Report:

Visual impact assessment report for the development of a Portion of the Remainder of Erf 464, George

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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) were undertaken. Following the desktop information gathering process, a site visit was conducted to test the conclusions of the terrain analysis, to 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

- An urban design report for the development of a portion of the remainder of erf 464, George for the purposes of a University/Research Institute/Academy, Aurecon, 2019
- Rezoning & Subdivision for the Development of a Portion of the Remainder of Erf 464, George. Project overview presentation, Aurecon 2019
- Motivation report for the Proposed Rezoning and Subdivision for the Development of a Portion of the Remainder of Erf 464, George, Aurecon 2019

1.2.3 Receiving site

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

This study was conducted between April 2019 and July 2019. 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 a 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 Viewshed analysis

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 tertian 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 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 view-shed 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-shed that must be subjected to subsequent field testing and verification.

A probable viewshed can be based on topography only and shows areas that will be screened by intervening hills, mountains etc. A probable topographic view-shed does not consider heterogeneous and complex natural and man-made elements in the surrounding landscape. Intervening vegetation, buildings or small variations in topography, such as road cuttings are therefore not considered.

Therefore, it is a conservative assessment of those areas that may be visually impacted by the planned infrastructure. Increasing sophistication/accuracy of the probable view-shed by the addition of data 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-shed analysis.

1.3.3 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 The George 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 (Figure 1,2,3,4 & 5), 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 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.
- The Kaaimansgat Pass (start of the Seven Passes Road) is listed as a significant scenic route that passes the proposed Garden Route Dam development (Figure 2 & 5).

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 visual impacts of development.

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

- Significant view corridors add value to the George sense of place and create a perception of space by focussing on views outside of the built-up envelope. The Garden Route Dam development area is an example of a significant view corridor towards the Outeniqua Mountains (Figure 1,2,3)
- 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 that starts next to the proposed Garden Route dam development (Figure 2)
- 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 has been allocated a Class 1 rating (Figure 5).

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.

The development patterns and the character of the area within which the proposed development will be situated must be described.

Figure 1: A view corridor from Frikkie Gericke street onto the project site and the Outeniqua mountains in the background

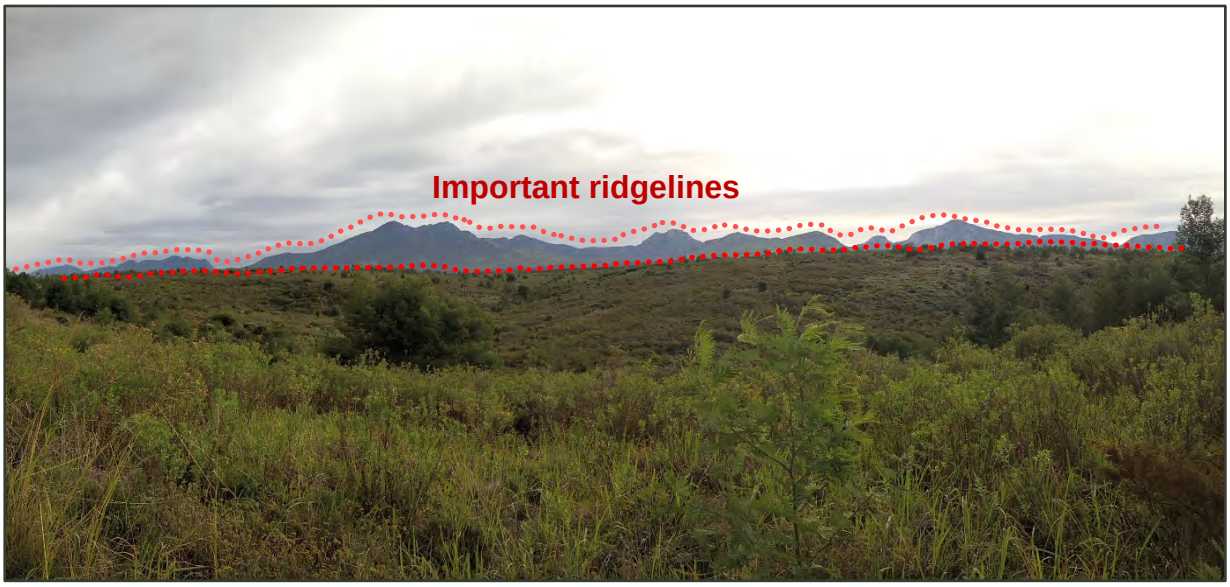

Figure 2: A view corridor from Madiba Drive (start of the Seven Passes road) on the project site and the Outeniqua mountains in the background

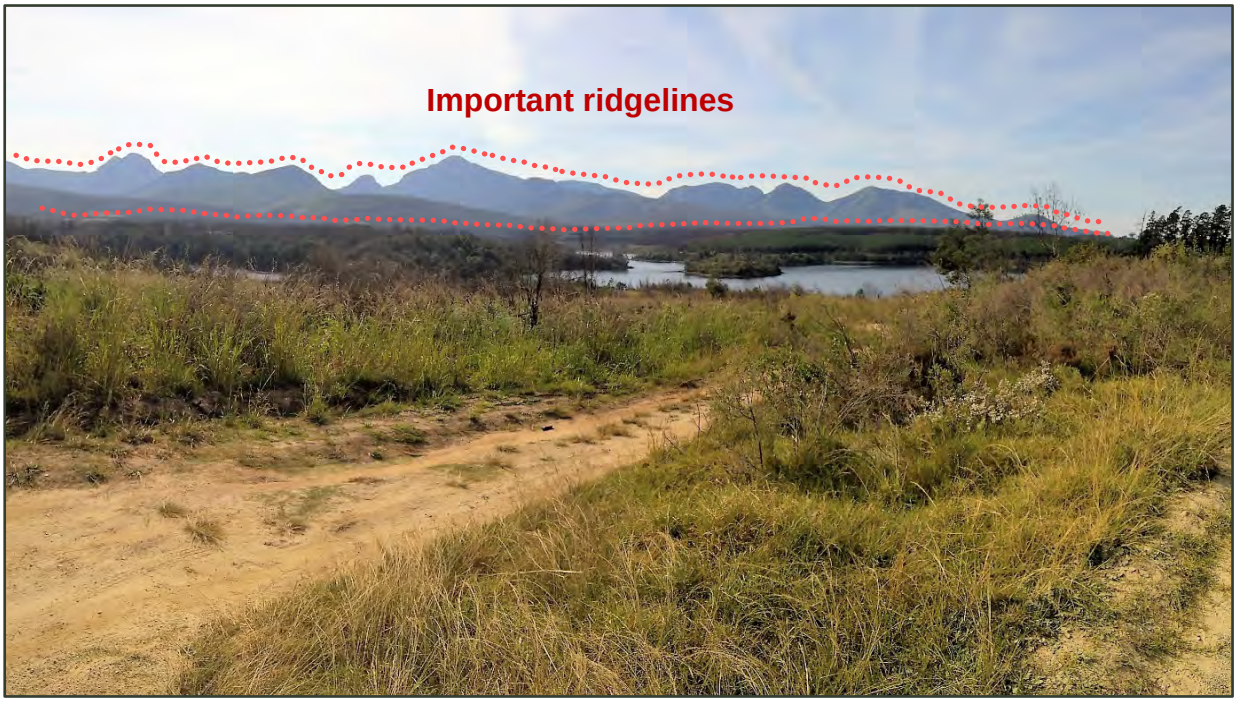

Figure 3: A view corridor from the project site towards the Garden Route Dam and the Outeniqua mountains in the background

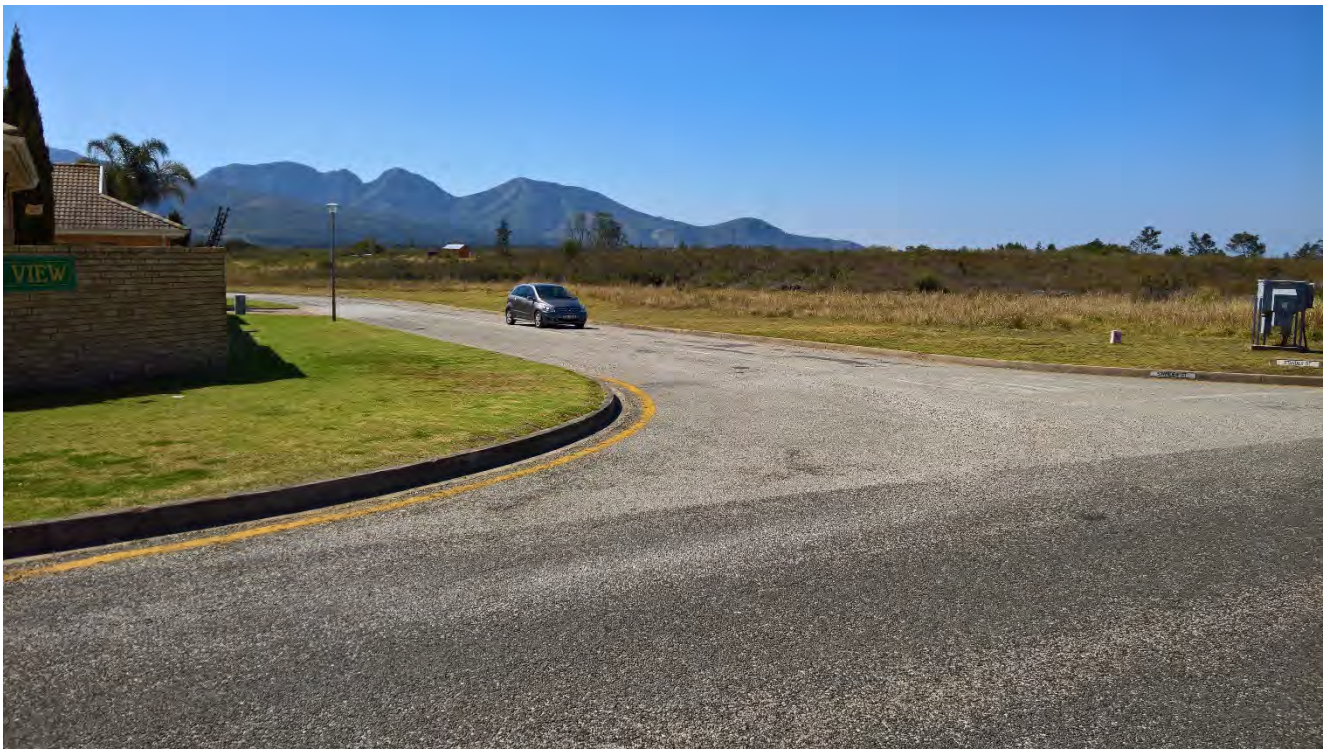

Figure 4: A view corridor from Meyer street onto the project site and the Outeniqua mountains in the background

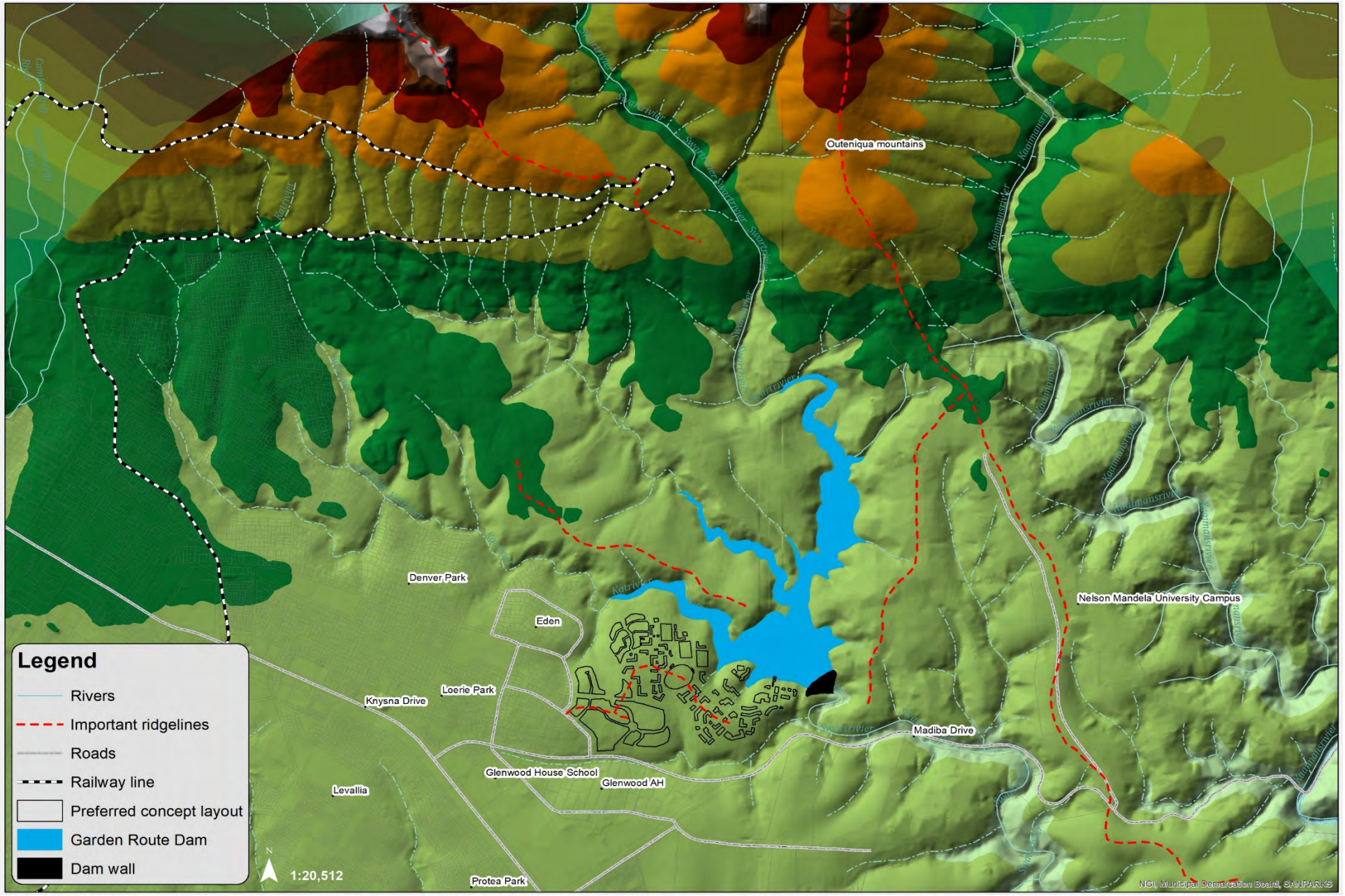

Figure 5: Important ridgelines (George SDF & Landscape Characterisation and Visual Resource Management Analysis)

3. PROJECT DESCRIPTION

3.1 Project location

The project is in the North-Eastern part of George, bordering the Southernmost boundary of the Garden Route Dam (Figure 6). George is located to the west of Wilderness, with a strong coastline forming the southern boundary of the town.

The property is situated approximately 2km north from the N2 highway, with access to the site currently being provided through the N9 (Knysna Road) linking in with Madiba Drive that leads to the Nelson Mandela University Saasveld Campus. The site can also currently be accessed via Stander Road to the West of the site.

The area is characterised by a mountainous area to the north, with residential uses to the West and South of the site. The neighbourhoods of Eden George and Loerie Park are situated directly to the West of the site. The Glenwood AH (Agricultural Holding) is located south of Madiba Drive. The site is currently vacant, with various gravel roads on the site being utilised for recreational activities.

3.2 Development description

The preferred development option sees a campus (university / research institute / academy) as central to the development with supporting uses and mutually beneficial functions (Figure 7 & 8).

This development proposal places strong emphasis on the clustering of a variety of buildings, which will vary slightly in use. The core of the campus is located centrally in the eastern half of the site. The campus will be strategically located on the flatter slopes of the project site and is intended to be a key attraction to the site. The design has thus made provision for selected prominent buildings towards the southern parts of the site, so that these selected buildings would be visible from Madiba Drive

Due to the envisioned size and diversity of the proposed educational institutions, an expansion of the core campus is proposed towards the north-west of the main campus. This expansion continues the inclusive, vibrant and sustainable nature of the main campus by also emphasising pedestrian movement and by harnessing and maintaining the presence of natural vegetation and green corridors which will allow the open spaces to be managed better.

A mix of Single Residential and Group Housing land uses are proposed on the South-Western portion of the site, as well as on a smaller portion towards the North-Western boundary of the site. This is to ensure greater integration between the existing neighbourhood and the newly proposed land uses towards the north-west of the site. Student housing is proposed in clusters on the eastern portion of the site, and in dispersed locations around the extended campus. These student housing opportunities are strategically designed in order to provide a range of housing options in order to ensure affordability and choice (Figure 7 & 8).

The development proposal will include several sports fields in key locations around the site. Most notable is a campus sports oval, large enough for a cricket field or athletics track, which would provide a good-quality space in which to host various events for the benefit of the entire community. The development proposal will include a hotel and tourism business development on the north-eastern portion of the site. Adjacent to the hotel and business school is a proposed waterfront commercial area (Figure 7 & 8).

A well-designed road network will be integrated throughout the site. The development proposal introduces two new access points along Madiba Drive, which will be accompanied by the formalisation of the existing informal access point along Stander Road (Figure 8 & 9).

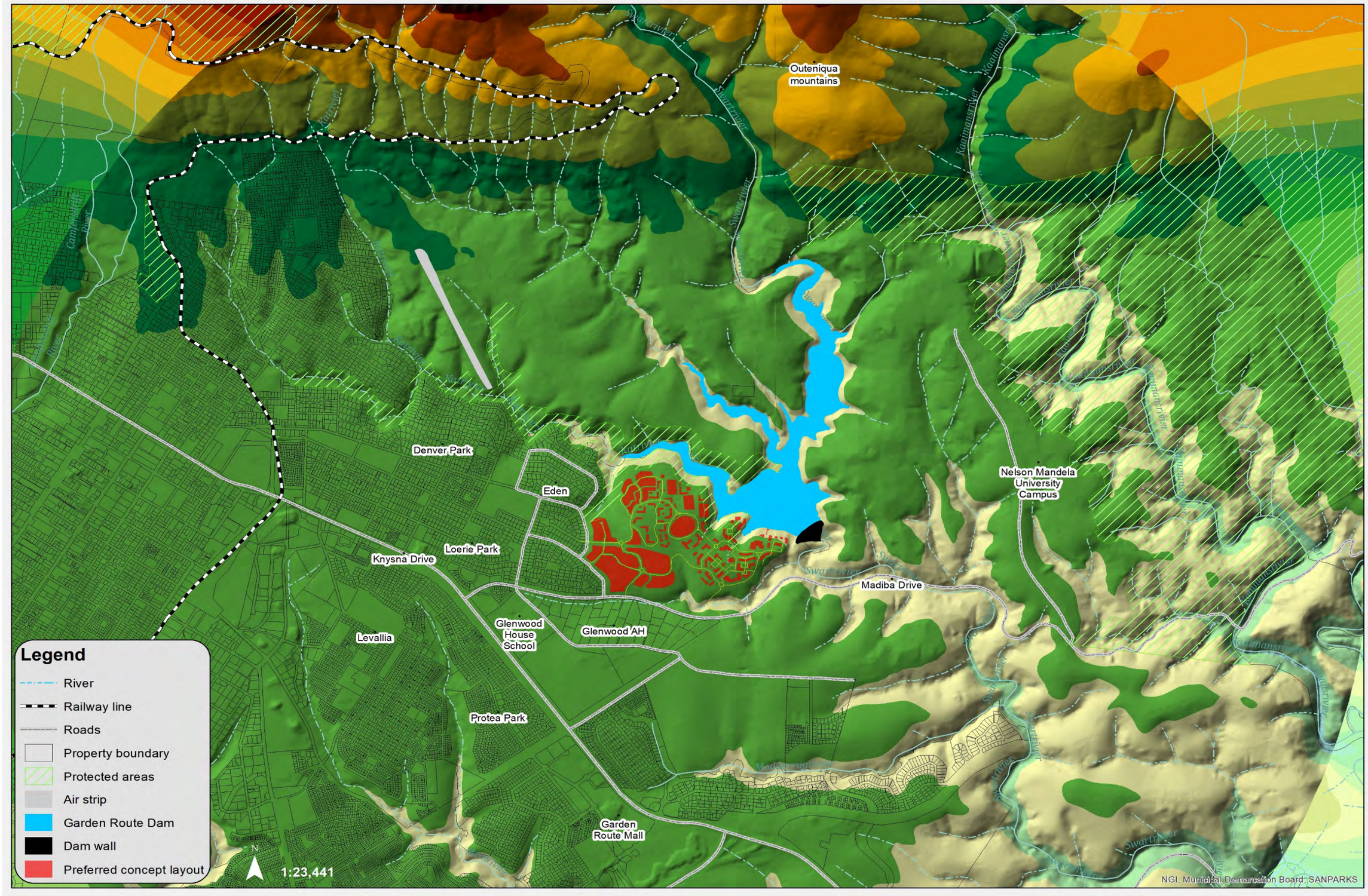

Figure 6: Project location

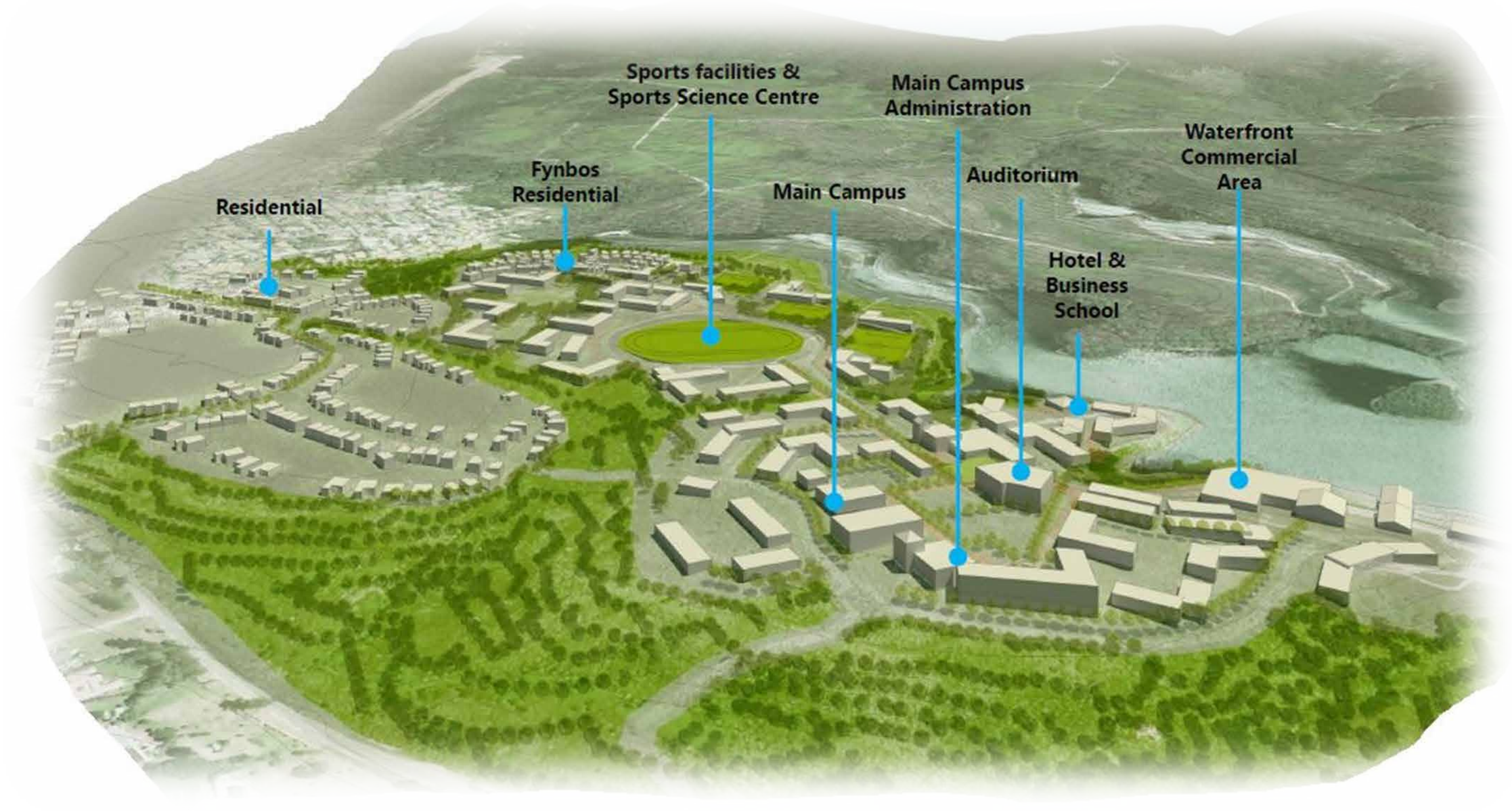

Figure 7: Project conceptual visualisation

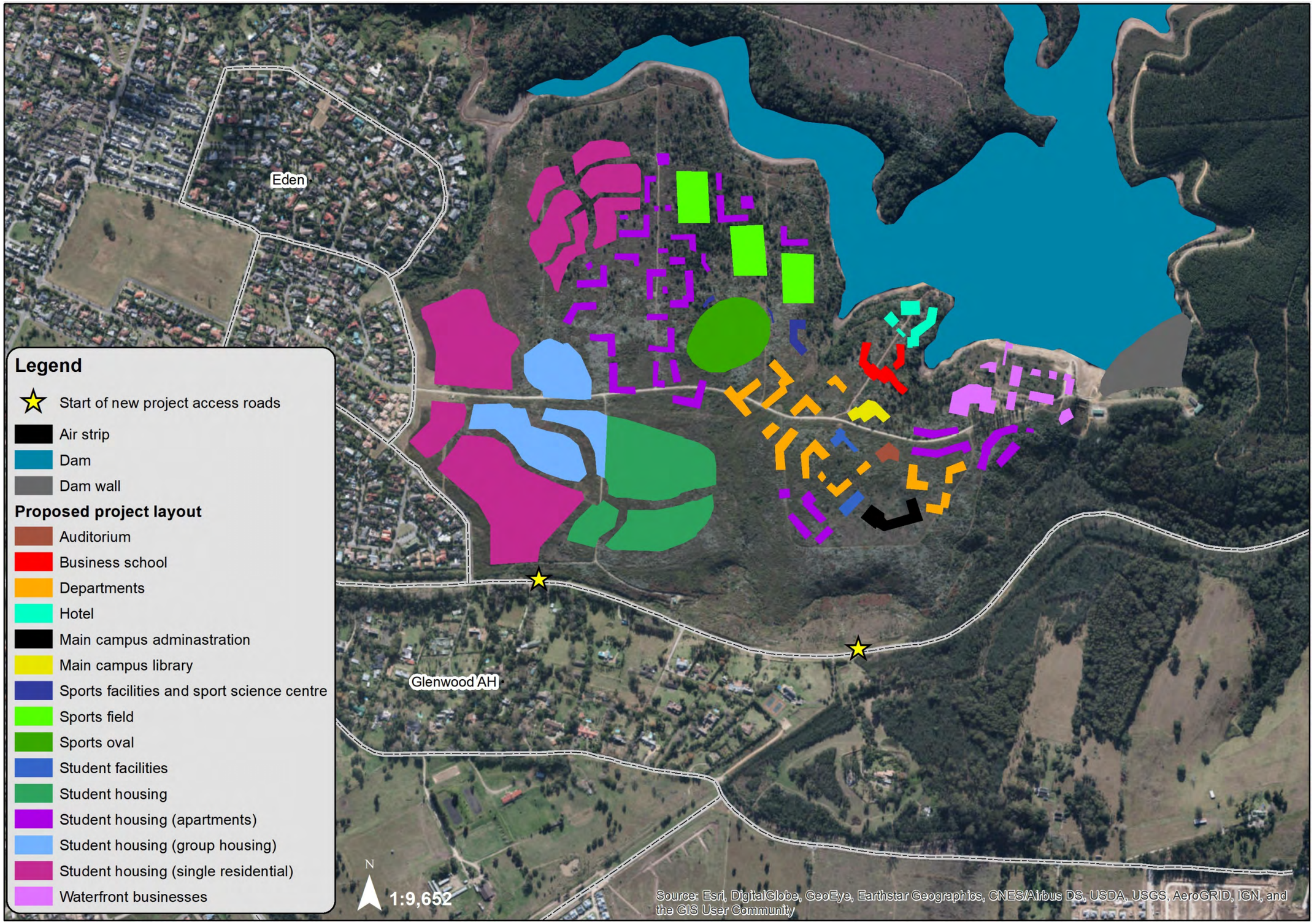

Figure 8: Project layout

The riparian areas have been maintained in the development proposal and selected buffer areas have been placed around these riparian zones. The development proposal further makes use of green belts throughout the site and at strategic locations, the green belts are used as buffers and beautification tools.

In terms of the George Municipality Integrated Zoning Scheme By-Law (2017), the following definitions (listed in alphabetical order) apply to the potential land uses / activities presented in the development proposal:

"Boarding House" means a building where lodging is provided, and includes ancillary communal cooking, dining and other communal facilities for the use of lodgers, together with such outbuildings as are normally used in connection with a boarding house; and -

a. Includes a building in which rooms are rented for residential purposes, a guest house or guest lodge, a home for the aged, a residential facility or handicapped persons or orphans; and

b. Does not include a hotel, dwelling house, second dwelling, backpackers' lodge or group house.

"Business Premises" means a property from which business is conducted and:

a. Includes a shop, big box retail, supermarket, restaurant, liquor store, two electronic or mechanical playing devices, plant nursery, office, funeral parlour, financial institution and building for similar uses, place of assembly, place of leisure institution, hotel, hospital, conference facility, rooftop base telecommunication station, and multiple parking garage;

b. Includes also the following land uses above ground floor only –

(i) Flats,

(ii) Caretaker's quarters,

(iii) Backpackers lodge,

(iv) Youth hostel, as well as

(v) Boarding houses; and

c. Does not include a place of entertainment, gambling place, motor repair garage, industry, noxious trade, risk activity, adult entertainment, adult services, or adult shop.

"Conference Facility" means a place where information is presented and ideas or information exchanged among groups of people or delegates and includes the supply of meals to delegates.

"Convenience Shop" means a small retail concern that is open long hours and that typically stocks a range of everyday items such as groceries, snack foods, candy, toiletries, soft drinks, tobacco products, newspapers and magazines.

"Dwelling House" means a building containing only one dwelling unit, together with such outbuildings as is ordinarily used with a dwelling house, including:

(a) a storeroom and garaging:

(b) a second dwelling unit or additional dwelling, with a floor area which does not exceed 60 m2, provided that application for consent use must be submitted if the second dwelling or additional dwelling unit is larger than 60 m2;

(c) a braai room;

(d) renewably energy structures for household purposes;

(e) home occupation;

(f) letting to lodgers;

(g) a bed and breakfast establishment; and

(h) home childcare.

"Flats" means a building containing three or more dwelling units of which at least one does not have a ground floor, together with such outbuildings, open space and private roads as are ordinarily associated with flats.

"Function Venue" means a building or structure used for functions, weddings and expos on what is mainly rural property.

"Group Housing" means a group of separate or linked dwelling units where every dwelling unit has a ground floor, which units may be cadastral subdivided but are planned, designed and built as harmonious architectural entity in an ordered way and integrated with communal private open spaces, private roads and parking.

"Hotel" means a property used as a temporary residence for transient guests, where lodging and meals are provided, and -

(a) includes –

(i) a restaurant or restaurants;

(ii) conference, entertainment facilities and a chapel that are subservient and ancillary to the dominant use of the property as a hotel;

(iii) premises which are licensed to sell alcoholic beverages for consumption on the property;

(iv) flats;

(v) a wellness centre;

(vi) a boarding house; and

(b) does not include –

(i) a liquor store;

(ii) a backpacker's lodge

(iii) a dwelling house, or

(iv) a dwelling unit.

"Occasional Use" means a temporary departure granted by the Municipality for a specific occasion or event that may include:

(a) craft markets;

(b) circuses;

(c) religious gatherings;

(d) film shoots;

(e) builder's yards;

(f) seasonal camping sites; and

(g) other outdoor events.

"Office" means property used for the conducting of an enterprise primarily concerned with administrative, clerical, financial or professional duties, and includes -

(a) medical consulting rooms; and

(b) a clinic.

"Place of Instruction" means -

(a) a place for education or training at pre-school, school or post-school levels, including-

(i) creche;

(ii) nursery school;

(iii) primary school;

(iv) secondary school;

(v) college;

(vi) university; or

(vii) research institute; and

(b) includes the following ancillary uses –

(i) a boarding hostel;

(ii) sports and recreation centre;

(iii) a civic facility for the promotion of knowledge to the community, including –

1. a public library;

2. place of worship;

3. public art gallery;

4. museum;

5. place of instruction in sport where the main objective is instruction rather than participation of the public as competitors or spectators; and

(c) does not include a reformatory or a conference facility.

"Place of Leisure" means a place used predominantly for commercial leisure activities that may attract relatively large numbers of people, operate outside normal business hours or generate noise from such activities on a regular basis, including–

(a) a cinema;

(b) theatre;

(c) amusement park/ centre;

(d) dance hall;

(e) ball room hall;

(f) gymnasium;

(g) sport centre;

(h) skating rink;

(i) pool room;

(j) pub; and

(k) a sports and recreation centre.

“Private Open Space” means land not designated as public open space which is used primarily as a private site for sport, play, rest or recreation, or as a park or nature conservation area and -

(a) includes ancillary buildings, infrastructure, and public land which is or will be leased on a long-term basis; and

(b) does not include shops, restaurants and gymnasiums.

“Public Open Space” means -

(a) land, with or without access control ─

(i) owned by the Municipality or other organ of state;

(ii) not leased out by the Municipality or that other authority on a long-term basis,

(iii) set aside for the public as an open space for recreation or outdoor sport and designated as public open space; and

(b) includes a park, playground, public or urban square, picnic area; public garden, nature area and ancillary buildings and infrastructure.

“Restaurant” means a commercial establishment where meals and liquid refreshments are prepared or served or prepared and served to paying customers primarily for consumption on the property and may include licensed provision of alcoholic beverages for consumption on the property, and the option for customers to purchase food for consumption off the property.

“Shop” means property used for the retail sale of goods and services to the public and -

a. Includes a retail concern where goods which are sold in such a concern are manufactured or repaired, a funeral parlour, flats above ground floor, service trade, ancillary sale of alcoholic beverages, clinic and the sale of motor vehicles; and

b. Does not include a hotel, industry, supermarket, motor repair garage, open air motor vehicle display, service station, restaurant, adult entertainment, adult services, adult shop or liquor store.

"Sports and Recreation Centre" means an outdoor or indoor sports and recreation facility which may be public or privately owned and which may include sports grounds and fields, golf courses, a sports stadium, as well as ancillary and subservient facilities and amenities like a clubhouse with a restaurant and shop, gymnasium, ablution facilities, stores, and related administrative buildings.

3.3 Proposed rezoning and subdivision

The Remainder of Erf 464, George, is located within the municipal boundaries of the George Municipality and currently zoned as ‘Undetermined Use Zone’. However, the various land use rights which would be required for the implementation of the development proposal falls outside of the parameters of the current zoning. To allow for the proposed development as indicated in the above section, it is proposed that the site be rezoned from “Undetermined Use Zone” to “Sub-Divisional Area”, as per subsection 20(2) of the Land Use Planning By-Law for George Municipality, 2015.

In order to make provision for the proposed development on this subdivisional area, the intention is then to further subdivide the subdivisional area into 162 separate portions. The newly subdivided portions will then be zoned to the appropriate use zones to accommodate the campus and range of supporting land uses as proposed in the development proposal. The use zones proposed in terms of the George Municipality Integrated Zoning Scheme By-Law (2017) include the following (Figure 9):

- Community Zone I

- Business Zone I
- Single Residential Zone I
- General Residential Zone II
- General Residential Zone IV
- General Residential Zone VI
- Open Space Zone II
- Open Space Zone III
- Transport Zone II

The residential land uses that are planned as part of the university development, is purely seen as a component of the university and ancillary and complementary land use to the university uses. A variety of types of housing is planned that could cater for undergrad students, lecturers, visiting lecturers, post-grad students through to single residential erven.

A mix of Single Residential and Group Housing land uses are proposed on the south-western portion of the site, as well as on a smaller portion towards the north-western boundary of the site. This is to ensure greater integration between the existing neighbourhood and the newly proposed land uses towards the north-west of the site. There is currently an existing demand for a range of housing opportunities in this area, together with a predicted increase in demand due to the proposed development. It is estimated that this provision of residential space on the site will also absorb the demand for on-site housing by future employees, post-graduate students and other users of this space.

On-site student housing is also proposed in clusters on the eastern portion of the site, and in dispersed locations around the extended campus. These student housing opportunities are strategically designed in order to provide a range of housing options in order to ensure affordability and choice. Table 1 provides information regarding the maximum building heights and Table 2 permitted building sizes of the various erven based on the zoning rights and site size

The Campus / university uses will predominantly be developed on the erven zoned as “Community Zone 1”, which includes a “place of instruction” as its primary use. The erven zoned as “General Residential Zone IV” are earmarked for student housing apartments. With a permitted building size of 69 100m², a total of approximately 1728 student housing apartments could be developed on these erven, at an average size of approximately 40m² per apartment. It is envisaged that a further 1281 student housing units could be developed on the erven zoned as “Community Zone 1” (that will accommodate the campus buildings), as “a place of instruction” includes for the development of a boarding hostel. The total number of student housing units (including the group housing and single residential) will thus be in the region of around 3300.

Zoning	Community Zone I	Business Zone I	Single residential Zone I	General residential Zone II	General residential Zone IV	General residential Zone VI	Open space Zone III	Open space Zone II	Transport Zone II
Height	(i) The highest point of a building to the top of the roof may not exceed 12 meters, provided that there is no height limit for a bell, tower, steeple, minaret or similar architectural feature designed to accentuate the significance of a building. (ii) The general provisions regarding earth banks and retaining structures in the by-law apply	The highest point of a building may not exceed 15 meters to the top of the roof	(i) The height of a dwelling house may not exceed 6.5 meters to the wall plate in all cases, 8.5 meters to the ridge of the roof in the case of a pitched roof (ii) The general provisions regarding earth banks and retaining structures in the by-law apply	(i) The height of a dwelling house may not exceed 6.5 meters to the wall plate in all cases, 8.5 meters to the ridge of the roof in the case of a pitched roof (ii) The general provisions regarding earth banks and retaining structures in the by-law apply	(i) The highest point of a building may not exceed 15 meters to the top of the roof (ii) The general provisions regarding earth banks and retaining structures in the by-law apply	The highest point of a building may not exceed 15 meters to the top of the roof	Not applicable	Not applicable	Not applicable

Table 1: George municipality town planning scheme development parameters

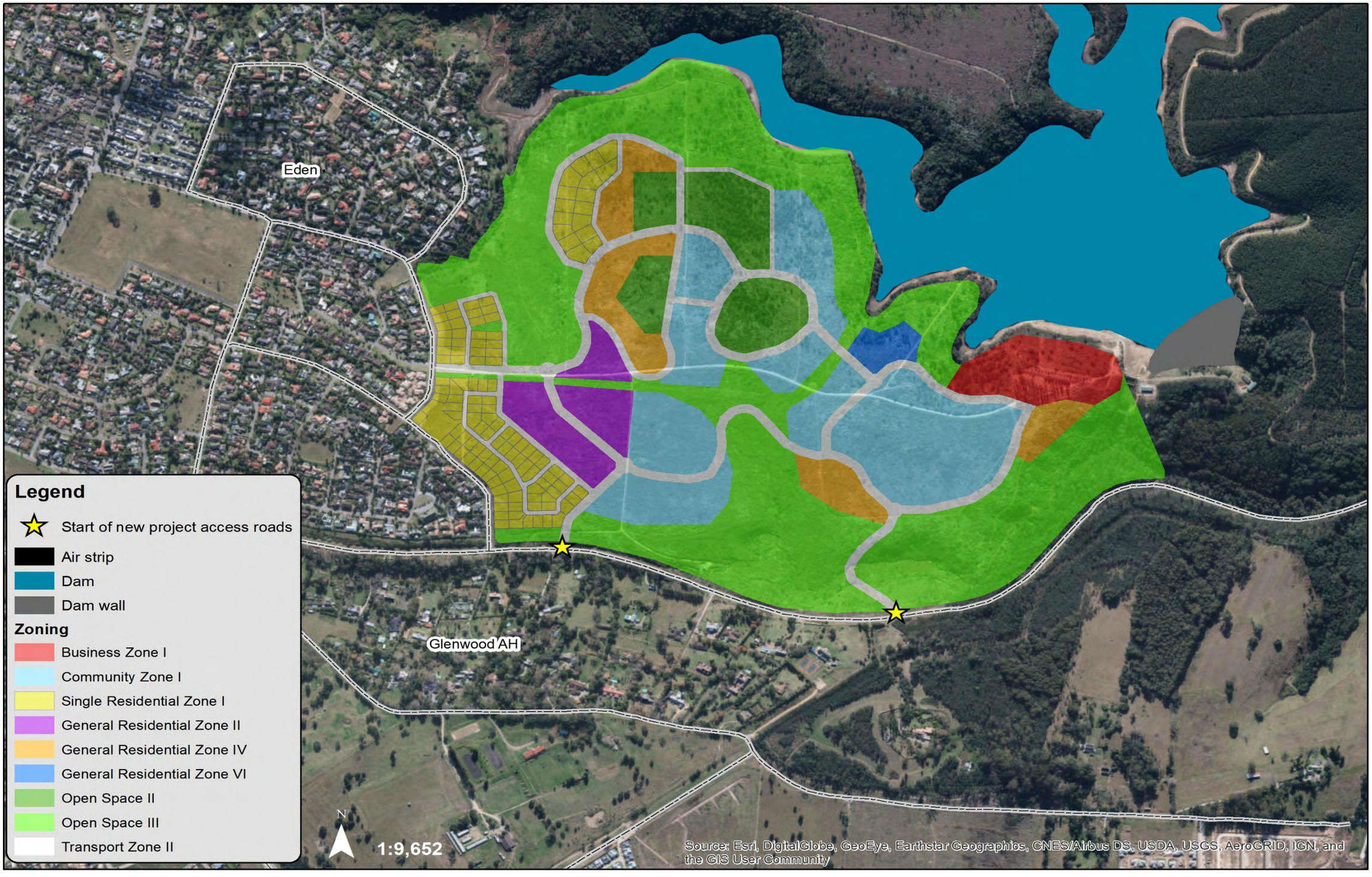

Figure 9: Project zoning

Zoning	Land use Description	FAR	Density (dwelling units per hectare)	Building square meters	number of dwelling units	Area (Ha)	% of Area
Community Zone I	Campus - University/Research institute/Academy	1,2	na	265800	1281	22,15	19%
Business Zone I	Waterfront commercial development	3	na	129300	na	4,31	4%
General Residential Zone VI	Hotel	3	na	34500	na	1,15	1%
General Residential Zone II	Medium density residential / Group housing	na	35	na	174	4,97	4%
General Residential Zone IV	Apartments / Flats / Student Housing	1	na	69100	1728	6,91	6%
Single Residential Zone I	Free standing dwelling houses	na	1 dwelling per erf	na	129	9,32	8%
Open Space Zone II	Recreational Spaces / Sports fields	na	na	na	na	8,22	7%
Open Space Zone III	Parks / Natural Assets / Preservation Areas	na	na	na	na	52,08	44%
Transport Zone II	Roads	na	na	na	na	9,39	8%
						118,5	100%

Table 2: Table depicting the maximum permitted building size

3.4 Civil services

Access to the proposed development area during construction will be provided east from Stander Street. No upgrades to the existing road infrastructure are required at this point in time. This road will, however, be upgraded following construction of the internal roads. The two main access roads to the campus after construction will be North from Madiba Drive, whereby the design of the roads will be a combination of earthworks, filling and a bridge over the existing watercourse on site. The watercourse crossing might be a combination of culverts and earth fill, but this can only be confirmed during the design stage.

The stormwater system forms an integral part of the road and urban planning layout. The system rests on three legs, the minor system, the major system and an emergency system. The minor storms are catered for in the pipe system while the major storms are routed through a linked system of roads and public open spaces using attenuation techniques. No bulk stormwater systems are required as the stormwater will be dispersed via several stormwater outlets into the existing natural watercourse. Accumulated stormwater will be dispersed by means of energy dissipating structures to minimize the effect of peak runoff downstream.

Wastewater generated from the proposed development will gravitate to the existing Glenwood pump station as well as the proposed Erf 464 pump stations and pump sewage through rising mains and gravity pipelines to the Glenwood pump station. And from there into the existing system towards the Outeniqua Wastewater Treatment Works, where it will be treated. Although the Outeniqua Wastewater Treatment Works currently does not have the capacity, upgrades are underway which will be able to accommodate the development by the time construction is estimated to commence.

The drainage for the site is in different directions due to the topography of the site. Due to this, two (2) pump stations are required to pump the sewerage to the existing sewerage system adjacent to the site. A conventional waterborne sewerage system will be provided with single connections to individual erven and the main sewer line will be constructed within roads reserves and/or midblock depending on the site topography.

George is supplied with water mainly from the Garden Route Dam but makes use of various other pumped sources such as from the Gwaiing River. The water is purified at the George water treatment plant. Water is supplied to all areas within George through a network of bulk water lines distributing water to and from each reservoir supply area. The George Municipal Water Master Plan indicates that the proposed development falls within the George Main zone. According to the investigations, the existing water treatment plants and the network has insufficient capacity to accommodate the proposed development.

The design criteria for the internal water infrastructure will be based on the average domestic consumption per day per erf dependent on the land use classification. Minimum pressures for the network are calculated for the fire flows of 30ℓ per second and peak demand at the point of lowest pressure under peak flow conditions. Water valves will be placed so that a maximum of four valves need to be closed to isolate a section of a pipeline. Valves will be spaced so that the length of the main included in an isolated section does not exceed 600m. All the valves will be installed at T-pieces where applicable and not within road surfaces. The minimum cover to pipe will be 0.8m within the road reserve.

The Municipality's Electrical Department (MED) is currently assessing the total electrical demand of the proposed development and the current electrical capacity. The MED will advise whether any upgrades will be required to accommodate the proposed development.

The road width will be a minimum of 4.5m and road surfaces will be either Cape seal, Asphalt or Paved surface. Sub-base and base materials will be imported. Sub-surface drainage, where applicable, will be installed and barrier kerbs will be installed around bellmouths (a 10m minimum radius). Road reserve widths will be determined by the actual road width to be constructed and the design life of the roads will be 20 years.

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 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 tending 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 own 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 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 has 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 strong drawcard for recreational activities. In addition, 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 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 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 on a regular basis 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 increase.
- **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. In order 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.

In a similar way, 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, 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, as 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 phrases (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 results 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

George and the site of the proposed development are situated in the 'Garden Route', in the southeastern extent of the Western Cape. The area is a scenic, coastal area with rich, visual diversity. This diverse and beautiful coastal area is a landscape formed over millions of years and numerous sea-level changes. The Outeniqua and Tsitsikama mountains, which consist of hard and folded Table Mountain Quartzite, form a majestic backdrop to a coastal platform, in the north (Figure 10).

The undulating coastal platform falls relatively gently towards the ocean and is drained by numerous rivers that either find their way to the ocean through steep-sided gorges, where the substrate is TMQ, or via estuaries where the substrate is softer. The coastline is again diverse with half heart bays, with headlands of hard TMQ and sandy beaches, estuaries and sand dunes or cliffs and river gorges.

Figure 10: A view of the undulating coastal platform and Outeniqua mountains in the Garden Route

The proposed project site is located on top of a hill with views over the Garden Route Dam, George, Madiba Drive and Outeniqua mountains. The topography of the site can be described as a low, flat-topped ridge with gentle to moderately steep sloping sides and featuring indents where the landscape has been eroded into small valleys by drainages

From: Oberholzer and Winter, Western Cape Provincial Spatial Development Framework – Heritage and Scenic Resources: Inventory and Policy Framework (May 2013)

"The Cape Fold Mountains, predominantly the Langeberg and Outeniqua ranges, continue east from the Overberg as far as Plettenberg Bay (and even further to Port Elizabeth). Between the mountains and the coast, the well-known 'Garden Route' traverses a series of estuaries, lakes and forests of scenic value between Mossel Bay and Plettenberg Bay. The northern boundary of the Eden District is defined by the impressive

Swartberg Mountains, a range consisting of the same Table Mountain Group sandstones, reaching over 2100m in places, and often covered by snow in winter" (Figure 11)

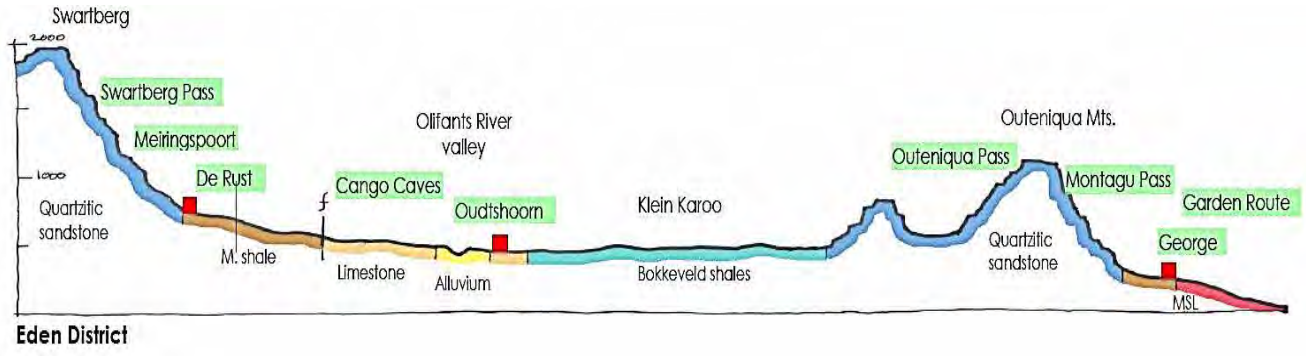

Figure 11: Cross section through the Eden District (source: Oberholzer and Winter 2013)

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".

5.2 Surrounding land uses

The project area is surrounded by urban areas, smallholdings, areas degraded by invasive alien plants, commercial Pine plantations and natural areas. The project area of approximately 118 hectares edges the dam on the north. This edge is identified being the approximate level of the dam at maximum capacity. The western edge is guided by the established neighbourhoods of Eden and Loerie Park. The southern edge is guided by Madiba Drive and the Glenwood AH neighbourhood (Figure 12).

The established neighbourhoods are on the western edge and is zoned as Single Residential Zone I with a few selected developments being zoned as General Residential Zone II, located further to the east. Found in the neighbourhood is a variety of strategically placed open spaces / green spaces for recreational activities. These spaces are zoned Open Space Zone I.

The area to the south of the project site is zoned Agricultural Zone II. Although the zoning is Agriculture Zone II, the main land use is residential in this area. The area is a conglomeration of smallholdings, which is permitted under Agricultural Zone II zoning (Glenwood AH). Further to the south, a golf driving range and a horse riding

club are located on municipal land. The zoning for these land uses is listed as Open Space Zone II. The area further east consists of large scale agricultural practices and zoned as Agricultural Zone I.

Towards the east on the opposite side of the Garden Route Dam are commercial Pine plantations and the Nelson Mandela University Campus. Directly to the north of the site is characterised by mountainous areas and the project location provides unobstructed views of the Outeniqua Mountains. A small buffer area around the Garden Route Dam forms part of the Katrivier Local Nature Reserve and is thus zoned as Open Space Zone IV. The agricultural areas to the north of the Garden Route Dam are also zoned as Agricultural Zone I.

Most of the areas to the west and to the south of the site have been developed, with residential land uses making up the majority of developments in these areas. Towards the east and the north of the site are vast areas of land that are being used for forestry. The area that is planned as part of this rezoning and subdivision application is approximately 118 hectares in extent and has historically been utilised for agricultural purposes. The topography of the site can be described as a low, flat-topped ridge with gentle to moderately steep sloping sides and featuring indents where the landscape has been eroded into small valleys by drainages. A strong riparian zone forms part of the southern and south-eastern boundary of the site, as well as along a small slither on the edge of the Garden Route Dam.

With the exception of the dam wall and related infrastructure and a public toilet structure, there are currently no other unnatural permanent structures on the site. Temporary structures on the site include telephone poles and a small wendy-house with a boom gate, which is used to control access onto the site. In addition, temporary toilets and bins have been strategically placed on the site, in areas where the public most often partakes in recreational activities.

In general, the area surrounding the site is characterized by a combination of residential land, agricultural, commercial plantation and natural areas to the north.

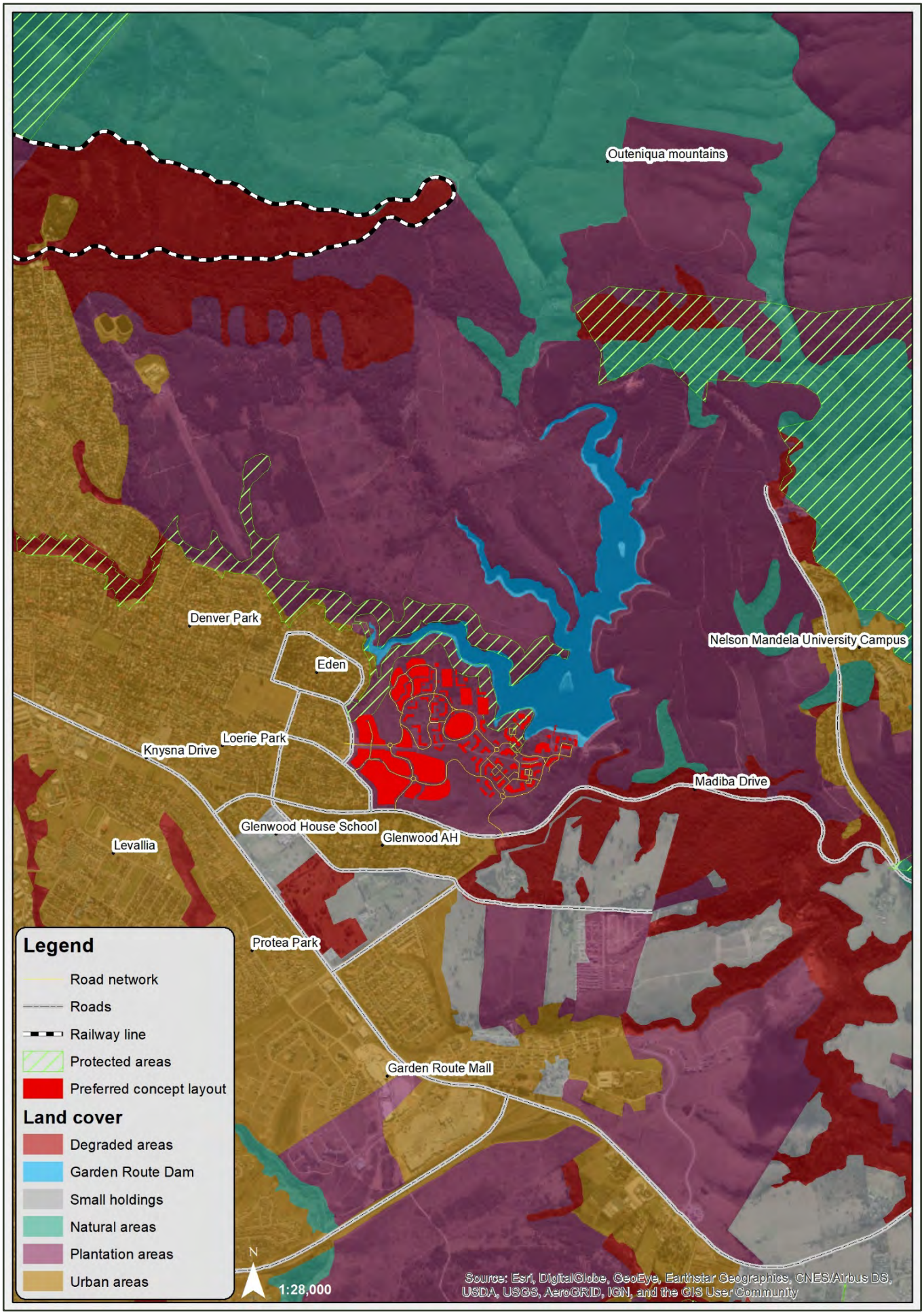

Figure 12: Land cover

5.3 Topography

The project area is located on top of a hill with views over the Garden Route Dam, George (Eden, Loerie Park, Glenwood AH), Madiba Drive and Outeniqua mountains. The topography of the site can be described as a low, flat-topped ridge with gentle to moderately steep sloping sides and featuring indents where the landscape has been eroded into small valleys by drainages. A larger drainage valley lies along the southern boundary and the Garden Route Dam shoreline lies close to the northern boundary. Slopes on the southern edge are steep, while those beyond the northern half are more gradual, except for the drainage valleys, which are relatively steep. The average height above sea level varies between 177 – 220 meters (Figure 13).

The lowest points of the site are located along the southern boundary of the site, which forms part of a riparian buffer. The east-west ridge bisects the terrain and forms a natural watershed which creates two main drainage areas to the north and the south. The area towards the southern boundary of the site drains via riparian zones and natural drainage channels. The northern part does not have any prominent natural drainage courses.

5.4 Local vegetation

The project site was a former pine plantation area which has undergone substantial disturbance. The study site has been exposed to no less than three uncontrolled burns during the last 12 years and has been substantially invaded by invasive alien plants during this period (Figure 2,3). The site can, therefore, be described as a highly disturbed and formerly transformed habitat. Until recently, most of the study area was covered by a commercial pine tree plantation.

Only a very narrow belt along the Garden Route Dam shore, the public picnic area and the small river along the southern boundary of the site was free of pine trees. Originally the area would have consisted of Fynbos on the flatter “upland” areas and Forest/Thicket in the valleys and on valley slopes. Some remnants of these natural vegetation types persisted during the forestry cultivation period (Figure 14).

The area thus does not contain any significantly sensitive intact/original vegetation and most of it consists of resilient pioneer vegetation which can be classed as being of relatively low sensitivity. Some of the original Fynbos vegetation occurs along the south-facing slopes above and adjacent to the drainage line that lies along the southern boundary. This area includes a critically endangered bulb geophyte species that survived the multi-year coverage of pine trees.

The wetland along the drainage on the southern boundary has been negatively impacted by the frequent discharge of raw sewerage effluent from the pump station next to it

5.5 Protected landscapes

The site lies within the Garden Route Biosphere Reserve, and the Kat river Nature Reserve covers a narrow section of the project area. The project area contains small areas of Critical Biodiversity Areas 1 (Aquatic) and Ecological Support Areas 1 (Terrestrial) and Ecological Support Areas 2 (Restore from plantation or high-density invasive alien plants) (Figure 15).

Figure 13: Project site topography

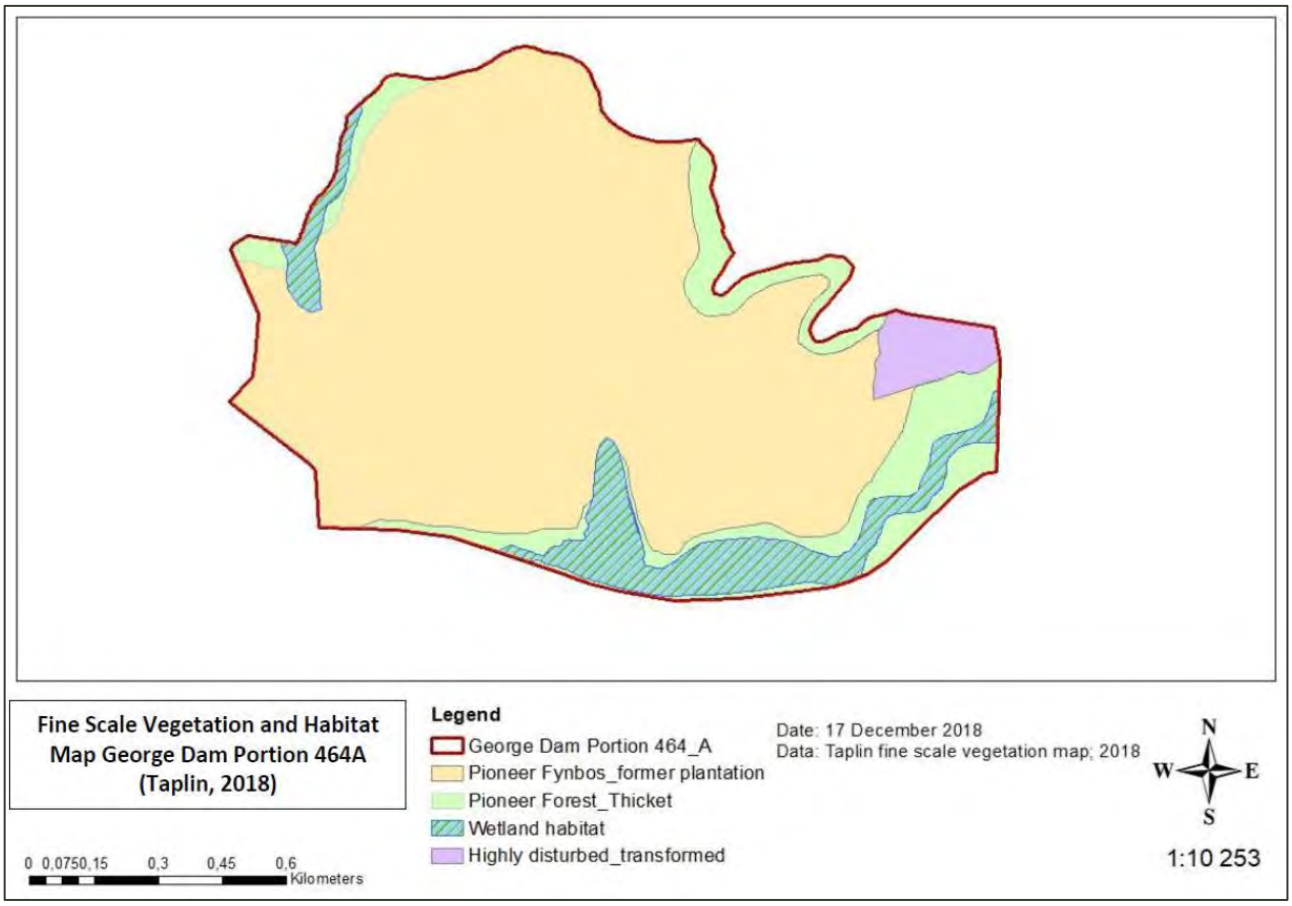

Figure 14: Vegetation and habitat map

5.6 Landscape character & value

Landscape character is defined as the distinct, recognisable, and consistently occurring pattern of elements in a particular type of landscape as created by specific combinations of geology, landform, soils, vegetation, land use, field patterns, and human settlement.

The George Spatial Development Framework (GSDF) states (Policy D6) that 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. Proposed developments up the slope of a prominent hill or mountain should not degrade its aesthetic/visual value.

The GSDF identifies the Seven Passes Road that starts at Madiba Drive as a significant scenic route that must be managed in such a way that it does not compromise the scenic views offered by the route (Figure 25,26). The area around the Garden Route Dam (GRD) has also been identified as an important view corridor

A mountain, hill or ridge is described as a physical landscape feature, elevated above the surrounding landscape. This includes the foot/base, slope and crest of a mountain, hill or ridge. 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. The project is located on a hill with views on important ridgelines identified in the GSDF that should not be compromised by developments (Figure 1,2,3,5).

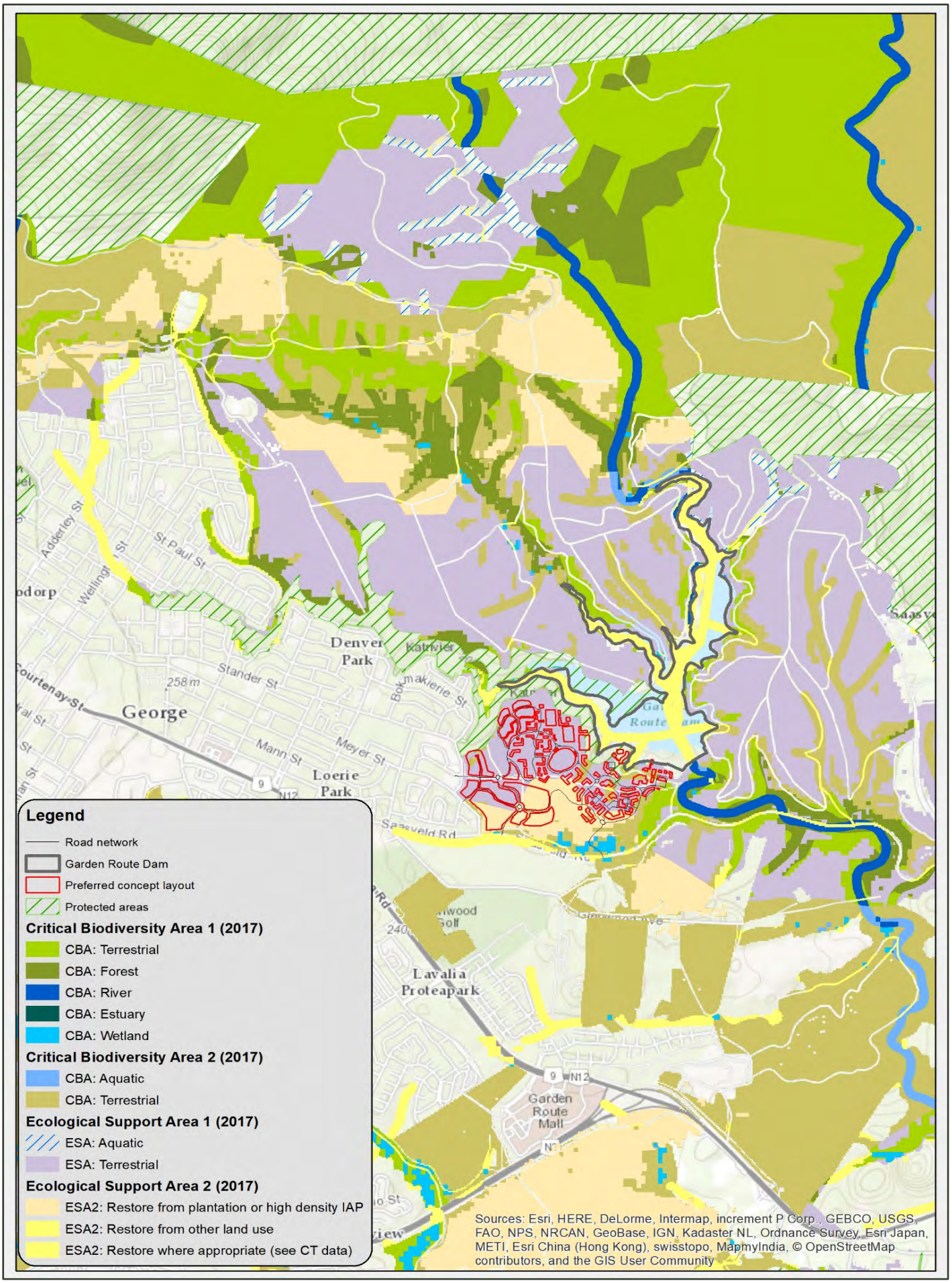

Figure 15: Protected landscapes

6. VISIBILITY OF THE PROPOSED DEVELOPMENT

6.1 View catchment

The geographical area from which the project will theoretically be visible, or view catchment (probable viewshed), is dictated by topography. Theoretically, the project site could be seen from the neighbourhood Glenbarrie in the west, the Outeniqua mountain to the north, the Nelson Mandela University in the east and the informal settlement of Thembalethu in the south (Figure 29).

However, distance, development, vegetation and topography will reduce the actual view catchment that the site and project will have, to a much smaller area

6.2 Zone of visual influence

The topography of the site can be described as a low, flat-topped ridge with gentle to moderately steep sloping sides and featuring indents where the landscape has been eroded into small valleys by drainages. A larger drainage valley lies along the southern boundary and the Garden Route Dam shoreline lies close to the northern boundary. Slopes on the southern edge are steep, while those beyond the northern half are more gradual, except for the drainage valleys, which are relatively steep.

The project area is surrounded by urban areas, smallholdings, areas degraded by invasive alien plants, commercial Pine plantations and natural areas. The area is characterised by a mountainous and plantation areas to the north, with residential uses to the west and south of the site. The neighbourhoods of Eden George and Loerie Park are situated directly to the west of the site. The Glenwood AH (Agricultural Holding) is located south of Madiba Drive and is a conglomeration of smallholdings. Further to the south, a golf driving range and a horse-riding club. Towards the east on the opposite side of the Garden Route Dam is commercial Pine plantations and the Nelson Mandela University Campus.

The neighbourhoods of Eden and Loerie park located west of the project site block views into the project site and only houses located directly next to the development have direct views of the project site (Figure 17, 19,20,21,22,23,24). The project site can also be viewed from Madiba Drive and Glenwood AH (Figure 18 & 25). Due to the screening effect of topography features and pine trees, there is a very narrow viewing corridor into the project site from the Nelson Mandela University campus (Figure 28). The project site is not visible from the airstrip due to topographical features and houses blocking views into the project site (Figure 16).

The zone of visual influence for the whole site of the proposed development is illustrated in Figure 18. It spans an area of approximately 1.5 km south, 1 km west, 1km north and 2 km to the east. According to the specific criteria for visual impact assessments, the visibility of the site is local, being visible from the area less than 5km away.

6.3 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 site and proposed development include the residential areas located next to the project location (Eden, Loerie Park & Glenwood AH), the start of the scenic Seven Passes road (Madiba Drive), the Nelson Mandela University campus and the conservation areas north of the project site (Figure 18,19,20,21,22,23,24,25,26,27,28,29,30).

Figure 16: Observer location A

Figure 17: Observer location B (houses screening views into the project site)

Figure 18: Observer location C

Figure 19: Observer location D (1)

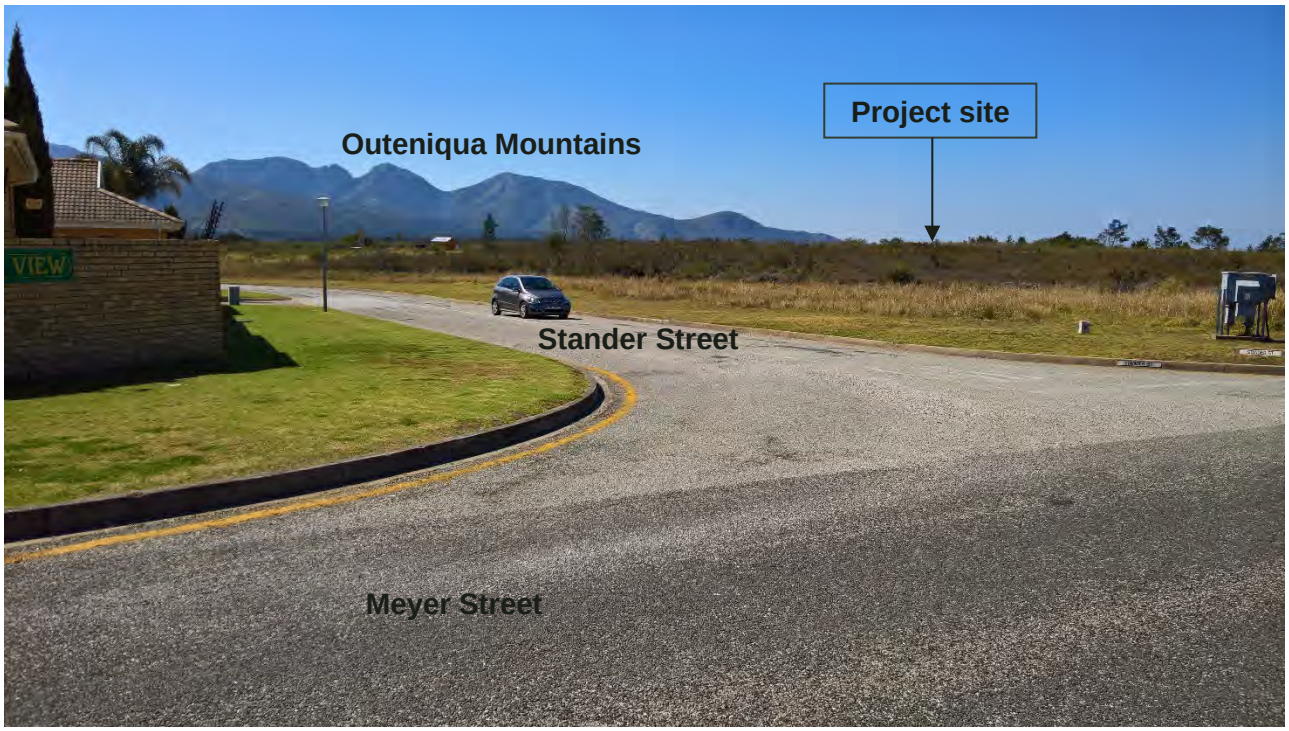

Figure 20: Observer location D (2)

Figure 21: Observer location E

Figure 22: Observer location E

Figure 23: Observer location F

Figure 24: Observer location F

Figure 25: Observer location H (1)

Figure 26: Observer location H (2)

Figure 27: Observer location H

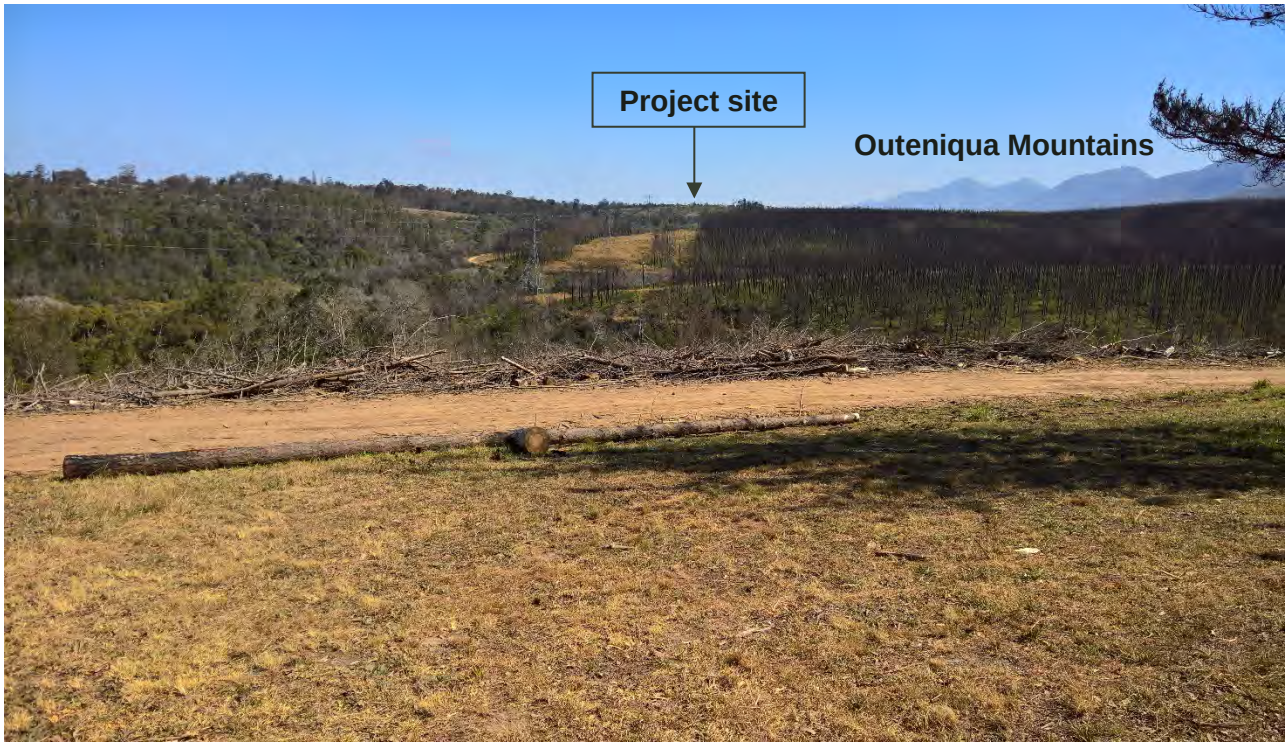

Figure 28: Observer location I

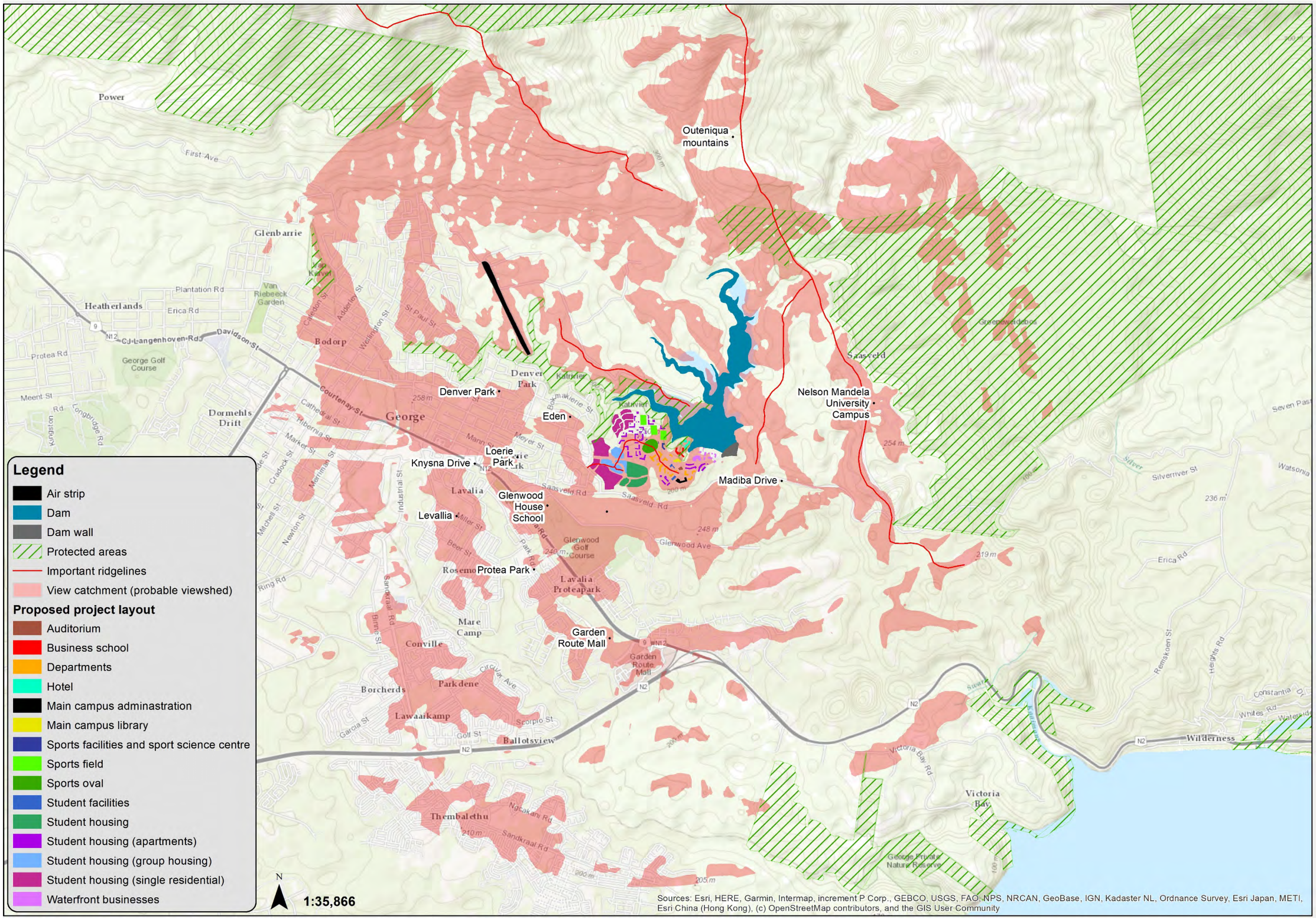

Figure 29: Project view catchment (probable viewshed)

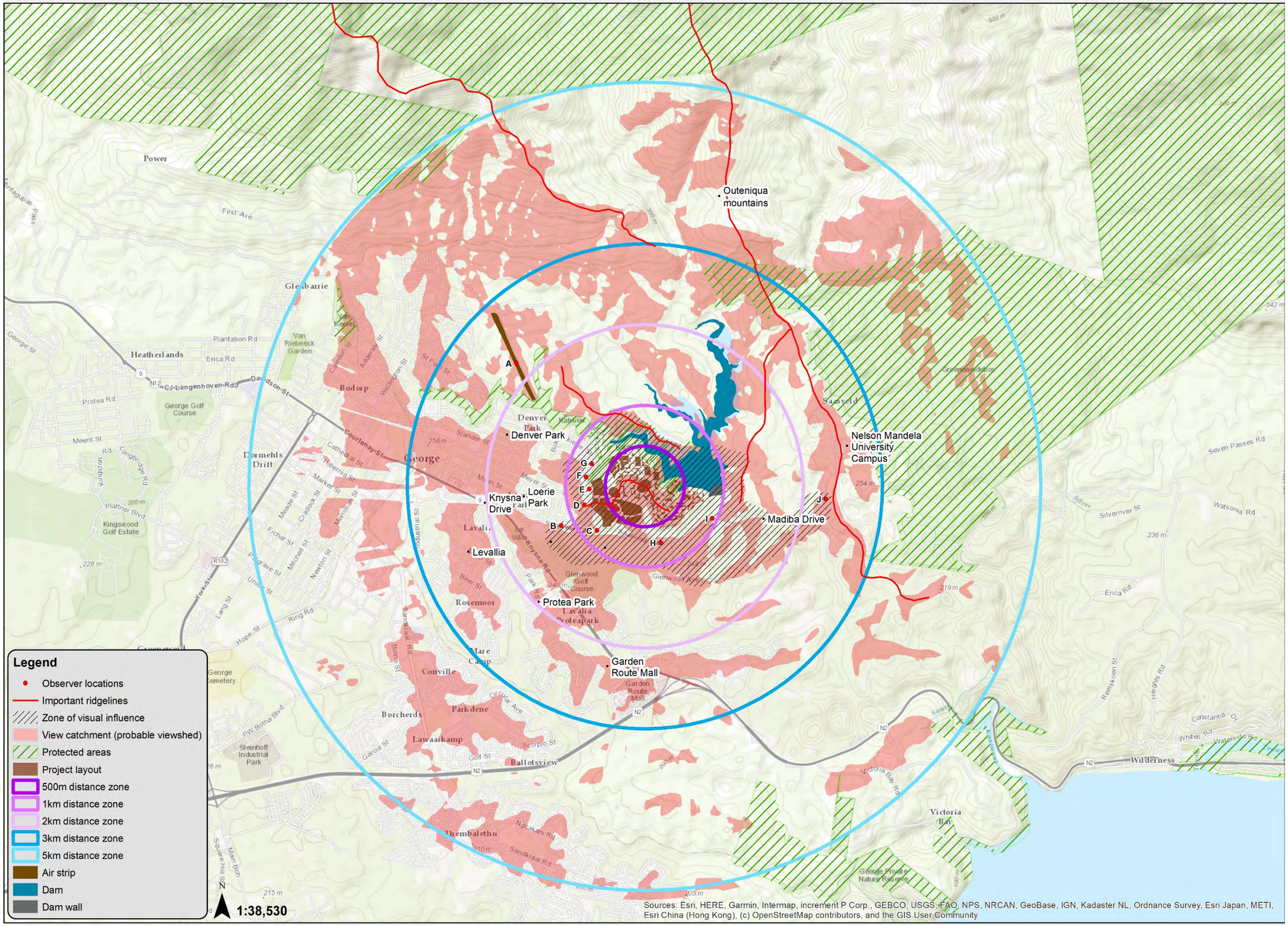

Figure 30: Project zone of visual influence and observer points

6.4 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 that diminishes detail. Thus, the impact at 1 000 m would be 25% of the impact as viewed from 500 m. At 2 000 m, 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 important criteria for this study.

Thus, visual exposure is an expression of how close receptors are expected to get to the proposed interventions on a regular basis. For the purposes of 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).

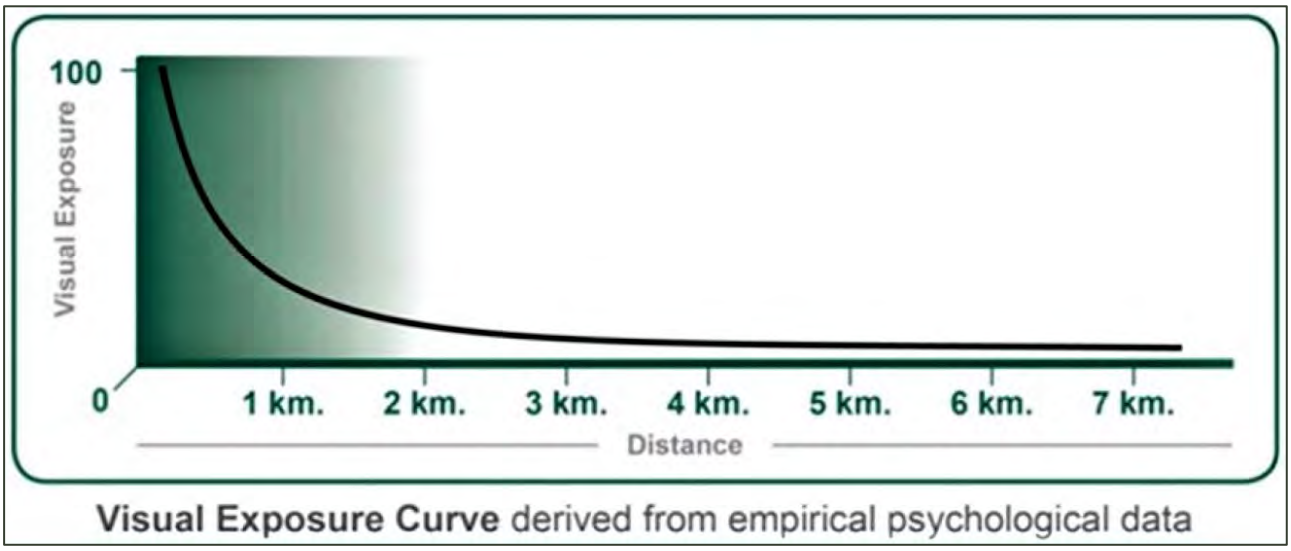

Figure 31: Visual exposure graph

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

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

6.4.1 View corridors

6.4.1.1 The Seven Passes scenic tourist route

The Kaaimansgat Pass (start of the Seven Passes Road) is listed in the George Spatial Development Framework as a significant scenic route that passes south of the project site. The project site is not visible from the initial stretch of Saasveld road due to the screening effect created by the Loerie Park neighbourhood (house structures) (Figure 17). The project site only becomes highly exposed from the turnoff into Stander street all along Madiba Drive up to observer point I that is within a 1km viewing distance from the project site (Figure 18,25,26,27,30). From observer point I onwards to the Nelson Mandela University turnoff views into the project are screened by topographic features and vegetation. Residences located in the Glenwood AH next to Madiba drive will also be highly exposed to the project site (Figure 18,25)

6.4.1.2 Stander and Bokmakierie Street view corridor

The project site will have a high exposure from the first row of residences located Stander and Bokmakierie street within a 1km viewing distance from the project site (Figure 19,20,21,22,23,24,30). Residences located deeper within the Loerie Park and Eden neighbourhoods will have a low exposure to the project site due to the screening effect of other residences and topographic features (Figure 17).

6.4.1.3 Nelson Mandela University view corridor

Topographic features and pine trees create a narrow viewing corridor from the Nelson Mandela University (Figure 28). Due to the distance (2.5km) from the project site and narrow viewing corridor, a moderate visual exposure is allocated to the view corridor (Figure 31).

6.4.1.4 The George water treatment works and airstrip view corridor

Although the George water treatment works, and the airstrip is located on an elevated position (250m amsl) at a 3km viewing distance the project site is not visible due to the screening effect created by topographic features, vegetation and houses (Eden) (Figure 16,31).

6.5 Visual sensitivity

The inherent visibility of a project sites 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

A mountain, hill or ridge is described as a physical landscape feature, elevated above the surrounding landscape. 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.

The topography of the site can be described as a low, flat-topped ridge with gentle to moderately steep sloping sides and featuring indents where the landscape has been eroded into small valleys by drainages. A larger drainage valley lies along the southern boundary and the Garden Route Dam shoreline lies close to the northern boundary. Slopes on the southern edge are steep, while those beyond the northern half are more gradual, except for the drainage valleys, which are relatively steep. A large portion of the proposed project infrastructure is located on the ridgeline area that has a high visual sensitivity. The project infrastructure located on the slope areas has a medium to low visual sensitivity.

For the purposes of a visual assessment, the screening value of the vegetation is considered and not the ecological value thereof. i.e. tall vegetation provides screening while lower (<1m) vegetation does not provide screening. The project site has very few remaining trees and is limited to a handful of mature Pine trees located close to the dam will have a high visual sensitivity. The remaining transformed Fynbos (including young invasive alien plant trees) that covers most of the project site varies between 1m and 3m tall so provide little to moderate screening. The areas of the site covered by this vegetation will have a high visual sensitivity.

The residential (settlement patterns) areas surrounding the project site (Loerie Park, Eden, Glenwood AH) provide a visual enclosure (screening) to the proposed development rendering the site a low visually sensitivity. Towards the north (Outeniqua mountains) no residential buildings are located rendering the site highly visually sensitive. The Nelson Mandela University campus is located toward the east but provides no screening to the proposed development and renders the site highly visually sensitive.

Based on the abovementioned information the of visual sensitivity of the site was categorised as high, medium & low (Figure 32).

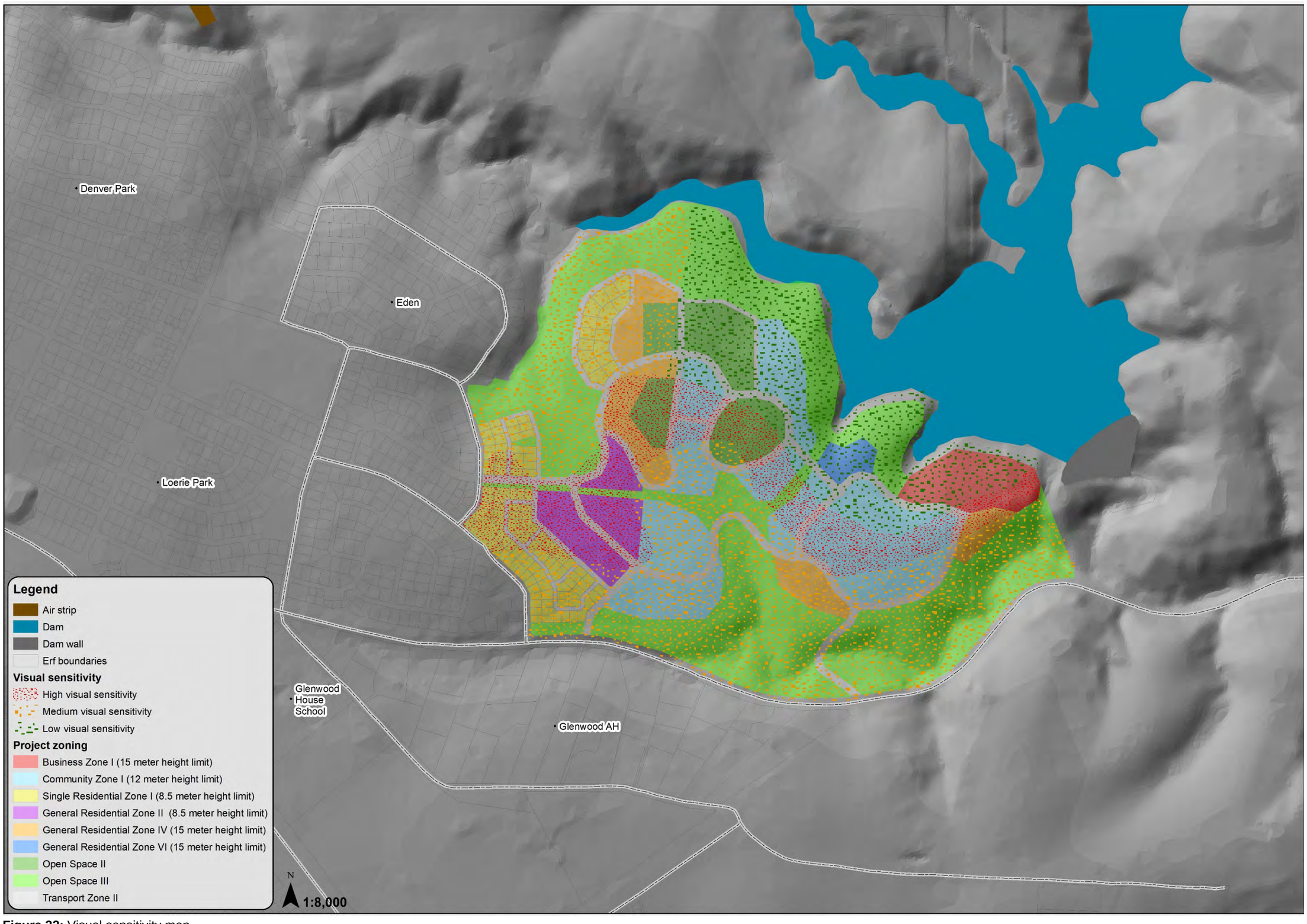

Figure 32: Visual sensitivity map

6.6 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 and on the type of vegetation 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 and vegetation
- Moderate VAC - partial screening is provided by topography and vegetation
- Low VAC - little screening is provided by topography or vegetation

The project site is located on an elevated landform and is therefore visually exposed to the surrounding area and the, therefore, has a low VAC. However, moving some the development infrastructure from the prominent ridgeline (elevated) area onto the flatter slopes or reducing building heights the combined with effective landscaping could provide some screening to the development and reducing the VAC.

The VAC of the project site is moderate to high due to the elevated landform and vegetation.

6.7 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 clearly noticeable
- Low visual intrusion – the proposed development creates minimal change or blends in well with the surroundings

The proposed development is an extension of the surrounding residential development of George (Loerie Park, Eden & Glenwood AH), and is as such compatible with the particular qualities of the area. However, because the development will be located on an elevated landform that includes a prominent ridgeline it will be clearly noticeable. The visual intrusion for the proposed development ranges from none to moderate to high where the proposed development will partially fit into its surroundings but will be clearly noticeable.

7. 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.

7.1 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 create cut and fill with slopes and would result in visual scarring of the landscape.

Operational phase:

- The site is currently undeveloped and covered in vegetation. The development would result in a change in visual character from a landscape covered in vegetation and without buildings to a built landscape.

With the exception of the dam wall and related infrastructure and a public toilet structure, there are currently no other unnatural permanent structures on the site. Temporary structures on the site include telephone poles and a small wendy-house with a boom gate, which is used to control access onto the site. In addition, temporary toilets and bins have been strategically placed on the site, in areas where the public most often partakes in recreational activities.

The project site was a former pine plantation area which has undergone substantial disturbance. The study site has been exposed to no less than three uncontrolled burns during the last 12 years and has been substantially invaded by invasive alien plants during this period. The site can, therefore, be described as a highly disturbed and formerly transformed habitat.

The proposed development would be visible from the Kaaimansgat Pass (start of the Seven Passes Road) is listed in the George Spatial Development Framework as a significant scenic route that passes south of the project site (Saasveld road & Madiba Drive). The proposed development would also be visible from sensitive receptors such as the residential areas of Glenwood AH, Loerie Park and Eden. The proposed development will require lighting which will have a visual impact at night. This will be visible to the surrounding areas and sensitive receptors in these areas.

7.2 Impact assessment criteria

7.2.1.1 The extent of the impact

The spatial or geographic area of influence of the visual impact: the extent of the impact for the prosed development is local (limited to the immediate surroundings).

7.2.1.2 Duration of the project

The predicted lifespan of the visual impact: the duration of impacts for the proposed development ranges from short term (duration of the construction phase) to permanent (time will not mitigate the visual impact).

7.2.1.3 The intensity of the impact

The magnitude of the impact on views, scenic or cultural resources (intensity of the impacts): the intensity of the impacts for the proposed development will range from medium (visual and scenic resources are affected to a limited extent) to high (scenic and cultural resources are significantly affected).

7.2.1.4 The probability of the impact

The degree of possibility of the visual impact occurring (probability of the impact occurring): the probability of the impact occurring for the proposed development ranges from highly probable (most likely that the impact will occur) to definite (the impact will occur regardless of any mitigation measures).

7.2.1.5 Reversibility

The reversibility of the proposed project is barely reversible (the impact is unlikely to be reversed even with intense mitigation measures)

7.2.1.6 Irreplaceable loss of resources

The degree to which resources will be irreplaceably lost due to the proposed development is significant.

7.2.1.7 Cumulative effect

An effect which 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. The cumulative impacts of the proposed development before mitigation is high and after mitigation medium.

7.2.1.8 Significance

The significance of impacts is determined through a synthesis of the assessment criteria. The significance of the impacts of the proposed development is high negative that will require considerable mitigation measures to achieve an acceptable level of impact.

8. VISUAL CONSTRAINTS & MITIGATION

The proposed development is located on an elevated landform (hill & ridgeline) and is therefore visually exposed to a potentially large area. The George Spatial Development Framework (GSDF) states that 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. Urban developments located on the slopes of prominent hills and located in viewing corridors with a high exposure should not degrade its aesthetic/visual value. The GSDF has identified important ridgelines and sensitive viewing corridors on the proposed development.

The GSDF also states that scenic routes such as the Seven Passes Road that is located next to the project area should be managed in such a way as not to compromise the scenic views offered from these routes. The 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

Based on the results from the policy review and the visual assessment, a visual sensitivity map was produced. 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. If buildings and structures are located within the high visual sensitive area the highest point of all infrastructure should not exceed 5.5 meters (Figure 32).

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 (medium and low visual sensitivity) 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.

8.1 Visual mitigation principles

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 to 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 applicable 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.

8.2 Visual mitigation principles

The following mitigation should be considered when constructing the proposed infrastructure for this project to reduce the visual impact.

8.2.1 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 to 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.

8.2.2 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. Such colours would include tonal variations of existing colours in the surrounding landscape. Contrasting but discordant colours that stand out in the landscape should be avoided.
- Select colours for smooth structures that are two or three shades darker than the background colours to compensate for shadow patterns created by natural textures that make colours appear darker.
- Galvanized steel on structures should be darkened to prevent glare. Low lustre paints should be used wherever possible to reduce glare.

8.2.3 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 a number of 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.

8.2.4 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.

8.2.5 Development and architectural guidelines

Development and building guidelines need to address procedural, planning and aesthetic considerations required for the successful design and development of the property and the architectural ethos of the development. The purpose of design guidelines is to protect and safeguard the environment and scenic resources and guide appropriate architectural character to protect the investment value of the development.

The guidelines should not be restrictive conditions but should promote an overall design sensitivity whilst allowing flexibility for individual expression. The buildings should aim to be as visually recessive as possible. Of importance to visual impact aspects will be height, finishes and form, with grouping of components in separate but linked forms providing a better visual impact than one larger component. Orientation, materials,

low pitch roofscape will all contribute to visual mitigation. Colours of walls should be muted earth colours excluding white, beige and cream. Roof colour should be dark grey. Windows should be recessed with overhangs to prevent reflection of the sun.

8.2.6 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 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 20years and should be monitored and revised every 5 years.
- To provide Landscape Guidelines for homeowners. Planting of lawn alone exacerbates the visibility of the units. The mix of lawn, shrubs and trees should be carefully designed with the importance of trees and large shrubs emphasized, to provide further greening of the built environment.
- To draw up a Landscape Operational Maintenance Plan for the Home Owners Association to manage the shared open spaces beyond individual erf boundaries.
- To provide guidelines on visually permeable boundary treatments, using fencing for the most part and walls at entrances only. No precast concrete walls.

8.2.7 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.

A number of 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 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 cutoff 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

8.2.8 Restoration and reclamation

Strategies for restoration and reclamation are very much 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 a separate part 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 such 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.

8.3 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 buildings design development occurs, that 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, and indigenous vegetation is, to be retained, what is to be removed, the planting of indigenous trees, new tree 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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