APPENDIX C -
SPECIALIST IMPACT ASSESSMENT

APPENDIX C1 - VISUAL IMPACT ASSESSMENT

VISUAL IMPACT ASSESSMENT

PROPOSED INSTALLATION OF TELECOMMUNICATION MASTS AND ASSOCIATED INFRASTRUCTURE AT ASHBURTON, KZN, SOUTH AFRICA

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REPORT TITLE:
VISUAL IMPACT ASSESMENT: PROPOSED INSTALLATION OF TELECOMMUNICATION MASTS AND ASSOCIATED INFRASTRUCTURE AT ASHBURTON SITE, KZN, SOUTH AFRICA.

REPORT VERSION:
DRAFT

NAME	RESPONSIBILITY	DATE
Mr. M. Johnson	Report compilation	
Dr. A. Carter	Review and Quality control	

EXECUTIVE SUMMARY

Transnet Freight Rail is proposing the installation of a radio telecommunication mast above Ashburton Railway Tunnel No. 4, located on the south-eastern outskirts of Pietermaritzburg and approximately 3km north-west of the town of Ashburton.

The general requirement is a 21m tapered steel lattice tower with either a square or triangular base. The masts shall be painted red and white and shall have a Direct Current (DC) powered navigation light on top.

A site visit to assess the visual character of the area and visit potentially sensitive viewpoints was undertaken on the 28th of October 2019. Other industrial infrastructure in the surrounding areas includes large industrial buildings, the railway line, power lines and telephone lines. The landuse to the west of the proposed site comprises of an industrial area and business park. To the north of the proposed site is the Cleland Residential Suburb. There are areas of natural vegetation immediately south and east of the proposed site. Generally, the development is sheltered by natural vegetation and the topography of the landscape.

The following visual sensitive receptors were identified:

- Ashburton Small Holdings (Residential);
- Cleland Residential Suburb;
- Shortts Retreat (light industrial area and business park); and
- Motorists using the R103.

The following impacts were identified:

	Pre-Mitigation	Post Mitigation
CONSTRUCTION PHASE		
Impact 1: Visual impact of construction activity	LOW-	LOW-
OPERATIONAL PHASE		
Impact 2: Impact of the mast on visually sensitive points and areas		
• Ashburton Small Holdings (Residential)	MODERATE-	MODERATE-
• Cleland Residential Suburb	LOW-	LOW-
• Shortts Retreat (light industrial area and business park)	LOW-	LOW-
• Motorists using the R103	LOW-	LOW-
CUMULATIVE IMPACTS		
Cumulative Impact 1: Visual impact of facility construction and operation	MODERATE-	MODERATE-
NO-GO ALTERNATIVE		
No-Go Impact 1: Impact of telecommunication mast on sensitive visual receptors	NONE	NONE

Concluding Statement

Overall, the telecommunication mast will have a low to moderate impact on the visual landscape for certain visual receptors. However, this should be considered within the context of the following:

- Existing industrial and electrical infrastructure, including large industrial buildings, the railway line and associated infrastructure, overhead powerlines and telephone lines, already impose on the visual landscape for nearby visual receptors;
- The topography and vegetation will screen most views of the mast; and
- Although limited, certain mitigation recommendations in this report can mitigate the impacts to some extent.

It is concluded that potential losses of scenic resources are not sufficiently significant to present a fatal flaw to the proposed project.

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SPECIALIST CHECKLIST

Section	*NEMA 2014 Regs - Appendix 6(1) Requirement*	Position in report
1	A specialist report prepared in terms of these Regulations must contain—	
(a)	details of-	
	(i) the specialist who prepared the report; and	Section 1.6 and Appendix C2
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Section 1.6 and Appendix C3
(b)	a declaration that the person is independent in a form as may be specified by the competent authority;	Appendix C2
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Chapter 1 and 4
(d)	the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1.3 and Section 3.1
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process;	Chapter 2 and Chapter 3
(f)	the specific identified sensitivities of the site related to the activity and its associated structures and infrastructure;	Section 5.2 and Section 7.1.4
(g)	an identification of any areas to be avoided, including buffers;	There are no areas to be avoided.
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitive of the site including areas to be avoided, including buffers;	Figure 3 and Figure 8
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.5
(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;	Chapter 7
(k)	any mitigation measures for inclusion in the EMPr;	Chapter 7
(l)	any conditions for inclusion in the environmental authorization;	Chapter 7
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Chapter 7
(n)	a reasoned opinion- (i) as to whether the proposed activity or portions thereof should be authorized and (ii) if the opinion is that the proposed activity of portion thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Chapter 8
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not Applicable
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Any comments, which were received, relating to the Visual Impact Assessment have been included in the Issues and Response Trail (IRT) in the Final BAR.
(q)	any other information requested by the competent authority.	Not Applicable

GLOSSARY OF TERMS

Study area
The area surrounding the project area, and including the project area, that will experience visual impacts.

Viewshed
The outer boundary defining a view catchment area, usually along crests and ridgelines.

Viewpoint
A selected point in the landscape from which views of a particular project or other feature can be obtained.

Visually sensitive receptor
Visual receptors include viewer groups such as the local community, residents, workers, the broader public and visitors to the area, as well as public or community areas from which the development is visible.

Sense of place
The unique quality or character of a place, whether natural, rural or urban. Relates to uniqueness, distinctiveness or strong identity. Sometimes referred to as genius loci meaning 'spirit of the place'.

Visual absorption capacity
The ability of an area to visually absorb development as a result of screening topography, vegetation or structures in the landscape.

1. INTRODUCTION

CES Environmental and Social Advisory Services (CES) has been appointed by Transnet Freight Rail as independent environmental assessment practitioners to undertake a Basic Assessment for the proposed installation of a telecommunication mast and associated infrastructure between Pietermaritzburg and Ashburton, in KwaZulu-Natal. One of the significant potential environmental issues identified during the planning phase of the BA was the visual impact that the proposed development would have on the landscape.

This Visual Impact Assessment (VIA) report provides specialist input into the BA process for the proposed project, which includes the construction of a 21m high radio telecommunication mast.

For the purposes of conducting the VIA, guidance has been taken from the Provincial Government the Western Cape, Department of Environmental Affairs and Development Planning (DEA&DP) Guideline for Involving Visual and Aesthetic Specialists in the EIA Process (Oberholzer, 2005). These are the only VIA guidelines that have been issued in South Africa.

Oberholzer (2005) notes that visual, scenic and cultural components of the environment can be seen as a resource, much like any other resource, which has a value to individuals, to society and to the economy of the region. In addition, this resource may have a scarcity value, be easily degraded, and is usually not replaceable. Therefore, the guidelines recommend that the following specific concepts should be considered during the visual input into the EIA process:

- An awareness that 'visual' implies the full range of visual, aesthetic, cultural and spiritual aspects of the environment that contribute to the area's sense of place.
- The consideration of both the natural and the cultural landscape, and their inter-relatedness.
- The identification of all scenic resources, protected areas and sites of special interest, together with their relative importance in the region.
- An understanding of the landscape processes, including geological, vegetation and settlement patterns, which give the landscape its particular character or scenic attributes.
- The need to include both quantitative criteria, such as 'visibility', and qualitative criteria, such as aesthetic value or sense of place.
- The need to include visual input as an integral part of the project planning and design process, so that the findings and recommended mitigation measures can inform the final design, and hopefully the quality of the project.
- The need to determine the value of visual/aesthetic resources through public involvement.

1.1. Terms of Reference

The overall aim of a VIA is to determine the current landscape quality (scenic views, visual sensitivity) and the visual impact of the proposed telecommunication mast. The terms of reference for the VIA includes the following tasks:

1. Undertaking a desktop survey using 1:50 000 survey maps, 1:10 000 orthophotos, digital colour aerial imagery and any other high resolution images.
2. Conducting a site reconnaissance visit and photographic survey of the proposed project site.
3. Conducting a desktop mapping exercise to establish visual sensitivity:
   - Describe and rate the scenic character and sense of place of the area and site;
   - Establish extent of visibility by mapping the viewsheds and zones of visual influence;

- Establish visual exposure to viewpoints; and
- Establish the inherent visual sensitivity and visual absorption capacity of the site by mapping slope grades, landforms, vegetation, special features and land use and overlaying all relevant above map layers to assimilate a visual sensitivity map.

4. Reviewing relevant legislation, policies, guidelines and standards.
5. Preparing a draft Visual Baseline/Sensitivity report which:
   - Assesses the proposed project against the visual sensitivity criteria such as extent of visibility, the sites inherent sensitivity, visual sensitivity of the receptor's, visual absorption capacity of the area and visual intrusion on the character of the area;
   - Assesses impacts based on a synthesis of criteria for each site (criteria = nature of impact, extent, duration, intensity, probability and significance); and
   - Establishes mitigation measures/recommendations with regards to minimizing visual risk areas.

1.2. Legislative context

Currently there is little legislation relating directly to Visual Impact Assessments. There are however, guidelines that provide direction for visual assessments as well as pieces of legislation that aim to protect visual resources. Relevant guidelines and legislation include:

The National Environmental Management Act (NEMA) and the Regulations in terms of Chapter 5 of NEMA (Act No. 107 of 1998), and NEMA EIA Regulations (2014) apply as the proposed wind farms are a listed activity. The need for a visual assessment as part of the EIA has been identified.

DEA&DP Guideline for Involving Visual and Aesthetic Specialists in EIA Processes (Oberholzer, 2005) are applicable in the Western Cape and provide good general guidance for the preparation of visual specialist input into EIA processes. The guidelines document the requirements for visual impact assessment, factors that trigger the need for specialist visual input, timing and nature of visual input as well as choice of visual specialists, preparation of terms of reference and guidance for specialist input / visual assessment methodology.

1.3. Seasonal Changes

In terms of Appendix 6 of the 2014 EIA Regulations, a specialist report must contain information on "*the date and season of the site investigation and the relevance of the season to the outcome of the assessment*". The site visit was undertaken in Spring (October 2019). The season in which the site visit was undertaken does not have any considerable effect on the significance of the impacts identified, the mitigation measures, or the conclusions of the assessment since the vegetation cover does not vary significantly over the seasons.

1.4. Information Base

The following information was used to conduct the VIA:

- Documentation and KML files supplied by the client;
- ToR for the visual specialist;
- Photographs and information captured during the site visit;
- Google Earth software and data (aerial imagery - 2018);
- Sentinel-2 Satellite Imagery (2018);

- SRTM Digital Elevation Model; and
- South African National Landcover dataset (2014).

1.5. Assumptions and Limitations

1.5.1. Spatial data accuracy

Spatial data used for visibility analysis originates from various sources and scales. Inaccuracy and errors are, therefore, inevitable. Where relevant, these are highlighted in the report. Every effort was made to minimize their effect.

1.5.2. Viewshed calculations

a) Calculation of the viewsheds is based on the use of the Shuttle Radar Topography Mission (SRTM) Digital Elevation Models (DEMs) downloaded from the USGS Earth Explorer Website. These raster images have a resolution of 30 metres, which means that each pixel of the raster covers an area of 30 m x 30 m (900 m²), and is assigned a single height value.
b) An observer in the surrounding landscape was assumed to be 1.8m tall.
c) Calculation of the viewsheds does not consider the potential screening effect of vegetation and buildings.

1.6. Authors Details

Mr Michael Johnson, author

Michael holds a BSc in Geoinformatics, a BSc (Hons) *cum laude* in Geoinformatics and an MSc in Geoinformatics from Stellenbosch University. Michael's Master's thesis examined the use of Remote Sensing and computer vision technologies for the extraction of near-shore ocean wave characteristic parameters. For the duration of his Master's, he was based at the Council for Scientific and Industrial Research (CSIR) in Stellenbosch. During this time, in addition to his Master's studies, he provided GIS and Remote Sensing tutoring and technical assistance to the junior staff and fellow students. Michael graduated in March 2018 and has been working for CES since. Since joining CES, Michael has been involved in a number of projects where his GIS and Remote Sensing skills have been utilised. These include, but are not limited to, landcover mapping for the King Cetswayo District Municipality Environmental Management Framework, the use of remote sensing to map invasive alien plant species for the Swartland and Buffalo City Invasive Alien Species Management Plans and multiple Visual Impact Assessments which require GIS modelling.

Michael is registered with the International Association for Impact Assessments (IAIA) and the South African Geomatics Council as a Candidate Geomatics Practitioner: GISc Professional (CGPrGISc 0299).

Relevant VIA experience:

Project	Responsibility
SANBI Kwelera National Botanical Garden	Viewshed Analysis
Eskom Lesokwana Powerline	Viewshed Analysis
Albany WEF	Author
Bayview WEF	Author
Boulders WEF (Internal)	Author
Rietkloof WEF	Author
Indyebo WEF	Author
Rietkloof WEF amendments	Author
Umsobomvu WEF amendments	Author

Project	Responsibility
Coleskop WEF amendments	Author
Plan 8 Grahamstown WEF amendments	Author
Golden Valley 2 WEF amendments	Author
Great Kei WEF amendments	Author
Dassiesridge WEF amendments	Author
Ukomeleza WEF amendments	Author
Mother WEF amendments	Author
Alt-E Paalfontein WEF Screening Assessment	Author

Dr Alan Carter, reviewer

Alan is an Executive of the East London Office, and has over 25 years of experience in both environmental science and financial accounting disciplines including with international accounting firms in South Africa and the USA. He holds a PhD in Plant Sciences and a BCom Honours degree in financial accounting. Alan is a member of a number of professional bodies including American Institute of Certified Public Accountants (AICPA), South African Council for Natural Scientific Professions (SACNASP) and Institute of Waste Management South Africa (IWMSA). He is also certified as an Environmental Assessment Practitioner in South Africa (EAPSA) and as an ISO14001 EMS auditor with the American National Standards Institute. Areas of specialization include: environmental impact assessment, coastal management, waste management, climate change and emissions inventories, aquaculture, environmental accounting and auditing and visual impact assessment. Alan has been involved in numerous VIAs, where his responsibility has included author, reviewer and project leader.

Relevant VIA experience:

Project	Responsibility
Waaihoek WEF	Project Leader/Reviewer
Chaba WEF	Project Leader/Reviewer
Great Kei WEF	Project Leader/Reviewer
Tomas River WEF	Project Leader/Reviewer
Peddie WEF	Project Leader/Reviewer
Qunu WEF	Project Leader/Reviewer
Bayview WEF	Review and Quality Control
Nqanakwe WEF	Project Leader/Author
SANBI Kwelera National Botanical Garden	Project Leader/ Reviewer
East London IDZ Solar PV Facility	Project Leader/ Author
Langa Energy Solar PV Facility	Project Leader/ Author
Theza Langa Solar PV Facility	Project Leader/ Author
Zulu Dam (Lusikisiki Regional Bulk Water Scheme)	Project Leader/ Author
Quko Conservancy and Estate	Project Leader/ Author
Cyprea Sands Residential Estate	Project Leader/ Author
Blacklight Solar PV Facility	Project Leader/ Author
Peddie Solar PV Facility	Project Leader/ Author
Rietkloof WEF	Review and Quality Control
Plan 8 Grahamstown WEF amendment	Review and Quality Control
Golden Valley 2 WEF amendment	Review and Quality Control

2. TRIGGERS FOR SPECIALIST VISUAL INPUT

The DEA&DP guideline suggests various triggers for conducting a Visual Impact Assessment (VIA). With respect to the proposed Telecommunication Mast, a number of aspects of the development that would suggest the need for a VIA. These include:

- Areas lying outside a defined urban edge line;
- A significant change to the townscape or streetscape;
- Possible visual intrusion in the landscape; and
- Obstruction of views of others in the area.

The purpose of conducting a VIA is to determine:

- The visibility of the proposed project;
- The potential visual impact on visual/scenic resources;
- The nature, extent, duration, magnitude, probability and significance of impacts, as well as measures to mitigate negative impacts and enhance benefits; and
- The character and visual absorption capacity of the landscape.

2.1. Selecting appropriate approach for the visual impact assessment

The category of development influences the level of visual impact to be expected. As is illustrated in Table 2.1, a telecommunication infrastructure is considered a category four development.

Table 2.1: Key to 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, power lines, freeways, toll roads, large-scale infrastructure generally. Large-scale development of agricultural land and commercial tree plantations. Quarrying and mining activities with related processing plants.

Table 2.2 indicates that VIAs become more critical where wilderness or protected landscapes are involved, as well as when high density urban development or large-scale infrastructure are being considered. The project area is considered in this report to be of low scenic, cultural or historical significance and the surrounding areas have been disturbed. Based on the table, it is deemed that a “Moderate Visual Impact is expected” for the proposed Telecommunication Mast.

Table 2.2: Categorization of issues to be addressed by the visual assessment (DEA&DP Guidelines)

Type of environment	Type of development (see Box 3) Low to high intensity				
	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 medium scenic, cultural or 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 urban 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

Table 2.3 describes the category of VIA. With regards to the proposed Telecommunication Mast, some change in the visual character of the area, and potentially some intrusions on scenic resources may be expected.

Table 2.3: Description of the key categories of visual impact expected

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.

Based on the above considerations, the approach adopted for the VIA is that prescribed for a development or activity where a moderate visual impact is expected.

According to the DEA&DP guideline, this will require a Level 3 Visual Assessment

Approach	Type of issue (see Box 4)				
	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** visual input	**Level 2** visual input	**Level 3** visual assessment	**Level 4** visual assessment	

A Level 3 Visual Assessment consists of the following main elements:

- 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; and
- Description of alternatives, mitigation measures and monitoring programmes.

3. METHODOLOGY

3.1. Site Visit and Photographic Survey

The field survey was conducted on the 28th of October 2019 and provided an opportunity to:

- Determine the actual or practical extent of potential visibility of the proposed development, by assessing the screening effect of landscape features;
- Conduct a photographic survey of the landscape surrounding the development; and
- Identify sensitive landscape and visual receptors.

Viewpoints were chosen using the following criteria:

- High visibility – sites from where most of the mast will be visible;
- High visual exposure – sites at various distances from the proposed site; and
- Sensitive areas and viewpoints from which the mast will potentially be seen.

3.2. Baseline Description

A desktop study was conducted to establish and describe the landscape character of the receiving environment. A combination of Geographic Information System (GIS), literature review and photographic survey was used to analyse land cover, landforms and land use in order to gain an understanding of the current landscape within which the development will take place (GLVIA, 2002). Landscape features of special interest were identified and mapped, as were landscape elements that may potentially be affected by the development.

3.3. Visual Impact Assessment

A GIS was used to calculate viewshed(s) for the proposed telecommunication mast.

Other associated infrastructure may be built. However, the visual impact of these features is not considered as important as those of the mast. For this reason, such other structures were not considered in the VIA.

The viewsheds and information gathered during the field survey were used to define criteria such as visibility, viewer sensitivity, visual exposure and visual intrusion for the proposed development. These criteria are, in turn, used to determine the intensity of potential visual impacts on sensitive viewers. All information and knowledge acquired as part of the assessment process were then used to determine the potential significance of the impacts according to the standardised rating methodology as described in Section 7.2 of this document.

4. VISUAL ASSESSMENT INFORMATION

4.1. Relevant project information

The proposed radio telecommunication mast will be installed above Ashburton Railway Tunnel No. 4, located on the south-eastern outskirts of Pietermaritzburg and approximately 3km north-west of the town of Ashburton (Figure 4.1). The site is located within the within uMsunduzi Local Municipality under UMgungundlovu District Municipality, in the KwaZulu-Natal Province. The site is can be accessed from the R103 road along a secondary private service road (Figure 4.1).

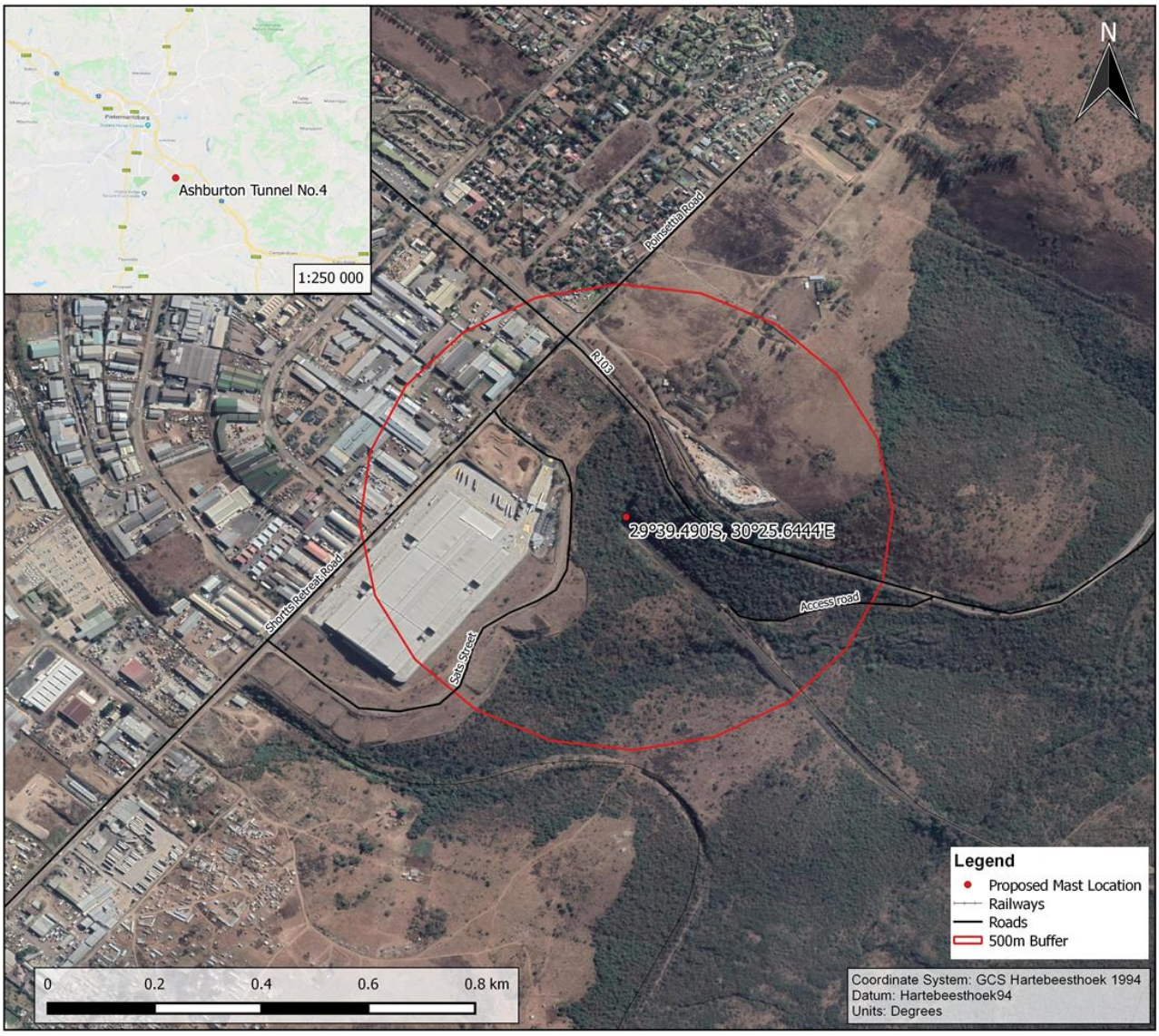

Figure 4.1: Location of the proposed site at Ashburton tunnel No.4 near Pietermaritzburg

4.1.1. Details and nature of the Telecommunication Masts

The general requirement is a 21m tapered steel lattice tower with either a square or triangular base. The design is a tapered, self-supporting lattice type mast (angle iron) with a 2.5m^2 Antenna load at the top of the mast, which needs to sustain wind speeds up to 160km/h. The masts shall be painted red and white and shall have a Direct Current (DC) powered navigation light on top (Figure 4.2). The mast will also be constructed above the railway tunnel in an area where existing freight rail infrastructure has been installed. The site layout plan for the proposed mast is depicted in Figure 4.3.

Figure 4.2: Example of a lattice radio telecommunications mast

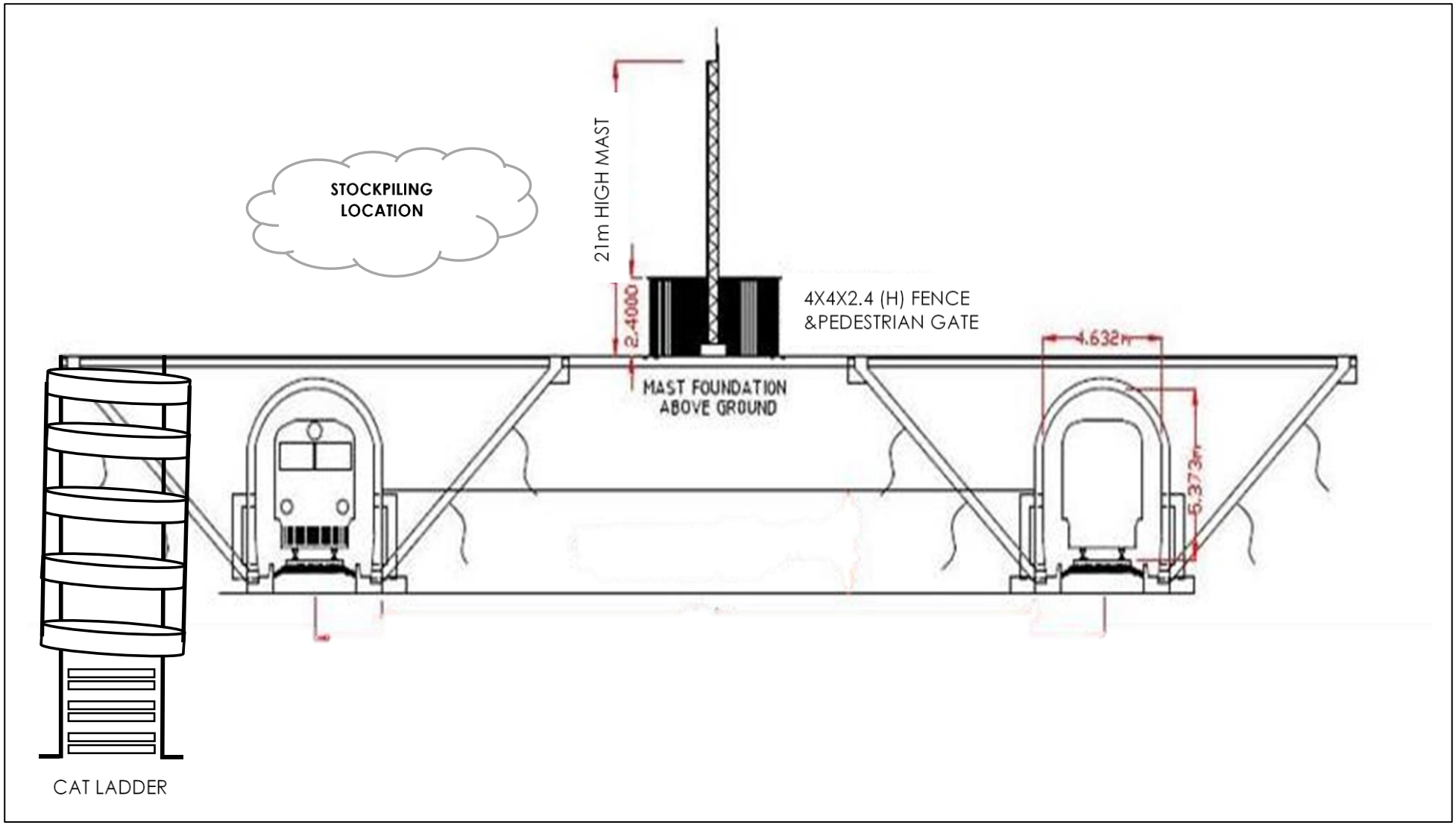

Figure 4.3: Site layout of the proposed radio high mast at Ashburton Tunnel No. 4 near Pietermaritzburg, KwaZulu-Natal

5. BASELINE DESCRIPTION

5.1. Description of the affected physical environment

The study area is partially characterised by:

- An industrial area and warehousing business park to the west;
- A residential area to the north; and
- Indigenous vegetation to the east and south.

5.1.1. Climate

The Ashburton Tunnel site is located on the south-eastern outskirts of Pietermaritzburg. Pietermaritzburg is predominantly a warm and temperate region in KZN. On average, the annual temperature in Pietermaritzburg is 18.2°C, with June being the coldest month and February being the hottest month with averages of approximately 12.9°C and 22.2°C, respectively. The region experiences more rains in summer and less so during the winter season or period. On average an estimated 897mm precipitation falls annually, with the least amount of rainfall experienced in June (12mm). The precipitation is at its highest in January with an estimated rainfall of 140mm as shown on the graph in Figure 5.1 below.

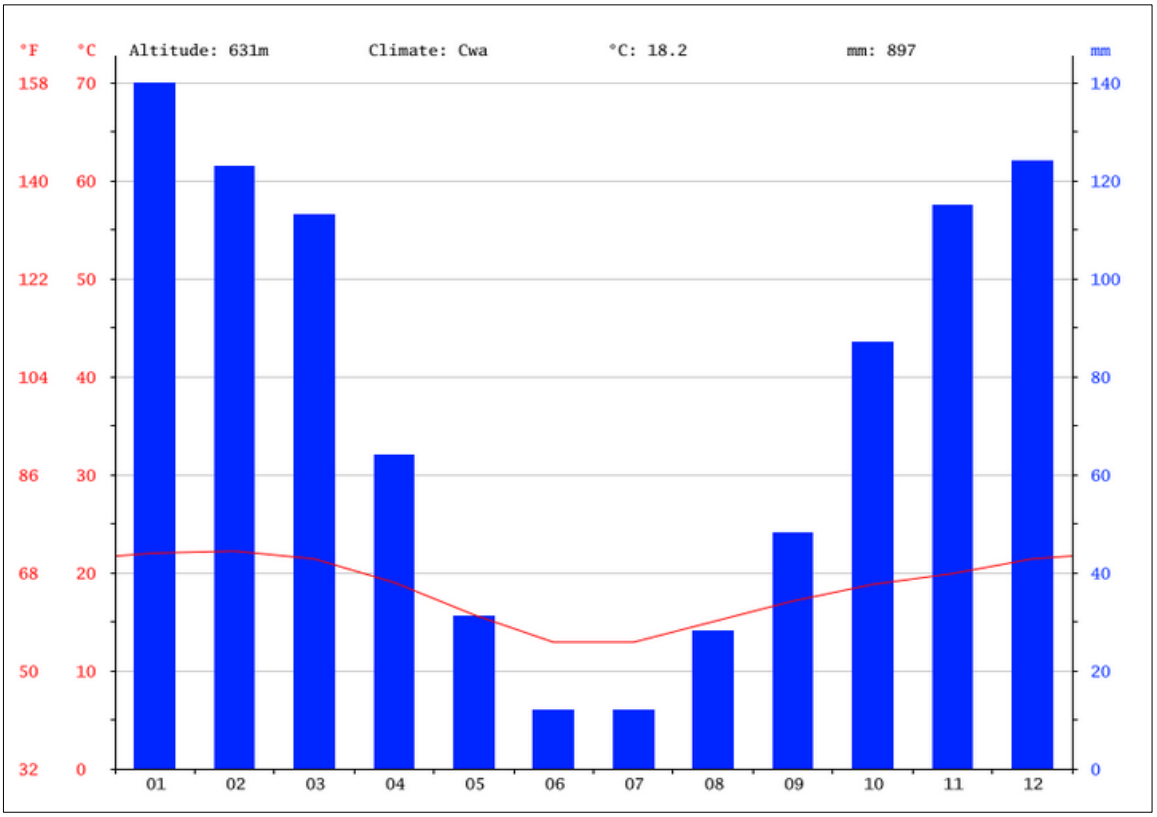

Figure 5.1: Climate data for Pietermaritzburg (Climate-Data.org, 2019)

5.1.2. Topography

The Ashburton site is located in a valley at an altitude of about 710m above sea level. The immediate surroundings (within the 500m of the proposed telecommunications tower) slope in a south-easterly direction. The broader surroundings are attributed by ridges and valleys, with steeper valleys found to the south (Figure 5.2). The topographic screening potential is considered high.

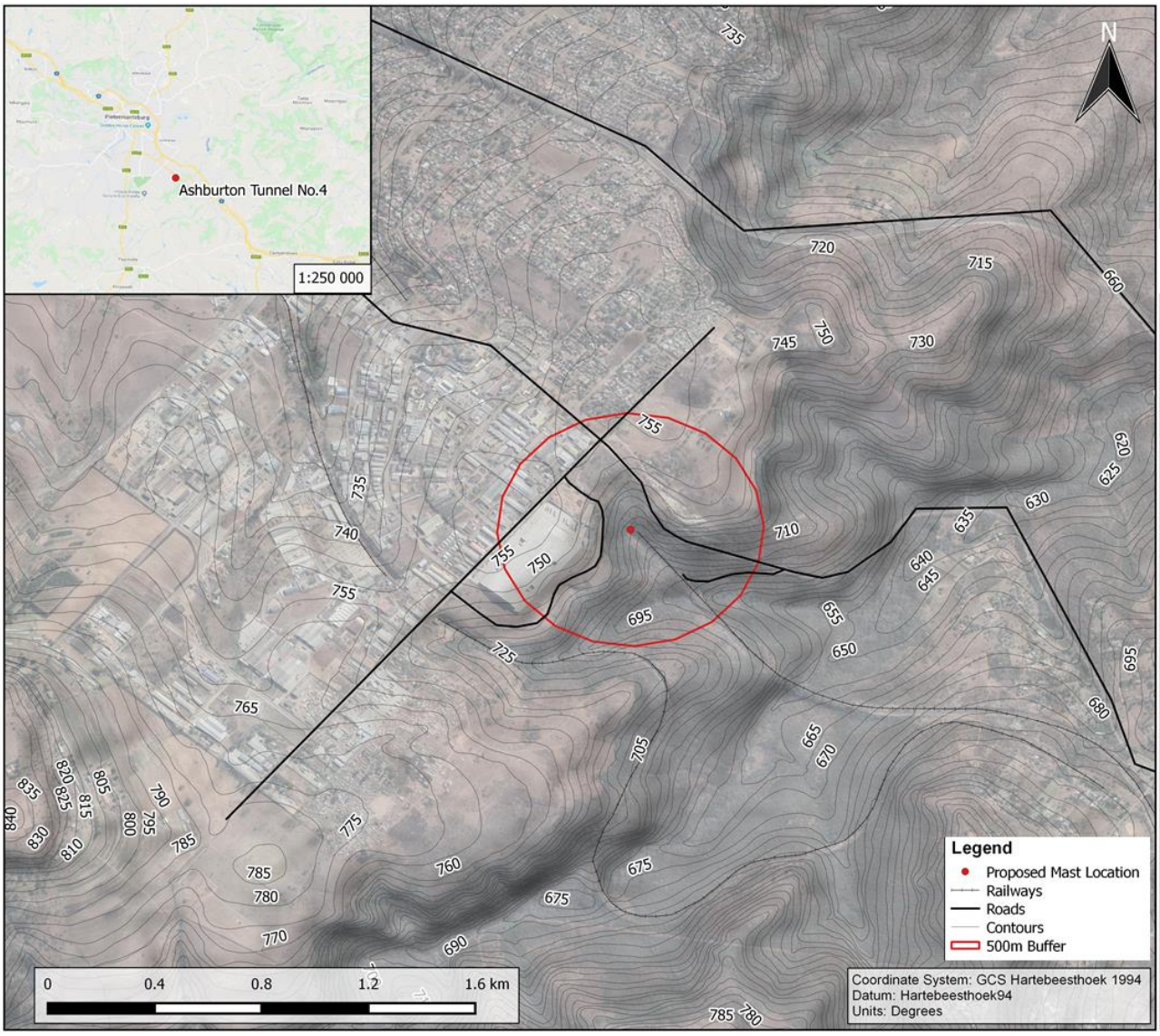

Figure 5.2. Topography surrounding the Ashburton project site.

5.1.3. Vegetation

According to National vegetation by Mucina & Rutherfors (2018), the Ashburton Tunnel site is located within the KwaZulu-Natal Hinterland Thornveld, which occurs on the undulating plains and upper margins of valleys of the Mpisi, Mvoti, Umgeni, Lufafa and Mtungwane Rivers in KwaZulu-Natal (Figure 5.3). This vegetation is characterised by open thornveld, dominated by Vachellia woody species. This vegetation type is also considered to be vulnerable, with 22% transformed by agriculture and urban development, and none of the targeted 25% statutorily conserved in nature reserves.

From a visual impact assessment perspective, the most important features of the vegetation are its height and density as these determine its screening potential. During the field visit it was confirmed that the indigenous vegetation located south and east of the proposed site is relatively dense and has a height of between 3-6m (Figure 5.4).Therefore, the vegetation in the area is considered to have a moderate to high screening potential for the proposed telecommunications mast.

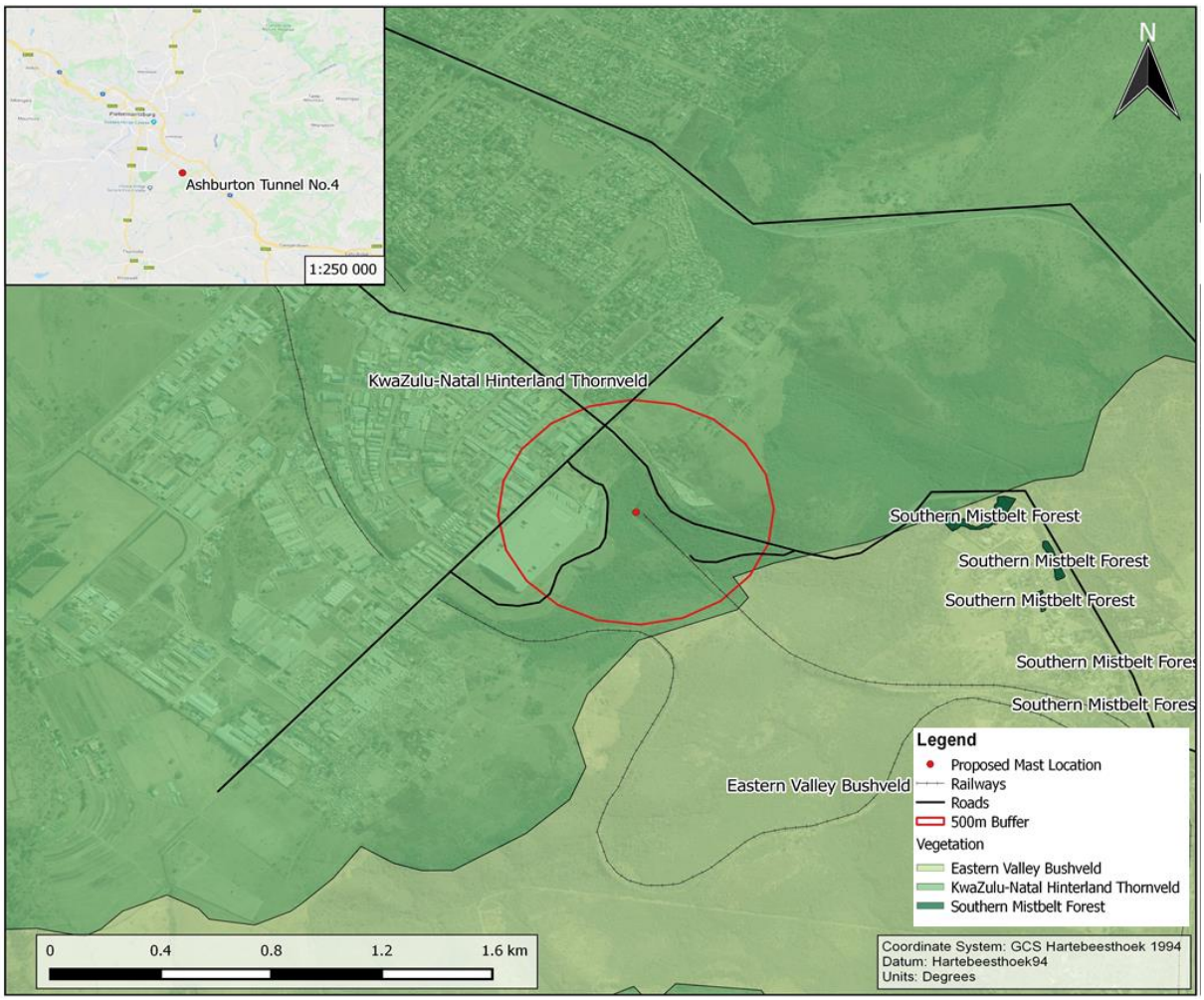

Figure 5.3: Vegetation surrounding the site (Mucina & Rutherford 2018).

Figure 5.4: Indigenous vegetation to the south and east of the proposed site.

5.1.4. Built environment

The site is located on the outskirt of Pietermaritzburg and thus, parts of the study area are highly developed. The areas that will potentially be affected include:

- Shortts Retreat industrial area (located within 500m to the west of the site);
- The south-eastern part of Cleland Residential Suburb (located approximately 500m north of the site); and
- Small holdings on the western edge of Ashburton (located over 1.2km east and south-east of the site).

The only major road dissecting the study area is the R103, which runs in a north-east to south-west direction and is located approximately 100m north-east of the proposed site.

5.2. Potential sensitive receptors

Visually sensitive receptors are locations or areas where people may have a significantly increased visual sensitivity or exposure to changes in the surrounding environment. Figure 5.5 below indicates all potential visual receptors within 5km of the proposed telecommunication mast.

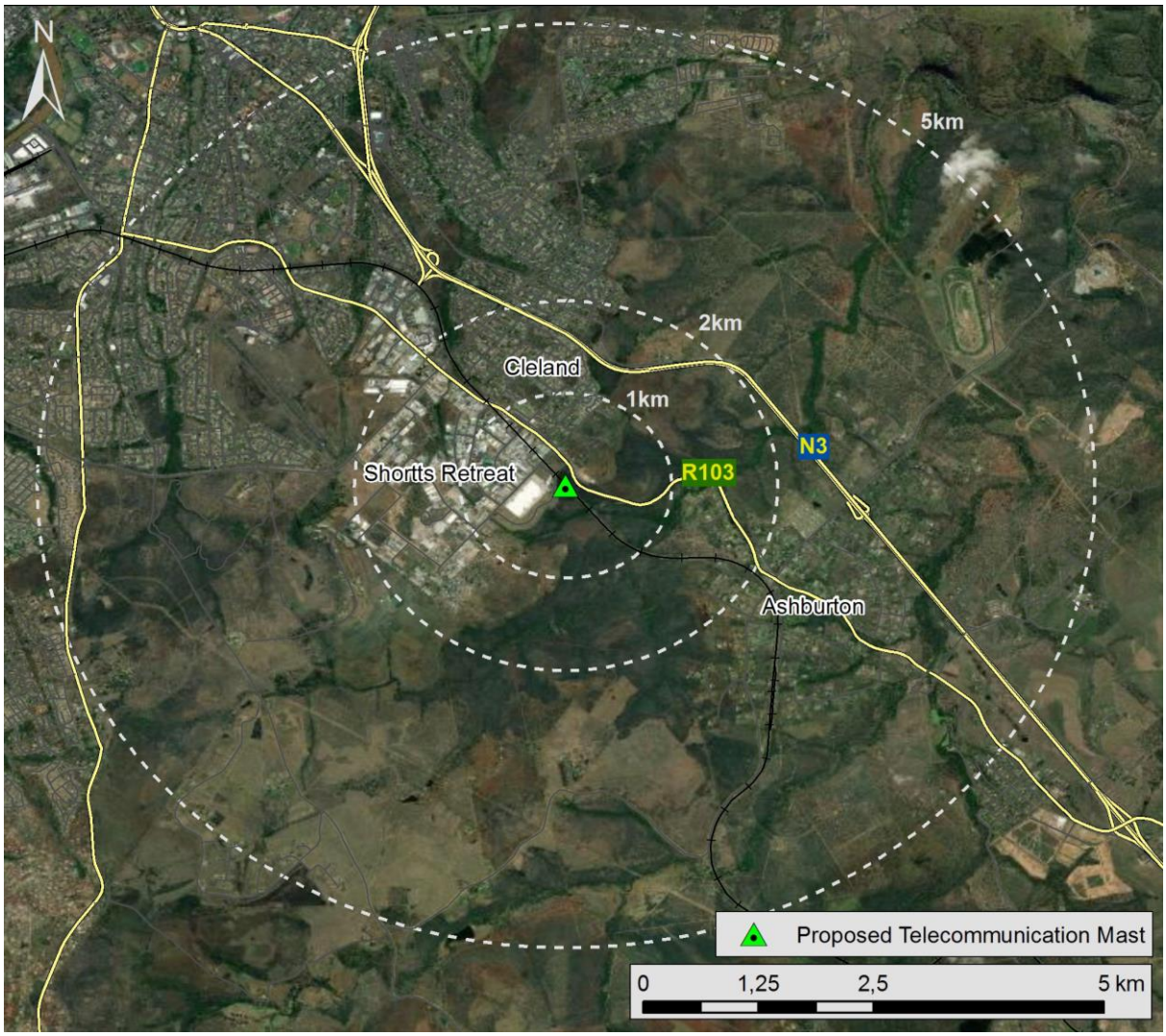

Figure 5.5: Potential sensitive receptors for the proposed development site at Ashburton Tunnel.

6. DESCRIPTION OF ALTERNATIVES

Integral to the EIA process is the consideration and evaluation of alternatives to the proposed development plan. This is also applicable when conducting specialist studies including VIAs. For the purposes of this VIA, the following alternatives have been assessed (Table 6.1).

Table 6.1: Alternatives applicable to the proposed mast installation.

Type of Alternatives Considered	Description of the Alternative relating to the proposed Ashburton Tunnel No.4 Telecommunication Mast
Location alternative	Only one location has been assessed. Alternative locations for the current project are not reasonable or feasible as the proposed telecommunication mast is required on this suitable location. Communication channels along freight rail routes require upgrading and the installation of telecommunication masts on this site is critical to the overall feasibility of the project. Therefore, only the project site described in this report has been considered.
Technology alternatives	One of the alternatives considered was to run fibre cable from the Ashburton Radio High Site to the tunnel location located 3 kilometres away. Due to the distance, the risk is high in that the cable faults will cause outage in the tunnel resulting in the loss of full communication in the communication system installed in the tunnel. Tunnel Communication is meant to be independent from the Radio High Sites and be always available in case of work activity and emergencies in the tunnel.
Activity alternatives	Alternative activities for the current project are not reasonable or feasible as the purpose of the proposed mast installation is to improve the communication channels along the existing freight railways in this area.
No-go alternative	The “No-go” alternative entails maintaining the status quo. In other words, the proposed construction of the telecommunication mast would not go ahead, and current land uses would continue as undisturbed. While potential risks associated with the telecommunication mast would be avoided, the visual risk of adjacent industrial and rail infrastructure would persist and, potential benefits of the proposed project would be forfeited

7. ASSESSMENT OF IMPACTS

The assessment and mitigation of visual impacts should be conducted in the following manner:

- Identify visual impact criteria (key theoretical concepts);
- Conduct a visibility analysis; and
- Assess the impacts of the proposed telecommunication mast taking into consideration factors such as sensitive viewers and viewpoints, visual exposure and visual intrusion.

Oberholzer (2005) notes that thresholds of significance define the level or limit at which point an impact changes from low to medium significance, or medium to high significance. These thresholds are often determined by current societal values which define what would be acceptable or unacceptable to society and may be expressed in the form of legislated standards, guidelines or objectives. However, unlike water quality or air quality, thresholds for visual or scenic quality cannot be easily quantified, as they tend to be abstract, and often relate to cultural values or perceptions. A second difficulty is that natural, rural and urban landscapes are constantly changing, and the assessment will, therefore, need to consider this in determining the significance of impacts. A third difficulty may be the divergence of opinion on what constitutes 'acceptable' change, by the individual, the community or society in general.

The visual assessment should recognise that some change to the landscape over time is inevitable with the expansion of urban areas and introduction of new technologies, such as communication masts. This will have a bearing on significance ratings, particularly in identified growth areas.

7.1. Specific criteria for visual impact assessments

Oberholzer (2005) recommends that the following specific visual impact assessment criteria should be considered (Table 7.1 below). These criteria relate specifically to VIAs. The proposed project should be assessed against these criteria before attempting rate the impacts based on the standard rating scales (Section 7.2). These visual impact criteria have been used to help determine the severity rating of the impacts in Section 7.2.

Table 7.1: Visual Assessment Criteria

	Criteria	High	Moderate	Low
Applied to the project as a whole	**Visibility of the project –** the geographic area from which the project will be visible, or view catchment area. (The actual zone of visual influence of the project may be smaller because of screening by existing trees and buildings). This also relates to the number of receptors affected.	*High visibility* – visible from a large area (e.g. several square kilometres).	*Moderate visibility* – visible from an intermediate area (e.g. several hectares).	*Low visibility* – visible from a small area around the project site.

	Criteria	High	Moderate	Low
	Visual sensitivity of the area – the inherent visibility of the landscape, usually determined by a combination of topography, landform, vegetation cover and settlement pattern. This translates into visual sensitivity.	*High visual sensitivity* – highly visible and potentially sensitive areas in the landscape.	*Moderate visual sensitivity* – moderately visible areas in the landscape.	*Low visual sensitivity* – minimally visible areas in the landscape.
Applied to the whole project and receptors	**Visual intrusion** – the level of compatibility or congruence of the project with the particular qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape.	*High visual intrusion* – results in a noticeable change or is discordant with the surroundings;	*Moderate visual intrusion* – partially fits into the surroundings, but clearly noticeable;	*Low visual intrusion* – minimal change or blends in well with the surroundings.
Applied to receptors	**Visual sensitivity of Receptors** – The level of visual impact considered acceptable is dependent on the type of receptors.	*High sensitivity* – e.g. residential areas, nature reserves and scenic routes or trails;	*Moderate sensitivity* – e.g. sporting or recreational areas, or places of work;	*Low sensitivity* – e.g. industrial, mining or degraded areas.
	Visual exposure – based on distance from the project to selected viewpoints. Exposure or visual impact tends to diminish exponentially with distance.	*High exposure* – dominant or clearly noticeable;	*Moderate exposure* – recognisable to the viewer;	*Low exposure* – not particularly noticeable to the viewer;
	Visual absorption capacity (VAC) - the potential of the landscape to conceal the proposed project.	*Low VAC* - e.g. little screening by topography or vegetation.	*Moderate VAC* - e.g. partial screening by topography and vegetation;	*High VAC* – e.g. effective screening by topography and vegetation;
	Note: *Various components of the project, such as the structures, lighting or power-lines, may have to be rated separately, as one component may have fewer visual impacts than another. This could have implications when formulating alternatives and mitigations.*			

7.1.1. Overall visibility of the project

The visibility of the project is an indication of where in the region the development will potentially be visible from. The rating is based on viewshed size only and is an indication of how much of a region will potentially be affected visually by the development. A high visibility rating does not necessarily signify a high visual impact, although it can if the region is densely populated with sensitive visual receptors.

The calculated viewshed (Figure 7.1) indicates where the proposed Ashburton telecommunication mast will be visible from. As anticipated, due to the height and location, the proposed telecommunication mast will have a moderate visibility.

Overall visibility of the Ashburton Telecommunication Mast: **MODERATE**

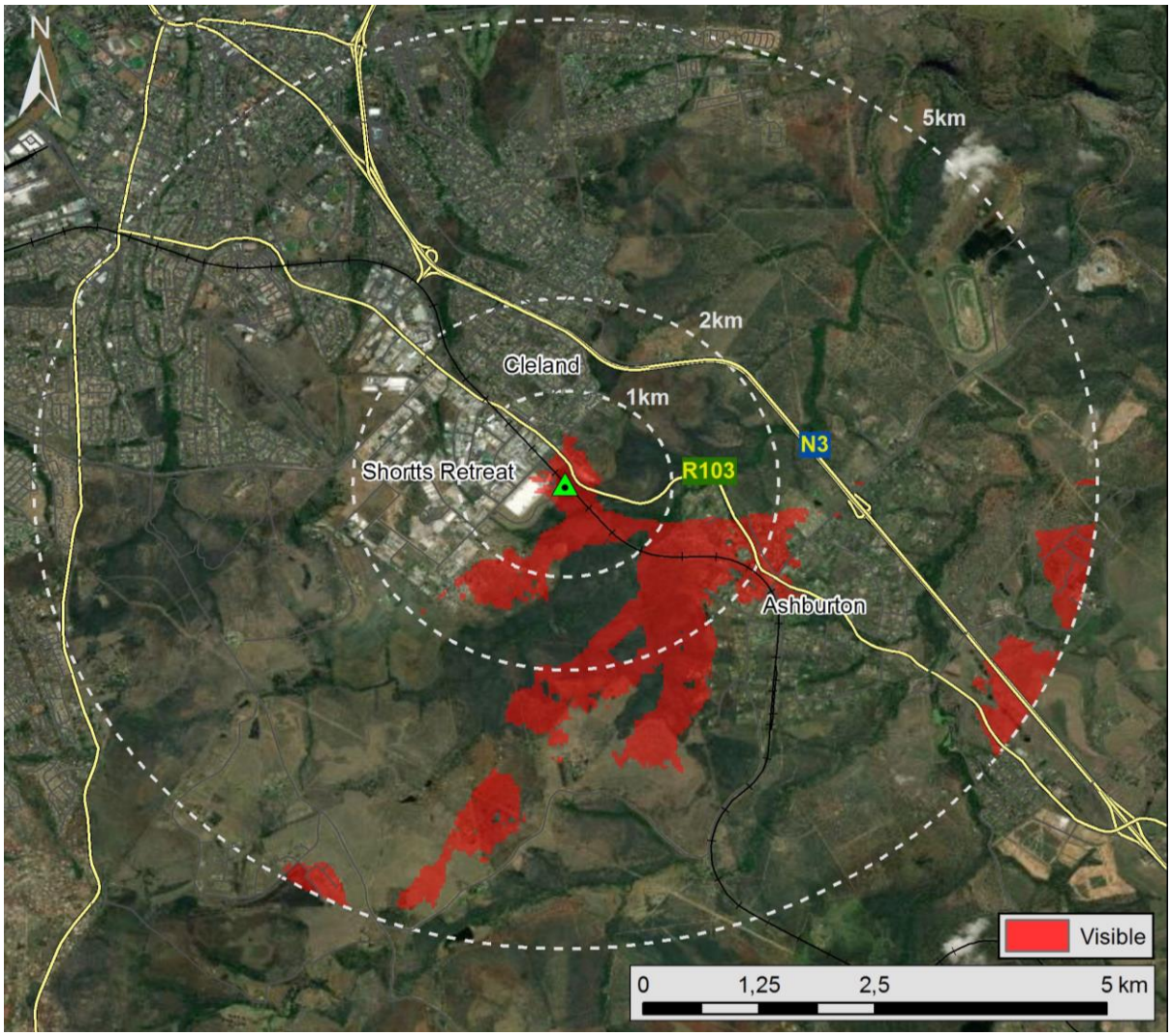

Figure 7.1: Viewshed of the proposed Ashburton telecommunication mast.

7.1.2. Overall visual sensitivity of the surrounding landscape

Visual sensitivity is the inherent visibility of the landscape, usually determined by a combination of topography, landform, vegetation cover and settlement pattern. This translates into visual sensitivity.

Large portions of the landscape in the study area have been transformed by residential and industrial developments. Man-made structures and activities are present in most views of the landscape. Views from areas located north and west of the proposed mast will experience high level as of topographic screening. While vegetation screening may be moderate to high, it is dependent on the viewers location in the landscape.

However, there are several receptors in the surrounding landscape, of which some may be opposed to the construction of a 21m high telecommunications mast. Therefore, based on the Visual Assessment Criteria (Table 7.1) the surrounding landscape is classified as having Moderate visual sensitivity.

Overall visual sensitivity of the surrounding landscape: **MODERATE**

7.1.3. Overall visual intrusion of the project on the surrounding landscape

Visual intrusion is the level of compatibility or congruence of the project with the qualities of the area, or its 'sense of place'. This is related to the idea of context and maintaining the integrity of the landscape or townscape.

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

Sense of place is defined by (Oberholzer 2005) as: 'The unique quality or character of a place... relates to uniqueness, distinctiveness or strong identity.' It describes the distinct quality of an area that makes it memorable to the observer.

While the telecommunications mast may be clearly noticeable from the surrounding areas, railway lines and their associated infrastructure (including overhead electrical lines), as well as large industrial buildings, are already a common site in the surrounding landscape. Based on the Visual Assessment Criteria the visual intrusion of the proposed mast on the surrounding landscape is rated as moderate.

Overall visual intrusion on the surrounding landscape: **MODERATE**

7.1.4. Visual assessment criteria of receptors

Viewer (or visual receptor) sensitivity is a measure of how sensitive potential viewers of the development are to changes in their views. The sensitivity of viewer groups depends on their activity and awareness within the affected landscape, their preferences, preconceptions and their opinions. Visual receptors are identified by looking at the development viewshed, and include scenic viewpoints, residents, motorists and recreational users of facilities within the viewshed. Many highly sensitive visual receptors can be a predictor of a high intensity/magnitude visual impact although their distance from the development (measured as visual exposure) and the current composition of their views (measured as visual intrusion) will have an influence on the significance of the impact.

In this report the following distances from the site are used as proxy for categories of exposure:

- High exposure – 0 to 1km from the development.
- Moderate exposure – 1km to 2km from the development.
- Low exposure – greater than 2km from the development.

Based on potential sensitivity, visibility and exposure, the following sensitive receptors (Figure 5.5) were identified within the study area:

- Ashburton Small Holdings (Residential);
- Cleland Residential Suburb;
- Shortts Retreat (light industrial area and business park); and
- Motorists using the R103.

An assessment of these receptors in terms of the visual sensitivity, visual exposure, visual absorption capacity (VAC) and visual intrusion has been included below. This assessment has also been used to help determine the severity rating of the impacts in Section 7.2.

Ashburton Small Holdings

There are a number of homesteads on the Ashburton Small Holdings to the south-east of the proposed site. Residents' views and any scenic viewpoints on their properties may potentially be affected by the proposed development. However, this will be dependent on the site-specific characteristics of each homestead. On a whole these agricultural holdings have been classified as having the following visual assessment criteria:

- The sensitivity of residents on surrounding holdings is considered *MODERATE* to *HIGH*.
- The telecommunication mast will result in a noticeable change in the surroundings for residents living close to the project area. However, landuse activities in the area have already transformed the visual landscape and the introduction of the mast will partially fit into the surroundings. Therefore, the visual intrusion is rated as *MODERATE*.
- There are no homesteads within 1km of the proposed site. There are a few between 1km and 2km which will have a *MODERATE* visual exposure. Majority of the homesteads are located further than 2km from the proposed site and will thus have a *LOW* visual exposure.
- The VAC for homesteads on surrounding farm in rated as *MODERATE* to *HIGH*, as most homesteads for surrounded by trees which will screen views.

Cleland Residential Suburb

The suburb of Cleland is located just over 1km north of the proposed site. The majority of the suburb is screened by the topography, urban vegetation and infrastructure, such as walls and buildings. The small area that may potentially be affected has the following visual assessment criteria:

- The sensitivity of residents is considered *MODERATE* to *HIGH*.
- The nearest house within the suburb is located just over 500m from the proposed site. The visual exposure is thus rated as *HIGH*.
- Views from the suburb already include infrastructure such as roads, power lines, telephone poles, street lights etc. Therefore, the visual intrusion of the proposed mast is thus rated is *MODERATE*.
- Views from the suburb will be largely screened as a result of the topography, urban vegetation, walls and buildings. The VAC is therefore considered *HIGH*.

Shortts Retreat

Shortts Retreat, which is light industrial area and business park, is located within 1km west of the proposed site. This area has the following visual assessment criteria:

- As it is an industrial area, the sensitivity is rated as *LOW*.
- The visual exposure is rated as *MODERATE* to *HIGH*.
- The introduction of the telecommunication mast will fit in with the industrial landscape. Therefore, the visual intrusion is rated as *LOW*.
- The topography and large industrial buildings will screen views from most location within Shortts Retreat. Therefore, the VAC is considered *HIGH*.

Motorists using the R103

Motorists using the R103 will potentially be able to see the mast from certain viewpoints. However, the following should be considered:

- Motorists are generally classified as *LOW SENSITIVITY* visual receptors since they are exposed to a landscape feature for only short period and are not focused on the landscape for its aesthetic value.
- The landscape, particularly to the north and to the west, has been transformed by urban developments, existing power lines, railway infrastructure and other light industries. As such, the visual intrusion is rated as *MODERATE*.
- The visual exposure is rated as *HIGH*, as section of the R101 is located within 1km of the proposed site.
- The topography and relatively tall vegetation will screen views of the development. Therefore, the VAC is rated as *HIGH*.

7.2. Criteria used for the assessment of impacts

The following standard rating scales have been defined for assessing and quantifying the identified impacts (Table 7.2). This is necessary since impacts have several parameters that need to be assessed. The identified impacts have been assessed against the following criteria:

- Relationship of the impact to **temporal scales** - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
- Relationship of the impact to **spatial scales** - the spatial scale defines the physical extent of the impact.
- The **likelihood of the impact occurring** - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident) and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.
- The **severity of the impact** - the severity/beneficial scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected party (Table 7.3).

The severity of impacts should be evaluated with and without mitigation to demonstrate how serious the impact is when nothing is done about it. The word ‘mitigation’ means not just ‘compensation’, but also the ideas of containment and remedy. However, mitigation must be practical, technically feasible and economically viable.

Table 7.2: Criteria used to rate the significance of an impact.

Temporal scale (*the duration of the impact*)		
Short term	**1**	Less than 5 years (Many construction phase impacts are of a short duration).
Medium term	**2**	Between 5 and 20 years.
Long term	**3**	Between 20 and 40 years (From a human perspective almost permanent).
Permanent	**4**	Over 40 years or resulting in a permanent and lasting change that will always be there.

Spatial scale (*the area in which any impact will have an effect*)		
Localised	**1**	Impacts affect a small area of a few hectares in extent. Often only a portion of the project area.
Study Area	**2**	The proposed site and its immediate surroundings.
Municipal	**3**	Impacts affect the Municipality, or any towns within the municipality.
Regional	**3**	Impacts affect the wider area or the Western Cape Province as a whole.
National	**3**	Impacts affect the entire country.
International	**4**	Impacts affect other countries or have a global influence
Likelihood (*the confidence with which one has predicted the significance of an impact*)		
Definite	**4**	More than 90% sure of a particular fact. Should have substantial supportive data.
Probable	**3**	Over 70% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	**2**	Only over 40% sure of a particular fact, or of the likelihood of an impact occurring.
Unlikely	**1**	Less than 40% sure of a particular fact, or of the likelihood of an impact occurring.

Table 7.3: Impact severity rating.

Impact severity *(The severity of negative impacts, or how beneficial positive impacts would be on a particular affected system or affected party)*			
Very severe	**8**	**Very beneficial**	**8**
An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. For example the permanent loss of land.		A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit. For example the vast improvement of sewage effluent quality.	
Severe	**4**	**Beneficial**	**4**
Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these. For example, the clearing of forest vegetation.		A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. For example an increase in the local economy.	
Moderately severe	**2**	**Moderately beneficial**	**2**
Medium to long term impacts on the affected system(s) or party (ies), which could be mitigated. For example constructing a sewage treatment facility where there was vegetation with a low conservation value.		A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way. For example a 'slight' improvement in sewage effluent quality.	
Slight	**1**	**Slightly beneficial**	**1**
Medium or short term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. For example a temporary fluctuation in the water table due to water abstraction.		A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.	
No effect		**Don't know/Can't know**	
The system(s) or party(ies) is not affected by the proposed development.		In certain cases it may not be possible to determine the severity of an impact.	

Table 7.4: Matrix used to determine the overall significance of the impact based on the likelihood and effect of the impact.

Likelihood		Effect													
		3	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
	1	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	3	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	4	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Table 7.5: The significance rating scale.

Significance	Description
Low	These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by the public and/or the specialist as constituting a fairly unimportant and usually short term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.
Moderate	These impacts will usually result in medium to long term effects on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by society as constituting a fairly important and usually medium term change to the (natural and/or social) environment. These impacts are real but not substantial.
High	These impacts will usually result in long term effects on the social and/or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long term change to the (natural and/or social) environment. Society would probably view these impacts in a serious light.
Very High	These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or social) environment, and usually result in severe or very severe effects, or beneficial or very beneficial effects.

The ***environmental significance*** scale is an attempt to evaluate the importance of a particular impact. This evaluation needs to be undertaken in the relevant context, as an impact can either be ecological or social, or both. The evaluation of the significance of an impact relies heavily on the values of the person making the judgment. For this reason, impacts of especially a social nature need to reflect the values of the affected society.

Prioritising

The evaluation of the impacts, as described above is used to assess the significance of identified impacts and determine which impacts require mitigation measures.

Negative impacts that are ranked as being of "**VERY HIGH**" and "**HIGH**" significance will be investigated further to determine how the impact can be minimised or what alternative activities or mitigation measures can be implemented. These impacts may also assist decision makers i.e. numerous **HIGH** negative impacts may bring about a negative decision. For impacts identified as having a negative impact of "**MODERATE**" significance, it is standard practice to investigate alternate activities and/or mitigation measures. The most effective and practical mitigations measures will then be proposed. For impacts ranked as "**LOW**" significance, no investigations or alternatives will be considered. Possible management measures will be investigated to ensure that the impacts remain of low significance.

These significance ratings may have limited usefulness unless they are described in terms of the broader visual context (Oberholzer 2005). The visual assessment criteria (Table 7.1) have, therefore, been used to assist in this regard.

7.3. Assessment of Impacts

7.3.1. Construction phase impacts

Construction Phase Impact 1: Visual impact of construction activity

Cause and comment

There are various activities which will take place during the construction phase which may have impacts on sensitive visual receptors:

- There will be a slight increase in vehicular movement of trucks delivering supplies and construction material.
- A small area of degraded vegetation will need to be cleared for the foundations.
- Construction of telecommunication mast will potentially draw attention if they are exposed above the skyline.
- Soil stockpiling and vegetation debris.

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Impact 1: Visual impact of construction activity					
Without Mitigation	Short term	Localised	Slight	Probable	**LOW**
With Mitigation	Short term	Localised	Slight	Probable	**LOW**

Mitigation measures

The following mitigation measures are proposed:

- The construction contractor should clearly demarcate construction areas so as to minimise site disturbance.
- The site should be kept neat and tidy. Littering should be fined, and the SHE officer should organise rubbish clean-ups on a regular basis.
- Night lighting of the construction sites should be minimised within requirements of safety and efficiency.
- Implement mitigation measures as recommended in the EMPr.

7.3.2. Operational phase impacts

Impact 2: Impact of telecommunication mast on visually sensitive receptors

Cause and comment

- As seen in the viewshed (Figure 7.1), the mast will be visible from the surrounding areas. Notable features within the viewshed area include: Ashburton Small Holdings (Residential), Cleland Residential Suburb, Shortts Retreat (light industrial area and business park) and the R103 road. The visual assessment criteria, as discussed in

Section 7.1, have been used to inform the severity of the impact. The VAC should also be considered when determining the risk or likelihood of the impact.

Receptor	Effect			Risk or Likelihood	Overall Significance	
	Temporal Scale	Spatial Scale	Severity of Impact		Without Mitigation	With Mitigation
Residential areas						
Ashburton Small Holdings (Residential)	Long Term	Localised	Moderate	Probable	**MODERATE**	**MODERATE**
Cleland Residential Suburb	Long Term	Localised	Moderate	Unlikely	**LOW**	**LOW**
Light industrial area and business park						
Shortts Retreat	Long Term	Localised	Slight	Possible	**LOW**	**LOW**
Surrounding Roads						
Motorists using the R103	Long Term	Localised	Slight	Probable	**LOW**	**LOW**

Mitigation and management

The current location is well suited, as the topography will screen most views of the mast. Other than avoiding the site completely there are no mitigation measures that can further reduce the visual intrusion of the telecommunication mast itself. However, lighting must be designed to minimise light pollution without compromising safety.

7.3.3. Cumulative Impacts

<u>Cumulative Impact 1: Visual impact of facility construction and operation</u>

Cause and comment

Sadler (1996) defines cumulative impacts as the “the net result of environmental impact from a number of projects and activities”.

There are other industrial developments and electrical infrastructure existing within the surrounding landscape. These include existing railways lines and overhead powerlines. The cumulative visual impacts of this infrastructure will be moderate; however, the contribution of the proposed telecommunication mast will be ***minimal***.

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
Cumulative Impact 1: Visual impact of facility construction and operation					
Without Mitigation	Long Term	Regional	Moderate	Definite	**MODERATE**
With Mitigation	Long Term	Regional	Moderate	Definite	**MODERATE**

Mitigation and management

There are no feasible mitigation measures to reduce the cumulative visual impact of the industrial and electrical infrastructure in the surrounding areas. All developments that require Environmental Authorisation must adhere to mitigation measures as set out in their respective EMPr.

7.3.4. No-Go Impacts

No-Go Impact 1: Impact of telecommunication mast on sensitive visual receptors

Cause and comment

The “no-go” option should always be considered as an alternative. The “No-go” alternative entails maintaining the status quo. In other words, the proposed construction of the Ashburton Telecommunication Mast would not go ahead, and current land uses would continue as before (i.e. agricultural land with the existing railway infrastructure). This is not automatically the optimal environmental option, as a site may not have intrinsic conservation value. In the case of the proposed Ashburton Tunnel telecommunication mast, the development will have the benefit of providing an upgrade in the current telecommunications infrastructure along the railway line, which in turn expedite work activities during maintenance There are no feasible mitigation measures to reduce the cumulative visual impact of the industrial and electrical infrastructure in the surrounding areas. All developments that require Environmental Authorisation must adhere to mitigation measures as set out in their respective EMPr and provide necessary safety improvements.

Impact	Effect			Risk or Likelihood	Overall Significance
	Temporal Scale	Spatial Scale	Severity of Impact		
No-Go Impact 1: Impact of telecommunication mast on sensitive visual receptors					
Without Mitigation	N/A	N/A	N/A	N/A	**NONE**
With Mitigation	N/A	N/A	N/A	N/A	**NONE**

Mitigation and management

Not applicable to the no-go option.

8. CONCLUSIONS AND RECOMMENDED MANAGEMENT ACTIONS

The proposed Ashburton telecommunication mast will have a height of 21m and will be visible from the immediate surrounding areas. Other industrial infrastructure in the surrounding areas includes large industrial buildings, the railway line, power lines and telephone lines. The landuse to the west of the proposed site comprises of an industrial area and business park. To the north of the proposed site is the Cleland Residential Suburb. There are areas of natural vegetation immediately south and east of the proposed site. Generally, the development is sheltered by natural vegetation and the topography of the landscape.

The assessment of the proposed project was undertaken in terms of the following visual assessment criteria:

- Visibility of the project;
- Visual exposure;
- Visual sensitivity of the area;
- Visual sensitivity of receptors; and
- Visual intrusion.

Each impact was rated in terms of the following:

- Temporal Scale;
- Spatial Scale;
- Likelihood; and
- Severity.

The following main visual receptors were identified:

- Ashburton Small Holdings (Residential);
- Cleland Residential Suburb;
- Shortts Retreat (light industrial area and business park); and
- Motorists using the R103.

Summary of impacts:

	Pre-Mitigation	Post Mitigation
CONSTRUCTION PHASE		
Impact 1: Visual impact of construction activity	LOW-	LOW-
OPERATIONAL PHASE		
Impact 2: Impact of the mast on visually sensitive points and areas		
• Ashburton Small Holdings (Residential)	MODERATE-	MODERATE-
• Cleland Residential Suburb	LOW-	LOW-
• Shortts Retreat (light industrial area and business park)	LOW-	LOW-
• Motorists using the R103	LOW-	LOW-
CUMULATIVE IMPACTS		
Cumulative Impact 1: Visual impact of facility construction and operation	MODERATE-	MODERATE-
NO-GO ALTERNATIVE		
No-Go Impact 1: Impact of telecommunication mast on sensitive visual receptors	NONE	NONE

Concluding Statement

Overall, the telecommunication mast will have a low to moderate impact on the visual landscape for certain visual receptors. However, this should be considered within the context of the following:

- Existing industrial and electrical infrastructure, including large industrial buildings, the railway line and associated infrastructure, overhead powerlines and telephone lines, already impose on the visual landscape for nearby visual receptors; and
- Although limited, certain mitigation recommendations in this report can mitigate the impacts to some extent.

It is concluded that potential losses of scenic resources are not sufficiently significant to present a fatal flaw to the proposed project.

9. REFERENCES

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APPENDIX C2 - DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed installation of a telecommunication mast and associated infrastructure at various locations at Ashburton Tunnel No. 4, Pietermaritzburg, South Africa

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	CES (t/a Coastal and Environmental Services (Pty) Ltd.) (at time of assessment)			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition	135%
Specialist name:	Mr Michael Johnson			
Specialist Qualifications:	MSc Geoinformatics			
Professional affiliation/registration:	South African Geomatics Council - Candidate Geomatics Practitioner: GISc Professional (CGPrGISc 0299)			
Physical address:	Block C, The Estuaries, Oxbow Crescent, Century City, 7441			
Postal address:	Block C, The Estuaries, Oxbow Crescent, Century City,			
Postal code:	7441	Cell:	082 746 4380	
Telephone:		Fax:		
E-mail:	mikeyjohnson01@gmail.com			

2. DECLARATION BY THE SPECIALIST

I, _____ Michael Johnson_____, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- 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 realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

_____
Signature of the Specialist

CES (at time of assessment)
Name of Company:

23/06/2020
Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, _____Michael Johnson_____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

_____

Signature of the Specialist

CES (at time of assessment)

Name of Company

23/06/2020

Date

A.C

Signature of the Commissioner of Oaths

23/6/2020

Date

ANDREW KOCH CA (SA)
Commissioner of Oaths RSA
9 Dal Road
Camps Bay
8005

Certified a true copy
of the original

APPENDIX C3 - CURRICULUM VITAE OF THE SPECIALIST

MICHAEL JOHNSON
Curriculum Vitae

CONTACT DETAILS

Name of Company	**CES – Environmental and Social Advisory Services**
Designation	Cape Town Branch
Profession	Environmental Consultant and GIS Specialist
Years with firm	Two (2) Years
E-mail	m.johnson@cesnet.co.za
Office number	+27 (0)21 045 0900
Nationality	South African
Professional Affiliations	International Association of Impact Assessment (IAIAsa) South African Geomatics Council - Candidate Geomatics Practitioner: GISc Professional (CGPrGISc 0299)
Key areas of expertise	• Geographic Information Systems • Remote Sensing • Landcover and Vegetation Mapping • Visual Impact Assessment • Environmental Impact Assessment

PROFILE

Mr Michael Johnson

Michael holds a BSc in Geoinformatics, a BSc (Hons) cum laude in Geoinformatics and an MSc in Geoinformatics from Stellenbosch University. Michael's Master's thesis examined the use of Remote Sensing and computer vision technologies for the extraction of near-shore ocean wave characteristic parameters. For the duration of his Master's, he was based at the Council for Scientific and Industrial Research (CSIR) in Stellenbosch. During this time, in addition to his Master's studies, he conducted work in collaboration with the CSIR Coastal Systems Research Group and provided GIS and Remote Sensing tutoring and technical assistance to the junior staff and fellow students. Michael graduated in March 2018 and has been working for CES since. Since joining CES, Michael has been involved in a number of projects where his GIS and Remote Sensing skills have been utilised. These include, but are not limited to, landcover mapping for the King Cetswayo District Municipality Environmental Management Framework, the use of remote sensing to map invasive alien plant species for the Swartland and Buffalo City Invasive Alien Species Management Plans and multiple Visual Impact Assessments which require advanced GIS modelling.

Michael has also been part of the project team that has recently completed an independent completion audit for MCA-Malawi for 6 RAPs conducted for the Infrastructure Development Project in Malawi. These RAPs documented the physical and economic displacement impacts and compensation for assets of people affected by wayleave corridors along 400kV, 132kV, 66kV and 33kV OHLs, as well as for substations and permanent access roads.

Michael is registered with the International Association for Impact Assessments (IAIA) and the South African Geomatics Council as a Candidate Geomatics Practitioner: GISc Professional (CGPrGISc 0299).

EMPLOYMENT EXPERIENCE	**Environmental Consultant, Coastal and Environmental Services (Cape Town)** *May 2018-Current* **GIS Sub Consultant, EOH Coastal and Environmental Services (East London)** *March 2018 - May 2018* **Student/Junior project researcher, CSIR (Stellenbosch)** *February 2016- November 2018* **Course Tutor, Stellenbosch University** *February 2016- November 2018*
ACADEMIC QUALIFICATIONS	**Stellenbosch University,** Stellenbosch, South Africa • 2018 - MSc Geoinformatics • 2015 - BSc (Hons) cum laude Geoinformatics • 2014 - BSc Geoinformatics
COURSES	Rhodes University and CES, EIA Short Course *2017*
CONFERENCE PROCEEDINGS	37th Symposium of Remote Sensing of the Environment, March 2017. *Extracting near-shore ocean wave characteristic parameters using remote sensing and computer vision technologies* Society of South African Geographers Student Conference, September 2016. *Deriving bathymetry from multispectral Landsat 8 imagery in South Africa* CSIR Natural Resources Environment Science week, 2016. *Detection of coastal ocean wave characteristics from remotely sensed imagery*
PROFESSIONAL EXPERIENCE	**SPECIALIST GIS, DATA MANAGEMENT AND REMOTE SENSING** **King Cetshwayo Environmental management Framework, 2018** Creating, updating and mapping Landcover using Sentinel-2 satellite imagery and supervised classification approaches. Deliverable was a high definition, updated Landcover map (covering an area of approximately 8200km^2) for use in the Environmental Management Framework. **Buffalo City Metropolitan Municipality Invasive Alien Species Plan, 2018** Mapping of alien plant species using remote sensing. This was done using Sentinel-2 satellite imagery, 10cm high resolution aerial imagery and data collected during four field surveys. Deliverable was a distribution map of invasive alien species that would feed into the Invasive Alien Species Plan. **Swartland Municipality Invasive Alien Plant Species Plan, 2018** Mapping of alien plant species using sentinel-2 satellite imagery, 50cm aerial imagery and data collected during a field survey. Deliverable was a distribution map of invasive alien species that would feed into the Invasive Alien Species

Plan. These were used to calculate the level of infestation per specie per management unit.

Eastern Cape Biodiversity Spatial Plan, 2019
GIS specialist work on a very large dataset. Tasks included combining multiple GIS input layers to create one final output, repairing geometry and cleaning up sliver polygons, performing area calculations and cleaning attributes of final dataset.

MCA Malawi RAP, 2018 & 2019
Completion audit for 6 RAPs conducted for the Infrastructure Development Project in Malawi. These RAPs documented the physical and economic displacement impacts and compensation for assets of people affected by wayleave corridors along 400kV, 132kV, 66kV and 33kV OHLs, as well as for substations and permanent access roads.

Kenmare Pilivili ESIA, 2018
Conducted specialist GIS and Remote Sensing tasks including:

- Creating Maps for the Environmental and Social Impact Report.
- The mapping the distribution of *Icuria Dunensis* using Sentel-2 Imagery for the stretch of coastline between Pebane and the Matibane Forest (just south of Nacala) in Mozambique.
- Historical Mapping on the Mualadi Estuary Mouth near Pilivili.

Triton Minerals Ancuabe Monitoring, 2018
GIS specialist mapping and co-authored the field guide for Plant Species of Conservation Concern for the Ancuabe Graphite Mine Monitoring Project in Mozambique.

Suni Resources Balama ESIA, 2018
GIS mapping for specialist studies conducted for the Balama Central Graphite Mine in the district of Balama in Cabo Delgado Province, northern Mozambique.

Cape Agulhas Precinct Plans, 2019
GIS Specialist

Cameroon Solar Photovoltaic (PV) power station, 2019
Conducted a slope analysis, identified drainage lines and mapped landuse using a digital elevation model and Sentinel-2 satellite imagery for five alternate Solar PV sites near Mbalmayo in Cameroon.

Malawi Catchment Management Strategies, 2020
Landcover mapping using Sentinel-2 satellite imagery for three large water resource areas in Malawi. Landcover was used to determine the level of degradation and to identify priority areas within each catchment.

Ekurhuleni Bioregional Plan, 2020
Creating, updating and mapping Landcover using Sentinel-2 satellite imagery and supervised classification approaches. Deliverable was a high definition, updated Landcover map for use in the Bioregional Plan.

PROJECT MANAGEMENT, EIAs & MANAGEMENT PLANS

Northcliff Nature Reserve, 2018
Co-author of the Environmental Management Plan.

Boulders WEF Powerline, 2019
Basic Assessment for a proposed 132kV sub-transmission line, near Vredenburg in the Western Cape Province. Was assigned the role of project manager, co-author of the Basic Assessment Report and GIS specialist.

Wijnberg Dam Expansion, 2019
Basic Assessment for a proposed dam expansion, near Greyton in the Western Cape Province. Was assigned the role of project manager, co-author of the Basic Assessment Report and GIS specialist.

Door of Hope, Children's Mission Village Development, 2019
Basic Assessment and S24G for a proposed village estate for orphaned children, in the Gauteng Province. Was assigned the role of project manager, co-author of the Basic Assessment Report and GIS specialist.

Blombos Dune and Ecological Study, 2019
Project Management and GIS Specialist

Gouritz Dune Maintenance Management Plan, 2020
Project Management, GIS Specialist and co-author of the Maintenance Management Plan.

Stillbaai Dune Maintenance Management Plan, 2020
Project Management, GIS Specialist and co-author of the Maintenance Management Plan.

Witsands Dune Maintenance Management Plan, 2020
Project Management, GIS Specialist and co-author of the Maintenance Management Plan.

VISUAL IMPACT ASSESSMENTS AND VISUAL SPECIALIST INPUT

Visual impact assessments incorporate advance GIS specialist work and 3D modelling to assess the potential visual impacts that a development could have on the surrounding landscape. VIA experience includes the following projects:

- Bayview WEF and Powerline, 2018
- Rietkloof WEF, 2018
- Boulders WEF, 2019
- Indyebo WEF, 2019
- Plan 8 WEF, 2018
- Golden Valley 2 WEF, 2018
- Coleskop WEF, 2019
- Umsobomvu 1 WEF, 2019
- Eskom Lesokwana Powerline, 2019

- Dassiesridge WEF, 2019
- Ukomeleza 1 WEF, 2019
- Great Kei WEF, 2019
- Motherwell WEF, 2019
- Paalfontein WEFs and Solar PV Facilities, 2019
- Albany WEF and Powerline, 2020

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes me, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

Michael Johnson Date: 15 January 2020