Cato Ridge Land Use Options Project

Landscape and Visual Impact Assessment

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Definitions

Cumulative impact	Cumulative impacts can result from individually minor but collectively significant activities taking place over a period.
Development	Any proposal that results in a change to the landscape and/ or visual environment.
Elements	Individual parts, which make up the landscape, for example trees and buildings.
Feature	Particularly prominent or eye-catching elements in the landscape such as tree clumps, church towers or wooded skylines.
Environmental Impact Assessment	A public process that is used to identify, predict, or cause the least damage to the environment at a cost acceptable to society, in the long term as well as in the short term.
Impact (Visual)	A description of the effect of an aspect of the development on a specified component of the visual, aesthetic, or scenic environment within a defined time and space.
Issue (visual)	Issues are concerns related to the proposed development on a specified component of the visual, aesthetic, or scenic environment within a defined time and space.
Level 3 assessment	Visual impact assessment report by visual specialist or competent professional/. Review by an independent, experienced visual specialist (if required). Identification of issues raised in scoping phase and site visit; Description of the receiving environment and the proposed project. Establishment of view catchment area, view corridors, viewpoints and receptors; Indication of potential visual impacts using established criteria; Inclusion of potential lighting impacts at night; Description of alternatives; mitigation measures and monitoring programmes.
Land cover	The surface cover of the land usually expressed in terms of vegetation cover or the lack of it. Related to but not the same as Land use.
Land use	What land is used for based on broad categories of functional land cover, such as urban and industrial use and the different types of agriculture and forestry.
Landform	The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation, and physical processes.
Landscape	An area, as perceived by people, the character of which is the result of the action and interaction, of natural and/ or human factors.
Landscape character	These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur, they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes.
Landscape quality	A measure of the physical state of the landscape. It may include the extent to which typical landscape character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
Landscape value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a variety of reasons.
Mitigation measures	Actions that enhance benefits of a proposed development, or avoid, mitigate, restore or compensate for negative impacts.

Proposed Development Area	The three individual areas included in the Study Area and which are the focus of the EIA.
Receptors	Individuals, groups, or communities who are subject to the visual influence of a project.
Scenic route	A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.
Sense of place	The unique quality or character of a place, whether natural, rural, or urban allocated to a place or are through cognitive experience by the user. It relates to uniqueness, distinctiveness or strong identity and is sometimes referred to as genius loci meaning "spirit of the place".
Severity	The intensity of the impact on views, scenic or cultural resources.
Significance	The significance of impacts can be determined through a synthesis of the aspects produced in terms of their nature, duration, severity, extent, and probability.
Study Area	The geographical area falling under this study. It includes areas available for development as well as areas set out for conservation and rural residential.
Viewpoint	A selected point in the landscape from which views of a project or another feature can be obtained.
View catchment area	A geographic area, usually defined by the topography, within which a particular project or other feature would generally be visible.
Viewshed	The outer boundary defining a view catchment area, usually along crests and ridgelines
Visibility	The geographic area from which the project will be visible.
Visual absorption capacity	The ability of an area to visually absorb development because of screening topography, vegetation, or structures in the landscape.
Visual character	The overall impression of a landscape created by the order of the patterns composing it; the visual elements of these patterns are the form, line, colour and texture of the landscape's components. Their interrelationships are described in terms of dominance, scale, diversity, and continuity. This characteristic is also associated with land use.
Visual exposure	The relative visibility of a project or feature in the landscape. Visual exposure is based on distance from the project to selected viewpoints. Visual exposure or visual impact tends to diminish exponentially with distance.
Visual resource	The visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features).
Landscape and Visual Impact Assessment	A Landscape and Visual Impact Assessment simulates and predicts the significance and intensity of the visual effects on the landscape.
Visual Intrusion	The level of compatibility or congruence of the project with the qualities of the area, or its sense of place. This is related to context and maintaining the integrity of the landscape or townscape.

Acronyms

ALOS	Advanced Land Observation Satellite
BLM	Bureau of Land Management
BPEO	Best Practical Environmental Option
CRDC	Cato Ridge Development Company
CSIR	Council for Scientific and Industrial Research

DEADP	Department of Environmental Affairs and Development Planning
DEM	Digital Elevation Model
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GPS	Geographical Positioning System
IDP	Integrated Development Plan
ILP	Institute for Lighting Professionals
KZN	Kwa Zulu Natal
KOPs	Key Observation Points
NATCOR	Natal Corridor
LAP	Local Area Plan
LVIA	Landscape and Visual Impact Assessment
PDA	Proposed Development Area
SACLAP	South African Council for the Landscape Architectural Profession
SANBI	South African National Botanical Institute
SANLC	South African National Land-Cover
SEA	Strategic Environmental Assessment
VAC	Visual Absorption Capacity
ZII	Zone of Theoretical Influence
ZIV	Zone of Theoretical Visibility
ZVI	Zone of Visual Influence

Abbreviations

3D	Three dimensional
DC	Distribution Centre
ha	Hectare
Ltd.	Limited
m	Meter
mm	Millimetre
km	Kilometre
amsl	Above mean sea level
LA	Landscape Architect
ML	Megalitre
uPVC	Unplasticized polyvinyl chloride,
°C	Degree Celsius

Document Structure

The specialist study will be undertaken in compliance with Appendix 6 of GN 982 of 4 December 2014, as amended by Appendix 6 of GN 326 of 7 April 2017. **Table 1** indicates how Appendix 6 has been fulfilled in this report.

Table 1: Indication of compliance with Appendix 6 of 2014 EIA Regulations, as amended

NEMA Regulations (2017) Appendix 6	Relevant sections
(1) A specialist report prepared in terms of these Regulations must contain -	
(a) details of -	
(i) the specialist who prepared the report; and	Appendix C
(ii) the expertise of that specialist to compile a specialist report, including a curriculum vitae;	Appendix C
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix D
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.3 and 1.4
(cA) an indication of the quality and age of base data used for the specialist report;	Section 4.2
(cB) a description of existing impacts on site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7 (7.2.3)
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 4.2.2
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 4 and Appendix B
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying alternative;	Section 6
(g) an identification of any areas to be avoided, including buffers;	This has been identified during SEA phase and outlined in Figure 3.
(h) a map superimposing the activity, including the associated structures and infrastructure on the environmental sensitivities of the site, including areas to be avoided, including buffers;	Figure 3, includes conservation and restricted areas
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment or activities;	Section 7
(k) any mitigation measures for inclusion in the EMPr;	Section 7
(l) any conditions for inclusion in the environmental authorisation;	Section 8
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7.3
(n) a reasoned opinion -	
(i) as to whether the proposed activity, activities or portions thereof should be authorised;	Section 8
(iA) regarding the acceptability of the proposed activity or activities; and	Section 8

(ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr.	Section 7
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report	N/A
(p) a summary and copies, if any, comments received during any consultation process and, where applicable all responses thereto; and	N/A
(q) any other information requested by the competent authority.	No other information requested

1. Introduction

1.1 PROJECT BACKGROUND

Assmang (Pty) Ltd and the Cato Ridge Development Company Ltd. (CRDC) is investigating making land available to stimulate economic opportunities across the wider community of Cato Ridge. This proposed land development area is located within the eThekwini Metropolitan Municipality, KwaZulu Natal.

The total project study area is 1263.48 and the development footprint has been revised down from the original 609.46 ha to 353.3 ha, as per the latest layout indicated in Figure 3.

Zutari undertook a Pre-Feasibility Study (PFS) in 2020 to determine the developability of the land, designed a phased layout, determined the financial viability, refined potential layout options, and identified potential no-go options. Assmang and the CRDC do not intend to develop the land themselves, but rather, to make land strategically available for sale to third parties, who will remain responsible for development authorisations.

1.2 LOCATION

The project is located in Cato Ridge near the western boundary of the eThekwini Metropolitan Municipality, KwaZulu Natal and is situated to the north of the N3 highway. Cato Ridge is located approximately 51 km west of Durban via the N3 and 29 km southeast of Pietermaritzburg. The R103, which acts as an alternative route between Durban and Pietermaritzburg (Refer to Figure 1), bisects the Study Area. A central railway line, the Natal Corridor (Natcor), also divides the area and provides general accessibility to the informal and agricultural areas in the north and south. Figure 2 indicates the three Phase/PDAs.

Assmang and its subsidiary company, Cato Ridge Development Company (CRDC) have an operational manganese smelter (Cato Ridge Works) to the west of the Study Area. Immediately north of the Study Area, there is the KwaXimba settlement and 3 km east of the Study Area lies the Inchanga settlement. Camperdown agricultural areas are found in the south. Hibiscus Hospital and Cato Ridge Country Club are located approximately 2.1 km southwest of the Study Area. Eskom Cato Ridge Training Centre, Cato Zulu Industrial Park, Metallica Chemicals (Pty) Ltd as well as Value Logistics Cato Ridge are located in the southern vicinity of the Study Area. Further north, Frey's Food Brand (Pty) Ltd and Cobro Concrete (Pty) Ltd are situated along Eddie Hagen Drive, approximately 1 km northeast of the Study Area. Makro Distribution Centre (DC) and SMD Durban (used car dealer) are situated in the northeastern portion of the Study Area. The Study Area of 789.02 hectares will be investigated as part of this Environmental Impact Assessment (EIA) process, refer to Figure 1. The proposed development footprint identified is approximately 609.46 ha. and will be spread across three Development Areas, as illustrated in Figure 2.

1.2.1 PHASE 3 / PDA 1

Phase 3 or Proposed Development Area 1 (PDA1) is located on a section of land directly north of the N3 and between the N3 and the R103 Road.

1.2.2 PHASE 1 / PDA 2

Phase 1 or Proposed Development Area 2 (PDA2) is located north and west of the R103 Road/Eddie Hagen Drive, east of the D1022 Road and south of the existing Makro DC.

1.2.3 PHASE 2 / PDA 3

Phase 2 or Proposed Development Area 3 (PDA3) is located north of Phase 1 (PDA2) and the existing Assmang manganese smelter (Assmang Cato Ridge Works) and includes the parcel of land up to an informal road on the northern boundary of the escarpment.

1.3 PURPOSE OF THE REPORT

The proposed project triggers several listed activities in terms of the 2014 EIA Regulations, as amended, and an EIA process is required. Based on the results of the web-based national screening tool, accessed by Zutari, a Landscape and Visual Impact Assessment (LVIA) is required to support the EIA process ad decision-making.

During the screening phase of the project, it was reported that:

- "*Consideration must be made during the planning processes to minimise potential adverse impacts of proposed development on the visual character and views within the Study Area. People in the area may value the undeveloped (green land) within an urban environment which are already highly disturbed. Any change to this landscape may adversely affect views and thus perceptions of the landscape for these viewers*" (SRK 2011) and;
- The potential visual impact, especially along the N3, should be further investigated.

Site-specific development plans are not yet available, and this report relates to the proposed general land uses, the purpose of this report is:

- To establish the Zone of Theoretical Visibility (ZTV) for the three different Phase/PDAs;
- To establish the landscape baseline of the Study Area in terms of physical influences, land cover, the influence of human activity, aesthetic, and perceptual aspects as well as an overall sense of place and landscape value;
- To establish the visual baseline in terms of the areas in which the project will be visible, the different groups of people (visual receptors) who may experience views of the proposed development, the places where they will be affected identified as Key Observation Points (KOPs), the nature of the views and the visual amenity at these places;
- To assess the landscape impacts (effects) which deals with the effects of change and development on the landscape as a resource by means of:
  - Identifying components (individual elements or key features) of the landscape that are likely to be affected by the proposed development;
  - Identifying interactions between the landscape receptors and the different components of the development during all the different project stages;
- Assess the visual effects which deals with the effects of change and development on the views available to people and their visual amenity;
- Assess the cumulative landscape and visual effects; and
- Propose mitigation measures to minimise any potential landscape and visual impacts during the planning, construction, operational and decommissioning phase, as applicable to the proposed project.

1.4 SCOPE OF WORK

The scope of work includes the following:

- A literature review and desktop investigation to collate relevant information;
- Undertake a site visit (including a photographic survey from key viewpoints within the Study Area to determine the setting, visual character, land uses and the Genius Loci (sense of place);
- Compile a baseline description. (Determine the current conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured);
- Compile a visual baseline (Undertake data preparation and visibility analysis, which includes the calculation of viewsheds for the 3 Phase/PDAs);
- Identify KOPs and the distance from the impact and sensitive visual receptors;
- Identify and assess the potential direct, indirect and cumulative landscape and visual impacts on the landscape and sensitive viewers/receptors for the construction and operation phases of the proposed project (both negative and positive);
- Study the cumulative impacts of the project by considering the impacts of existing industries/mines/agricultural practices within the area, together with the impact of the proposed project; and
- Provide input to the Environmental Management Programme (EMPr), including mitigation and monitoring requirements to ensure that the negative visual impacts are avoided, reduced, or mitigated and the positive visual impacts are enhanced.

1.5 DEVELOPMENT CATEGORY AND LEVEL OF ASSESSMENT

In terms of the Guideline for Involving Visual and Aesthetic Specialists on EIA Processes (Oberholzer, B. 2005) the depth and scope of an LVIA should be based on a combination of the sensitivity of the existing environment (from the most visually sensitive to the least sensitive) and the nature of the development (from the least intensive to the most intensive). The type of environment and type of development are both divided into five categories, which are indicated in a matrix.

Through the application of the LVIA methods of assessment and as presented in Appendix A, the proposed project is defined as a Category 4 development, which includes light industry. The type of environment includes areas of low to medium scenic quality (confirmed during the site visit) and medium - high cultural, or historical significance (maps indicating the heritage significance are also included in Appendix A). According to Oberholzer (2005), a moderate - high visual impact is therefore expected, with potential intrusion on views from rural areas which may potentially lead to a change in the scenic resources and visual character of the area. In line with the above, a Level 3 Assessment is therefore required.

Typically, a Level 3 Assessment includes:

- Identification of issues raised in scoping phase (if applicable);
- Description of the receiving environment and the proposed project;
- Establishment of the view catchment area, view corridors, viewpoints and receptors;
- Indication of potential landscape and visual impacts using established criteria;
- Inclusion of potential lighting impacts at night;
- Description of alternatives (where applicable), mitigation measures and monitoring programmes.

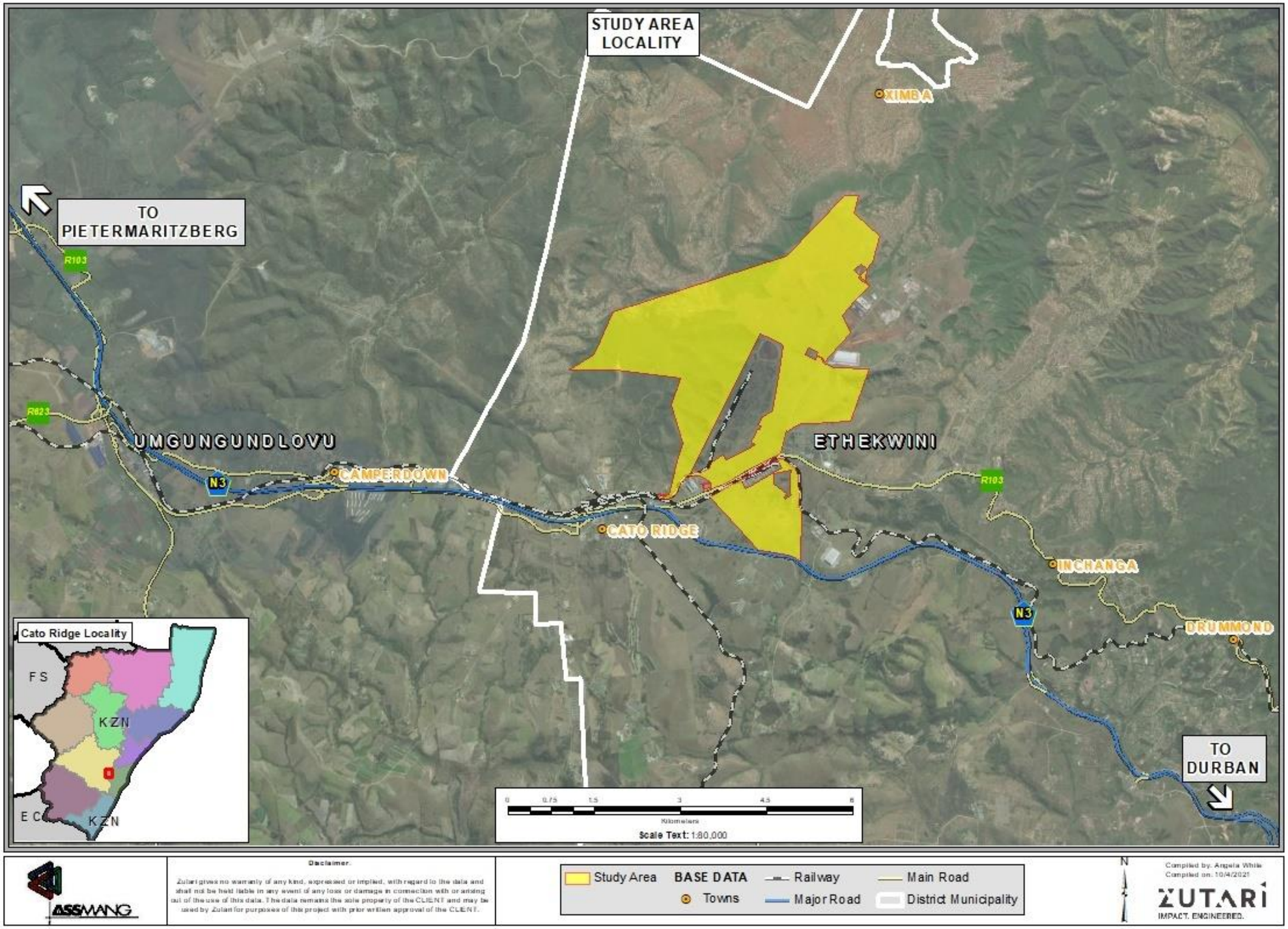

Figure 1: Locality map

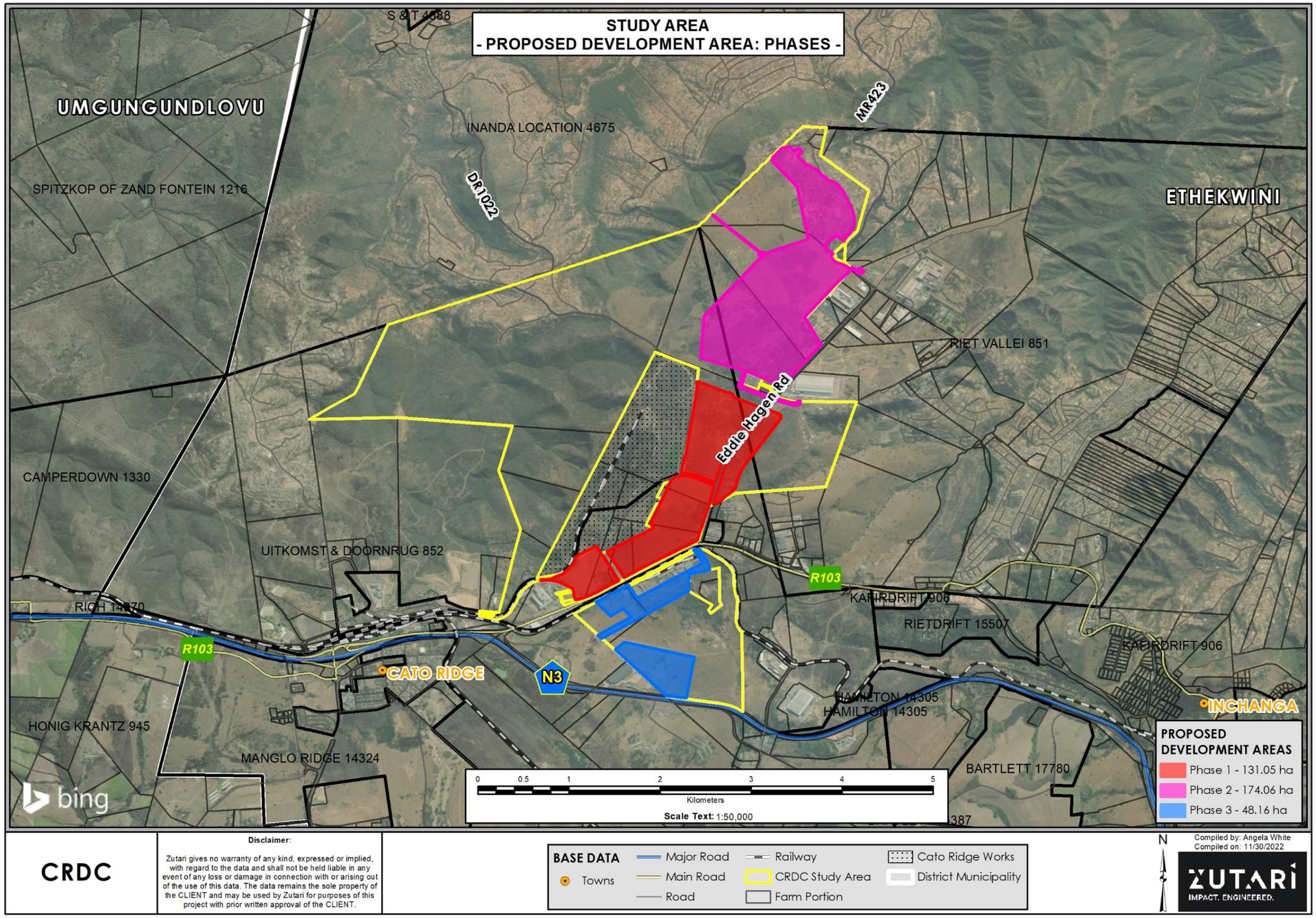

Figure 2: Phase / PDAs

2. Assumptions and limitations

- Determining a visual resource in absolute terms is not achievable. It is a complex procedure since it is determined through a combination of quantitative (visibility) and qualitative (aesthetic value) criteria. Therefore, a visual assessment cannot be entirely objective in this sense. Individuals will evaluate a landscape differently, based on experience, cultural, and social background;
- Various factors can enhance or reduce the visual impact of the proposed project, for instance, vegetation near a receptor's view of the proposed project. Other factors include weather, climatic conditions, and seasonal change. Therefore, it is difficult to determine the visual impact of the proposed project from the viewpoint of each receptor;
- No specific national legislation for visual assessments currently exist in South Africa. However, the assessment of visual impacts is required by implication when the provisions of relevant acts governing environmental management are considered and when certain characteristics of either the receiving environment or the proposed project indicate that visibility and aesthetics are likely to be significant issues and that visual input is required (Oberholzer, 2005);
- At the time of writing this report, no overhead power distribution lines are proposed as part of this development;
- The layouts, locations and technical specifications provided by Zutari are assumed to be correct;
- Both the viewshed and site survey assumed that the visual receptor's eye height is between 1.5 m-1.7 m above ground level, based on the average heights for men and women;
- The viewsheds resulting from the Digital Elevation Model (DEM) and as illustrated in this report, indicate the areas from which the proposed project is likely to be visible and do not take local vegetation cover (landcover) and anthropogenic structures into account as these factors are too variable. Potential sensitive receptor points have therefore been ground-truthed during the site assessment;
- Where slight differences are probable, certain landscape and visual baseline conditions will be assessed according to the specific Phase/PDA;
- The cumulative impacts apply to the broader Cato Ridge Local Area Plan (LAP) which extends approximately 14 km further north of the Phase 2 (PDA3). Reference can be made to Figure 31;
- The LVIA is based on a worst-case scenario that considers maximum infrastructure height of 30m (proposed container storage areas will not exceed a stack height of more than 10) as indicated in Section 5 and assumes the total development footprint will be fully developed.

3. Applicable legislation

3.1 POLICIES AND PLANS

Several policies and plans that apply to the site and development have been reviewed. These include:

- eThekwini Integrated Development Plan (2019/2020)
- Durban Strategic Environmental Assessment (SEA) (2020)
- Cato Ridge Local Area Plan (2018)

3.1.1 MUNICIPAL LEVEL

eThekwini Integrated Development Plan

The eThekwini Integrated Development Plan (IDP) recognizes that Cato Ridge is of a significant scale to assist in delivering on the strategic objectives of the Municipality.

Its objectives include:

- Develop and Sustain the Spatial, Natural and Built Environment;
- Prosperous, Diverse Economy and Employment Creation;
- Creating a Quality Living Environment;
- Fostering a Socially Equitable Environment;
- Supporting Organisation Design, Human Capital Development and Management;
- A Vibrant and Creative City – The Foundation for Sustainability and Social Cohesion;
- Good Governance and Responsive Local Government; and
- Financially Accountable and Sustainable City.

Durban Strategic Environmental Assessment (2020)

A Strategic Environmental Assessment (SEA) is a widely used tool for proactively integrating environmental sustainability issues into the formulation of policies, plans and programmes. This is achieved through an assessment of the implications of strategic plans, programmes, policies and decisions for the environment (both positive and negative), and in turn on social well-being and economic prosperity, which rely on well-functioning natural systems and the ecosystem services they generate.

The Durban SEA makes provision for:

- Economic development as this is seen as a priority for the city to create jobs and income opportunities. The major economic pillars for Durban are currently logistics (related to the economic opportunities associated with the Durban Port and transport corridors), tourism and manufacturing, with the agriculture sector also playing a significant, but, in some cases, declining role. In addition, there is a growing focus on regeneration (for example in the inner city) and the revitalisation of existing industrial areas to maximise productivity and economic growth opportunities.

Its objectives include:

- The protection, maintenance and reducing further loss of Durban's natural asset base;
- Reverse the declining trends in environmental quality;
- Reversing and slowing the environmental state and associated pressures;
- Recognition, protection, and maintenance of the City's natural assets;

The Durban SEA recognizes that:

- Economic development has a range of potential environmental impacts and a key challenge moving forward is therefore to find ways to reduce the environmental impact of these activities and developments, for example, through optimising the location, improving the efficiencies, and minimising impacts of economic activities. Resources are also needed to explore the feasibility of harnessing a range of green and circular economy opportunities for Durban in a more concerted way so that the city remains competitive at the global level and an attractive investment destination;
- There is a significant housing backlog of over 390 000 dwellings, with an estimated timeframe in excess of 60 years to address this based on current funding levels;
- Human wellbeing and economic activity will increasingly be influenced by declining environmental quality and climate-related disasters; and
- Responses are not keeping pace with the need, but there are opportunities to do things differently.

Cato Ridge Local Area Plan (2018)

The Cato Ridge Local Area Plan (LAP) recognizes that:

- *"Cato Ridge needs to be established as a regional logistics hub and industrial production node which complements existing industrial zones of the City and provides for expansion of industry and enhancement of the City's logistics platform. The zones immediately adjacent to the N3 will provide opportunities for logistics and industrial activity growth and development";*
- The infrastructure of the industrial zone requires upgrading to accommodate for growth and new industry;
- The residential area requires upgrading to provide attractive housing for workers and investors;
- Land uses of the area need to diversify and increase;
- Residential expansion needs to be accommodated within the Cato Ridge village functional area plan;
- General industry is expanding to the north of the N3;
- Suitable land use south of the N3 includes education, residential, commercial (along major routes), public open space and a business park.

3.1.2 GUIDELINE DOCUMENTS

Guideline for Visual and Aesthetic Specialists in EIA processes

This guideline was coordinated by the Council for Scientific and Industrial Research (CSIR), compiled by Bernard Oberholzer Landscape Architects in 2005 and issued by the Provincial Government of the Western Cape under the Department of Environmental Affairs and Development Planning (DEADP). The purpose of this guideline was to provide decision-makers with adequate and appropriate information about the potential positive and negative visual and aesthetic impacts of proposed development and any associated management actions in order to make an informed decision on whether or not to approve, proceed with or finance the development.

Visual, scenic and cultural components of the environment can be seen as a resource which have value for inhabitants and the regional economy. Visual and scenic resources are often difficult to assess as they have cultural or symbolic meaning, therefore, LVIA's are to be performed in a logical, holistic, transparent, and consistent manner. Oberholzer (2005) identifies the following concepts to form an integral part of the LVIA process:

- Visual resources include the visual, aesthetic, cultural and spiritual aspects of the environment, which contribute toward and define an area's sense of place;
- Natural and cultural landscapes are inter - connected and must be considered as such;
- All scenic resources, protected areas, and sites of special interest within a region need to be identified and considered as part of the LVIA;
- All landscape processes such as topography, vegetation, and settlement patterns that characterise the landscape must be considered;
- Both quantitative criteria, such as 'visibility' and qualitative criteria, such as aesthetic value or sense of place, must be included as part of the study;
- LVIA's must inform the EIA process in terms of visual inputs; and
- Public involvement must form part of the process.

The guideline furthermore recommends that the LVIA process identifies the Best Practicable Environmental Option (BPEO) based on the following criteria:

- Long term protection of important scenic resources and heritage sites;
- Minimisation of visual intrusion on scenic resources;
- Retention of wilderness or special areas intact as far as possible; and
- Responsiveness to the area's uniqueness, or sense of place.

International guidelines

Other international guideline documents include:

- Guidelines for Landscape and Visual Impact Assessment (LVIA) compiled by the Landscape Institute and the Institute of Environmental Management and Assessment (IEMA, 2013) which outline the best practice in landscape and visual impact assessment – this is used as a key guideline for LVIA in the United Kingdom;

- Visual Resource Management Method. The Visual Resource Management System (VRM) is a system that was developed by the US Department of The Interior Bureau of Land Management. This system recognises that landscapes (urban as well as rural) have a variety of visual values. These different values warrant different levels of management, and it is, therefore, necessary to systematically identify and evaluate these values.

4. Methodology

4.1 IMPACT ASSESSMENT MEIHODOLOGY

To allow for sufficient consideration, impacts were assessed using the standard Zutari rating system, which is a common, defensible method of assessing significance that will enable comparisons to be made between risks/impacts and will enable authorities, stakeholders, and the client to understand the process and rationale upon which risks/impacts have been assessed. The impact assessment method is provided in Appendix B.

4.2 LANDSCAPE AND VISUAL ASSESSMENT MEIHODOLOGY

4.2.1 DESKTOP STUDY

The desktop investigation served as a planning basis for the site visit by identifying preliminary areas of importance (focus areas) in terms of potential landscape and visual impacts. The current context was understood prior to conducting the site visit, which involved a study of the existing environment in terms of topography and land cover. Other relevant documents such as the 2019-2020 eThekwini Integrated Development Plan (IDP), the 2018 Cato Ridge LAP and the 2020 Durban SEA Baseline Assessment, the Vegetation Assessment for Assmang Landholdings (Styles, D, 2020) and the Draft Environmental Screening Report (Zutari, 2020) were also consulted. These resources, together with the various viewshed analyses (the outer boundary showing the view catchment) formed the basis for the site visit. Potential sensitive receptors (mostly associated with towns, roads and villages) were identified and mapped.

The terrain information was derived from the Advanced Land Observation Satellite (ALOS) 30 m data which became available to the general public in 2015/16. The base topographic data is from MapIT South Africa, 2015. Both these data sets are of very good quality. The desktop study included a study of the existing environment in terms of topography and land cover data information from the South African National Land-Cover (SANLC) 2018 raster dataset is based primarily on the newly gazetted land-cover classification standard (SANS 19144-2) with 73 classes of information and is available on an open license agreement. It is of excellent quality.

4.2.2 SITE VISIT

A site visit was undertaken on the 9th of November 2021. The study included a drive around the surrounds to determine the visual context within which the proposed land uses, and infrastructure is to be developed. Areas of potential important observation points were assessed and recorded by making use of Global Positioning System (GPS) to confirm these aesthetically sensitive viewpoints and potential sensitive receptors. High resolution, geo-referenced photos was taken from KOPs within the study area towards the proposed infrastructure. Other photos, which represent the unique sense of place, land use and specific landscape character types were also be captured during the site visit. The site visit was during the rainy season with heavy cloud cover. Natural vegetation was lush and green and could

provide more natural screening compared to winter months, however, due to the sub-tropical climate the variation in landscape colours and vegetation density throughout the year is not expected to be significant. Based on a visual perspective, seasonal variation will not influence the outcome of the report as there is no seasonal preference for carrying out a site visit in the given context.

4.2.3 BASELINE PHASE

Establishing the landscape baseline

The landscape baseline aims to provide an understanding of the landscape that may be affected and is established through a desktop study and a site visit (as indicated in sections 4.2.1 and 4.2.2) which identifies and records the character of the landscape, the elements, features, aesthetic, and perceptual factors as well as the value attached to it. The landscape baseline will be established through the landscape character, landscape value, landscape quality, Visual Absorption Capacity (VAC), visual intrusion, and sense of place.

Landscape character

The landscape character is made up of the following natural and man-made attributes:

- Physical influences: Geology, soils, landform, drainage lines and waterbodies;
- Land cover: Different types of vegetation patterns and vegetation/tree cover;
- Influence of human activity: Land use management, the character of settlement, building types and pattern, open fields, and enclosure;
- Aesthetic and perceptual aspects of the landscape: Scale, complexity, openness, tranquillity, and wilderness; and
- Overall sense of place.

Landscape value

A value to the potentially affected landscape will be established, and information that will contribute to the value might include:

- National parks;
- Areas of outstanding scenic beauty;
- Conservation areas; and
- Historical or cultural heritage sites (refer to Figure A 1 - Figure A 3 included in Appendix A)

VAC and visual intrusion

VAC is an indication of the ability of the landscape to visually conceal the proposed development. Areas with high VAC can accommodate and absorb physical changes in the landscape without transforming its visual character and quality, while a low VAC rating implies a low ability to absorb or conceal visual impacts. The factors that contribute to the VAC factor includes topographical diversity, vegetation, soil contrast, visual pattern, and recovery time.

The degree of visual intrusion is closely related to the VAC and maintaining the integrity of the landscape and essentially rates the degree of contrast between the appearance of the proposed development and the existing environment. The higher the landscape quality and the more consistent the visual context, the more likely the impact will be intrusive.

Landscape quality

Landscape quality is based on human perceptions and expectations in the context of the existing environment. A landscape's visual quality is, therefore, a factor of an observer's emotional response to physical landscape characteristics and therefore assigning values to

visual resources is a subjective process. The landscape's scenic quality can be evaluated based on a combination of the landscape's intrinsic physical properties, consisting of the landform, vegetation, water, colour, adjacent scenery, scarcity and cultural or man-made modifications.

Landscape quality increases with the presence of water, topographic ruggedness and where diverse patterns of vegetation occur. Areas that contain more natural features or harmonious man-made compositions will have a more favourable landscape quality than areas with non-harmonious human activity.

Sense of place

Sense of Place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or viewer. It is created by the land use, character, and quality of a landscape, as well as by the tangible and intangible value assigned thereto.

The landscape baseline is communicated through means of:

- Maps, photos, and text, at an appropriate level of detail, divided into landscape character types or areas, as appropriate;
- Identification and description of the individual elements and aesthetic and perceptual aspects of the landscape; and
- Identification of the condition of the landscape.

Establishing the visual baseline

The aim of the visual baseline is to establish the area in which the development may be visible, the different groups of people who may experience views of the proposed development, the places where they will be affected, the nature of the views and the visual amenity at these points. The visual baseline will be established by identifying the visibility and visual exposure, the visual receptors and the KOPs.

Visibility and visual exposure

Visibility refers to the geographic area from which the proposed project would potentially be visible. Visibility is a function of the line of sight and forms the basis of the LVIA as only visible structures will influence the visual character of the area. Visibility is determined by conducting a viewshed analysis which calculates the geographical locations from where the proposed infrastructure might be visible.

Visual exposure of the proposed project/infrastructure is based on the distance from the proposed source of impact and usually fades out beyond 7 km (assuming the landscape is horizontal with little topographic variances). The visibility of an object decreases exponentially over distance and accordingly visual impact will diminish as the viewer moves away from the object being viewed. It is also important to note that the actual zone of visual influence (ZVI) of the proposed project may be smaller than indicated because of screening by existing vegetation and infrastructure.

Viewshed analyses

The viewshed analyses (the area in which the proposed infrastructure will be visible) was conducted at the outset of the project. Elevation data was to create a Digital Terrain Model (DTM) of the study area to create intervisibility between points and along lines radiating out from the infrastructure location/s and to construct a map showing the area from which the proposed infrastructure may theoretically be visible (ZTV). The viewshed analysis consists of a combination of the results of two spatial analysis tools. Both outputs are single-band raster datasets that are merged mathematically to form a single dataset that represents visual sensitivity. Firstly, a visibility analysis effectively indicates how natural topography will obscure

the line of sight to the feature from anywhere on the surrounding landscape. This analysis includes the average height of the observer above ground level, curvature of the earth, and typical atmospheric refractivity, but does not include transient obstructions such as seasonal vegetation, weather phenomenon, or man-made structures. Secondly, a proximity analysis is done from the feature in question and extending as far as is required for the analysis. A proximity analysis is necessary to indicate how the visibility of a feature will decrease logarithmically with increasing distance. Finally, the visibility analysis is mathematically merged with the proximity analysis to form one spatial dataset that gives a good idea of the degree of impact of the analysed feature to an observer placed anywhere on the landscape. High values tend to indicate both high visibility and close proximity, whereas low values tend to indicate limited visibility and distant proximity. Values of zero indicate no impact, which can be either due to no line of sight or a proximity distant enough to be considered negligible. Typical tasks for a viewshed analysis involve:

- Acquiring and processing layout data from the client (conversions and reprojections as necessary);
- Sourcing best available contour data or DEM raster (available from the Surveyor General)
- Clipping contours or DEM to 20 km radius from the proposed project boundary;
- Building a maximum resolution 3D terrain model from contours;
- Adding viewshed attributes to all infrastructure elements and run viewshed analysis;
- Generating proximity analysis;
- Merging viewshed and proximity analyses using raster maths;
- Adding further environmental raster layers (if necessary) with weighted average; and
- Producing a map of the resulting combined analysis.

Visual receptors

Receptors for visual impacts are potential viewers of the proposed development and receptor sensitivity refers to the degree that a development affects people. The perception of viewers is difficult to determine as there are many variables to consider such as:

- Familiarity with the actual scene;
- The location and context of the viewpoint;
- Circumstances that bring them into contact with that view (occupation or activity of the receptor) and;
- Nature and importance of the view (full or glimpsed, near or distant).

KOPs

KOPs will be identified based on prominent viewpoints where views towards the proposed project and associated infrastructure are uninterrupted as well as at points where positive viewshed areas intersect with potential receptors. The KOPs will be selected within a 7 km radius of the specific project components, and the following factors will also be considered:

- Accessibility to the public;
- The potential number and sensitivity of receptors who may be affected;
- The viewing direction and distance;
- Nature of the viewing experience; and
- View type.

The KOP analyses will be conducted by investigating the visual influence of the proposed infrastructure as per the available layout and information provided.

4.2.4 ASSESSMENT PHASE

Assessment of landscape impacts

An assessment of landscape effects deals with the effects of change and development on the landscape as a resource. The study area will be considered and includes the project boundary and the full extent of the wider landscape around it, which the proposed development will influence in a significant manner. This will be based on the maximum extent of the area from which the development is potentially visible, defined as the ZTV as described earlier.

Predicting landscape impacts (effects)

Once the baseline information is established. this can be combined with an understanding of the details of the proposed development to identify and describe landscape impacts (effects). The initial step will be to:

- Identify the components (individual elements or key features) of the landscape that are likely to be affected by the proposed land use options (landscape receptors).

The second step will be to:

- Identify interactions between the landscape receptors and the different components of the development during all the different project stages; and
- Assess direct and cumulative impacts (effects).

Assessing landscape impacts (effects)

The identified landscape impacts (effects) will be assessed to determine their significance.

Assessment will be based on:

- Sensitivity of landscape receptors (determined through the VAC and overall susceptibility to the type of change);
- Value of the landscape receptor (landscape character type/s and individual elements and features contributing to landscape character); and
- Severity (intensity) of landscape impacts (effects) related to size, scale, geographic extent, duration, and reversibility.

Assessment of visual impacts

The assessment of visual impacts (effects) deals with the effects of change and development on the views available to people and their visual amenity.

Predicting visual impacts (effects)

Likely impacts (effects) on potential visual receptors will be identified, to determine these impacts, the following will be considered:

- The nature of the view (full or partial);
- The proportion of the infrastructure which will be visible;
- The distance of the viewpoint to the proposed development; and
- Whether the view is stationary or transient

Assessing visual impacts (effects)

The identified visual impacts (effects) will be assessed to determine their significance. The assessment will be based on:

- The sensitivity of visual receptors (susceptibility of visual receptors to change, mainly based on the occupation or activity at a specific viewpoint and the extent to which their attention may be focused on the view);
- Value attached to the views; and

- Severity (intensity) of the visual effects related to size/scale, geographical extent, duration, and reversibility of visual effects.

Assessing cumulative landscape and visual impacts

Cumulative landscape effects can impact either the physical fabric or character of the landscape. Cumulative visual impacts can be caused by combined visibility which occurs where the receptor can see two or more developments from one viewpoint and/or sequential effects which occur when the receptor must move to another viewpoint to see different developments. Types of cumulative landscape and visual effects includes:

- Extension to an existing development;
- Filling of an area with similar types of development;
- Interactions with different types of development;
- Incremental change because of successive individual developments; and
- Landscape and visual impacts (effects) resulting from future actions;

The visual benefits or drawbacks of potential increased tourism as a result of change to the scenic environment will also be considered.

Mitigation of landscape and visual impacts

General forms of visual mitigation include:

- Prevention/avoidance;
- Reduction by means of:
  - Adjustment of site levels;
  - Use of appropriate form, detail design, materials and finishes where it is not desirable or practical to screen;
- Alterations to landform together with structured planting;
- Avoiding or reducing obtrusive lighting, consideration will be given to different ways of minimising light pollution; and
- Offset, remedy, or compensate.

5. Proposed Development

5.1 PROPOSED LAND USES

Based on the PFS, light industry[1], general industry[2], warehousing, and logistics land uses proved to be viable land use options from a market perspective. The project boundary covers a total area of 1263.48 ha, with 1257.74 ha. identified for future land uses.

Figure 3 below illustrates the proposed project layout which constitutes a combination of land use development options, which will comprise of the following land use activities:

- Light industry/General industry/Warehousing/Logistics;
- The proposed internal roads networks and reserves, including bulk service infrastructure (water, electrical and sewage);
- Rural residential Informal settlements have encroached and therefore these areas have been designated as such, for purposes of this project. Due to the encroachment, these areas have been excluded from any future development proposal associated with light/ general industry or logistics.;
- Existing electrical servitudes/ RoW and;
- Conservation areas.

[1] In terms of eThekwini Town Planning Regulations, use zones for the light Industry, include light industrial and service industrial. Light Industry also comprises of the following special consent: Institution, Offices, Parking Garage, Petrol Service Station, Shop in terms of clause 6(31), Restaurant, Totalisator Depot, Special Building or use, any other use authorised in terms of clause 6.

[2] In accordance with eThekwini Town Planning Regulations, use zones for the General Industry. Industrial purposes other than Extractive or Noxious are permitted. General Industry special consent are Institution, Offices, Parking Garage, Petrol Service Station, Shop in terms of clause 6(31), Restaurant, Totalisator Depot, Special Building or use, any other use authorised in terms of clause 6.

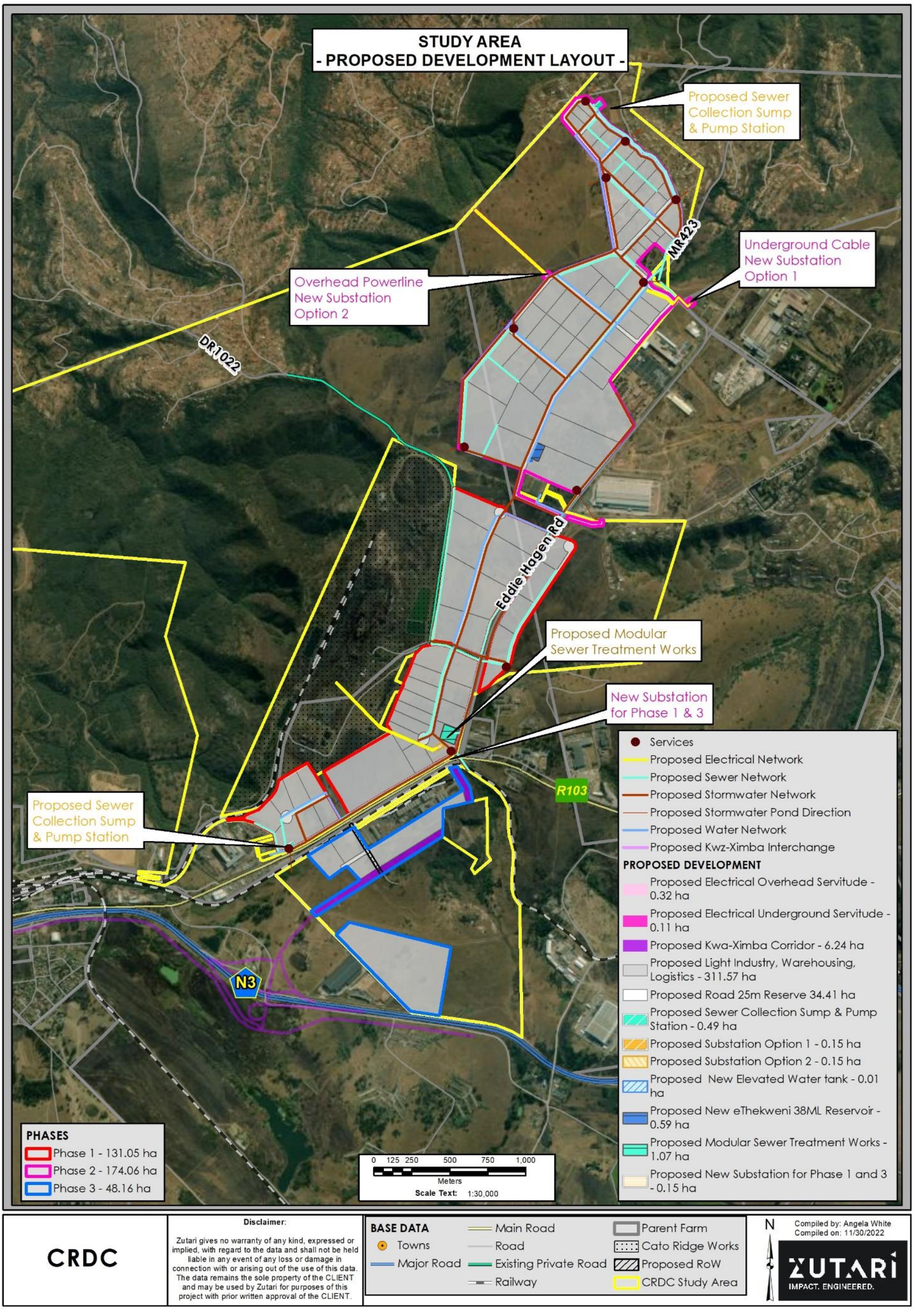

Figure 3: Proposed development

5.2 INFRASTRUCTURE REQUIREMENTS PER ERF

The site-specific infrastructure will be determined once the sale/lease of the property is finalised with future developers or investors. This will depend on the timing of the development, proposed land use and the proposals from the developer. **Table 2** and **Table 3** below is a typical indication of the type of activities and infrastructure during the different phases of the project/s.

Table 2 : Infrastructure requirements per erf (Construction phase)

Infrastructure	Requirements
Construction camps	Ablution facilities, vehicle park areas, yellow machine park areas (where required), storage areas, wash bays and oil separators.
Laydown areas	House kitchens, site offices, vehicle park areas, storage areas and ablution facilities
Stormwater diversion measures	

Table 3: Infrastructure requirements per erf (Operation phase)

Infrastructure	Requirements
Light and general industry	Supporting infrastructure such as offices, parking lots, paved areas, access roads, container storage areas and access-controlled areas. All these areas will vary in dimensions and sizes dependent on the proposal requirements of the developer/investor. The administrative building will be restricted to a six-storey building (18m). The proposed container storage areas will not exceed a stack height of more than 10 (which is an approximate maximum height of 30 m).
Warehousing facilities	Warehouses will typically be 15-18m in height.
Additional bulk infrastructure	• Internal roads (northern region) 7 m wide; • Stormwater management will be site-specific based on the final requirements of future developers; • Water infrastructure facilities, pipes and pump stations will connect to the existing water network; • Bulk sewerage infrastructure will need to be upgraded over the development horizon. A sewer reticulation network will extend across the development to ensure each site can be adequately serviced. A 2ML modular Waste Water Plant will be constructed for Phase 1 and by Phase 2 (PDA3) the entire precinct should connect with the planned sewer upgrade.

Infrastructure	Requirements
	• Existing infrastructure would be sufficient to meet the demand requirements for the full development activities. To satisfy the demand of the proposed development options, underground distribution lines, mini sub-stations and connection points will be developed for each erf.

5.3 REGIONAL INFRASTRUCTURE REQUIREMENTS

Regional infrastructure refers to bulk services that will support the full development across the entire Study Area. This includes electrical network, water infrastructure, sewerage infrastructure, stormwater drainage system and road upgrades. To respond to the future demands, the following infrastructure will be required to unlock the full development potential for the Study Area.

Table 4: Regional infrastructure requirements

Infrastructure	Requirements
Water supply	• One ground reservoir, with storage capacities of 38 ML and footprints of roughly 50 m x 50 m. It is estimated that the reservoir will have a maximum height of 10m; • One 500 kℓ elevated water tower (maximum height of 25 m and a total footprint of 10 m²) to provide sufficient water pressure for domestic usage and firefighting; and • 200 mm diameter mPVC/ uPVC water distribution lines, within the proposed road reserves of the internal road network.
Sewerage	• Internal sewer reticulation network for a gravity sewer line, which will extend within the road reserve of the proposed internal road network; and *The construction process for this infrastructure will include site clearance to accommodate the proposed structures, excavation work, finishing and installation of bedding. At a site level, sewers, manholes, erf/service connections and sewer ancillaries will be required for each erf.*
Proposed new roads	• The internal road network will be 20 m in width, including the road reserve; • All internal roads required for the development will be a single lane in both directions. Each lane will be 3.5 m wide, totalling 7 m in width; • The total road reserve will be 6.5 m for each lane. The purpose of the road reserve is to accommodate bulk service infrastructure for stormwater, sewer, water and electricity; •
Electricity	• Phase 1 and 3 - New bulk power supply line from the Cator Ridge Works substation and new substation connecting with the 11kV underground powerline reticulation system.

Infrastructure	Requirements
	• Phase 2 - 11 kV underground distribution line extending from the Abattoir 132 kV substation, within the proposed road reserve or Option 2 – A new substation with a 638m 132kV overhead powerline and 36m servitude, connecting with the existing Eskom overhead powerlines aliong the Cato Ridge escarpment, west of Phase 2. • Each mini substation will be approximately 2 m high, with a footprint of 10 m²-12 m² each.

5.4 PROJECT IMPLEMENTATION

- Pre-construction planning and design;
- Construction (5 -10 years per phase);
- Post-construction, including rehabilitation and site closure impacts;
- Operation (ongoing); and
- Decommissioning (not anticipated).

Landscape and visual impacts will be focused on the construction and operational phases of the project.

6. Baseline Analysis

This section of the report aims to analyse and describe the intrinsic value of the receiving landscape baseline, including the natural, cultural, and scenic features as well as the visual baseline which focuses on the receptors, overall visibility, and visual exposure. This analysis assists the reader by describing the landscape and visual resources before the development. This is essential as the existing environment must be understood before assessing the impacts that will bring about potential change.

6.1 LANDSCAPE BASELINE

A visual representation of the overall landscape baseline is included at the end of Section 6.1 and indicated in Figure 5 - Figure 12.

6.1.1 CLIMATE AND RAINFALL

The Cato Ridge area can be described as having a sub-tropical climate, with hot, humid and wet summers and winters that are warm, dry and clear. For Cato Ridge, the average maximum daily temperature is 23.4°C and the average minimum temperature is 13.5°C. The area is characterised by hot summers and relatively cold winters. The annual average rainfall is quite variable and long-term data has revealed that the KwaZulu-Natal coastal region and its immediate hinterland is subject to cyclical 'wet and dry' periods. Research suggests that these cyclical rainfall patterns can be attributed to the El-Nino effect and in wet cycles, the rainfall can exceed 1,200 millimetres (mm) per annum, while the total rainfall in the dry cycle can be less than 600mm per annum. Average rainfall of approximately 780 mm per year has been recorded over 10 years at Cato Ridge by the Agricultural Research Council while total precipitation measured at the Assmang site during 2008 was 709 mm. The majority of the rainfall occurs during the summer months (October to March). Maximum rainfall occurs in October and November when the average maximum rainfall is about 117 and 188 mm, respectively. June and July are the driest months, with average rainfalls of about 16 and 7 mm, respectively. (SRK Consulting, 2011)

6.1.2 TOPOGRAPHY

The three Phases/PDA's are situated in a region known as the Valley of a Thousand Hills, which is a region of moderate to extreme undulated topography, leading to local variations which do not represent any biophysical hazard for development (no to low-risk group) in the sense of storms and flooding, (SEA, 2020). (Reference can be made to Figure 13).

Phase 3 (PDA1)

Phase 3 (PDA1) is flat (between 0-5% slope) becoming more undulating towards the west with slopes of between 5-50%, it is however anticipated that the section of undulating terrain will not provide significant screening ability.

Phase 1 (PDA2)

Phase 1 (PDA2) is situated on an elevated flat landform (plateau) with a slope of between 0-5%. The eastern boundary of this Proposed Development Area is fringed by an escarpment which provides some form of visual screening if viewed from this direction.

Phase 2 (PDA3)

Phase 2 (PDA3) is an extension of the plateau (as described under Phase 1 (PDA2)) and is flanked by an escarpment on the north (the northern boundary coincides with the edge of the plateau) and drops off steeply to the east and west, which provides varying degrees of visual screening when viewed from the adjacent landscape. Most of the site is flat (gradient 0-5%) with isolated sections between 5-10%, mostly towards the western section of the Phase/PDA.

6.1.3 VEGETATION COVER

According to the national vegetation mapping (SANBI, 2019), the Study Area consists of three vegetation types namely:

- Dry Coast Hinterland Grassland
- Kwazulu-Natal Sandstone Sourveld
- Eastern Valley Bushveld

The Study Area is mainly covered with grassland associated with topographically flat sections. Eastern Valley Bushveld can be found along the escarpment where this semi-deciduous savannah woodland is represented in a mosaic with thickets, often succulent, and dominated by species of Euphorbia and Aloe.

The grassland consists of Kwazulu-Natal Sandstone Sourveld this is a "short, species-rich grassland with scattered low shrubs and *geoxylic suffrutices* associated with a landscape of "flat (or rolling) plateau tops and steep slopes commonly forming table mountains" (Mucina & Rutherford 2006). Much of the grassland occurs in a mosaic with valley bushveld vegetation and is infiltrated by these elements, giving it a different character to other grasslands on tillite at Cato Ridge.

For this study, the screening value of the vegetation is considered and not the ecological value thereof. Tall vegetation clumps, mostly in the form of exotic trees (*Eucalyptus*) offers sufficient screening ability in isolated areas (over 20 m on average), while shorter vegetation (less than 1 m) does not provide screening. If these trees are retained, they have the potential to visually screen infrastructure, especially if they are located closer to rural residential areas and main roads. The natural grassland will not provide any screening ability.

6.1.4 LANDCOVER

The landcover of the Study Area is diverse and primarily consists of of natural grassland, forest, residential, mining, and industrial land cover. Refer to Figure 14. Previously transformed areas will be able to absorb and accommodate physical changes in the landscape, without transforming the visual character and quality, whilst more natural areas have a lower ability to absorb and conceal visual impacts.

Phase 3 (PDA1)

The largest proportion of Phase 3 (PDA1) is made up out of grassland, wetlands towards the eastern boundary, dense forest, and woodland along a section of the escarpment and a small industrial area along the western border next to the R103 Road.

Phase 1 (PDA2)

The largest portion of this Phase/PDA comprises natural grassland and dispersed pockets of dense woodland.

Phase 2 (PDA3)

The Phase/PDA largely consists of natural grassland and woodland towards the central areas and eastern border with a formal residential area located towards the north.

6.1.5 LAND USE

Assmang, including the Cato Ridge Development Company Limited, owns all the properties which comprise the Study Area. The Study Area is mainly zoned for residential and general industry and is currently unused. Refer to Figure 4.

Phase 3 (PDA1)

Phase 3 (PDA1) is currently unused, with evidence of small-scale illegal sand mining.

Phase 1 (PDA2)

Fenced off unused land which is less accessible to the public than Phase 3 (PDA1) and Phase 2 (PDA3).

Phase 2 (PDA3)

Phase 2 (PDA3) is currently subject to informal activities in the form of cattle grazing and occasional illegal sand mining.

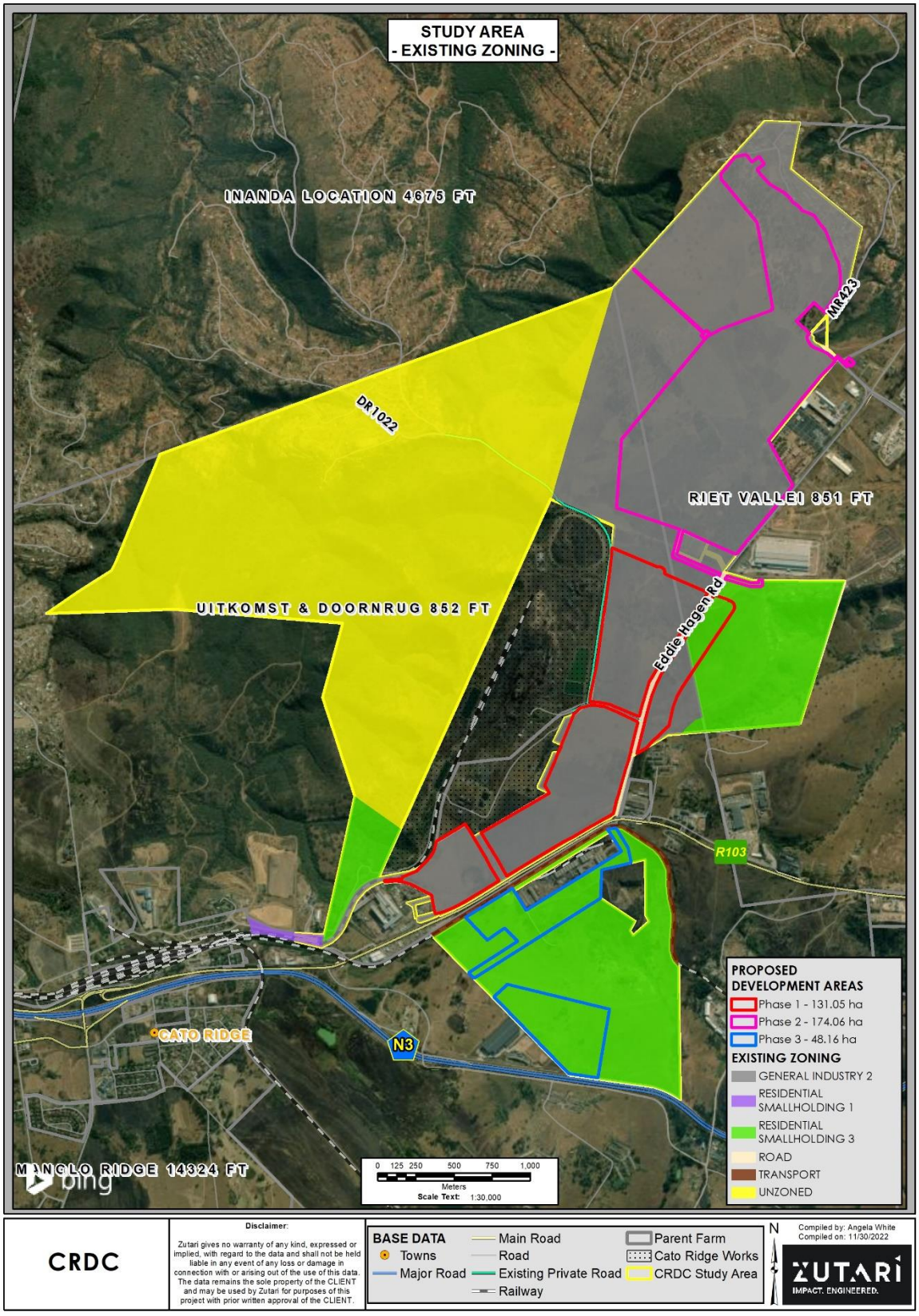

Figure 4: Existing zoning (Study Area)

6.1.6 LANDSCAPE CHARACTER

Landscape character is a distinct, recognisable, and consistent pattern of elements in the landscape that distinguishes one landscape from another. Landscape character includes the natural and man-made attributes of the study area, including topography, land cover and vegetation. The overall landscape character is influenced negatively by incompatible activities, or positively by the presence of natural and/or man-made features, such as steep gradients, the presence of rocky ridges, natural vegetation, pans, and floodplains.

Landscapes may be divided according to landscape character types, which are defined as distinct types of landscapes that are relatively homogenous in character. These landscape types are generic and may occur anywhere in the country where the same combinations of physical and cultural landscape attributes occur. Aesthetic aspects of landscape character can be recorded in a systematic and objective way according to the following range of aspects:

- Scale
- Enclosure
- Diversity
- Texture
- Form
- Line
- Colour
- Balance
- Pattern

In addition to the aesthetic aspects, other aspects of landscape perception can further influence landscape character and may be more subjective and responses to them might be more personal and coloured by the experience of the individual. Such factors include a sense of wildness, sense of security, the quality of light and perceptions of beauty or scenic attractiveness. Some factors can be perceived or experienced by senses other than sight, such as noisiness or tranquillity and exposure to the elements (Swanwick, 2002). Table 5 highlights applicable aspects of the landscape character of the study area.

Table 5: Aesthetic and perceptual aspects of landscape character (Swanwick, 2002) – aspects relating to the study area are highlighted in grey

Aspect	Characteristics				Motivation
Scale	Intimate	Small	**Large**	Vast	The scale of the landscape is considered large as a result of the extreme undulating terrain in some sections with the main topographical features being rolling mountainous terrain and hills (obscuring long-range views in certain locations) and higher-lying flat plateaus offering long-range views (to some extent) across the landscape.
Enclosure	Tight	**Enclosed**	**Open**	Exposed	The landscape can be described as enclosed as well as open, even though the vegetation height is less than 1 m and up to 20 m. The undulating terrain offers a

Aspect	Characteristics				Motivation
					sense of intimate enclosure (especially towards the west of the study area). Flatter plateau areas stand in contrast to this and create a sense of openness.
Diversity	Uniform	Simple	**Diverse**	Complex	The landscape can be described as diverse as the study area is characterised by high vertical relief, rolling grass hills with mosaic patches of trees and shrubs as well as flat plateaus.
Texture	Smooth	**Textured**	Rough	Very rough	The landscape is textured due to the contrast between the dominant grassy herbaceous layer (with a visually smooth and soft appearance), clumps of trees and pockets of woody shrubs associated with areas of vertical relief.
Form	**Vertical**	**Sloping**	Rolling	Horizontal	The landscape's form is a combination of vertical (steep slopes, especially when driving on roads along the escarpment) and sloping as the landscape naturally slopes towards the south.
Line	Straight	**Angular**	Curved	**Sinuous**	The larger landscape elements are mostly sinuous with various winding and twisting roads and footpaths. The geometric shapes of existing infrastructure such as transmission lines and buildings associated with warehousing and light industrial facilities provide some angular forms within the landscape.
Colour	Monochrome	Muted	**Colourful**	Garnish	The colours associated with the natural landscape are shades of green to vibrant, deep green. Existing buildings, signs and fences contribute to additional colour within the landscape.
Balance	Harmonious	Balanced	**Discordant**	Chaotic	The landscape is discordant in terms of the relationship between the vertical and horizontal landscape elements.

Aspect	Characteristics				Motivation
Pattern	**Random**	Organised	Regular	Formal	The landscape is considered random with landscape elements (primarily man-made) being haphazardly spaced with no rigid or formal pattern.
Movement	Dead	Still	Calm	**Busy**	The vehicular movement within the study area is considered busy as the N3 National Road borders Phase 3 (PDA1) to the south and the R103 road is used to transport goods from industries within the area. Significant heavy vehicle traffic is visible within the study area.

Phase 3 (PDA1)

Although Phase 3 (PDA1) has a more natural, open appearance, it is highly influenced by the presence of the N3 Road. Various small, informal dirt roads traverse the site and existing transmission line pylons are visible along the southern boundary.

Phase 1 (PDA2)

Phase 1 (PDA2) has a strong industrial feel with various light industrial buildings/warehouses visible along both sides of Eddie Hagen Drive, the presence of the Natal Corridor (Natcor) railway, the existing Assmang Cato Ridge Works mining operations with associated activities and small-scale illegal sand mining, mainly contribute to the overall character. Structures and buildings are haphazardly spaced contributing to the visually discordant landscape and lack of an overall sense of place. Existing larger buildings and warehouses along main roads have the potential to visually screen the proposed development.

The existing industrial type and mining-related infrastructure will lower the overall visual intrusion of the proposed development on the receiving environment. If the proposed development/s is compatible with the existing surrounding land uses, it will result in lower levels of visual intrusion. The development will be experienced visually as a logical extension of the existing built-up areas.

Phase 2 (PDA3)

Phase 2 (PDA3) has a more rural open feel and residential houses from the KwaXimba settlement encroach the site on the northern boundary. The houses are informally scattered between narrow meandering dirt roads. Local building development has been sporadic, minor in scale and confined to small pockets. Houses in the Denge and Siweni settlements are located in a small cluster on the western boundary of the Phase/PDA. The Assmang grasslands appear to sustain significant cattle grazing and large patches of illegal sand mining are evident amongst the informal tracks crossing this area. An existing transmission line traverses the site in a north-south direction along the western escarpment.

The R103, situated parallel to the N3 Road, divides Phase 3 (PDA1) and Phase 1 (PDA2). This road is used as an alternative to the N3 and is well utilised for the transportation of goods from industries within the area. Eddie Hagen Drive diverts north from the R103 and stops at the Mr423 Rd. which proceeds towards Phase 2 (PDA3). This road connects various rural settlements with the town of Cato Ridge.

The interface between the industrial nature of the proposed development and the rural/residential nature of the areas to the north must be delineated and softened in a way that maintains the existing and proposed visual identity and integrity of both areas.

6.1.7 VISUAL ABSORPTION CAPACITY (VAC)

VAC is an indication of the ability of the landscape to visually conceal the proposed development. Areas with high VAC can accommodate and absorb physical changes in the landscape without transforming its visual character and quality, while a low VAC rating implies a low ability to absorb or conceal visual impacts (Oberholzer, 2005). The factors that contribute to the VAC factor includes topographical diversity, vegetation, soil contrast, visual pattern, and recovery time.

The factors are listed and explained in Table 6 as adapted from the United States Bureau of Land Management (BLM, 2004).

Table 6: VAC factors and rating (BLM, 2004)

Factors	Rating criteria and score		
Vegetation	Low, uniform vegetation type. Typically, less than 1 m in height lacking in variety and usually uniform in colour with minimal screening capability. Low scrub and grass type vegetation. Score:1	Vegetation of moderate height between 1-2 m with some variation in colour and type. Effectively screens low surface disturbance. Scrub/ grass with intermingled shrubs. Score:2	Vegetation of more than 2 m in height. Continuous cover with significant screening potential for projects between 4–6 m in height. Score:3
Soil contrast	Surface disturbance would expose a high degree of contrast in colour with surrounding soil, rock and vegetation. Score:1	Surface disturbance would expose a moderate degree of contrast in colour with surrounding soil, rock and vegetation. Score:2	Surface disturbance would expose a low degree of contrast in colour with surrounding soil, rock and vegetation. Score:3
Visual variety	Rating units exhibit a low degree of visual variety in terms of the landscape character elements of form, line and texture with minimal variety in landforms, vegetation or colour. Score:1	Rating units exhibit a moderate degree of visual variety in terms of the landscape character elements of form, line and texture with moderate variety in landforms, vegetation or colour. Score:2	Rating units exhibit a high degree of visual variety in terms of the landscape character elements of form, line and texture with a high variety in landforms, vegetation or colour. Score:3
Topographical diversity	Landform has a low topographic diversity and variety. Typically, low rolling hills with few interesting landscape features	Landform has a moderate topographic diversity and variety with detail features that are interesting but not dominant or exceptional.	Landform has high topographic diversity and variety. High vertical relief is expressed as prominent cliffs, massive rock outcrops, detailed features

Factors	Rating criteria and score		
			which are dominant and exceptionally striking and intriguing.
	Score:1	Score:2	Score:3
Recovery time	Long term recovery time, longer than 5 years.	Moderate recovery time (3 to 5 years)	High recovery time (less than 3 years)
	Score:1	Score:2	Score:3

Scores, which amount to between 5-7 and are categorised as Low, scores between 8 -11 as Moderate and between 12-15 as High. VAC is further closely related to visual intrusion, which refers to the physical characteristics and nature of the contrast created by a project on the visual aspects of the receiving environment. As with VAC, it is a measure of the compatibility or the conflict of a project with the existing landscape and surrounding land use. Visual intrusion is rated in Section 6.1.8.

Table 7: VAC_Phase 3 (PDA1)

Phase 3 (PDA1)		
Factor	**Score obtained**	**Motivation**
Vegetation	1.5	The Phase/PDA mainly comprises low-level vegetation (grassland) with smaller patches of woody vegetation of moderate height located towards the east. In general, the vegetation will offer little screening ability.
Soil contrast	2	Small bare ground patches, mostly associated with small rocky outcrops and illegal sand mining are evident on site. Surface disturbance would expose a moderate degree of contrast in colour with surrounding soil, rock and vegetation.
Visual variety	2	The largest part of the site consists of open grassland, with existing industrial facilities (Cato Zulu Industrial Park and Shiptech Petroleum) located along the northern boundary. This infrastructure together with the existing railway line and patches of woodland vegetation offers some variety in terms of line, colour and texture.
Topographical diversity	1.5	The largest part of the Phase/PDA is located on a plateau with a shallow valley running from the central area of the site towards the east.
Recovery time	3	The recovery time is anticipated to be high as most of the disturbed areas will be located on flatter plateau areas with grassland vegetation.
Total	**10**	**Moderate**

Table 8: VAC_ Phase 1 (PDA2)

Phase 1 (PDA2)		
Factor	**Score obtained**	**Motivation**
Vegetation	1.5	The Phase/PDA is mainly covered by grassland vegetation, with scattered patches of tree clumps along the R103 Road, which could offer some potential screening. The small section of land between Safal Steel and Shadai SA is mostly covered by Woodland vegetation.
Soil contrast	1.5	From aerial observation, there are few open bare patches evident on site and soil disturbances could result in a moderate-high degree of contrast.
Visual variety	3	Existing industrial structures and warehouses increases the visual variety, although these are manmade features and not necessarily visually pleasing and provide elements of form, line and texture.
Topographical diversity	1.5	The Phase/PDA is located on a plateau that is mostly flat and gently slopes towards the south, providing little screening ability. The section east of Eddie Hagen Drive is flanked by the existing escarpment.
Recovery time	3	The recovery time is anticipated to be high as disturbed areas will be located on flatter plateau areas which consist of of natural grassland vegetation that will take less than 3 years to mature.
Total	**11.5**	**High**

Table 9: VAC_ Phase 2 (PDA3)

Phase 2 (PDA3)		
Factor	**Score obtained**	**Motivation**
Vegetation	1.5	The Phase/PDA is mainly covered by grassland vegetation with scattered patches of tree clumps along the R103 Road and towards the northern and central parts.
Soil contrast	2	Illegal sand mining has resulted in large patches of bare ground. However, the largest proportion of the Phase/PDA is covered with grassland.
Visual variety	1.5	Existing rural settlements, industrial activities towards the east and clumps of *Eucalyptus* trees increases the visual variety to some degree.
Topographical diversity	1.5	The Phase/PDA is located on a plateau that is mostly flat but slopes upwards towards the central area of the site.
Recovery time	3	The recovery time is anticipated to be high as disturbed areas will be located on flatter plateau areas that consist of of natural grassland vegetation which will take less than 3 years to mature.
Total	**9.5**	**Moderate**

The overall VAC for the study area is moderate-high. The natural grassland vegetation contributes minimally, however, VAC will increase, and visual intrusion decrease where a similar type of infrastructure (same as the proposed) is already present, such as along Eddie Hagen Drive and the R103 Road. Topographical variations, existing infrastructure and patches of Eucalyptus trees do not only provide visual variety but will assist with the VAC, especially along sections of Eddie Hagen Drive, sections along the R103 and the northern boundary of Phase 2 (PDA3). Due to the subtropical climate, visual contrast will remain similar throughout the year.

6.1.8 VISUAL INTRUSION

The degree of visual intrusion is closely related to the VAC and maintaining the integrity of the landscape, and essentially rates the degree of contrast between the appearance of the proposed development and the existing environment. The higher the landscape quality and the more consistent the visual context, the more likely the impact will be intrusive. Visual intrusion is rated according to Table 10.

Table 10: Visual intrusion ratings

Rating	Criteria
High	Results in a noticeable change or is discordant with the landscape
Moderate	Partially fits into the landscape, but is noticeable
Low	Minimal change or blends in well with the surrounding landscape

Phase/PDA	Visual intrusion	Motivation
Phase 3 (PDA1)	Moderate	Except for the Engen Cato Ridge 1 Stop fuelling station to the south, the Value Logistics Warehouse to the east and Shiptech Petroleum to the north, vast areas surrounding the site are still open and undeveloped.
Phase 1 (PDA2)	Low-Moderate	Visual intrusion will be slightly higher towards the east where development is proposed to take place on the plateau next to the escarpment and bordering rural residential houses. Visual intrusion will be low along the R103 Road where similar types of industrial activities dominate the landscape scene.
Phase 2 (PDA3)	Moderate-High	Light industrial activities are located within close range to Phase 2 (PDA3), although no such activities border the site as is the case with Phase 3 (PDA 1) and Phase 1 (PDA2). SMD Durban (second-hand car dealership) is located to the east with rural residential houses to the north.

As a result of increased activities, the intensity of the visual intrusion will be higher during the construction phase of the project compared to the operational phase. Increased topographical variety, the presence of a similar type of infrastructure and existing construction activities will reduce the overall visual intrusion.

6.1.9 LANDSCAPE QUALITY

Landscape quality is based on human perceptions and expectations in the context of the existing environment. A landscape's visual quality is, therefore, a factor of an observer's emotional response to physical landscape characteristics and therefore assigning values to visual resources is a subjective process.

The BLM division Visual Resource Management (VRM) system was specifically developed for minimising the visual impacts of surface disturbing activities and maintaining scenic values for the future. The landscape's scenic quality can be evaluated based on a combination of the landscape's intrinsic physical properties, consisting of the landform, vegetation, water, colour, adjacent scenery, scarcity and cultural or man-made modifications.

Landscape quality increases with the presence of water, topographic ruggedness and where diverse patterns of vegetation occur. Areas that contain more natural features or harmonious man-made compositions will have a more favourable landscape quality than areas with non-

harmonious human activity. The factors (indicated in **Table 11**) were obtained from the BLM (1986) Manual 8410-1 Visual Resource Inventory.

Table 11: Landscape quality rating definitions

Factor	Definition
Landform	Topography becomes more interesting as it gets steeper or more massive, or more severely or universally sculptured. Outstanding landforms may be monumental, or they may be exceedingly artistic and subtle.
Vegetation	Give primary consideration to the variety of patterns, forms, and textures created by plant life. Consider short-lived displays when they are known to be recurring or spectacular. Consider also smaller scale vegetation features, which add striking and intriguing detail elements to the landscape.
Water	Water adds movement or serenity to a scene. The degree to which water dominates the scene is the primary consideration in selecting the rating score.
Colour	Consider the overall colour(s) of the basic components of the landscape (e.g., soil, rock, vegetation, etc.) as they appear during seasons or periods of high use. Key factors to use when rating "colour" are variety, contrast, and harmony.
Adjacent scenery	Rating of scenery outside the scenery unit enhances the overall impression of the scenery within the rating unit. The distance which adjacent scenery will influence scenery within the rating unit will normally range from 0-7 km, depending upon the characteristics of the topography, the vegetative cover, and other such factors. This factor is generally applied to units that would normally rate very low in score, but where the influence of the adjacent unit would enhance the visual quality and raise the score.
Scarcity	This factor provides an opportunity to give added importance to one or all the scenic features that appear to be relatively unique or rare within one physiographic region. There may also be cases where a separate evaluation of each of the key factors does not give a true picture of the overall scenic quality of an area. Often it is a number of not so spectacular elements in the proper combination that produces the most pleasing and memorable scenery - the scarcity factor can be used to recognize this type of area and give it the added emphasis it needs.
Cultural modifications	Cultural modifications in the landform/water, vegetation, and addition of structures should be considered and may detract from the scenery in the form of a negative intrusion or complement or improve the scenic quality of a unit.

Table 12: Rating criteria and scoring system

Factor	Rating Criteria and Score		
Landform	High vertical relief as expressed in prominent cliffs, spires, massive rock outcrops, areas of severe surface variation, highly eroded formations, dune systems or detail features that are dominant and exceptionally striking and intriguing. Score: 5	Steep canyons, mesas, buttes, interesting erosional patterns, landforms of variety in size and shape or detail features, which are interesting though not dominant or exceptional. Score: 3	Low rolling hills, foothills, or flat valley bottoms or few or no interesting landscape features. Score: 1
Vegetation	A variety of vegetative types as expressed in interesting forms, textures, and patterns. Score: 5	Some variety of vegetation, but only one or two major types. Score: 3	Little or no variety or contrast in vegetation. Score: 1

Factor	Rating Criteria and Score		
Water	Clear and clean appearing, still, or cascading white water, any of which are a dominant element in the landscape. Score: 5	Flowing, or still, but not dominant in the landscape. Score: 3	Absent, or present, but not noticeable. Score: 0
Colour	Rich colour combinations, variety, or vivid colour; or pleasing contrasts in the soil, rock, vegetation and water Score: 5	Some intensity or variety in colours and contrast of the soil, rock and vegetation, but not a dominant scenic element. Score: 3	Subtle colour variations, contrast, or interest; generally muted tones. Score: 1
Adjacent scenery	Adjacent scenery greatly enhances visual quality Score: 5	Adjacent scenery moderately enhances overall visual quality. Score: 3	Adjacent scenery has little or no influence on overall landscape quality. Score: 1
Scarcity	One of a kind, unusually memorable or very rare within the region. Consistent chance for exceptional wildlife or wildflower viewing, etc. Score: 5	Distinctive, though somewhat similar to others within the region. Score: 3	Interesting within its setting, but fairly common within the region. Score: 1
Cultural Modifications	Modifications add favourably to visual variety while promoting visual harmony. Score: 2	Modifications add little or no visual variety to the area and introduce no discordant elements. Score: 0	Modifications add variety but are very discordant and promote strong disharmony. Score: -4

Total scores amounting to less than 11, are categorised as Low, scores between 12-18 as Moderate and scores higher than 19 as High.

In order to evaluate landscape quality accurately reference must be made to the greater landscape context, therefore landscape quality is rated according to the Study Area and not on an individual Phase/PDA scale.

Table 13: Landscape quality

Factor	Score obtained	Motivation
Landform	2.5	The landscape provides landforms in a variety of shapes and sizes such as shallow valleys, continuous undulating mountainous terrain, steep escarpments, plateaus and rolling grasslands. The plateau and associated escarpment are dominant features within the topographical context.
Vegetation	2	The vegetation associated with the Study Area does offer some variety but is mostly limited to low grass, clumps of larger exotic trees and woodland vegetation associated with steep relief.
Water	0	Water is absent.
Colour	2	Some variety in colours and contrast between soil and between vegetation is present, however, it is not a dominant scenic element.
Adjacent Scenery	2	The adjacent scenery largely detracts (industrial and mining-related activities) from the overall landscape quality, although

		the visual backdrop of the continuous undulating terrain contributes to the overall landscape quality.
Scarcity	1	The landscape of the site is not distinctive as there are various other similar types of landscape settings within the region.
Cultural modifications	0	The proposed infrastructure will add little or no visual variety to the area as there are existing similar types of infrastructure already present. The development will not introduce additional discordant elements, and if implemented, whilst considering proposed mitigation measures, it will have a low influence on the quality of the existing landscape.
Total	**10.5**	**Low**

6.1.10 LANDSCAPE VALUE

Landscape value is concerned with the relative value attached to a specific landscape by society, bearing in mind that a landscape may be valued differently by different stakeholders. Value can apply to areas of landscape as a whole or to the individual elements, features and aesthetic or perceptual dimensions which contribute to the character of the landscape (IEMA, 2013).

In determining landscape value, the people, or groups of people who could be affected by the proposed development should be considered, due to the landscape being valuable to people in different ways. In this regard, consideration is given to:

- People who live and work in an area may attach a lower value to the landscape;
- Special interest, for example, the ecological, cultural, or historic value of the landscape, as knowledge of these issues can often affect people's perception and appreciation of a landscape; and
- Landscapes valued by a public wider than the local population because they have a strong image or are well known and valued nationally and internationally.

Landscape value is based on receptor perception and is rated in Table 14.

Table 14: Receptor perception rating

Rating	Criteria
High	People attach a high value to aesthetics, such as in or around a game reserve, coastal areas, scenic routes, conservation areas and tourism destinations. The project is perceived to significantly impact this value of the landscape.
Moderate	People attach a moderate value to aesthetics, such as neighbourhoods and smaller towns, where natural character is still plentiful and in close range of residency.
Low	People attach a low value to aesthetics when compared to employment opportunities or where the environment has already been transformed.

The Study Area is likely to be most valued by tourists who pass through en route to various eco-tourism destinations within the greater Valley of a Thousand Hills Region which is well known for its dense forests, dotted with gorges, streams and traditional villages which attract campers, hikers, mountain bike enthusiasts and bird watchers. This is especially true for Eddie Hagen Drive which is a recognised tourist route in terms of the Outer West Development Corridor Study & Cato Ridge LAP (2012).

Local residents attach a high cultural and economic value to their surrounding landscape. In essence, local communities live from the landscape, and it is seen as a communal asset. Considering the above, local residents will therefore attach a moderate-high value,

depending on their direct association with the landscape. Typically older residents who have lived in the area all their life and who spend most of their time at home will attach a higher value to the landscape, whereas residents who work elsewhere and commute from their home base on a daily, weekly or monthly basis will value the landscape to a lower extent.

People and stakeholders who work within the study area (associated with existing light industrial and mining activities) will have a different perception because of the employment opportunities, their more regular contact with the landscape and the ongoing infrastructural type changes within it. The proposed developments will therefore affect the landscape value to a lesser extent for this specific receptor group.

Key tourism locations

Places of interest related to the local tourist industry and located within close proximity (less than 10 km) from the Study Area are listed in **Table 15**. The proposed development will not necessarily be visible from these locations and at this stage it is difficult to determine as it will be influenced by individual building and/or infrastructure position as well as final site grade and vegetation.

Table 15: Key tourism locations

Name	Description	Approximate distance from closest Phase/PDA
Thornridge Farm	Wedding venue	0.7 km (Phase 1 (PDA2))
Zest House	Corporate functions and accommodation	1.3 km (Phase 2 (PDA3))
Watervale Lodge	Accommodation and outdoor activities	2.3 km (Phase 3 (PDA1))
Assagay Coffee Farm	Coffee farm and tours	2.8 km (Phase 3 (PDA1))
Grass Roots	Bed and breakfast	4.8 km (Phase 3 (PDA1))
High stakes activity Centre	Adventure escapades, archery, quad biking, ziplining, clay pigeon shooting	4.4 km (Phase 3 (PDA1))
Emonyeni Guest Lodge and Conference Centre	Accommodation and functions	6 km (Phase 3 (PDA1))
Nagl Dam	Developing wildlife reserve which offers various activities such as fishing, nature walking trails, game viewing, birding and watersports and includes accommodation.	10 km (Phase 2 (PDA3))
Inchanga 4x4 Adventure Park	4 x 4 trails	4 km (Phase 3 (PDA1))
Clover Art Centre	Curio and roadside shop	3 km (Phase 3 (PDA1))
Indlondlo Cultural Village	Zulu Cultural Village and Arts Centre: Promoting Zulu Culture, Traditions, Dance, Music and Art.	3.2 km (Phase 2 (PDA3))
Honey Trails	Nature Reserve which offers trail running	5 km (Phase 3 (PDA1))
Cavalo Guest House and Equestrian Estate	Guest House and functions	7 km (Phase 3 (PDA1))
La Belle Femme Equestrian Centre	Equestrian based services	7 km (Phase 3 (PDA1))
Cato Ridge Country Club	Golf course	2.2 km (Phase 3 (PDA1))

Scenic routes

A scenic route is a road that travels through an area of natural and cultural beauty. Scenic routes around the Study Area are indicated in Figure 16 - Figure 18 and include:

- The Mr423 Road /Eddie Hagen Drive, to the north of Phase 2 (PDA3);
- The Thousand Hills Road, approximately 2.5 km east of Phase 3 (PDA1); and
- A section of the R103 Road (Old Main Road) approximately 3.4 km east of Phase 3 (PDA1).

The Mr423//Eddie Hagen Drive is a narrow road, which meanders through various small settlements with impressive views over the mountainous terrain. Views of the site from the Mr423 Road located below the escarpment will be restricted. This road is used by local tourists when travelling to Nagl Dam, located approximately 10 km from the northern boundary of Phase 2 (PDA3).

The Thousand Hills Road runs parallel with and between the R103 Road and the N3 Road. This road follows a ridgeline with some sections narrowing and steeply cutting into the eastern embankment. When travelling west along this road, views will only open towards the site, once merging onto the R103 road. At this point, the road becomes straight and is no longer considered a scenic route, as receptors enter the outskirts of Cato Ridge's industrial hub. The section of the R103 in the vicinity of Inchanga runs along the escarpment and offers some long-range views towards Phase 3 (PDA1). The Monteseel viewpoint (which offers views across the valley) is also located on this road, although the proposed development will not be visible from here.

6.1.11 NIGHTTIME LIGHTING

To determine the potential visual impact of night time lighting, it is important to understand the existing lighting levels within the Study Area. The Institute for Lighting Professionals ILP (2011) identifies five zones of environmental zones for exterior lighting control, describing the existing lighting conditions within the landscape. These zones are supported by design guidelines to reduce lighting pollution, which can inform mitigation measures.

Table 16: Environmental zones for night time lighting ILP (2011)

Environmental Zones	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO starlight reserves, IDA dark sky parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Beauty
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban
E4	Urban	High district brightness	Town/City centres with high levels of nighttime activity

Light pollution falls within the following categories, ILP (2011):

- Skyglow: Wasteful light from artificial sources emitted upward (at horizontal angles and higher) is scattered by aerosols such as clouds and fog or small particulates like

pollutants in the atmosphere. This scattering forms a diffuse glow that can be seen from far away. Skyglow is the most known form of light pollution.

- Light trespass: Unwanted light at night can seep through the windows of houses and buildings, causing sleeping disorders due to overexposure to light.
- Glare: Excessive brightness at night creates high contrast and decreased visibility, causing discomfort or, in extreme cases, a blinding effect.
- Lighting from vehicles within rural areas will generally be more intrusive than in urban settings and could therefore potentially have a greater impact due to the general lack of existing ambient light within areas further away from the study area.
- The ILP (2011) recommends that to maintain the night time setting, lighting within the identified zone should have minimal illumination into the sky.

The Study Area will fall within two categories namely E3 (Suburban) for areas located close to existing industrial facilities and E2 (low district brightness). The effects of night time lighting decrease towards the north (Phase 2 (PDA3)) where there is less industrial activity and sources of light will mainly be dispersed and from rural residential houses. The lights from industrial facilities will still be visible from these areas but will not be a dominant factor. The existing industrial infrastructure (especially in the form of security lighting) has already contributed to sky glow and artificial lighting within the Study Area. Compared to the existing development, the footprint of the proposed infrastructure (if fully developed) is much larger and would therefore have a substantial contribution to additional night-time lighting within the Study Area.

Figure 5: Agricultural areas located south of the N3 (outside proposed Study Area)

Figure 6: Existing Assmang Cato Ridge Works

Figure 7: Existing industrial activities along the D1022 Road

Figure 8: Existing logistic warehouse along the R103 Road

Figure 9: Typical rural houses and topography

Figure 10: Typical vegetation along the D157 access road to Value Logistics DC

Figure 11: SRF Felxipak (light industrial) along Eddie Hagen Drive

Figure 12: Existing berm at junction of R103 and Eddie Hagen Drive

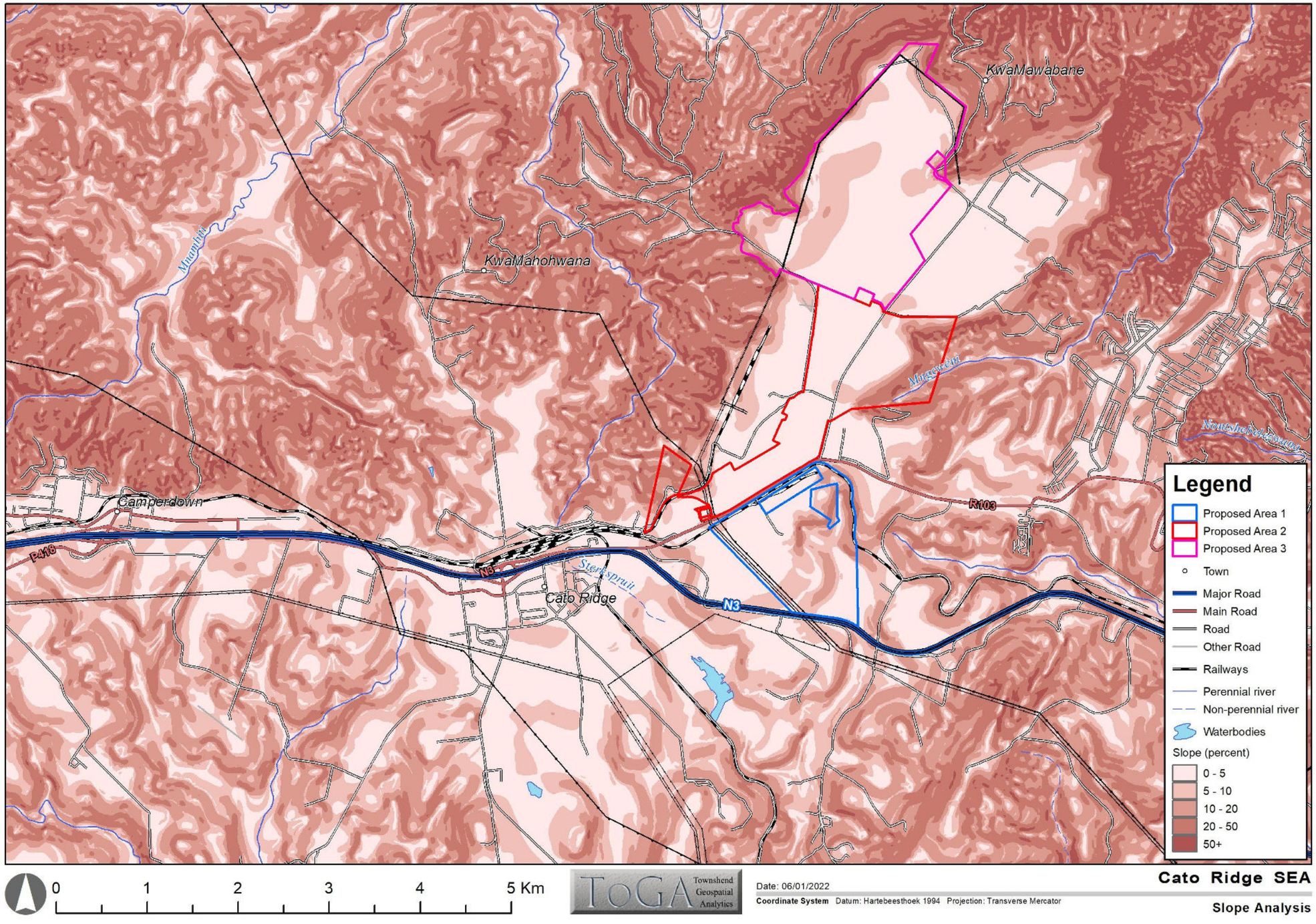

Figure 13: Slope Analysis

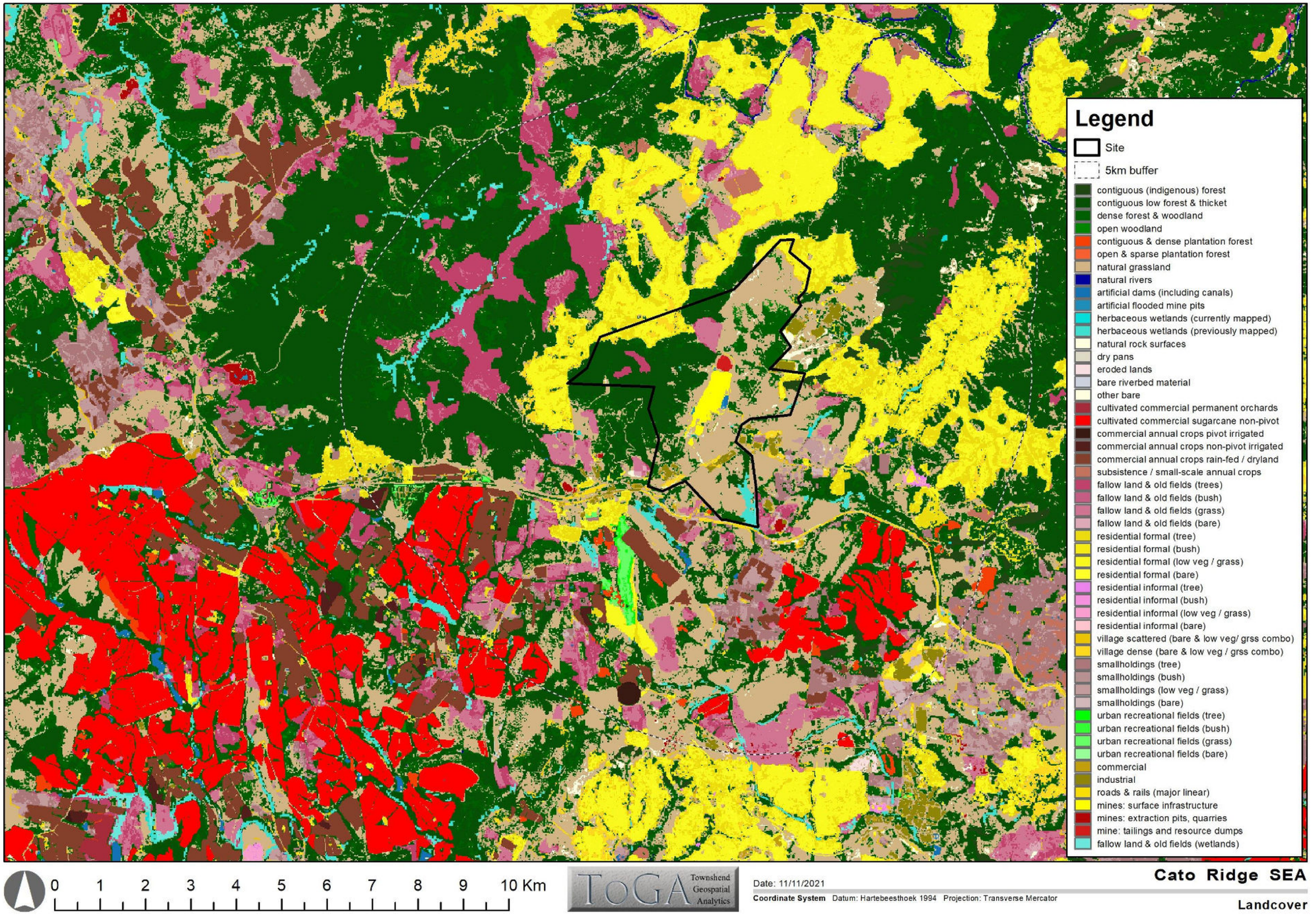

Figure 14: Landcover

6.2 VISUAL BASELINE

6.2.1 VISIBILITY AND VISUAL EXPOSURE

Visibility

Visibility is determined by the distance between the proposed project components and the visual receptor. The visibility or viewshed/ZTV of the project is the area from which the project will be visible and includes all the major observation sites from where the proposed project will be visible. The viewshed is theoretical as it assumes a direct line of sight between any point within the viewshed and the object being viewed.

A Geographic Information System (GIS) has been used to generate the viewshed analyses for the proposed project and related infrastructure. The system has 3D topographical modelling capabilities, including a line-of-sight analysis. For this project, the viewshed analysis was generated by means of contours using the proposed project and the height of the associated infrastructure. The visibility of a development and its influence on visual impact is rated using the criteria listed in Table 17.

Table 17: Visibility classes, IEMA (2013)

Class	Description
Highly visible	Clearly noticeable within the observer's view frame 0-1 km
Moderately visible	Recognisable feature within the observer's view frame 1-2 km
Marginally visible	Not particularly noticeable within the observer's view frame 2-5 km
Hardly visible	Practically not visible unless pointed out to observer beyond 5-7 km

Visual exposure

Visual exposure refers to the geographic area from which the proposed project will be visible and is defined by the degree of visibility of a proposed project from various receptor sites. According to Hull and Bishop (1998), the visual exposure of the proposed project is based on the distance from the proposed source of impact and usually fades out beyond 7 km. The visibility of an object decreases exponentially over distance and accordingly visual impact will diminish as the viewer moves away from the object being viewed. It is also important to note that the actual zone of visual influence of the proposed project may be smaller than indicated because of screening by existing vegetation and infrastructure. The influence of diminishing visual exposure over distance is shown below in Figure 15.

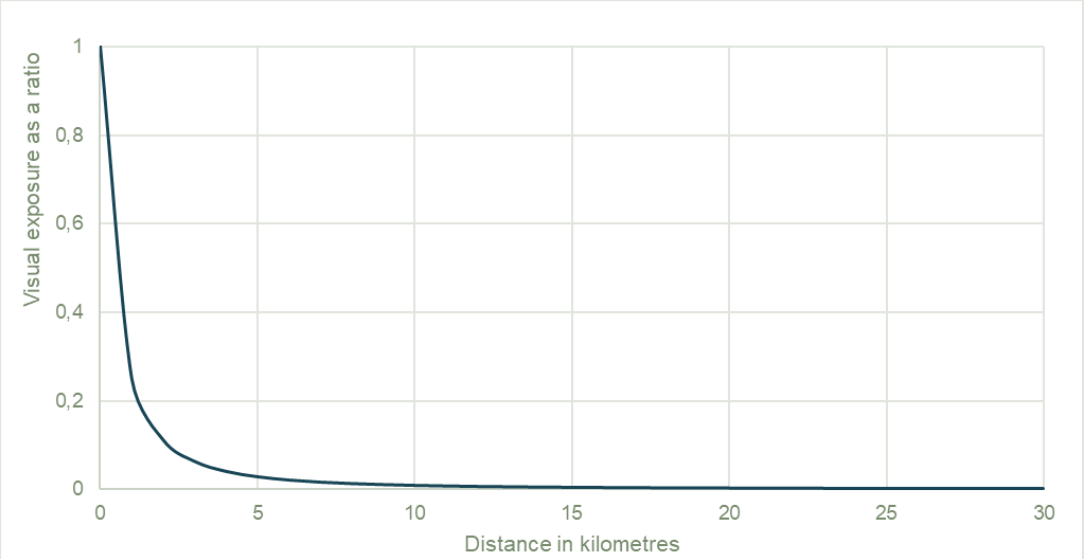

Figure 15: Visual exposure (Hull and Bishop, 1988)

Viewshed Analysis

The viewshed analysis calculates the geographical locations from where the proposed project might be visible (views towards the Phase/PDAs). This potential visual exposure of the project has been modelled by creating a DTM from contour data (20m intervals, obtained from the Surveyor General) and applying a viewshed analysis using GIS software, whereby all areas with a line of sight towards the proposed project are indicated. It must be noted that the heights of existing infrastructure and vegetation are not included in the calculation of the viewshed as these factors have too much variability in terms of seasonal change and possible land use changes in an extensive Study Area such as the one being assessed. It is therefore important to bear in mind that the proposed development will not be visible from all points within the viewshed, as views may be obstructed by visual elements, whereby such intervening objects will modify the viewshed at ground level. Based on this information and together with the site visit the visual envelopes of the various Phase/PDAs are as follows:

Phase 3 (PDA1)

Refer to Figure 16. The proposed infrastructure will have high visibility 1 km south (including the N3) and east of the Phase/PDA. Views will end abruptly towards the northeast up to the escarpment. Moderate visibility extends between 1–3 km in the north but extends between 5–6 km in the east and south. As a result of the escarpment, moderate visibility extends up to 1 km in the west. Natural topography allows for greater views across the landscape. Most of the site will be highly visible from the N3 Road because of the generally low vegetation height (grassland) and larger tracts of undeveloped land. Some mid-range views will be blocked by areas of woodland and Eucalyptus trees.

Phase 1 (PDA2)

Refer to Figure 17. High visibility is expected between 0-2 km north and south of the Phase/PDA (extending up to the N3 Road). High visibility extends up to 1 km east and west of the Phase/PDA where it ends at the onset of the escarpment. Moderate visibility extends from the N3 to isolated areas located 6 km to the south of the Phase/PDA, these include sections of the Mr 385 Road and Shady Lane located next to the golf course (Cato Ridge Country Club). During the site visit, it was confirmed that existing Eucalyptus tree clumps and infrastructure will screen most of these views. Visibility from the north extends up to the centre of the plateau where the topography creates a localised high ground.

Phase 2 (PDA3)

Refer to Figure 18. As a result of the existing topography (higher-lying plateau) with an escarpment running along the north, west and eastern boundaries, visibility for Phase 2 (PDA3) will be moderate for portions of land located to the east (between 0-2 km) and higher laying areas to the west, stretching as far as 6 km (largely associated with outspread villages of Kwa Mohohwane and Hlangakhule (views along Buchanan Road towards Phase 2 (PDA3) are mostly obscured by existing trees and infrastructure, but does open up occasionally). Visibility of Phase 2 (PDA3) from the north extends up to the edge of the plateau, almost in line with the proposed northern development boundary line. Visibility from the south towards Phase 2 (PDA3) is low (especially south of the N3) and views will mostly be obscured as a result of existing trees and infrastructure. Views towards Phase 2 (PDA3) are mostly encapsulated by the natural topography of the escarpment and therefore limiting the extent of the visual envelope.

Combined analysis

Refer to Figure 19. High visibility is centred within an area of approximately 1-2 km radius surrounding Phase 3 (PDA1), this is mostly as a result of the landscape sloping up towards the north and therefore offering open views from the N3 Road. High visibility is limited to the east and west and abruptly end at the onset of the escarpment. High – moderate visibility extends along higher-lying areas south of the N3 Road and extends between 3-4 km from the Study Area. Moderate-low visible extend up to 5 km east and west of the Study Area.

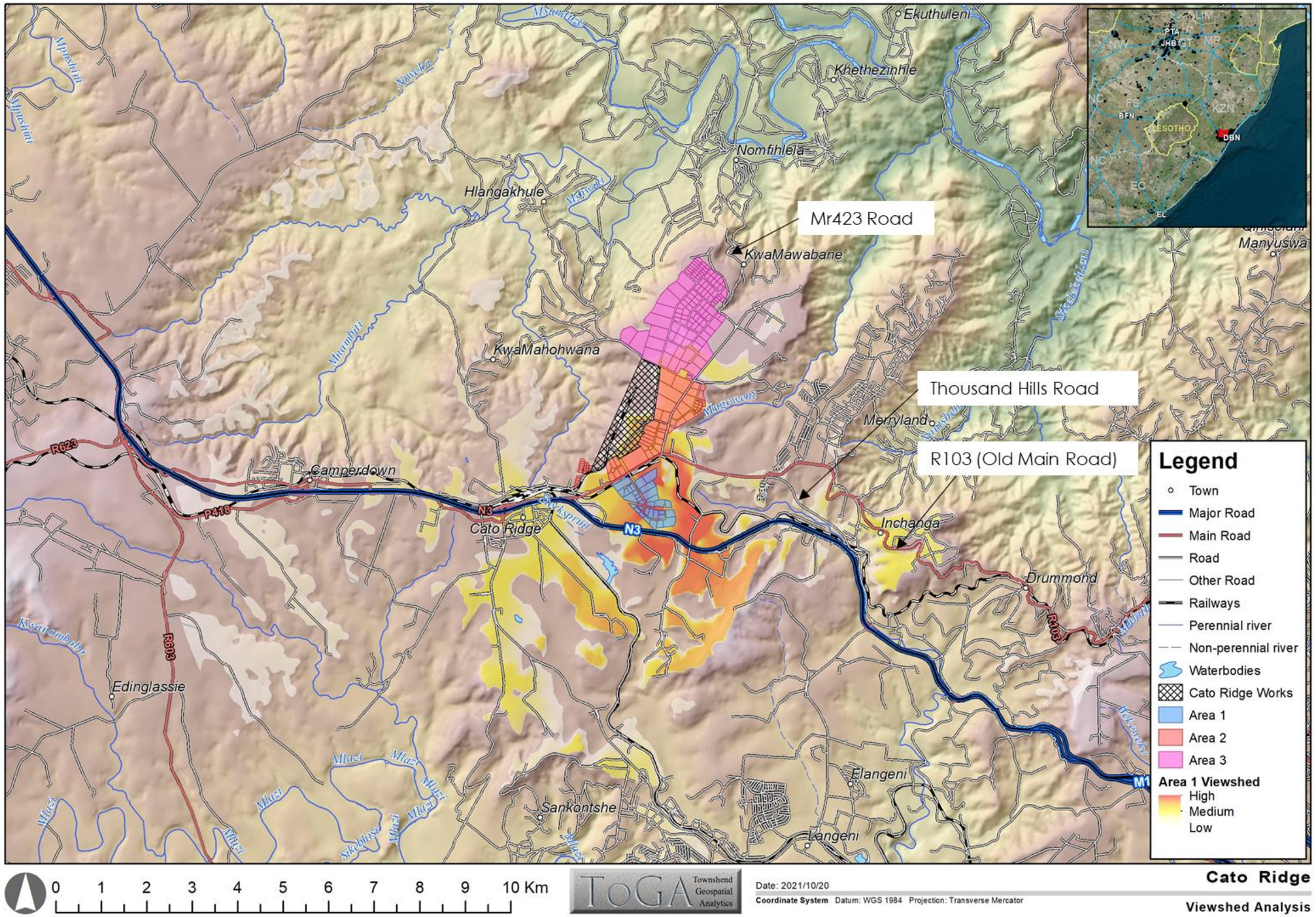

Figure 16: Viewshed Analysis_Phase 3 (PDA1)

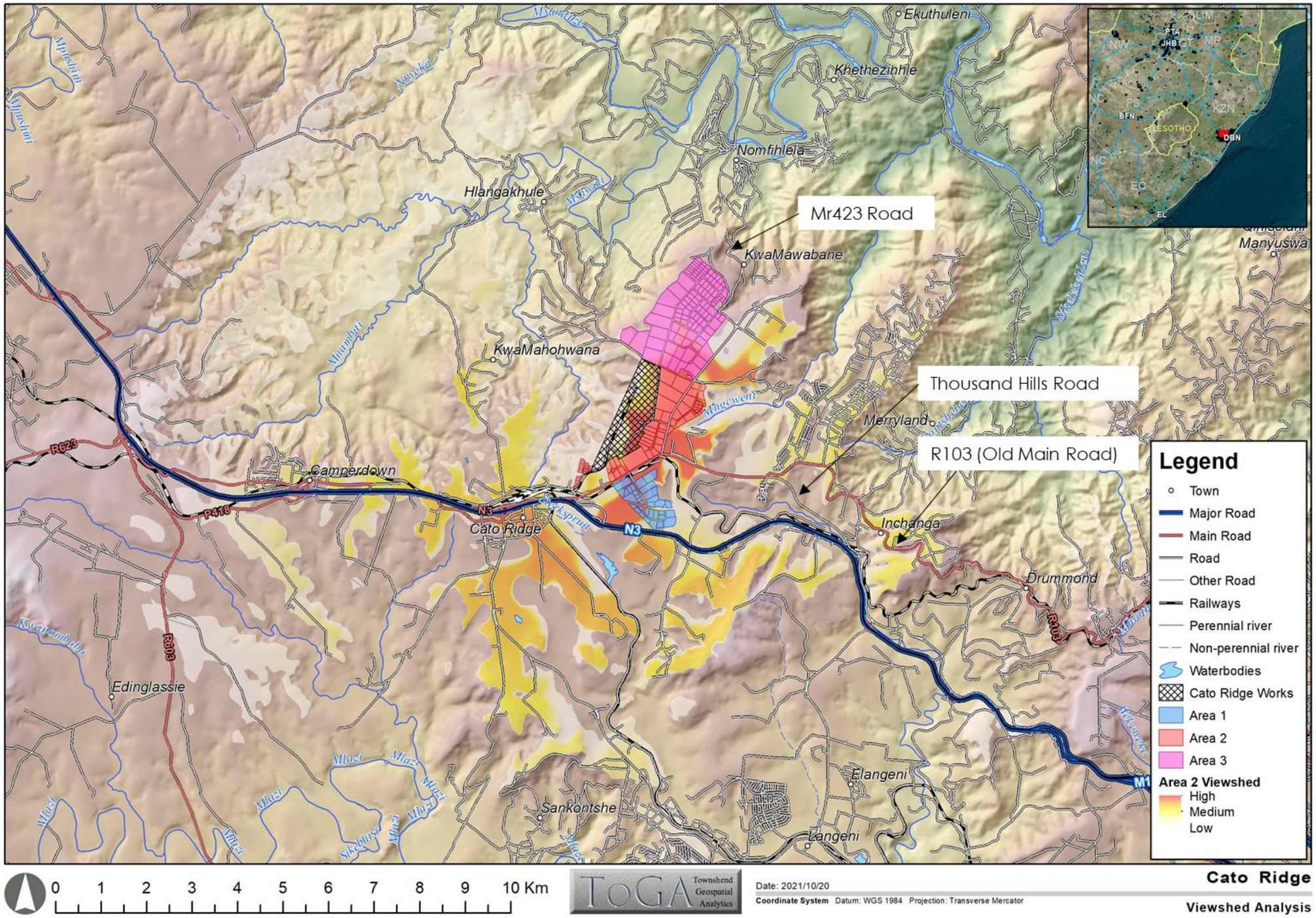

Figure 17: Viewshed Analysis_Phase 1 (PDA2)

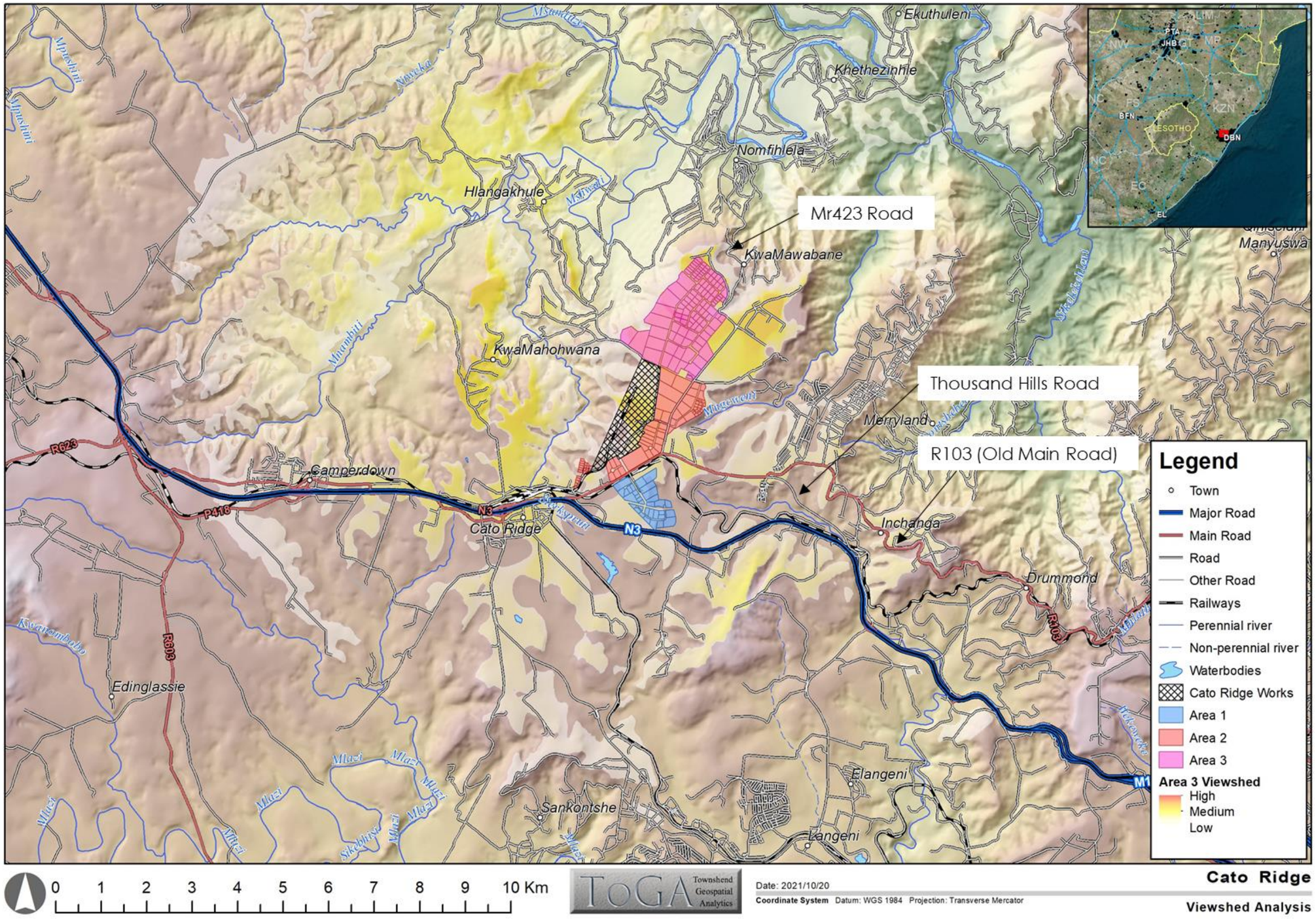

Figure 18: Viewshed Analysis_Phase 2 (PDA3)

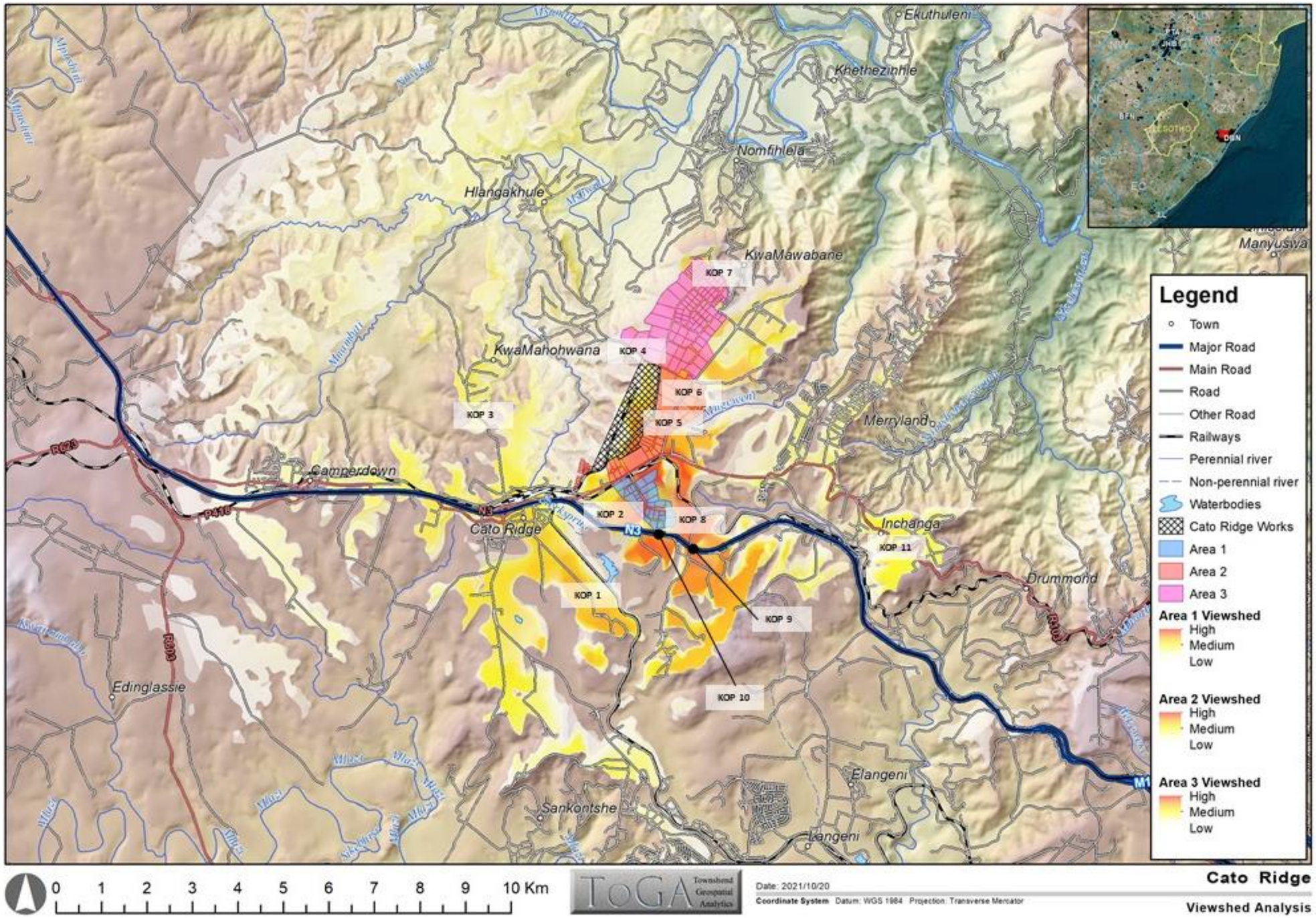

Figure 19: Viewshed Analysis _Combined

6.2.2 VISUAL RECEPTORS

Receptors are potential viewers of the proposed development. The perception of viewers is difficult to determine as there are many variables to consider such as:

- Familiarity with the actual scene;
- The location and context of the viewpoint;
- Circumstances that bring them into contact with that view (occupation or activity of the receptor) and;
- Nature and importance of the view (full or glimpsed, near or distant).

Other variables include cultural background, state of mind and how often the proposed project is viewed within a set period. Therefore, it is necessary to generalize the viewer sensitivity to some degree. Potential visual receptors that may be affected by the proposed project include:

- Users of recreational landscapes and public footpaths, including tourists and visitors;
- Residents;
- Users of public sports grounds and amenity open space;
- Users of public roads and railways;
- Workers; and
- Views of or from within valued landscapes.

Of the above visual receptors as mentioned above the most sensitive may include:

- Users of outdoor recreational facilities, whose attention or interest is focused on the landscape;
- Communities for whom the proposed development results in changes in the landscape setting or valued views that they enjoy; and
- Residential property owners with views affected by the proposed development.

The sensitivity of the receptors is indicated in Table 18 below and have been drawn from publicly accessible viewpoints, the sensitivity of which would be dependent on the location, the activity of the viewer and the importance of the view.

Table 18: Receptor sensitivity

Receptor sensitivity	Explanation
High	Views to and from scenic routes.
Moderate	Views to and from residential areas, agricultural areas, sporting / recreational areas or places of work.
Low	Views to and from industrial or degraded areas.

The following visual receptors have been identified in Table 19. Receptor locations are not only stationary but can also be roads along which people travel.

Table 19: Summary of key visual receptors

Visual receptors (Appendix C7)	Description (sensitivity of receptors)
Motorists travelling on the N3	These receptors attach a moderate–low value to aesthetics depending on the purpose and speed of travelling on the specific road.
Motorists travelling on the R103 Road	These receptors attach a moderate–low value to aesthetics depending on the purpose of travelling on the specific road.
Motorists travelling on local district roads linking rural settlements with industrial nodes and major roads	These receptors will mostly include local residents making short daily trips between schools, shops, hospitals, and work and will attach a moderate value to aesthetics.
Local residents from Denge and Siweni	These receptors attach a moderate-high value to aesthetics, depending on if they directly or indirectly benefit economically from the proposed development.
Motorists travelling along scenic roads en route to tourist destinations	These receptors attach a high value to aesthetics.

6.2.3 KOPS AND VIEW CORRIDORS

KOP's was identified based on prominent viewpoints where views towards the proposed project and associated infrastructure are either uninterrupted or partially uninterrupted as well as at points where positive viewshed areas intersect with potential receptors. The KOPs were selected within a 7 km buffer area of the proposed infrastructure. The KOP analyses were conducted by investigating the visual influence of the proposed infrastructure as per the available layout and information provided.

A list of key observation points as indicated in Table 20 has been confirmed during the site visit, refer to Figure 19 for their relationship to the different Phases/PDA's. The table below includes the applicable Phase/PDA, respective location, viewing direction, distance, visibility, receptor sensitivity, nature of the view as well as the type of view. Viewpoints mostly include views from important roads and areas of permanent settlement.

Table 20: Key observation points

Applicable Phase/PDA	KOP	GPS Location	Visibility	Receptor sensitivity	Nature of the view	Transient or stationary	Comment
Phase 3 (PDA1)	1	29°44'40.51"S 30°35'46.49"E Southwestern view from Shady Lane, next to the existing Cato Ridge golf course	Moderate	Moderate-High	Partial	Transient and Stationary	The proposed development for Phase 3 (PDA1) (as well as the existing Bakers Logistics warehouse) will be visible from this point. Even though there is no existing infrastructure located in the foreground or middle ground, existing trees

Applicable Phase/PDA	KOP	GPS Location	Visibility	Receptor sensitivity	Nature of the view	Transient or stationary	Comment
							provide texture and some screening.
Phase 3 (PDA1)	2	29°44'7.91"S 30°36'23.66"E Southern view from the D12 Road	High	Moderate	Full	Transient	KOP 2 provides open views towards the proposed development. Existing transmission lines are also visible from this point and clumps of trees provide some form of screening to the west.
Phase 1 (PDA2)	3	29°42'51.74"S 30°34'37.71"E Western view Buchanan Road	Marginal	Moderate	Partial	Transient	The view is framed by residential houses and the existing mining infrastructure is somewhat screened as a result of the topography. The development (located on the higher laying plateau) will however be visible.
Phase 2 (PDA3)	4	29°42'6.76"S 30°36'42.20"E Eastern view from the D1022 Road	High	Moderate-Low	Full	Transient	Views will be in close range of the proposed infrastructure and existing trees provide some form of visual screening, however, most of these trees do not appear in clumps and will most probably be removed during construction.
Phase 1 (PDA2)	5	29°43'1.77"S 30°37'13.12"E Western view from the Assmang Cato Ridge Works entrance road	High	Low	Full	Transient	Existing industrial infrastructure forms the backdrop of this view and proposed infrastructure located north and south of this point will be highly visible.
Phase 1 (PDA2)	6	29°42'35.19"S 30°37'32.65"E Southern view from Eddie Hagen Drive	High	Low-Moderate	Full	Transient	Views will be open (especially towards the east) as a result of the natural topography and a limited number

Applicable Phase/PDA	KOP	GPS Location	Visibility	Receptor sensitivity	Nature of the view	Transient or stationary	Comment
							of trees and existing infrastructure that offers screening.
Phase 2 (PDA3)	7	29°41'17.09"S 30°37'59.39"E Southern view from the northern access road on the boundary of Phase 2 (PDA3)	High	Moderate – High	Full	Transient and Stationary	From this point, the topography forms a convex curve (slopes upwards) towards a higher point in the landscape and therefore the horizon is foreshortened. Existing clumps of trees provide sufficient screening.
Phase 3 (PDA1)	8	29°44'21.15"S 30°37'33.72"E Western view from the D157 Road close to the existing Value Logistics Distribution Centre	High	Moderate	Full	Transient	This view opens up towards Phase 3 (PDA1) and the slight topographical incline allows for a full view over the shallow valley. The existing Bakers Transport warehouse is currently visible from this point.
Phase 3 (PDA1)	9	29°44'30.38"S 30°37'32.57"E Western view from the N3 Road	High	Moderate-Low	Full	Transient	Views open up towards Phase 3 (PDA1) after the D157 Road bridge and once past the clump of trees to the north.
Phase 3 (PDA1)	10	29°44'22.62"S 30°37'15.42"E Northern view from the D12 Road (running parallel with the N3 Road)	High	Moderate	Full	Transient	From the D12 road, Phase 3 (PDA1) is in full view with the existing Bakers Logistics and Value Logistics located to the east and west. An existing transmission corridor runs to the west and clumps of trees provides the landscape with some texture and colour contrast.
Phase 3 (PDA1)	11	29°44'25.72"S 30°40'12.82"E Western view from the R103 scenic road	Marginal	High-Moderate	Glimpse	Transient	The upper edges of (Phase 3 (PDA1) will be somewhat visible and protrude behind the

Applicable Phase/PDA	KOP	GPS Location	Visibility	Receptor sensitivity	Nature of the view	Transient or stationary	Comment
							existing Value Logistics Distribution Centre. A shallow landscape valley is visible in the middle ground with clumps of trees and the N3 Road providing contrast and diversity.

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Figure 20: KOP 1

Figure 21: KOP 2

Figure 22: KOP 3

Figure 23: KOP 4

Figure 24: KOP 5

Figure 25: KOP 6

Figure 26: KOP 7

Figure 27: KOP 8

Figure 28: KOP 9

Figure 29: KOP 10

Figure 30: KOP 11

7. Impact assessment, mitigation, and monitoring measures

Potential landscape and visual impacts associated with the proposed developments on the surrounding Study Area are discussed in the sections below according to the method outlined in Appendix B. This section presents an assessment of the significance of the impacts prior to mitigation and after mitigation when management and mitigation measures are put in place and taken into consideration, depending on whether mitigation measures are feasible and possible and assuming they are fully implemented. The tables below serve to summarise the significance of potential landscape and visual impacts for the individual Phase/PDAs.

Based on the type of infrastructure components and the nature of the receiving environment (obtained during the desktop study and confirmed during the site visit) the main landscape and visual issues identified are as follows:

- The visibility and visual exposure from proposed development (especially from Phase 3 (PDA1)) along the N3 Road;
- The Study Area is currently undeveloped and covered in vegetation. Development would result in a change in visual character from a 'wooded' unbuilt landscape to a built landscape;
- Visually intrusive construction activities such as the clearing of vegetation, earthworks (creation of platforms, cut and fill), deep trenching, building works, waste generation and temporary site offices;
- The visibility and visual exposure from proposed infrastructure to nearby residential areas (receptors residing permanently close to the Study Area);
- Visibility and visual exposure of proposed industrial type infrastructure from scenic roads, especially the change in views towards the steep escarpment;
- Expanding the existing footprint of industrial type infrastructure and buildings over a large area;
- Further degradation of the rural character and cultural village sense of place through the large-scale expansion of industrial type infrastructure;
- Increased levels of night time lighting within the Study Area;
- The visual upliftment of derelict land and potential transformation of existing structures/infrastructure through the introduction of new infrastructure within the area;
- The change in landscape character through subsequent, long term construction activities and the presence of heavy machinery.

7.1 LANDSCAPE IMPACTS

7.1.1 DESCRIPTION OF THE IMPACTS

Landscape impacts as a result of the proposed development relate to physical changes to the landscape which includes changes to the landscape character and to the landscape as a resource. Visual intrusion and VAC relate to the level of compatibility and the ability of the landscape to visually absorb the proposed infrastructure, including contrasts in form, line, colour and texture, mainly resulting from vegetation clearing and earthworks.

Landscape impacts during the construction and operation phases of the proposed development will include local changes to existing landscape views due to the extension of industrial type infrastructure and associated bulk infrastructure. During the construction stage,

additional impacts such as construction camps and the increase in construction vehicle activity will create further impacts in addition to the main infrastructure components. Landscape scarring from exposed cut slopes spoil sites and possible soil erosion around cleared areas during the construction phase of the project may also contribute to landscape impacts in localised areas. The tables below present the results of the landscape impacts.

Impacts on landscape character and sense of place

Table 21: Construction phase_ Impacts on landscape character and sense of place

ACTIVITY Description of proposed land use/ activity/ aspect	POTENTIAL ENVIRONMENTAL IMPACT Summary description of the impact	APPLICABLE AREA Site Camp/s, access routes and services corridors/ specific focus area or IAP study area	SIGNIFICANCE PRE-MITIGATION Results of application of impact assessment methodology							SUMMARY OF MITIGATION MEASURES Outline of recommended mitigation measures	SIGNIFICANCE POST-MITIGATION Results of application of impact assessment methodology						
			Intensity	Duration	Extent	Probability	Total	Status (pos/ neg)	Significance		Intensity	Duration	Extent	Probability	Total	Status (pos/ neg)	Significance
The change in landscape character through subsequent, long term construction activities and the presence of heavy machinery.	*Impact on landscape character and altering the sense of place.*	*PHASE 3 (PDA1)*	4	4	5	5	65	Neg.	Minor	None (except if opting for a no-go alternative)	4	4	5	5	65	Neg.	Minor
The change in landscape character through subsequent, long term construction activities and the presence of heavy machinery.	*Impact on landscape character and altering the sense of place.*	*PHASE 1 (PDA2)*	4	4	4	4	48	Neg	Minor		4	4	4	4	48	Neg.	Minor
The change in landscape character through subsequent, long term construction activities and the presence of heavy machinery.	*Impact on landscape character and altering the sense of place.*	*Phase 2 (PDA3)*	4	4	6	6	84	Neg	Moderate		4	4	6	6	84	Neg.	Moderate

Table 22: Operational phase_ Impacts on landscape character and sense of place

ACTIVITY Description of proposed land use/ activity/ aspect	POTENTIAL ENVIRONMENTAL IMPACT Summary description of the impact	APPLICABLE AREA Site Camp/s, access routes and services corridors/ specific focus area or IAP study area	SIGNIFICANCE PRE-MITIGATION Results of application of impact assessment methodology							SUMMARY OF MITIGATION MEASURES Outline of recommended mitigation measures	SIGNIFICANCE POST-MITIGATION Results of application of impact assessment methodology						
			Intensity	Duration	Extent	Probability	Total	Status (pos/neg)	Significance		Intensity	Duration	Extent	Probability	Total	Status (pos/neg)	Significance
The change in visual character from a 'wooded' unbuilt landscape to a built landscape.	*Impact on landscape character and altering the sense of place.*	*PHASE 3 (PDA1)*	3	7	5	5	75	Neg	Moderate	None (no-go alternative)	3	7	5	5	75	Neg	Moderate
The change in visual character from a 'wooded' unbuilt landscape to a built landscape	*Impact on landscape character and altering the sense of place.*	*Phase 2 (PDA3)*	3	7	4	4	56	Neg	Minor	None (no - go alternative)	3	7	4	4	56	Neg	Minor
Further degradation of the rural character and cultural village sense of place through the large-scale expansion of industrial type infrastructure.	*Impact on landscape character and altering the sense of place.*	*PHASE 3 (PDA1)*	3	7	5	6	90	Neg	Moderate	None (no - go alternative)	3	7	5	6	90	Neg	Moderate
Further degradation of the rural character and cultural village sense of place through the large-scale expansion of industrial type infrastructure.	*Impact on landscape character and altering the sense of place.*	*PHASE 1 (PDA2)*	3	7	4	4	56	Neg	Minor	None (no - go alternative)	3	7	4	4	56	Neg	Minor
Further degradation of the rural character and cultural village sense of place through the large-scale expansion of industrial type infrastructure.	*Impact on landscape character and altering the sense of place.*	*Phase 2 (PDA3)*	3	7	5	4	60	Neg	Minor	None (no - go alternative)	3	7	5	4	60	Neg	Minor

ACTIVITY Description of proposed land use/ activity/ aspect	POTENTIAL ENVIRONMENTAL IMPACT Summary description of the impact	APPLICABLE AREA Site Camp/s, access routes and services corridors/ specific focus area or IAP study area	SIGNIFICANCE PRE-MITIGATION Results of application of impact assessment methodology							SUMMARY OF MITIGATION MEASURES Outline of recommended mitigation measures	SIGNIFICANCE POST-MITIGATION Results of application of impact assessment methodology						
			Intensity	Duration	Extent	Probability	Total	Status (pos/neg)	Significance		Intensity	Duration	Extent	Probability	Total	Status (pos/neg)	Significance
The visual upliftment of derelict land and potential transformation of existing structures/infrastructure through the introduction of new infrastructure within the area.	*Impact on landscape character and altering the sense of place.*	*PDA1, PHASE 1 (PDA2), 3*	4	7	5	4	64	Pos	Minor	Refer to Table 25, "Summary of mitigation measures."	4	7	4	5	75	Pos	Moderate

Visual intrusion and VAC impacts

Table 23: Construction phase_Visual intrusion and VAC impacts

ACTIVITY Description of proposed land use/ activity/ aspect	POTENTIAL ENVIRONMENTAL IMPACT Summary description of the impact	APPLICABLE AREA Site Camp/s, access routes and services corridors/ specific focus area or IAP study area	SIGNIFICANCE PRE-MITIGATION Results of application of impact assessment methodology							SUMMARY OF MITIGATION MEASURES Outline of recommended mitigation measures	SIGNIFICANCE POST-MITIGATION Results of application of impact assessment methodology						
			Intensity	Duration	Extent	Probability	Total	Status (pos/neg)	Significance		Intensity	Duration	Extent	Probability	Total	Status (pos/neg)	Significance
*Visually intrusive construction activities such as the *clearing of vegetation, the increase in vehicular movement, **earthworks (creation of platforms/cut and fill), deep trenching, building works, waste generation and temporary site offices.*	*Loss of the landscape VAC leading to increased visual intrusion.*	*PHASE 3 (PDA1)*	3	4	5	6	72	Neg.	Minor	Dust minimization techniques must be implemented. All stockpiles are to be protected from dispersion as a result of wind and water. Temporary construction signs and barricading must be removed as soon as the particular activity or set of activities are complete and in accordance with health and safety requirements. Develop a method statement for post-construction rehabilitation that includes aspects such as: – Land restoration; – Topsoil storage and replacement; – Erosion control; – Alien plant control; and reseeding or revegetation (if applicable); and – post-construction monitoring of erosion and rehabilitation. (Use indigenous species for restoration). Ensure any imported materials (compost, soil, mulch etc.) and equipment/machinery is alien plant free. Construction camps must be set back from major or scenic roads and located in areas (where feasible) where large trees or topographical variations already offer some screening ability.	3	4	4	6	66	Neg.	Minor
*Visually intrusive construction activities such as the *clearing of vegetation, the increase in vehicular movement, **earthworks (creation of platforms/cut and fill), deep trenching, building works, waste generation and temporary site offices.*	*Loss of the landscape's VAC leading to increased visual intrusion.*	*PHASE 1 (PDA2)*	3	4	4	4	44	Neg.	Minor		3	4	3	3	30	Neg.	Negligible
*Visually intrusive construction activities such as the *clearing of vegetation, the increase in vehicular movement, earthworks (creation of platforms/cut and fill), deep trenching, building works, waste generation and temporary site offices.*	*Loss of the landscape's VAC leading to increased visual intrusion.*	*Phase 2 (PDA3)*	3	4	5	5	60	Neg.	Minor		3	4	4	5	55	Neg.	Minor

*Vegetation clearance includes the removal of tall trees (mostly exotic Gums) which will increase the visibility of the Study Area, reducing the overall VAC.
**Earthworks will create cut and fill of slopes and would result in visual scarring of the landscape.

Table 24: Operation phase_Visual intrusion and VAC impacts

ACTIVITY Description of proposed land use/ activity/ aspect	POTENTIAL ENVIRONMENTAL IMPACT Summary description of the impact	APPLICABLE AREA Site Camp/s, access routes and services corridors/ specific focus area or IAP study area	SIGNIFICANCE PRE-MITIGATION Results of application of impact assessment methodology							SUMMARY OF MITIGATION MEASURES Outline of recommended mitigation measures	SIGNIFICANCE POST-MITIGATION Results of application of impact assessment methodology						
			Intensity	Duration	Extent	Probability	Total	Status (pos / neg)	Significance		Intensity	Duration	Extent	Probability	Total	Status (pos/ neg)	Significance
Expanding the existing footprint of industrial type infrastructure and buildings over a large area.	*Loss of the landscape's VAC leading to increased visual intrusion.*	*PHASE 3 (PDA1)*	3	7	4	5	70	Neg	Minor	The development of architectural and landscape guidelines for proposed buildable areas. (The guidelines should not be restrictive but should promote an overall design sensitivity whilst allowing flexibility for individual expression by the end user).	3	7	2	5	60	Neg	Minor
Expanding the existing footprint of industrial type infrastructure and buildings over a large area.	*Loss of the landscape's VAC leading to increased visual intrusion.*	*PHASE 1 (PDA2)*	3	7	3	4	52	Neg	Minor	See column above	3	7	3	3	39	Neg	Minor
Expanding the existing footprint of industrial type infrastructure and buildings over a large area.	*Loss of the landscape's VAC leading to increased visual intrusion.*	*PHASE 2 (PDA3)*	3	7	5	5	75	Neg	Moderate	See column above	3	7	4	5	70	Neg	Minor

7.1.2 LANDSCAPE IMPACT SIGNIFICANCE

Landscape character and sense of place

Sense of place is the unique value that is allocated to a specific place or area through the cognitive experience of the user or receptor. It is generated by varying combinations of a range of factors including; land use, character, and quality of a landscape, as well as by the tangible and intangible value assigned thereto. As such, sense of place is a subjective matter that differs from person to person based on individual backgrounds, experiences, norms, values, and aspirations. While many factors influencing the sense of place are tangible (e.g., increased development, more people, noise, dust), the sense of place can also be significantly altered as a result of a change in intangible factors (e.g., socio-cultural norms and values). With an influx of people from outside the area, as well as work experience and increased disposable income, the local people will be exposed to differing world views, cultures, attitudes, norms, and values.

Naturally, people will begin to change based on these interactions. This change is likely to be experienced very gradually over time as people slowly become influenced and affected by these external factors. Some residents (predominantly young and more educated people) will welcome these changes and opportunities and will be able to maximise the resultant benefits. Other people (predominantly the elderly, less educated and more traditional) may find it difficult to adapt to the inevitable changes and will therefore be more likely to experience the negative impacts more acutely.

Existing mining-related and light industrial activities/infrastructure already contribute to the sense of place. Sense of place also have a strong relationship with the heritage or cultural value of the landscape. Heritage sites with various significance ranging from low - high have been identified and is indicated in Appendix A (refer to Figure A 1 - Figure A 3). Some of these sites (like graves and remnants of ancestral homesteads or farmsteads) could potentially have high value for specific families or groups of people and therefore the potential impact on sense of place will be higher for these individuals. It is however anticipated that the vast majority of visual receptors (especially people traveling through the area) will not be aware of these specific sites and will therefore have no spiritual or cultural connection as such.

The significance of the impacts on the landscape character and sense of place will be negative (minor – moderate) during the construction phase of the project (the impact significance will be slightly more for Phase 2 (PDA3) due to the largely unaltered site which, compared to the other two Phase/PDAs, are further removed from busy main roads and existing industrial activities).

During the operational phase of the project, the significance of the impacts on the landscape character and sense of place will be negative (minor–moderate). The significance of permanent landscape impacts will be higher for Phase 3 (PDA1) as a result of its close proximity to the landscape scenery south of the N3 Road which is mostly dominated by rural and agricultural activities, with few large-scale anthropogenic structures in sight (N3 Road and some larger warehouses located in isolated locations).

These changes to the landscape character and sense of place will have both positive and negative impacts within the landscape setting. Positive impacts may be increased through the implementation of enhancement measures such as the implementation of building and landscape architectural guidelines.

The negative impacts could give rise to increased levels of anxiety, tension and conflict and cannot be mitigated directly through visual mitigation measures and must be addressed indirectly through the proposed mitigation measures under the social/economic impact assessment.

Visual intrusion and VAC

Visual intrusion will be lower (negligible – minor) during the construction phase and range from moderate–minor during the operational phase. VAC levels increase where additional infrastructure of similar nature will be added as "expansion works", for example, further infill development along Eddie Hagen Drive and the R103 Road. Where current light industrial activities/infrastructure dominate the landscape scene, visual intrusion will be reduced. This is especially true for Phase 3 (PDA1) and Phase 1 (PDA2), where similar type of infrastructure is visible along sections of Eddie Hagen drive, the R103 and in sections that are in close proximity to larger warehouse facilities such as Value Logistics and Bakers Transport.

Visual intrusion will increase (and VAC will decrease) where infrastructure is located on higher-lying areas such as the plateau forming part of Phase 1 (PDA2) and 3, however, the visual dominance of existing mining infrastructure will lower the overall visual intrusion of Phase 1 (PDA2) (Minor), compared to Phase 2 (PDA3) (Moderate–Minor). The implementation of mitigation measures and the possible inclusion of recommendation measures will allow for infrastructure to be less noticeable and will further increase the landscape's VAC. The impacts on the VAC and visual intrusion can be somewhat mitigated during the operation phase but less so during the construction phase.

7.2 VISUAL IMPACTS

7.2.1 DESCRIPTION OF THE IMPACTS

Visual impacts relate to the recording of existing views and the determination of potential impacts as perceived by those living, working, and visiting the area. Infrastructure within visually significant locations will detract from the existing cultural landscape and interfere with the viewsheds of receptors, including road users of main roads such as the N3 Road, R103 Road and local village settlements in close proximity of the infrastructure. Night time lighting during the construction period will mostly be associated with temporary construction camps and vehicles. Permanent lights during the operational phase will mostly be associated with security lighting and signage. The tables below present the results of the visual impacts.

Impacts from visibility and visual exposure

Table 25: Operation phase_Visibility and visual exposure

ACTIVITY Description of proposed land use/ activity/ aspect	POTENTIAL ENVIRONMENTAL IMPACT Summary description of the impact	APPLICABLE AREA Site Camp/s, access routes and services corridors/ specific focus area or IAP study area	SIGNIFICANCE PRE-MITIGATION Results of application of impact assessment methodology							SUMMARY OF MITIGATION MEASURES Outline of recommended mitigation measures	SIGNIFICANCE POST-MITIGATION Results of application of impact assessment methodology						
			Intensity	Duration	Extent	Probability	Total	Status (pos/neg	Significance		Intensity	Duration	Extent	Probability	Total	Status (pos/neg)	Significance
The visibility and visual exposure from proposed development along the N3 Road.	*Impact on potential sensitive visual receptors*	*PHASE 3 (PDA1)*	3	7	5	6	90	Neg	Moderate	Existing opportunities which include areas set out for conservation purposes, rural residential and areas which are too steep for development will provide natural screening to variable extents. The development of landscape architectural guidelines and masterplan. ***Also refer to proposed recommendation measures for impacts related to visibility and visual exposure.**	3	7	4	6	84	Neg	Moderate
The visibility and visual exposure from proposed infrastructure to nearby residential areas on receptors residing permanently close to the Phase /PDA.	*Impact on potential sensitive visual receptors*	*PHASE 1 (PDA2)*	3	7	3	4	52	Neg	Minor	See column above	3	7	2	3	36	Neg	Minor
The visibility and visual exposure from proposed infrastructure to nearby residential areas on receptors residing permanently close to the Phase /PDA.	*Impact on potential sensitive visual receptors*	*Phase 2 (PDA3)*	3	7	5	5	75	Neg	Moderate	See column above	3	7	4	5	70	Neg	Minor
Visibility and visual exposure of proposed industrial type infrastructure from scenic roads, especially the change in views towards the steep escarpment.	*Impact on potential sensitive visual receptors*	*Phase 2 (PDA3)*	3	7	4	4	56	Neg	Minor	See column above	3	7	3	4	52	Neg	Minor

**Mitigation measures for potential landscape and visual impacts which could potentially occur during the operational phase of the project will have to be incorporated during the initial planning phase. The ultimate developers/ tenants would be responsible for mitigating visual impacts based on their specific development during operational phase. Given that this is not known at this stage, the mitigation measures are generic and will need to be refined once the specific site development plans are finalised.*

Proposed recommendation measures related to visibility and visual exposure

The following recommendation measures are proposed in order to potentially minimize the impact as a result of visibility and visual exposure and could be considered for inclusion in the overall landscape and architectural guidelines / master plan *based on practical feasibility and at the discretion of the professional team.*

- Existing vegetation patches within the Study Area should be maintained as green buffers (as far as possible and practically feasible). A site viability survey should be undertaken to identify trees and pockets of trees that are healthy and of good visual value, this will help to visually soften developments and produce more greening and visual screening in between buildings and various infrastructure. Even though most of the vegetation is exotic, a management plan must be drawn up to systematically remove exotic plants and replace them with indigenous plants;
- The wide grassed road servitude and scattered planting, north and south of the R103 and Eddie Hagan Drive already offer some visual screening. Visual impacts from these roads towards industrial activities can be further screened through denser planting of trees and shrubs along these sections (this will also assist with screening of the existing unsightly concrete fence);
- The section of land between the existing road and the northern boundary of Phase 2 (PDA3) (on current layouts approximately 10 m) must be landscaped (berms, trees, and shrubs) with indigenous vegetation to provide visual screening between existing rural houses and proposed industrial infrastructure;
- The physical reforming of the landscape for development, such as terracing and cut to fill for roads and buildings, must be designed to minimise visual impact. A Landscape Architect must be appointed at the early stages of the project to work with engineers/town planners in developing this plan;
- If feasible, the existing grassed berm at the split between Eddie Hagen Drive and the R103 must be kept and utilised as a visual screen, additional trees and shrubs must be planted to enhance this measure;
- Specific objectives in terms of visual screening which can be included as part of the landscape guidelines include the following:
  - Guidelines on the planting of indigenous trees and shrubs along access streets, new buildings and open spaces which allow for the medium- and long-term visual screening of the developments;
  - Minimal paving and hard surfaces must be introduced to open spaces (turning circles and sidewalks) and the greening of these areas must be encouraged;
  - Landscape guidelines for owners must specify a mix of lawn, trees and shrubs, with the importance of large shrubs and trees emphasised to provide further greening;
  - Provide guidelines on visually permeable boundary treatments. To reduce visual intrusion. Fences must be of a robust permeable mesh type in a dark grey or green colour. Razor wire, palisade fencing, shiny galvanized or white coloured fencing must be avoided for permanent security fencing around infrastructure areas. Electrification and isolators to be in matching colour. (Use fencing for most sections and walls at entrances only).

Impacts from night time lighting

Table 26: Construction phase - Impacts from night time lighting

ACTIVITY Description of proposed land use/ activity/ aspect	POTENTIAL ENVIRONMENTAL IMPACT Summary description of the impact	APPLICABLE AREA Site Camp/s, access routes and services corridors/ specific focus area or IAP study area	SIGNIFICANCE PRE-MITIGATION Results of application of impact assessment methodology							SUMMARY OF MITIGATION MEASURES Outline of recommended mitigation measures	SIGNIFICANCE POST-MITIGATION Results of application of impact assessment methodology						
			Intensity	Duration	Extent	Probability	Total	Status (pos/ neg)	Significance		Intensity	Duration	Extent	Probability	Total	Status (pos/ neg)	Significance
Increased levels of night time lighting within the Study Area.	*Visibility of night time lighting*	*PHASE 3 (PDA1), PHASE 1 (PDA2) Phase 2 (PDA3),*	3	4	3	4	40	Neg	Minor	Construction activities must be kept to daylight hours in order to limit the need for bright floodlighting and the potential for skyglow.	3	4	1	3	24	Neg	Negligible

Table 27: Operation phase - Impacts from night time lighting

ACTIVITY Description of proposed land use/ activity/ aspect	POTENTIAL ENVIRONMENTAL IMPACT Summary description of the impact	APPLICABLE AREA Site Camp/s, access routes and services corridors/ specific focus area or IAP study area	SIGNIFICANCE PRE-MITIGATION Results of application of impact assessment methodology							SUMMARY OF MITIGATION MEASURES Outline of recommended mitigation measures	SIGNIFICANCE POST-MITIGATION Results of application of impact assessment methodology						
			Intensity	Duration	Extent	Probability	Total	Status (pos/ neg)	Significance		Intensity	Duration	Extent	Probability	Total	Status (pos/ neg)	Significance
Increased levels of night time lighting within Phase 3 (PDA1)	*Visibility of night time lighting*	*PHASE 3 (PDA1)*	5	7	3	5	75	Neg	Moderate	Draw up external lighting restrictions and guidelines this will form part of the Architectural Guidelines. ***Also refer to proposed recommendation measures for impacts related to lights at night.**	4	7	3	5	70	Neg	Minor
Increased levels of night time lighting within Phase 1 (PDA2)	*Visibility of night time lighting*	*PHASE 1 (PDA2)*	3	7	3	4	52	Neg	Minor	See column above	2	7	3	3	36	Neg	Minor
Increased levels of night time lighting within Phase 2 (PDA3)	*Visibility of night time lighting*	*Phase 2 (PDA3)*	5	7	3	5	75	Neg	Moderate	See column above	4	7	3	5	70	Neg	Minor

Proposed recommendations related to impacts of lights at night

The following recommendation measures are proposed in order to potentially minimize the impact as a result of visibility and visual exposure and could be considered for inclusion in the overall landscape and architectural guidelines/ master plan based on the discretion of professional team.

- All lighting is to be kept to a minimum within the requirements of safety and efficiency;
- Low-level lighting, or limit mounting heights of lighting fixtures by utilising footlight or bollard level lights. The use of high light masts and high pole top security lighting should be avoided along the security fence of infrastructure areas. Any high-level masts should be covered to reduce glow and light spillage;
- Use minimum lumen or wattage in light fixtures, where possible and practical;
- Uplighting of structures must be avoided where possible, with lighting installed downward angles that provide precisely directed illumination beyond the immediate surroundings of the infrastructure, thereby minimising the light spill and trespass;
- No unshielded light sources are to be directly visible on any exterior surface or facade -, except for reflected light;
- All buildings must have "full cut off" light fixtures that direct light only below the horizontal;
- Use low-pressure sodium lamps, yellow LED lighting, or equivalent to reduce sky glow. (Bluish white lighting is more likely to cause glare).
- Make use of motion detectors on security lighting at office and workshop areas.

7.2.2 VISUAL IMPACT SIGNIFICANCE

Visibility and visual exposure

Visibility and visual exposure will be minor–moderate, with higher visibility for Phase 3 (PDA1), where the topography slightly tilts upwards from the N3 Road, offering open views for motorists and for receptors driving along dirt roads located directly south of the Phase/PDA. Visual exposure and visibility (as a result of the close proximity) will be highest for permanent residents located within close range to Phase 2 (PDA3), compared to permanent receptors which have views towards Phase 1 (PDA2). As a result of the distance, screening properties of existing vegetation, topography, and infrastructure the proposed infrastructure will not dominate views from scenic roads located east of the Study Area. Proposed development (especially on Phase 1 (PDA2)) will screen mining-related infrastructure from Eddie Hagen Drive.

Visibility and visual exposure along the scenic roads west of the Study Area will be more significant as the change in view will be more noticeable. Current views towards the northern plateau horizon indicate a visually smooth, continuous line, which will, through the proposed development, be broken up by buildings and related infrastructure and, from a distance, represent a series of geometric shapes. The proposed water tower with a height of 25m and a holding capacity of 2ML will be the most prominent feature if viewed from this location, especially if the proposed buildings/infrastructure located to the west have a much lower height.

Visibility and visual exposure will be highest just after construction. Visual impacts due to visibility and visual exposures will decrease to some extent if mitigation and recommendation measures are implemented and through the utilisation of existing site opportunities (such as screening from established trees and berms). This must be further explored and developed during the design and planning phase of the project.

Night time lighting

Additional infrastructure will further contribute to sky glow and night time lighting in the area. During the construction phase, the impact significance due to night time lighting will be greatly reduced if construction activities are limited to daylight hours and the residual impact which will remain, will mainly include security lighting at construction camps. The significance of permanent lights within the Study Area will be moderate as the extent of the proposed infrastructure footprint area is large with no night time lighting currently associated with any of the Phase/PDAs. Night time lighting from Phase 3 (PDA1) will have the greatest impact significance on motorists driving on the N3 Road, where it is assumed that lighting from these buildings will be a prominent architectural design feature. Night time lighting from Phase 2 (PDA3) will have the greatest impact on nearby rural communities which currently experience low levels of light at night. Exterior lighting can be reduced through the implementation of recommendation measures.

7.2.3 CUMULATIVE IMPACTS

A "cumulative impact" is defined in the EIA regulations, 2014 as 'past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities'.

Cumulative landscape effects can impact either the physical fabric or character of the landscape. Cumulative landscape and visual impacts can be caused by combined visibility which occurs where the receptor can see two or more developments from one viewpoint and/or sequential effects which occur when the receptor must move to another viewpoint to see different developments. Types of cumulative landscape and visual effects are shown in Table 28 and include:

- Extension to an existing development;
- Filling an area with similar types of development;
- Interactions with different types of development;
- Incremental change because of successive individual developments; and
- Landscape and visual impacts (effects) resulting from future actions.

The cumulative impacts apply to the broader study area of the Cato Ridge Local Area Plan. Refer to Figure 31 below which is an extraction from the Cato Ridge LAP, 2018.

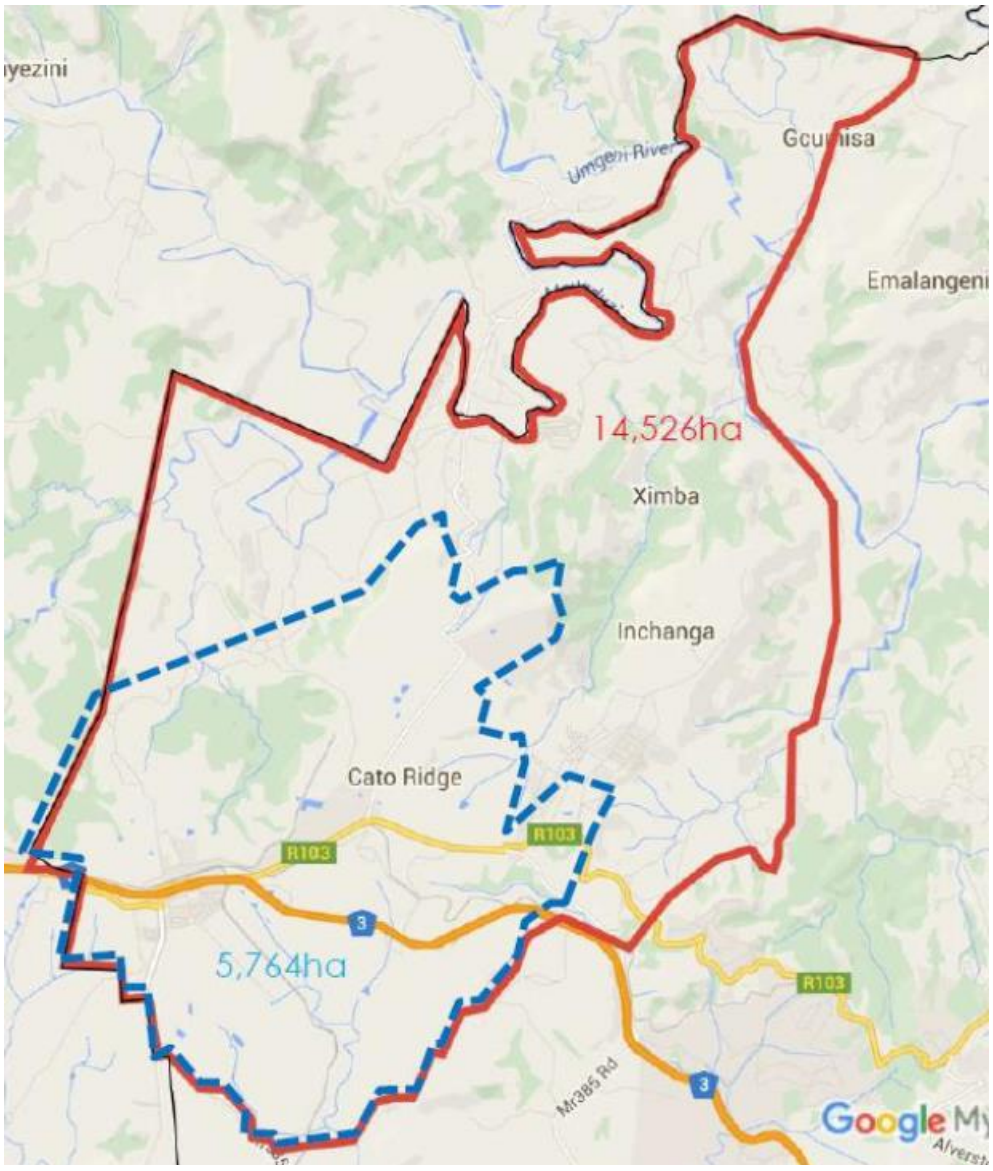

Figure 31: Study Area boundary for cumulative impacts

Table 28: Types of cumulative landscape and visual impacts (SNH, 2012)

Generic	Specific	Characteristics
Combined		
Occurs where the receptor can see two or more developments from one viewpoint	In combination	Where two or more developments are or would be within the receptor's arc of vision at the same time without him/her moving his/her head.
	In succession	Where the receptor must turn his/her head to see the various developments, actual and proposed.
Sequential		
Occurs if the receptor must move to another viewpoint to see the same or different developments. Sequential effects may be assessed for travel along regularly used routes or such as major roads or popular paths.	Frequently sequential	Where the features occur regularly and with short time lapses between instances depending on speed of travel and distances between the viewpoints.
	Occasionally sequential	Where longer time lapses between appearances would occur because the receptor is moving very slowly or there is a larger distance between the viewpoints.

Considering the existing context and the development within the proposed Study Area, the following cumulative landscape and visual impacts are indicated in Table 29.

Table 29: Cumulative impacts

Impact	Type of cumulative impact	Cumulative significance of visual / landscape impact
Visual amenity could be positively impacted through the introduction of the new urban development and the associated standardisation of architectural guidelines. This could potentially lead to other existing developments to upgrade their infrastructure to a similar look and feel.	Combined	Minor (positive)
An increase in development could lead to additive impacts due to the influx of people and sprawling of informal buildings along roads.	Combined	Moderate (negative)
Incremental urban development will result in the loss of the rural character of the area south of the N3, however, the concentration of industrial activities north of the N3 would reduce the impacts of land use change south of N3.	Sequential	Minor (positive) Low (negative)
New development will make the existing Assmang Cato Ridge Works less conspicuous as it will stand in relation to a built-up area vs. open land (reduced visual intrusion). An increase in visual screening/berms will also lower the overall visibility.	Combined	Minor (positive)
The proposed industrial land uses, and upgrade of road infrastructure could potentially	Combined	Low (negative)

Impact	Type of cumulative impact	Cumulative significance of visual /landscape impact
lead to increased heavy vehicle traffic in the area, which will negatively impact the overall rural character in areas adjacent to the various Phase/PDAs.		
Current warehouses and logistic facilities (north of the N3) which are currently visible, but not that noticeable, will become more noticeable through the massing of similar type structures.	Combined	Low (negative)
The proposed developments will cumulatively add to the existing industrial sense of place and consolidate industrial land uses north of the N3 as per LAP.	Combined/Sequential	Moderate (negative)

7.3 NO GO ALTERNATIVE

The No-Go Option should the Cato Ridge Land Development and Release Project not proceed would be that CRDC not pursue any development of the land. The site will remain in the ownership of CRDC/ Assmang and the status quo will be retained for the site.

For purposes of comparative assessment in terms of the EIA, a likely worst-case scenario approach for the no-go option is considered and compared with the impact assessment for the worst-case scenario preferred development alternative for consistency. Extrapolating the existing land use practices under a no-go development option, it is reasonable to assume that incursions onto the property for illegal sand mining, waste dumping, grazing (including burning) and informal settlements would continue. The landowner would continue to manage the areas together with law enforcement to the extent reasonable. However, historical impacts and in the absence of additional income to facilitate an intensified management approach to the land, it would be reasonable to assume that these impacts would continue and possibly escalate as the surrounding rural communities continue to expand and densify, creating increasing demand for land and resources. The likely impact scenario for landscape and visual resources in the event of a no-go development scenario is indicated in the table below.

Table 30: No go alternative assessment

ACTIVITY Description of proposed land use/	**POTENTIAL ENVIRONMENTAL IMPACT** Summary description of impact	**APPLICABLE AREA** Development Areas	**SIGNIFICANCE** Results of application of impact assessment methodology						
			Intensity	**Duration**	**Extent**	**Probability**	**Total**	**Status (pos / neg)**	**Significance**
NO GO Alternative	Increased land degradation in terms of illegal dumping, littering and anticipated hap hazardous placement of informal/illegal structures.	All	4	7	3	6	84	Neg	Moderate

7.4 MONITORING PROGRAMME

The following sections 7.4.1 - 7.4.3 serve as recommendations only , the final scope and involvement of a Landscape Architect must be determined by the client and the professional team.

7.4.1 PLANNING PHASE

During this phase, a Landscape Architect (LA) must be appointed as part of the design team. The LA must be professionally registered and experienced in these types of projects and will need to be monitored by the Environmental Control Officer (ECO)/ Environmental Assessment Practitioner (EAP) or the Local Authority.

- Consulting with Engineers and Architects to ensure that sensitive earthwork and buildings design development occurs, to reduce construction and operation phase landscape and visual impacts;
- Work with the Surveyor, arborist and planners to establish which trees are to remain on site for visual screening and apply this information in the design of the civil and building works;
- Preparation of a Landscape Master Plan. The plan must include the findings of the tree survey, including trees and indigenous vegetation to be retained, vegetation to be removed, the planting of indigenous trees and phasing out of exotic trees in areas between development, 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; and
- The LA must prepare a Landscape Operation and Maintenance Plan for the ongoing management of the whole Phase/PDAs' landscape development.

7.4.2 CONSTRUCTION PHASE

During this phase, a LA must continue to monitor the management of trees, earthworks and the implementation of the Landscape Master Plan and establishment thereof. The retention and performance of the LA will need to be monitored by the ECO/EAP.

The architectural building guidelines are to be implemented and monitored by the Architect and ECO. This must happen at the plan approval stage as well as during construction.

7.4.3 OPERATIONAL PHASE

The LA is to be retained to monitor the landscape development on private open space and to advise landowners on landscape and visual aspects. This appointment and performance are to be monitored by the ECO/EAP/Environmental Authority.

8. Conclusion

The Study Area forms part of the national SIP 2: Durban-Free State-Gauteng and is located within eThekwini's Primary Corridor and a proposed logistics hub as per the eThekwini Local Area Plan (LAP). Cato Ridge has also been identified as a potential industrial and logistics node and falls under the KZN Industrial and Logistics Hub (Region 1). (Zutari, 2021). The proposed development fulfils the requirements and the objectives as set out by the Cato Ridge LAP.

The Study Area consists of a mix between the natural and built environments with local topographical variations and existing clumps of trees and berms, allowing for some visual screening opportunities in isolated locations. The busy transportation networks, existing light industrial and mining-related infrastructure and dispersed rural houses offer a diverse visual character. Visual quality tends to decrease as there is an increase in industrial activities, and as such, the visual sensitivity of the different Phase/PDAs varies, and receptors may value the existing undeveloped (green land) within the urban and developed environment.

Various landscape and visual impacts are expected which will mostly result in an adverse effect on important views (such as those from the N3) and impaired views from residents permanently residing in the area. The change in the landscape character of the different Phase/PDAs is mostly a result of the removal of existing grassland and woodland vegetation, implementation of earthworks, the construction of the proposed developments and the implementation of bulk infrastructure. However, visibility is limited, mainly due to the existing undulating topography, especially for Phase 2 (PDA3) where the escarpment encloses views from the north and west (views from the east is affected to a lesser extent). The overall visibility will be minor–moderate. Various cumulative impacts have been identified which are mostly as a result of infill development (similar types of development) and incremental change because of successive individual developments and this will further contribute to the industrial nature and visual character of the area.

The intensity of the landscape and visual impacts can be reduced to some degree through the implementation of proposed mitigation measures, which include building aesthetics (architectural guidelines on finishes and colours), lighting design, visual screening, the positioning of buildings on sites and the inclusion of an overall landscape master plan for the Study Area. The change in landscape and visual character is also positive as the proposed development will consolidate industrial development, and with the implementation of enhancement/mitigation measures, could potentially ameliorate the negative visual impacts of old infrastructure and derelict open areas within the Study Area. The implementation and monitoring of the proposed mitigation measures, such as architectural guidelines and the landscape master plan, could also further offer a sense of orientation and urban hierarchy which can positively contribute to the overall sense of place.

With reference to Oberholzer, B (2005) a moderate–high visual impact is expected. With the implementation of the proposed landscape and visual mitigation measures, the overall visual impact for the Study Area will be low–moderate and from a visual perspective is not fatally flawed. This is largely as a result of:

- The relatively small visual envelope (natural topography restricts most of the views);
- Most receptors will be in transit and will only have brief views towards the proposed development/s;
- There are already existing developments of similar nature within the Study Area; and
- Depending on the viewing location, some views will potentially remain unchanged as existing infrastructure will obscure views towards new developments.

Based on the outcomes of this visual assessment and assuming the mitigations measures, and recommendation are adequately implemented, the specialist finds no visual impediment to the application for environmental authorisation.

9. References

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Appendix A _ Method of assessment

The following methods of assessment for determining the level of detail of the assessment were utilised in this report (Oberholzer, 2005):

Table A 1: Categories of development and impact severity

CATEGORIES OF DEVELOPMENT AND IMPACT SEVERITY					
Type of environment	**Category 1 development**	**Category 2 development**	**Category 3 development**	**Category 4 development**	**Category 5 development**
Protected/wild areas of international, national or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of moderate scenic, cultural, historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected
Areas or routes of low scenic, cultural, historical significance/disturbed	Little or no visual impact expected, possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites/run-down areas/ wasteland	Little or no visual impact expected, possible benefits	Little or no visual impact expected, possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

The following key provides an explanation to the categories of development:

Table A 2: Key categories of development

Category 1 development:

e.g., nature reserves, nature-related recreation, camping, picnicking, trails, and minimal visitor facilities.

Category 2 development:

e.g., low-key recreation / resort / residential type development, small-scale agriculture / nurseries, narrow roads and small-scale infrastructure.

Category 3 development:

e.g., low-density resort / residential type development, golf or polo estates, low to medium-scale infrastructure.

Category 4 development:

e.g., medium density residential development, sports facilities, small-scale commercial facilities/office parks, one-stop petrol stations, light industry, medium-scale infrastructure.

Category 5 development:

e.g., high-density township / residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, powerlines, freeways, toll roads, large scale infrastructure generally. Large-scale development of agricultural land and commercial tree plantations. Quarrying and mining activities with related infrastructure.

Table A 3: Key categories of issues

Very high visual impact expected:

Potentially significant effect on wilderness quality or scenic resources;
Fundamental change in the visual character of the area;
Establishes a major precedent for development in the area.

High visual impact expected:

Potential intrusion on protected landscapes or scenic resources;
Noticeable change in visual character of the area;
Establishes a new precedent for development in the area.

Moderate visual impact expected:

Potentially some effect on protected landscapes or scenic resources;
Some change in the visual character of the area;
Introduces new development or adds to existing development in the area.

Minimal visual impact expected:

Potentially low level of intrusion on landscapes or scenic resources;
Limited change in the visual character of the area;
Low-key development, similar in nature to existing development.

Little or no visual impact expected:

Potentially little influence on scenic resources or visual character of the area;
Generally compatible with existing development in the area;
Possible scope for enhancement of the area.

From the above, the severity of the impact determines the level of the assessment:

TABLE A 4: CATEGORISATION OF APPROACHES USED FOR VISUAL ASSESSMENT

Approach	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	Very high visual impact expected
Level of visual input recommended	Level 1	Level 2	Level 3	Level 4	

The following box explains the inputs required at each level of assessment. As indicated in Section 1.5, a Level 4 assessment is required for the proposed project (Oberholzer, 2005).

Level 1 input:

Identification of issues, and site visit;
Brief comment on visual influence of the project and an indication of the expected impacts/benefits.

Level 2 input:

Identification of issues raised in scoping phase, and site visit;
Description of the receiving environment and the proposed project;
Establishment of Receptor Site area and receptors;
Brief indication of potential visual impacts, and possible mitigation measures.

Level 3 assessment:

Identification of issues raised in scoping phase, and site visit;
Description of the receiving environment and the proposed project;
Establishment of receptor site area, view corridors, viewpoints and receptors;
Indication of potential visual impacts using established criteria;
Inclusion of potential lighting impacts at night;
Description of alternatives, mitigation measures and monitoring programmes;
Review by independent, experienced visual specialist (if required).

Level 4 assessment:

As per Level 3 assessment, plus complete 3D modelling and simulations (if applicable) with and without mitigation;
Review by independent, experienced visual specialist (if required).

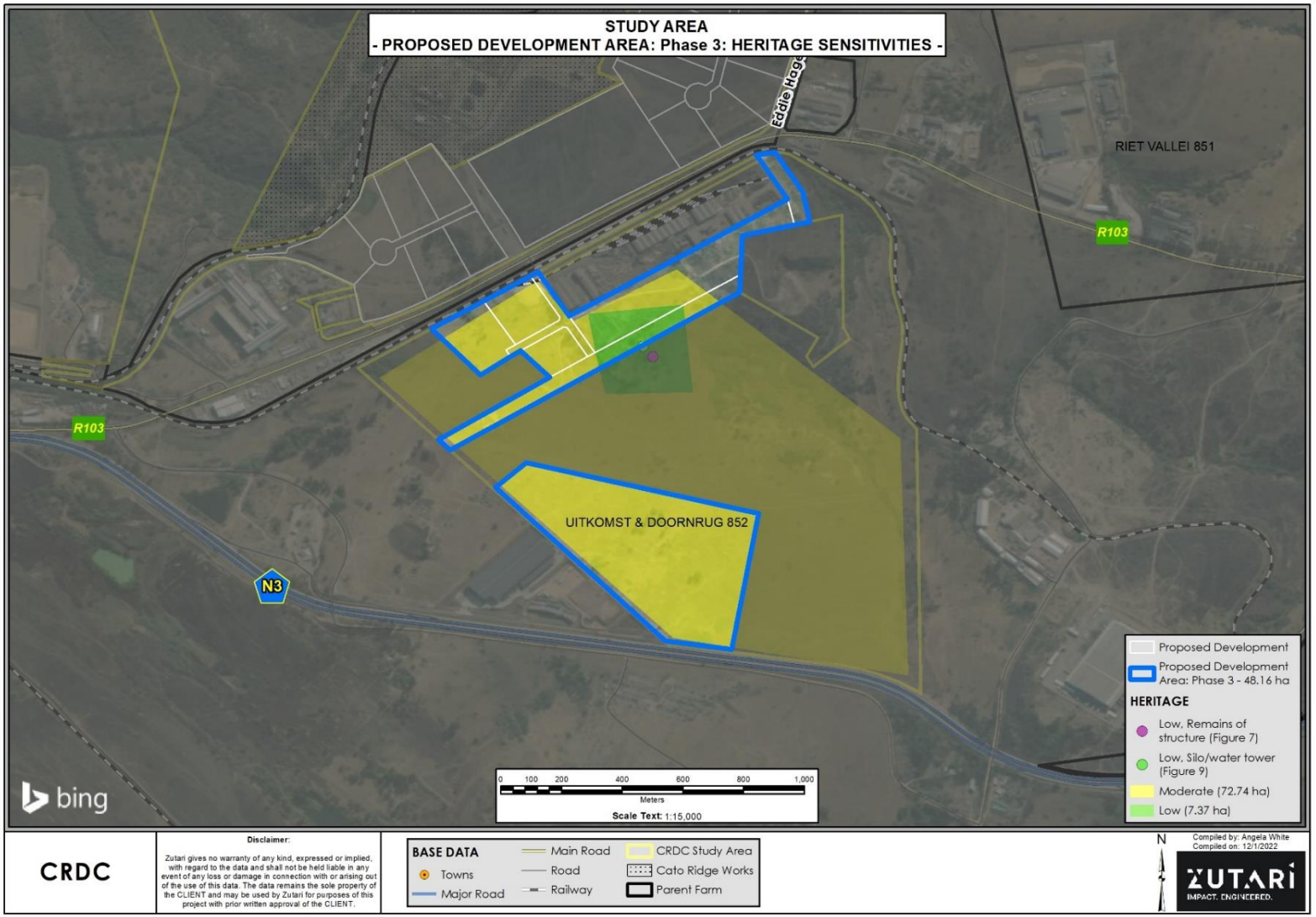

Figure A 1: Heritage sites and significance _PDA1

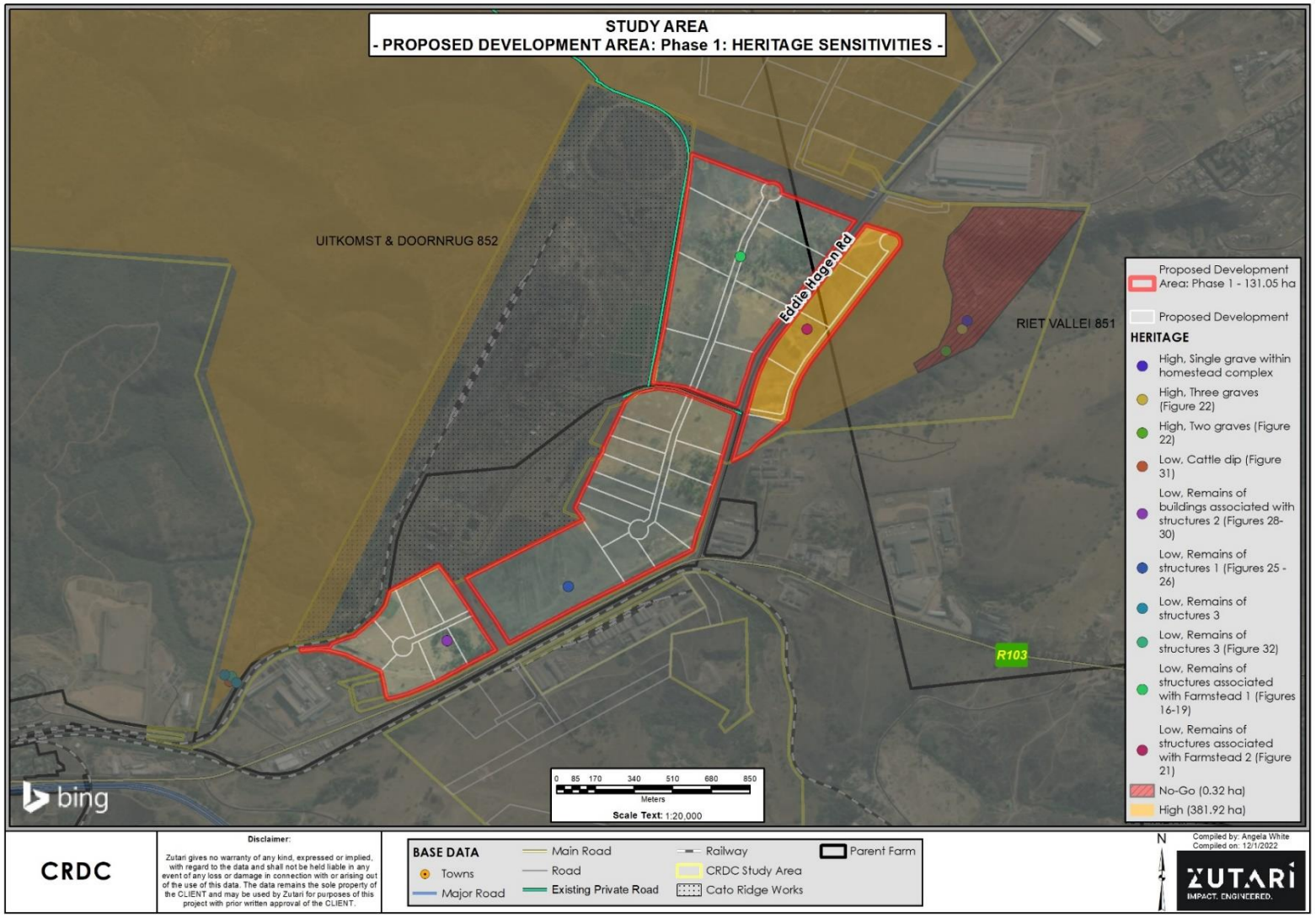

Figure A 2: Heritage sites and significance _PDA2

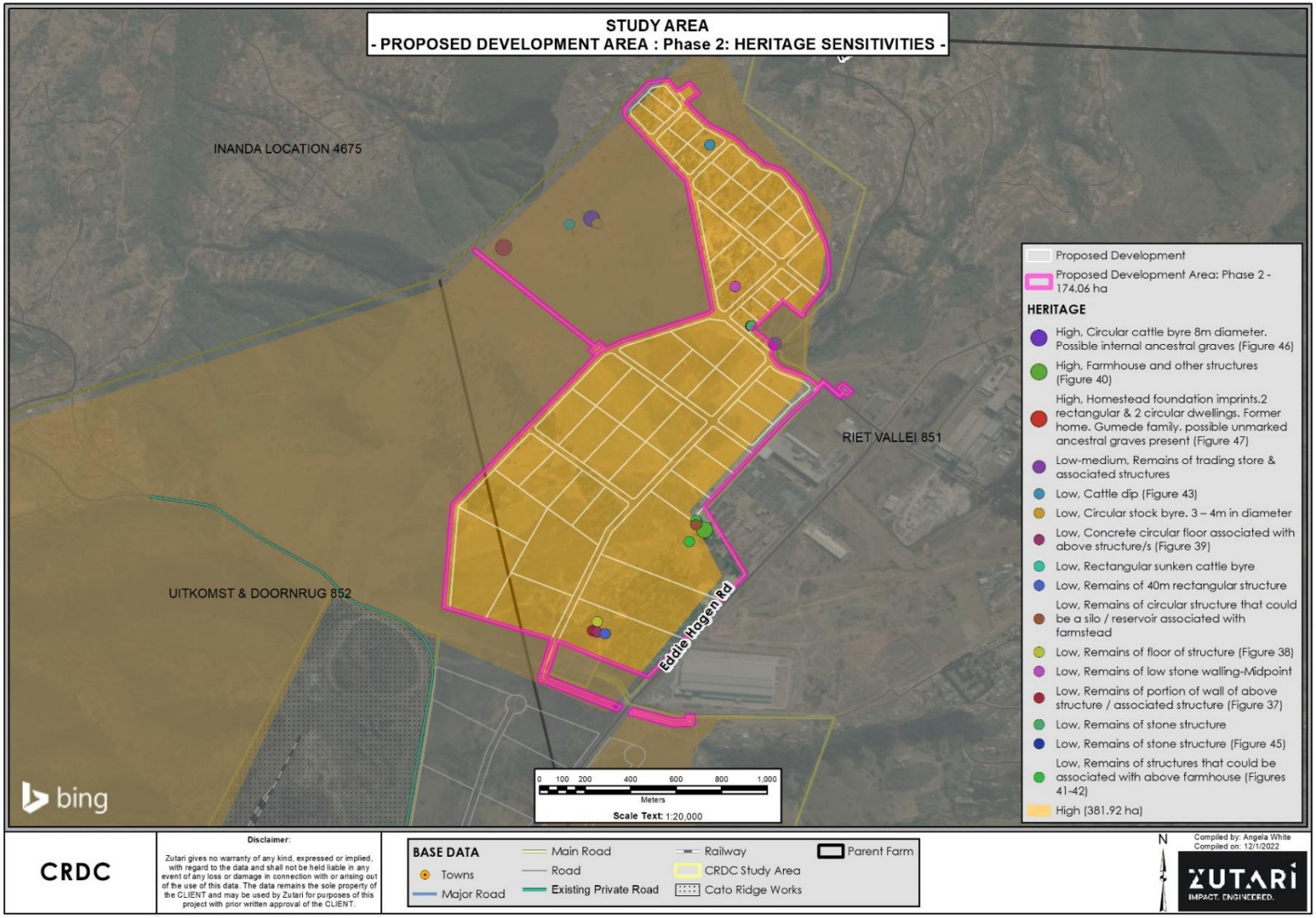

Figure A 3: Heritage sites and significance _Phase 2 (PDA3)

Appendix B_ Impact Assessment Methodology

Calculations

This section outlines the proposed method and calculations for assessing the significance of the potential visual impacts as provided by Zutari (2021). The criteria include the intensity (size or degree of scale), which also includes the type of impact, being either a positive or negative impact; the duration (temporal scale) and the extent (spatial scale). These numerical ratings are used in an equation whereby the consequence of the impact can be calculated as follows:

Significance = consequence x probability

Consequence = type x (intensity +duration + extent)

To calculate the significance of an impact, the probability (or likelihood) of that impact occurring is applied to the consequence:

Depending on the numerical result the impact would fall into a significance category as negligible, minor, moderate or major, and the type would be either positive or negative.

Intensity

The intensity refers to the degree of alteration of the affected environmental receptor, refer to **Table B1**.

Table B1: Description of intensity and assigned numerical values

Numerical Rating	Category	Description
1	**Negligible**	Natural and/ or social functions and/ or processes are negligibly altered
2	**Very low**	Natural and/ or social functions and/ or processes are slightly altered
3	**Low**	Natural and/ or social functions and/ or processes are somewhat altered
4	**Moderate**	Natural and/ or social functions and/ or processes are moderately altered
5	**High**	Natural and/ or social functions and/ or processes are notably altered
6	**Very high**	Natural and/ or social functions and/ or processes are majorly altered
7	**Extremely high**	Natural and/ or social functions and/ or processes are severely altered

Duration

The duration refers to the length of permanence of the impact on the environmental receptor, refer to Table B2.

Table B2: Description of duration and assigned numerical values

Numerical Rating	Category	Descriptors
1	**Immediate**	The impact will continue for less than 1 month.
2	**Short term**	The impact will continue for between 1 month and 2 years.
3	**Medium term**	The impact will continue for 2-5 years.
4	**Long term**	The impact will continue for 6-15 years.
5	**Project life**	The impact will cease after the operational life span of the project
6	**Beyond project life**	The impact will remain for some time after the life of the project.
7	**Permanent**	The impact will remain indefinitely.

Extent

The extent refers to the geographical scale of impact on the environmental receptor, refer to **Table B3**.

Table B3: Description of extent and assigned numerical values

Numerical Rating	Category	Descriptors
1	Very limited	Impacts very limited / felt in isolated areas of the study area
2	Limited	Impacts limited to specific parts of the study area
3	Local	Impacts felt mostly throughout the study area
4	Municipal area	Impacts felt outside the study area, at a municipal level
5	Regional	Impacts felt outside the study area, at a regional/provincial level
6	National	Impacts felt outside the study area, at a national level
7	International	Impacts felt outside the study area, at an international level

Probability

To calculate the significance of an impact, the probability (or likelihood) of that impact occurring is also considered, refer to **Table B4**.

Table B4: Definition of probability ratings

Numerical Rating	Category	Descriptors
1	Highly unlikely / None	Expected never to happen
2	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
3	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
4	Probable	Has occurred here or elsewhere and could therefore occur
5	Likely	The impact may occur
6	Almost certain / Highly probable	It is most likely that the impact will occur
7	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur

Significance

Table B5: Application of significance ratings

Range		Significance rating
-147	-109	Major (-)
-108	-73	Moderate (-)
-72	-36	Minor (-)
-35	-1	Negligible (-)
0	0	Neutral
1	35	Negligible (+)
36	72	Minor (+)
73	108	Moderate (+)
109	147	Major (+)

When assessing impacts, broader considerations should also be considered. These include the level of confidence in the assessment rating; the reversibility of the impact; and the irreplaceability of the resource as set out in respectively in **Table B6 – Table B8**.

Table B6: Definition of confidence ratings

Rating	Descriptor
Low	Judgement is based on intuition
Medium	Determination is based on common sense and general knowledge
High	Substantive supportive data exists to verify the assessment

Table B7: Definition of reversibility ratings

Rating	Descriptor

Low	The affected environment will not be able to recover from the impact – permanently modified
Medium	The affected environment will only recover from the impact with significant intervention
High	The affected environmental will be able to recover from the impact

Table B 8: Definition of irreplaceability ratings

Rating	Descriptor
Low	The resource is not damaged irreparably or is not scarce
Medium	The resource is damaged irreparably but is represented elsewhere
High	The resource is irreparably damaged and is not represented elsewhere

Appendix C _ Specialist information

The Landscape and Visual Assessment was undertaken by Elmie Weideman from Create Landscape architecture and Consulting. Mrs Weideman is a qualified Landscape architect and registered with the South African Council for Landscape Architects (SACLAP).

The following LVIA's have been completed by Mrs Weideman over the past five years:

- An ash dam facility for Eskom at Kriel power station, Mpumalanga;
- A wind farm for Just Energy near St. Helena Bay;
- A crude oil storage farm near Saldanha;
- Upington solar farm, near Upington in the Northern Cape province;
- Various concrete reservoirs located within the Olifants river catchment in the Limpopo and Mpumalanga Provinces;
- A 200 MW photovoltaic facility close to Westonaria;
- A 210 km, 400kV transmission powerline for Southern Africa Power Pool (SAPP) on behalf of Eskom, South Africa and Botswana Power Corporation;
- A 362 km, 400kV transmission powerline for Southern Africa Power Pool (SAPP) on behalf of NamPower and Rede Nacional de Transporte de Electricidade of Angola;
- Approval for a mining right application near Vanrhynsdorp, Western Cape;
- Mokolo Crocodile Augmentation Project Phase 2, Limpopo Province;
- Mogalakwena PV Facility, Limpopo Province;
- Mossel Bay Energy 1000MW Gas Plant;
- Greenleaf Energy 1000MW Gas Plant;
- Polihali Reservoir Associated Infrastructure, Lesotho; and
- Venetia Mine PV plant and associated infrastructure.

All GIS mapping was compiled by Stephen Townshend from Townshend Geospatial, who has extensive experience in GIS modelling, viewsheds, photomontages and photographic experience for landscape and visual assessments.

Appendix D _ Declaration of interest

DECLARATION OF INTEREST BY SPECIALIST

KWAZULU-NATAL PROVINCE
ECONOMIC DEVELOPMENT, TOURISM AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

	(For official use only)
Provincial Reference Number:	
NEAS Reference Number:	KZN / EIA /
Waste Management Licence Number (if applicable):	
Date Received by Department:	

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

Submitted in terms of section 24(2) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) or for a waste management licence in terms of section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

KINDLY NOTE:

1. This form is current as of **May 2021**. It is the responsibility of the Applicant / Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the form have been released by the Department.

PROJECT TITLE

Cato Ridge Land Development

DISTRICT MUNICIPALITY

eThekwini Municipality

1. SPECIALIST INFORMATION

Specialist name:	Elmie Weideman		
Contact person:	Elmie Weideman		
Postal address:	Po Box 1152 Northcliff		
Postal code:	2115	Cell:	0794993227
Telephone:	0794993227	Fax:	
E-mail:	elmie@lacreate.co.za		
Professional affiliation(s) (if any)	SACLAP Registration number 20223		
Project Consultant / EAP:	Zutari (Pty) Ltd.		

DECLARATION OF INTEREST BY SPECIALIST

EAPASA Registered EAP number:	SACLAP (Registration number 20223)		
Contact person:	Elmie Weideman		
Postal address:	PO Box 1152		
Postal code:	2115	Cell:	0794993227
Telephone:	0794993227	Fax:	
E-mail:	elmie@lacreate.co.za		

2. DECLARATION BY THE SPECIALIST

I, Elmie Weideman are that --

General declaration:

- I act as the independent specialist in this application;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998).

EWeideman

Signature of the specialist:

CREATE Landscape Architecture and Consulting

Name of company:

2023-03-24

Date: