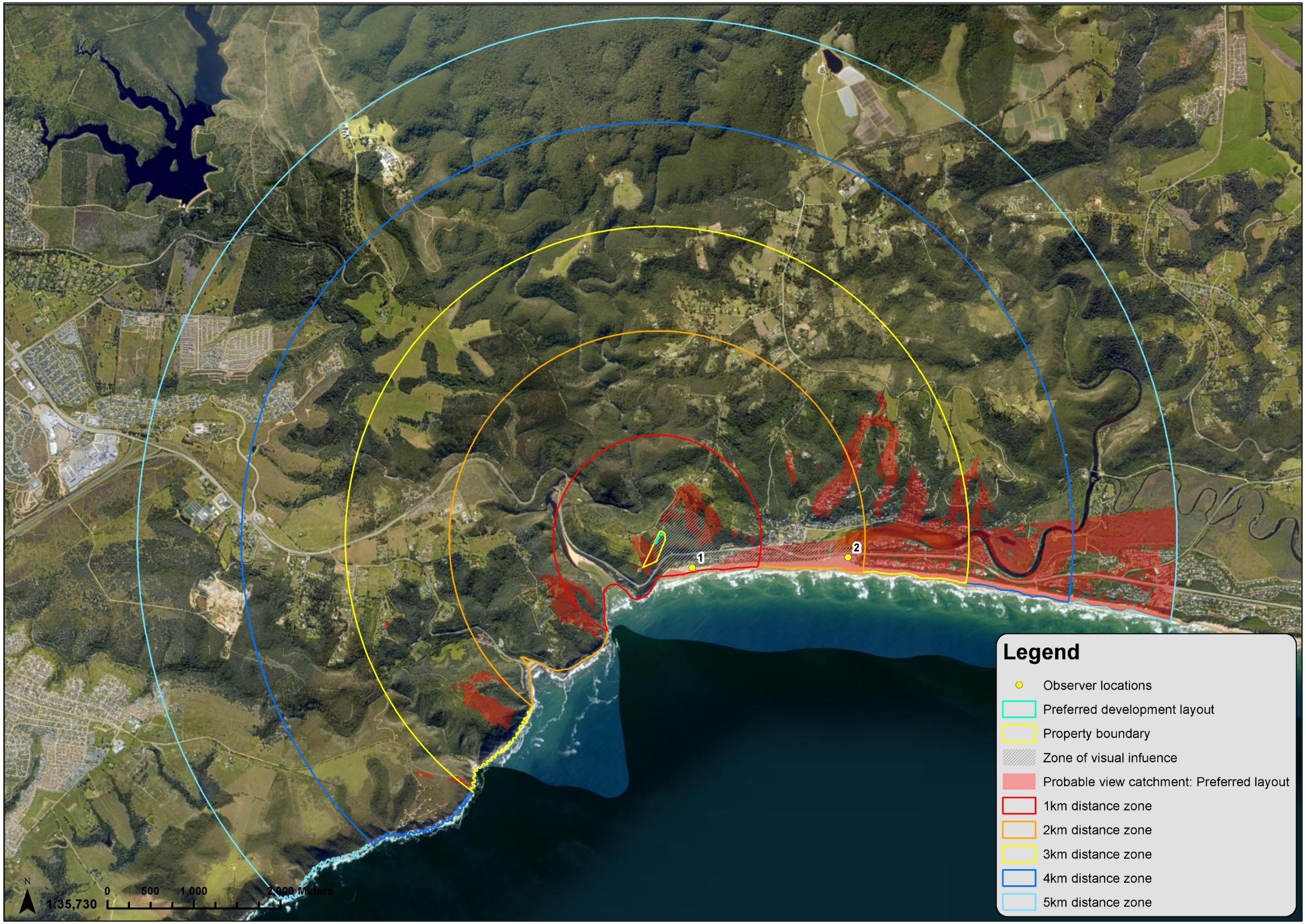

Figure 10: Preferred development layout probable view catchment

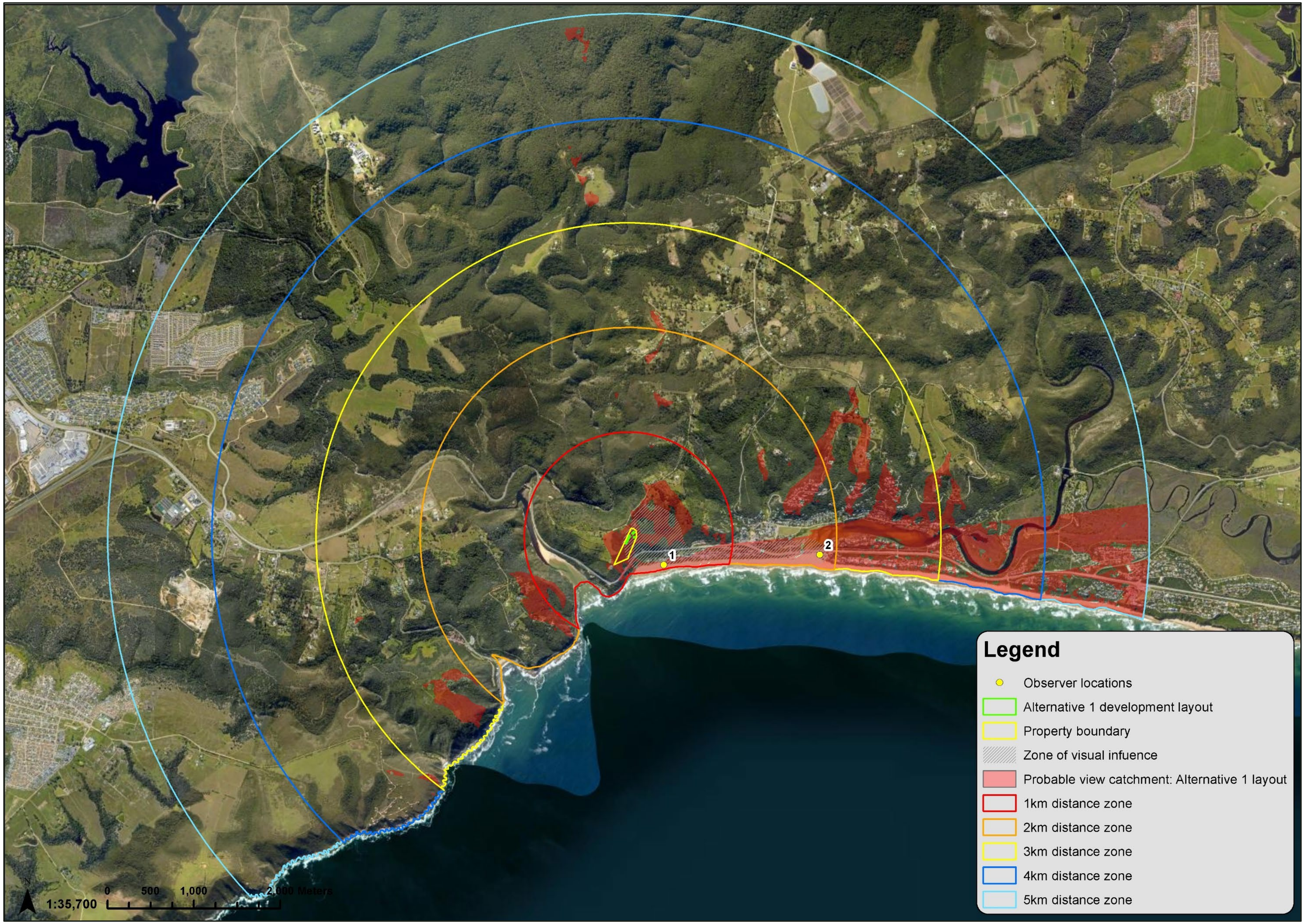

Figure 11: Alternative 1 development layout probable view catchment

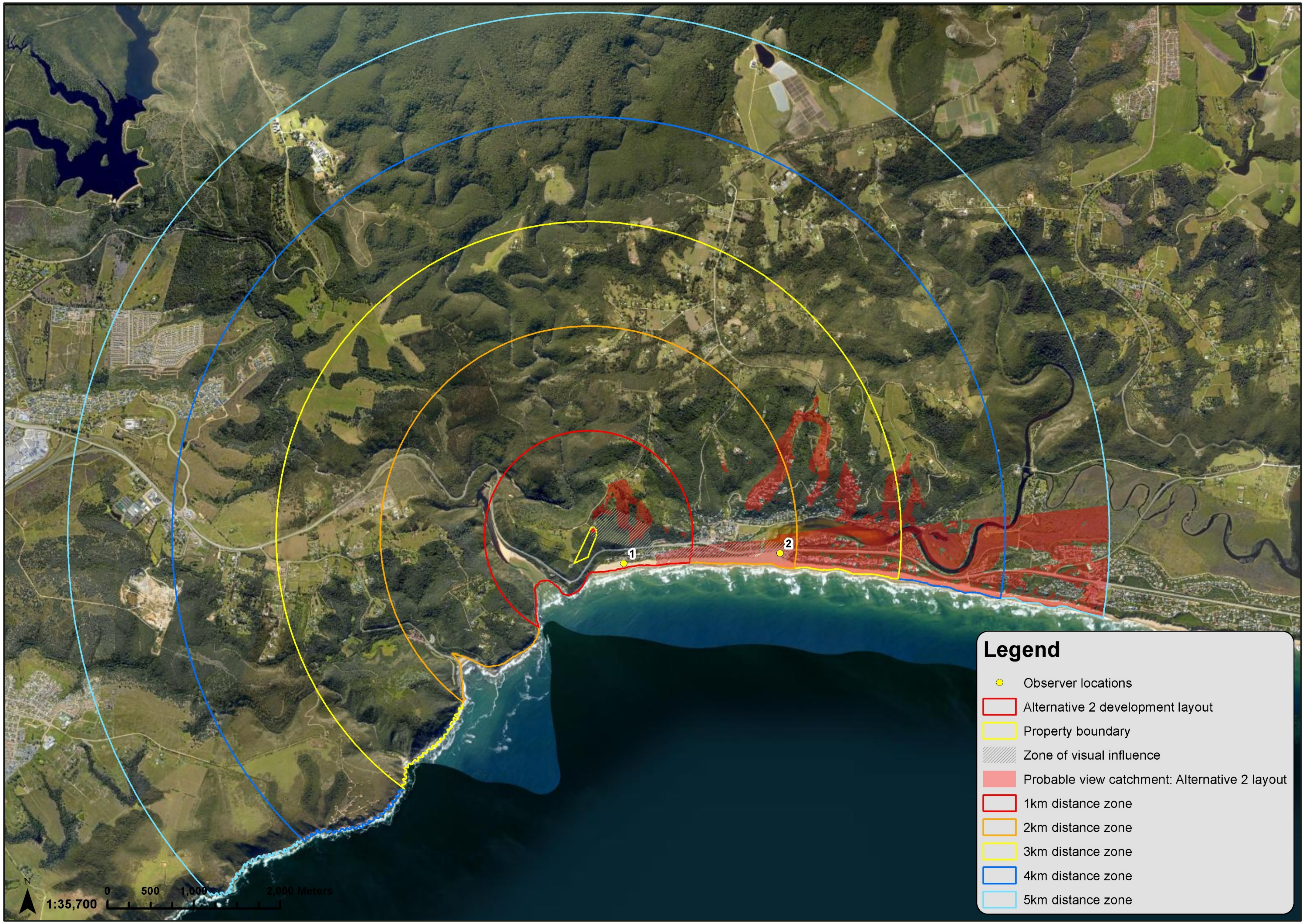

Figure 12: Alternative 2 development layout probable view catch

7.3 Visual exposure

The visual impact of a development diminishes at an exponential rate as the distance between the observer and the object increases. Relative humidity and fog in the area directly influence the effect. Increased humidity also causes the air to appear greyer which diminishes detail. Thus, the impact at 1 km would be 25% of the impact as viewed from 500 m. At 2km, it would be 10% of the impact at 500 m. The inverse relationship between distance and visual impact is well-recognised in visual analysis literature (Hull and Bishop, 1998) and was used as an important criterion for this study.

Thus, visual exposure is an expression of how close receptors are expected to get to the proposed development regularly. For this assessment, close-range views (equating to a high level of visual exposure) are views over a distance of 500 m or less, medium-range views (equating to a moderate/medium level of visual exposure) are views of 500 m to 2 km, and long-range views are over distances greater than 2 km (low levels of visual exposure).

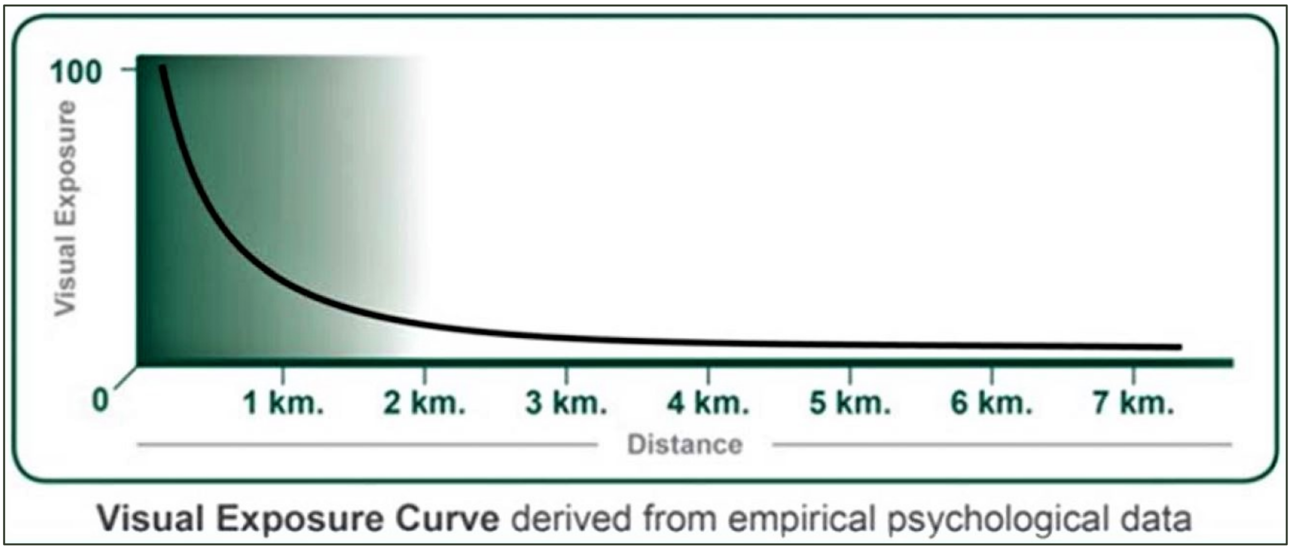

Figure 13: Visual exposure graph

Within the Zone of Visual Influence view corridors, viewpoints and receptors will experience “Visual Exposure” to the proposed development. The following visual exposure classes were considered during the assessment:

- High exposure – dominant or clearly noticeable
- Moderate exposure – recognisable to the viewer
- Low exposure – not particularly noticeable to the viewer

7.3.1 View corridors

7.3.1.1 Observer location 1 view corridor

The view corridor is located at Leentjies Klip road within the 1km distance zone. Only small portions of the pods and main dwelling that are above the surrounding vegetation will be visible (Figures 12 & 14). Due to the close proximity of the observer location to the proposed development the visual exposure will be moderate.

7.3.1.2 Observer location 2 view corridor

The view corridor is located at the parking area next to the NSRI building within the 2km distance zone. Only small portions of the pods and main dwelling that are above the surrounding vegetation will be visible (Figures 12 & 15). Due to the distance between the observer location and the proposed development the visual exposure will be low.

Figure 14: Observer location 1

Figure 15: Observer location 2

7.4 Visual sensitivity

The inherent visibility of a project site's landscape is usually determined by a combination of topography, landform, vegetation cover, settlement pattern and special features. This translates into visual sensitivity. The following visual sensitivity classes were considered during the assessment:

- High visual sensitivity – highly visible and potentially sensitive areas in the landscape,
- Moderate visual sensitivity – moderately visible areas in the landscape,
- Low visual sensitivity – minimally visible areas in the landscape

Slope and aspect are very important in the context of views. Topography expressed in the form of slope and aspect can perform an important role in limiting views or 'focusing' views in a certain direction. Many of the viewers surrounding the hilltop on which the development is located are located on lower elevations and therefore would experience a limited visual envelope or viewshed, as the rising topography around them would prevent wider views of the surrounding terrain beyond the immediate low-lying areas.

The proposed development is located on a south facing slope looking down on the N2 road and the Wilderness settlement along the coast. The proposed development is not located on a prominent ridgeline and the topography towards the west, north and east screen views into the proposed development (Figure 8). Tall vegetation (>8m) surrounding the proposed development also screen views into the development to a large extent (Figure 7). The proposed development, therefore, has low visual sensitivity.

7.5 Visual absorption capacity

Visual Absorption Capacity (VAC) is the capacity of the landscape to conceal the proposed development. The VAC of a landscape depends on its topography, the type of vegetation and surrounding infrastructure (buildings, roads etc.) that occurs in the landscape. The size and type of development also play a role. The following visual absorption classes were considered during the assessment:

- High VAC – effective screening is provided by topography, vegetation, and existing infrastructure.
- Moderate VAC - partial screening is provided by topography, vegetation, and existing infrastructure.
- Low VAC - little screening is provided by topography, vegetation, and existing infrastructure.

Surrounding tall vegetation, the topographical position and design of all three development layout options provide a high level of visual absorption for the proposed development (Figures 1,2, 7 & 8).

7.6 Visual intrusion

Visual intrusion is defined as the level of compatibility or congruence of the project with the particular qualities of the area, or its sense of place. This is related to the idea of context and maintaining the integrity of the landscape or townscape. The following visual intrusion classes were considered during the assessment:

- High visual intrusion – the proposed development results in a noticeable change or is discordant with the surroundings.
- Moderate visual intrusion – the proposed development partially fits into the surroundings but is clearly noticeable.
- Low visual intrusion – the proposed development creates minimal change or blends in well with the surroundings.

The proposed development's low visual impact design and use of appropriate cladding materials and colour selection materials allow it to blend in very well with its surroundings and create a minimal change in the landscape. The proposed development, therefore, has a low visual intrusion.

8. POTENTIAL VISUAL IMPACTS OF THE PROPOSED DEVELOPMENT

The assessment of visual impacts is based on a synthesis of criteria including nature of impact, extent, duration of the impact, intensity, probability of occurrence, reversibility, irreplaceable loss of resources, cumulative effect and level of significance.

8.1 Nature of the impact

The nature of the visual impacts will be the visual effect the activity would have on the receiving environment. These visual impacts will be:

Pre-construction phase:

- Removal of some vegetation will be required for earthworks. Some vegetation would also be cleared for building thereby increasing the visibility of the site and resulting in a loss of the vegetation visual resource.

Construction phase:

- During construction, earthworks would some visual scarring of the landscape.

Operational phase:

- The development site is currently undeveloped and covered with indigenous vegetation (forest). The development would result in a small change in visual character from a landscape covered with indigenous vegetation and without buildings to a very low-density well landscaped built landscape.

8.2 Impact assessment criteria

The assessment of visual impacts is based on a synthesis of criteria including nature of impact, extent, duration of the impact, intensity, probability of occurrence, reversibility, irreplaceable loss of resources, cumulative effect and level of significance.

8.2.1.1 The extent of the impact

The spatial or geographic area of influence of the visual impact: the extent of the impact for all three of the proposed development layout options is local (limited to the immediate surroundings).

8.2.1.2 Duration of the project

The predicted lifespan of the visual impact:
Preferred layout: The duration of the proposed development layout ranges from short-term (duration of the construction phase) to medium-term (duration of screening vegetation to mature and other mitigation measures to be implemented).
Alternative 1 layout: The duration of the proposed development layout ranges from short-term (duration of the construction phase) to medium-term (duration of screening vegetation to mature and other mitigation measures to be implemented).
Alternative 2 layout: The duration of the proposed development layout ranges from short-term (duration of the construction phase) to short-term (duration of screening vegetation to mature and other mitigation measures to be implemented).

8.2.1.3 The intensity of the impact

The severity of the impact on views, scenic or cultural resources (intensity of the impacts):

Preferred layout: The intensity of the impact for the proposed development layout option will be low (visual and scenic resources are affected to a limited extent).
Alternative 1 layout: The intensity of the impact for the proposed development layout option will be medium-low (visual and scenic resources are affected to some extent).
Alternative 2 layout: The intensity of the impact for the proposed development layout option will be very low (visual and scenic resources are affected to a very limited extent).

8.2.1.4 The probability of the impact

The degree of possibility of the visual impact occurring (probability of the impact occurring:
Preferred layout: The probability of the impact occurring for the proposed development layout option will be possible (the impact may occur - between a 25% to 50% chance of occurrence)
Alternative 1 layout: The probability of the impact occurring for the proposed development layout option will be possible (the impact may occur - between a 25% to 50% chance of occurrence).
Alternative 2 layout: The probability of the impact occurring for the proposed development layout option will be improbable (the chance of the impact occurring is extremely low - less than a 25% chance of occurrence)

8.2.1.5 Reversibility

The impact of all three development layout options is partly reversible by implementing the mitigation measures for the proposed development that includes the planting of indigenous vegetation to screen views into the development and the selection of appropriate construction materials.

8.2.1.6 Irreplaceable loss of resources

The degree to which resources will be irreplaceably lost due to the three development layouts is marginal.

8.2.1.7 Cumulative effect

An effect that in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development.
Preferred layout: The cumulative impact of the development layout before mitigation are medium-low and low after mitigation.
Alternative 1 layout: The cumulative impact of the development layout before mitigation are medium and low after mitigation.
Alternative 2 layout: The cumulative impact of the development layout before mitigation is low and very low after mitigation.

8.2.1.8 Significance

The significance of impacts is determined through a synthesis of the assessment criteria. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter.
Preferred layout: The significance of the development layout is medium-low.
Alternative 1 layout: The significance of the development layout is medium.
Alternative 2 layout: The significance of the development layout is low.

8.3 Conclusion

The well-positioned and designed development infrastructure allows for it to blend in very well with its surroundings and create minimal contrast in the landscape. The preferred development layout option provides a slight advantage over the alternative 1 development layout options due to its lower density (five structures)

The alternative 2 development layout will have the lowest visual impact due to only one structure included in the layout..

9. VISUAL CONSTRAINTS & MITIGATION

Visual Garden Route Environmental Management Framework (GREMF) has identified the inappropriate placement of development infrastructure on prominent and exposed topographical features such as ridgelines as a risk to the visual landscape of the Garden Route.

The GREMF states that proposed developments within areas of outstanding natural beauty, scenic drives and panoramic views must be sensitive to the natural beauty and consider the following aspects when planning the development:

- Infrastructure should be visually unobtrusive.
- Materials and colours used for the development should blend into the surrounding landscape.
- Infrastructure should be grouped in clusters with open spaces between clusters.
- Infrastructure should not interfere with the skyline (ridgelines), landmarks, major views and vistas.
- The development should not increase light, noise or effluent pollution.
- The development should correspond to the historical, architectural and landscape style of surrounding layout and buildings.

Every attempt should be made to design the proposed development so that buildings, structures, and other improvements do not extend above the existing ridgelines (high visual sensitivity area) or alter the ridge profile significantly when viewed from the public streets, roads, water bodies or facilities.

Structures should be sited below the ridgeline to preserve a natural topographic and vegetative profile. Ridgelines and prominent hillsides should be retained as open space through appropriate clustering and/or transfer of density to other parts of the development site.

Infrastructure should be designed to conform to the natural topography and hillside setting of the project site. Buildings and associated infrastructure located on the hillsides below ridgelines should follow the contours of the site and blend with the existing terrain to reduce bulk and mass. Infrastructure should be positioned to allow adequate space for tree planting and other vegetation screening interventions. Roof forms and rooflines should be broken into smaller building components to reflect the irregular forms of surrounding natural features. The slope of roofs should be oriented in the same direction as the natural slope.

9.1 Visual mitigation measures

General visual mitigation principles to reduce visual impact can be categorised as:

- On-site treatments to reduce visual effects; and
- Treatments at viewer locations to reduce visual sensitivity.

On-site treatments involve rehabilitation of landforms and land cover, while viewer location treatments involve a range of treatments to screen views, filter views and/or re-orientate primary views.

On-site treatments might include:

- Visual and ecological planting patterns of indigenous vegetation to achieve landscape patterns that emulate in part existing mixes of tree and grass cover in the surrounding landscape.

- Minimising exposure of work areas to sensitive receptors.
- Preparing an internal landscape plan for rehabilitation areas.

At viewer location treatments include:

- Landscape design and plantings for affected locations. This will require an appropriately qualified person to visit the affected locations and develop a landscape plan to screen or filter views of the project areas.

Design fundamentals are general design principles that can be used for all forms of activity or development, regardless of the resource value being addressed. Applying the following three fundamentals will assist with mitigation measures:

- Proper siting or location.
- Reducing unnecessary disturbance.
- Repeating the elements of form, line, colour and texture of the surrounding landscape.

Design strategies are more specific activities that can be applied to address visual design problems. The following strategies will not necessarily apply to every proposed activity or project:

- Colour selection
- Earthwork
- Vegetative manipulation
- Structures
- Reclamation/Restoration
- Linear alignment design considerations

The fundamentals and strategies mentioned above are all interconnected, and when used together, can help resolve visual impacts from proposed activities or developments.

9.1.1 Reducing unnecessary disturbance

As a general rule, reducing the amount of land disturbed during the construction of a project reduces the extent of visual impact. Measures relevant to the project include:

- Retain as much of the existing vegetation as possible and where practical screen construction activities from key viewing locations. This is also referred to as vegetation manipulation.
- Establish limits of disturbance that reflect the minimum area required for construction.
- Existing vegetation should be retained where possible through the use of retaining walls.

9.1.2 Colour selection

The selection of the best colour for the planned project will have the greatest impact on the visual success or failure of the project. Strong contrasts in colour create easily recognizable visual conflicts in the landscape. Measures relevant to the project include:

- The selection of colours that blend with or are in harmony with the surrounding landscape will drastically reduce the visual impact of the project
- Galvanized steel on structures should be darkened to prevent glare. Low-lustre paints should be used wherever possible to reduce glare.

9.1.3 Reduce contrasts from earthworks

The scars left by excessive cut and fill activities during construction often leave long-lasting negative visual impacts. Once the dark surface soil layer is disturbed, exposing the much lighter colour of the subsurface soil, a strong contrast is created that may take many years to recover.

There are several ways to reduce the contrasts created by earthwork construction. Proper location and alignment are the most important factors. Fitting the proposed project infrastructure to the existing landforms in a manner that minimizes the size of cuts and fills will greatly reduce visual impacts from earthwork. Other earthwork design techniques, such as balancing cut and fill or constructing with all fill or all cut should be considered, where appropriate, as methods to reduce strong visual impacts. Measures relevant to the project include:

- The scars left by excessive cut and fill activities during construction often leave long-lasting negative visual impacts. Where possible fitting the proposed project infrastructure to the existing landforms in a manner that minimizes the size of cuts and fills will greatly reduce visual impacts from earthwork.
- The dumping of excess rock and earth on downhill slopes should be limited.

9.1.4 Glint and Glare

Solar glint and glare i.e. reflected sunlight from shiny surfaces such as windows can affect safety and residential amenity in surrounding areas. Glint is a momentary flash of light. and may be produced as a direct reflection of the sun on a window. Glint effects are not restricted to just windows and can occur from any reflective surface including building facades.

Glare is a continuous source of excessive brightness. It could be experienced by a stationary observer located in the path of reflected sunlight from the face of a window. Glare can also be an issue for buildings with reflective/ glassy facades.

Glint and glare can cause a distraction or lead to an after-image being experienced by an observer. This can present a nuisance and, under some circumstances, a safety hazard. Solar glint and glare impact significance is categorised differently for varying observer types. For dwelling receptors, significance is predominantly defined by duration and separation distance. For road users, it is mostly down to the location of the glare relative to an observer’s field of view.

Low emissivity windows (Low-E) are designed to reflect much more solar energy than standard glass panes. They block as much as 99% of the sun's ultraviolet rays, preventing interiors from fading and reducing the health risks posed by ultraviolet light. Low-E windows also block a large percentage of the sun's infrared light, which is chiefly responsible for solar heat gain inside a property; it is primarily for this reason that these windows are known as energy efficient. Most low-E windows are also quite well-insulated thanks to a double pane design, which further enhances their energy efficiency.

But all that UV and IR light reflected off Low-E windows must go somewhere, and quite often it does so in the form of light beams (glare) intense enough to melt some materials or to pose a hazard to nearby humans and animals.

Anti-glare window film can be applied to windows prone to glare. They reduce the reflection without reducing the amount of light that reaches the room and without obstructing the view either. The roof of a building can also be extended to provide more shade and thereby reducing glare from windows.

9.1.5 Limiting the footprints and heights of structures

Visual impact can be reduced by limiting the footprint of the buildings and hardscaping as well as the heights of buildings. Limiting the footprint of infrastructure will help to provide more greening areas in between buildings which will assist with screening and visual absorption of structures.

9.1.6 Landscaping

A Landscape Plan must be drawn up by a professionally registered Landscape Architect. The objective of the Landscape Plan must be:

- To identify and retain indigenous trees and shrubs that will visually screen the development.
- To provide a planting plan of indigenous trees and shrubs for streets and open spaces that will allow for the medium – long-term visual screening of the development and enhance the living environment of the owners and residents.
- To draw up a management plan for phasing in indigenous trees and phasing out exotic trees such that the proposed development will always be screened from sensitive receptors, by trees. The plan should include the planting of fast-growing, pioneer-type trees, trees with a medium growth rate and those that have a slower growth rate. This management plan should be for a minimum of 20 years and should be monitored and revised every 5 years.
- To provide guidelines on visually permeable boundary treatments, using fencing for the most part and walls at entrances only. No precast concrete walls.

9.1.7 Lightning design

Effective light management needs to be incorporated into the design of the lighting to ensure that the visual influence is limited to the power station, without jeopardising operational safety and security.

Several measures can be implemented to reduce light pollution and those relevant to the project are as follows:

- Where possible construction activities should be conducted behind noise/light barriers that could include vegetation screens.
- Low flux lamps and the direction of fixed lights toward the ground should be implemented where practical. Choose "full-cut off shielded" fixtures that keep light from going uselessly up or sideways. Full cut-off light fixtures produce minimum glare. They increase safety because you see illuminated people, cars, and terrain, not dazzling bulbs. If you can see the bright bulb from a distance, it's a bad light. With a good light, you see lit ground instead of the dazzling bulb. "Glare" is light that beams directly from a bulb into your eye.
- The design of night lighting should be kept to a minimum level required for operations and safety
- The utilisation of specific frequency LED lighting with a green hue on perimeter security fencing.
- Where feasible, put lights on timers to turn them off each night after they are no longer needed

9.1.8 Restoration and reclamation

Strategies for restoration and reclamation are very similar to the design strategies for earthwork, as well as the design fundamentals of repeating form, line, colour, and texture and reducing unnecessary disturbance. The objectives of restoration and reclamation include reducing long-term visual impacts by decreasing the amount of disturbed area and blending the disturbed area into the natural environment while still providing for project operations.

Though restoration and reclamation are separate parts of project design, they should not be forgotten or ignored. It is always a good idea to require a restoration/reclamation plan as part of the original design package. All areas of disturbance that are not needed for operation and maintenance should be restored as closely as possible to previous conditions. Measures relevant to the project include:

- The objective of restoration and reclamation efforts is to reduce the long-term visual impacts by decreasing the amount of disturbed area and blending the disturbed area into the natural environment while still providing for project operations.
- Topsoil should be stripped, saved, and replaced on earth surfaces disturbed by construction activities.
- Planting holes should be established on cut/fill slopes to retain water and seeds.
- Indigenous plant species should be selected to rehabilitate disturbed areas.

- Where possible rehabilitation efforts should emulate surrounding landscape patterns in terms of colour, texture and vegetation continuums.
- Replacing soil, brush, rocks and forest debris over disturbed earth surfaces when appropriate, thus allowing for natural regeneration rather than introducing an unnatural-looking grass cover.
- Revegetation of disturbed areas should occur as soon as practicable possible after the completion of various construction activities.

9.2 Monitoring program

The potential visual impacts and proposed mitigation thereof must be undertaken by a professionally registered landscape architect that must be part of the design team (including engineers and architects). The brief of the landscape architect (LA) must include:

- The LA must consult with both engineers and architects to ensure that sensitive earthwork and building design development occurs, which will allow for reducing the construction and operation phase visual impacts.
- The LA must work with the project surveyor, arborist and planners in establishing which trees are to remain on site for visual screening and taking this information into the design development of the civil and building works.
- The LA must prepare a landscape plan, design development thereof and monitoring implementation and thereafter maintenance. The plan must include the tree survey and what trees are, what indigenous vegetation is, to be retained, what is to be removed, the planting of indigenous trees, new trees and shrub planting along roadways and in open spaces in the built areas and a guideline document for private gardens within the development.

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