



**PROPOSED DEVELOPMENT OF A TELECOMMUNICATION
BASE STATION ON PORTION 7 OF THE FARM
JAGERSVLAKTE NO. 292, GRABOUW, WESTERN CAPE
PROVINCE**

Visual Impact Assessment

September 2018

Prepared for:



Prepared by:

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EXECUTIVE SUMMARY

Enviroworks was appointed by Warren Petterson Planning to compile the Visual Impact Assessment (VIA) for the proposed Maxwell Lattice Mast in order to determine the Visual Impact of the proposed telecommunication base station. This VIA Report was compiled in accordance with the Guidelines for involving a Visual and Aesthetic Specialist in the EIA process (DEA&DP, 2005). This Guideline was developed by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) to be implemented as best practise.

PROJECT DESCRIPTION

The proposed project entails the development of a thirty metre (30 m) Lattice Mast on Portion 7 of the Farm Jagersvlakte No. 292, Grabouw, Western Cape Province. Attached to the mast will be nine (9) triband antennae with six (6) transmission dishes and a Navigation Light attached to the top of the mast. At ground level four (4) concrete plinths will be constructed to which four (4) telecommunication equipment containers will be installed. The total development footprint for the proposed project is one hundred square metres (100 m²) surrounded by a two point four meter (2.4 m) palisade fence. Power will be obtained from the Theewaterskloof Local Municipality.

Since the introduction of LTE in South Africa in 2012 there has been greater need for access to faster data. Higher penetration of LTE data in educational, residential, commercial and business areas has led to lower subscription fees which in itself provide economic sustainability and development. When selecting a site, special consideration is given to the geographical aspects so that the cellular infrastructure is positioned to ensure optimal functionality and availability to the customer.

Warren Petterson (Pty) Ltd pride themselves in ensuring that a positive impact is created in terms of the social and economic wellbeing in the area and will endeavour to erect a base station in such a manner so that it does not detract from the aesthetics in the surrounding area.

DESIGN ALTERNATIVES

Two design alternatives are proposed, as detailed below.

Alternative 1: Construction of a thirty meter (30 m) Lattice Mast - Preferred option

The Lattice Mast is a free-standing thirty meter (30 m) high triangular base station with three sides (3). Lattice Masts can be considered to resemble industrial clutter, whereas a Monopole Mast is more discreet. The principles as set out in the City of Cape Town's Draft Telecommunication Infrastructure Policy: April 2015, will be implemented. The Policy states that a general rule for new freestanding telecommunication masts, a slim line monopole should be used in an urban context, while a lattice mast should be used in a rural context.

As the proposed development will be situated within the agricultural/natural setting outside the town of Grabouw and thus the Lattice mast is considered to be the preferred design alternative. If comparing Figure 1 and 2 below it is evident that the Lattice Mast blends in better with the surrounding environment and thus the Visual Impact Specialist would recommend the Lattice Mast as well.



Figure 1: Example of a Lattice Mast.

Alternative 2: Construction of a thirty meter (30 m) Monopole Mast

The Monopole Mast is a singular tube measuring in at thirty meters (30 m) in height, with the antennas mounted on the upper end of the tower. A Monopole Mast has a slim line design in order to minimise the visual exposure. Due to its design it blends into the surrounding environment more effectively. The mast will provide for the co-location, allowing multiple operators to use the same mast as a base station. This will reduce the demand for base stations in the same location. Monopole Masts can be painted green, which will further aid in reducing its visual impact. Should the Lattice Mast not be constructed a monopole mast will be a suitable alternative.



Figure 2: Example of a Monopole Mast

CONCLUSION AND RECOMMENDATIONS

The viewshed analysis for the proposed Maxwell Lattice Mast illustrates that the visual impact will be moderate due to its exposure; however, the viewshed analysis does not take into account the Visual Absorption Capacity of the surrounding environment. As outlined in Section 8.2 of the report the mast will have a high visual impact within the short distance zone due to the height of the mast and the number of receptors especially towards the south east. Within the short to medium zone the visual impact will be low as the VAC of the receiving environment increases due to the undulating topography and high vegetation cover. Built up structures within the zone is considered to be high thus limiting the visual impact. As distance between observers and the proposed development increase so will the visual impact decrease.

Within the medium to long distance zone the mast will be visible from certain vantage points as illustrated in Figure 13; however, taking into account the foreground and background built up and natural environment the impact will be low towards the north and highly unlikely in the other wind directions. Visibility beyond the five kilometer (5 km) radius from the proposed Maxwell Mast is expected to be negligible and low due to the distance between the object and the observer. The mast will be visible from the Hottentots-Holland towards the north west, Groenland Nature Reserve towards the north east and Koegelberg Nature Reserve towards the south west.

If all mitigation measures are implemented by the Developer the visual impact will be low on residence residing within the area as well as to commuters making use of National Route 2 and tourists visiting the surrounding tourist attractions.

The following mitigatory considerations can assist in minimising the visual impact:

- Access roads are to be kept clean and dust suppression techniques should be implemented to minimise impacts of vehicle movement;
- Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective;
- Construction camps as well as development areas should be screened with netting;
- Lights within the construction camp should face directly down (angle of 90°);
- Minimum vegetation should be removed to ensure the visual absorption capacity remain high;
- Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact;
- Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare;
- The proposed mast should be galvanised and glare must be prevented in order to blend with the surrounding environment; and,
- The containers should be painted a brownish color to ensure it blends in with the natural environment.
- Mitigation to minimise lighting impacts include the following:
 - Shielding the sources of light by physical barriers (walls, vegetation or structures itself);
 - Limit mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights);
 - Make use of downward directional lighting fixtures;
 - Make use of minimum lumen or wattage in lights;

- Use motion sensors to activate lighting ensuring light is available when needed.

Mitigation of visual impacts associated with the construction phase would entail proper planning, management and rehabilitation of the construction site. Mitigation measures include the following:

- Reduce the time of construction through careful planning of logistics and ensure the productive implementation of resources;
- Limit disturbance of the environment to the development footprint.
- Limit construction activities to business hours (07:00 – 17:00).

DECLARATION OF THE SPECIALIST

I, **Christoff du Plessis, ID 911126 5012 084**, declare that I:

- am an Environmental Specialist at Enviroworks;
- act as an independent Specialist Consultant in the field of Visual Impacts;
- am assigned as Specialist Consultant by Warren Petterson Planning (Pty) Ltd for this proposed project;
- I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference;
- remuneration for services by the proponent in relation to this proposal is not linked to approval by decision-making authorities responsible for permitting this proposal;
- the consultancy has no interest in secondary or downstream developments as a result of the Authorisation of this project.
- have no and will not engage in conflicting interests in the undertaking of the Activity;
- undertake to disclose to the Client and the Competent Authority any material, information that have or may have the potential to influence the decision of the Competent Authority required in terms of the Environmental Impact Assessment Regulations 2017; and,
- will provide the Client and Competent Authority with access to all information at my disposal, regarding this project, whether favourable or not.

Christoff du Plessis

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SPECIALIST CV AND DETAILS

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Christoff du Plessis

Relevant Qualifications

Baccalaureus Scientiae (B.Sc) in Environmental Geography: University of the Free State (2014)

Baccalaureus Scientiae (B.Sc) in Environmental Management: University of South Africa (2018)

Work Experience

January 2015 – Present: Environmental Specialist at Enviroworks

Key Specialist Experience

Visual Impact Assessment (VIA):

- Visual Impact Assessment for the proposed 132kV approximately 32 kilometre Havard Powerline from the Cecila- to Noorstad- Distribution Centre, Bloemfontein, Free State Province.
- Visual Impact Assessment for the proposed Phalaborwa Wildlife Activity Hub, Kruger National Park, Limpopo Province.
- Visual Impact Assessment for a 4.9ha Sand Mine on Portion 5 of the Farm Doornekraal No. 830, Western Cape Province.
- Visual Impact Assessment for the proposed development of the Klein Mooimaak Rest Camp, West Coast National Park, Western Cape Province.
- Visual Impact Assessment for the proposed development of the R27 gate within the West Coast National Park, Western Cape Province.
- Visual Impact Statement for the proposed development of the Buffeljagsrivier Monopole Mast, Western Cape Province.
- Visual Impact Statement for the proposed development of the Robertson Monopole Mast, Western Cape Province.
- Visual Impact Assessment for the proposed development of a 178 ha sand mine on the Farm Doornekraal No. 832, Western Cape Province.

- Visual Impact Statement for the proposed development of the Roodekrans Monopole Mast, Gauteng Province.
- Visual Impact Statement for the proposed development of the Bottelary Windmill Mast on Portion 25 of the Farm Klein Bottelary No. 17, Brackenfell South, Western Cape Province.
- Visual Impact Assessment for the proposed development of the Metsimaholo Landfill Site on Portion 3 of the Farm Katbosch No. 93, Free State Province.
- Visual Impact Assessment for the proposed development of the Grabouw Monopole Mast on Portion 13 of the Farm Van Aries Kraal No. 455, Western Cape Province.
- Visual Impact Assessment for the proposed development of the Muizenberg Monopole Mast on Erf 87093, Western Cape Province.
- Visual Impact Assessment for the proposed development of the Simon's Town, Monopole Mast on Erf 560, Western Cape Province.

Wetland Delineation Studies:

- Wetlands Delineation study for the development of 13 borrow pits along National Road 8, Ladybrand, Free State Province.
- Wetland Delineation study for the development of a 12.5ha cemetery on Erf 4233, Western Cape Province.
- Wetland Delineation study for the proposed development of an Agri-Hub near Cederville, Eastern Cape Province.
- Wetland Delineation study for the proposed development of an Agri-Hub near Lambasi, Eastern Cape Province.

Stormwater Management Plans:

- Stormwater Management Plan for the Agri-World Recycling Plant, Swellendam, Western Cape Province.
- Stormwater Management Plan for the Klaasvoogds Granite Mine, Springbok, Northern Cape Province.
- Stormwater Management Plan for the Moreson Poultry Project, Brandfort, Free State Province.
- Stormwater Management Plan for the Sintier Poultry Project, Bronkhorstspuit, Gauteng Province

ABBREVIATIONS

CBA	-	Critical Biodiversity Area
DEA	-	Department Environmental Affairs
DEA&DP	-	Department of Environmental Affairs & Development Planning
DEM	-	Digital Elevation Model
DTM	-	Digital Terrain Model
EIA	-	Environmental Impact Assessment
ESA	-	Ecological Support Area
GIS	-	Geographical Information System
Km	-	Kilometre
M	-	Metre
MAP	-	Mean Annual Precipitation
MAT	-	Mean Annual Temperature
USGS	-	United States Geological Survey
UTM	-	Universal Transverse Mercator
VAC	-	Visual Absorption Capacity
VIA	-	Visual Impact Assessment

REQUIREMENTS OF A SPECIALIST REPORT

Appendix 6 of Government Notice Regulation 326 of 7 April 2017 outlines the basic requirements of a Specialist Report. Please refer to Table 1 below of all requirements.

Table 1: Requirements of a Specialist Report as set out in GN R. 326 of 07 April 2017.

REQUIREMENTS	YES/NO
A Specialist report prepared in terms of these Regulations must contain –	
a. Details of –	Yes
i. The Specialist who prepared the report; and,	
ii. The expertise of that Specialist to compile a specialist report including a curriculum vitae;	
b. A declaration that the Specialist is independent in a form as may be specified by the Competent Authority;	Yes
c. An indication of the scope of, and the purpose for which, the report was prepared;	
i. An indication of the quality and age of base data used for the Specialist Report;	Yes
ii. A description of existing impacts on site, cumulative impacts of the proposed development and levels of acceptable change;	
d. The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Yes
e. A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Yes
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 site alternatives;	Yes
g. An identification of any areas to be avoided, including buffers;	Yes
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;	Yes
i. A description of any assumptions made and any uncertainties or gaps in knowledge;	Yes
j. A description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Yes
k. Any mitigation measures for inclusion in the EMPr	Yes
l. Any conditions for inclusion in the Environmental Authorisation;	Yes
m. Any monitoring requirements for inclusion in the EMPr or Environmental Authorisation;	N/A
n. A reasoned opinion –	
i. Whether the proposed activity, activities or portions thereof should be authorised;	Yes
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, and where applicable, the closure plan;	
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 of 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.	Yes

VISUAL IMPACT EVALUATION CRITERIA CHECKLIST

As per the Provincial Government of the Western Cape Guideline for involving Visual and Aesthetic Specialists in the EIA Process (DEA&DP, 2005), a high quality visual assessment should include the following criteria:

Table 2: Requirements of a Visual Impact Assessment.

REQUIREMENTS	YES/NO
Meet the minimum requirements for a visual assessment;	Yes
Is appropriate to the nature and scale of the proposed development;	Yes
Provides a full description of the environment and the project;	Yes
Considers the project within its wider context;	Yes
Provides a clear methodology using accepted conventions for visual assessment;	Yes
All sources of information and references are given;	Yes
Graphics, including maps and visual simulations, are clear;	Yes
Include both quantitative and qualitative criteria;	Yes
Cumulative visual impacts have been considered;	Yes
An evaluation of alternatives has been made;	Yes
An explanation of significance ratings, related to bench-marks, is given;	Yes
Recommendations for visual mitigation are sensible and practical;	Yes
Recommendations for monitoring programmes have been outlined;	Yes
The best practical environmental option has been considered;	Yes
All the visual issues raised in the scoping have been addressed;	Yes
A clear summary of mitigation measures, including essential and optional measures, is given.	Yes

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1 STUDY APPROACH

1.1 Methodology

The study was undertaken using Geographical Information System (GIS) software as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed development. A detailed Digital Elevation Model (DEM) for the study area (S35E18 & S35E19) was obtained from the United States Geological Survey. The methodology utilised to identify issues to the visual impact include the following activities:

- The creation of a detailed digital terrain model of the potentially affected environment;
- The identification of sensitive environments upon which the proposed telecommunication Base Station could have a potential impact on; and,
- The creation of viewshed analyses from the proposed Maxwell Mast in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analysis takes into account the dimension of the proposed Maxwell Mast and was calculated at a height of thirty meters (30 m).

This Report (Visual Impact Assessment) sets out to identify and quantify the possible visual impacts related to the proposed Maxwell Mast, as well as offer potential mitigation measures where required. The following methodology has been adopted for the assessment of the Visual Impact Assessment:

- **Determine the Potential Visual Exposure**
The visibility or visual exposure of any structure or activity is the point of departure for the VIA. It stands to reason that if the proposed infrastructure was not visible, no impact would occur. Viewshed analyses of the proposed structures indicate the potential visibility.
- **Determine Visual Distance/Observer Proximity to the facility**
In order to refine the visual exposure of the proposed Maxwell Mast on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for the structures.
Proximity radii for the proposed facility are created in order to indicate the scale and viewing distance of the structures and to determine the prominence of the structures in relation to their environment.
The visual distance theory and the observer's proximity to the Maxwell Mast are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed infrastructure.
- **Determine Viewer Incidence/Viewer Perception**
The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers, then there would be no visual impact. If the visual perception of the structure is favourable to all observers, the visual impact would be positive.
It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed infrastructure. It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background state of mind, and purpose of sighting which would create a myriad of options.
- **Determine the Visual Absorption Capacity of the Natural Vegetation**

This is defined as the capacity of the receiving environment to absorb the potential visual impact of the proposed development. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC.

The VAC would also be high where the Environment can readily absorb the structure in terms of texture, colour, form and light/shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or more of the characteristics of the environment would be low. The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases.

The Digital Terrain Model utilised in the calculation of the visual exposure of the proposed Lattice Mast does not incorporate the potential VAC of the natural vegetation of the region. It is therefore necessary to determine the VAC by means of the interpretation of the vegetation cover, supplemented with field observation.

➤ **Determine the Visual Impact Index**

The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the magnitude of each impact.

➤ **Determine the Impact Significance**

The potential visual impacts identified and described are quantified in their respective geographical locations in order to determine the significance of the anticipated impact. Significance is determined as a function of the extent, duration, magnitude and probability.

1.2 Projections

Projected coordinate systems are defined by ArcGIS Resource Centre (The developers) as *“a flat, two dimensional surface. Unlike a geographical coordinate system, a projected coordinate system has constant lengths, angles, and areas across the two dimensions. A projected coordinate system is always based on a geographic coordinate system that is based on a sphere or spheroid”*. Projected Coordinates systems are world based and thus the larger the area the larger the distortion. To minimise the distortion the Universal Transverse Mercator (UTM) coordinate reference system divides the Earth into 60 equal zones that are all 6 degrees wide in longitude from East to West. Grabouw falls within the thirty four degree (34°) UTM Zone, thus the WGS84/UTM S34 (32734) was used as projection.

2 ASSUMPTIONS AND LIMITATIONS

- Information is assumed to be the latest available information.
- Visual impact studies and assessments depend, to some extent, on subjective judgements. The subjectivity, of the analysis relates to the value driven nature of VIA. However, to deal with subjectivity, the methodology of this VIA is explained and rating categories clearly defined.

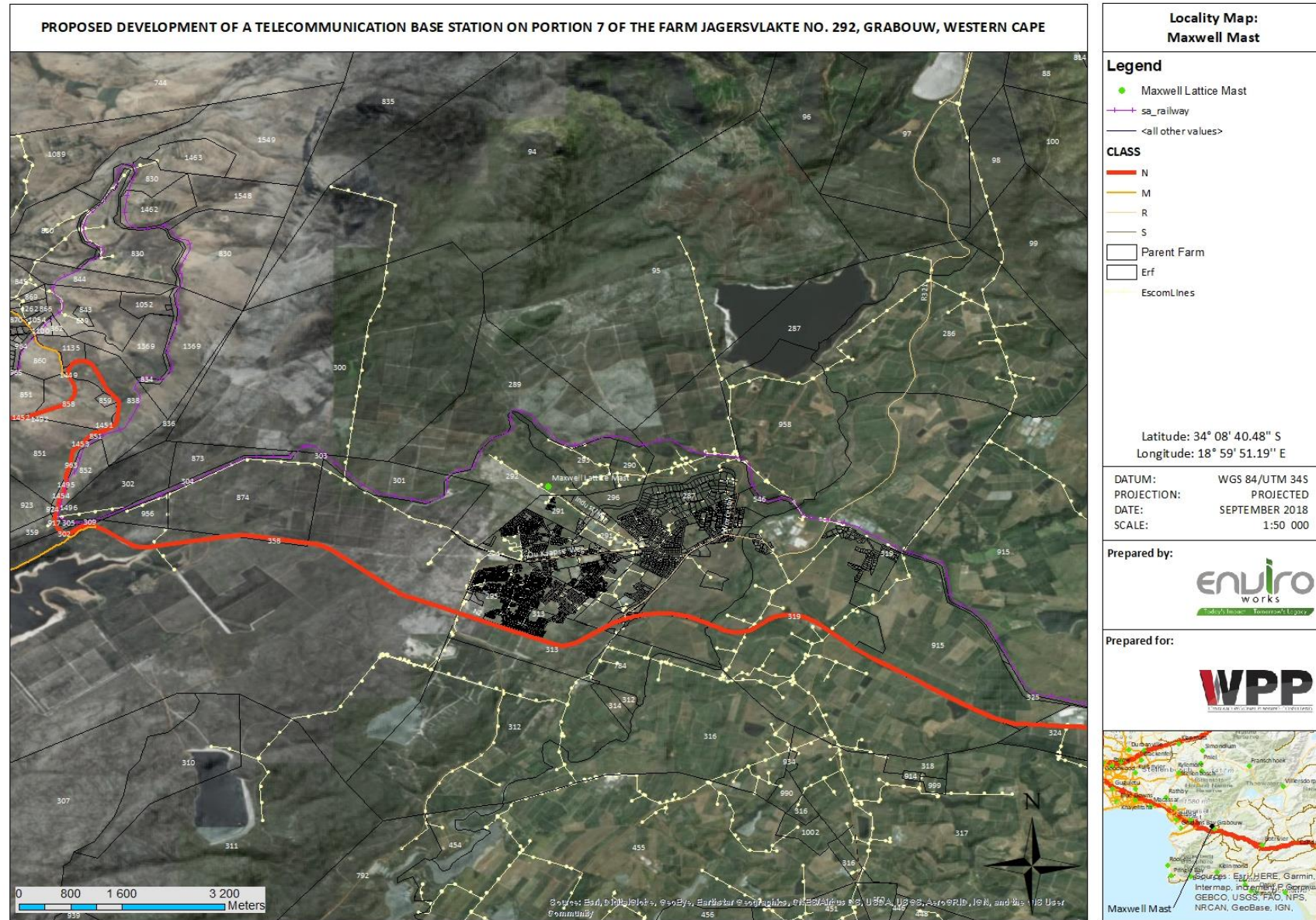


Figure 3: Locality Map of the Proposed Maxwell Mast, Grabouw, Western Cape Province.

3 SCOPE OF WORK

The determination of the potential visual impacts is undertaken in terms of nature, extent, duration, magnitude, probability and significance of the construction and operation phases of the proposed project. The study area for the visual assessment encompasses a geographical area of 130km² (extent of the maps) and includes a ten kilometre (10 km) buffer zone from the proposed Maxwell Mast. The study area constitutes mostly of Agricultural activities towards the northwest and west, with the Hottentots-Holland Nature Reserve situated towards the north, National Route 2 toward the south and the town of Grabouw towards the west. The residential area of Pineview is situated directly to the south of the proposed development.

Anticipated issues related to the potential visual impact of the proposed Maxwell Mast include the following:

- The visibility of the Mast to, and potential visual impact on, observers travelling along National Route 2 (N2) which is considered to be of high scenic value;
- The visibility of the facility to, and potential visual impact on observers residing in the town of Grabouw, on farms and the residential area of Pineview;
- Impact on tourist destinations visiting the wine farms within the ten kilometer (10 km) buffer zone;
- The visual absorption capacity of natural or planted vegetation as well as man-made topographical features;
- Potential visual impacts associated with the construction- and operational phase; and,
- The potential to mitigate visual impacts.

It is anticipated that the issues listed above may constitute a visual impact at a local scale.

4 THE AFFECTED ENVIRONMENT

The proposed Maxwell Lattice Mast will be situated on Portion 7 of the Farm Jagersvlakte No. 292, Grabouw, Western Cape Province. The study area constitutes of residential areas in association with agricultural activities. The town of Grabouw is situated one and a half kilometers (1.5 km) towards the west of the proposed development.

4.1 Topography, vegetation and hydrology

4.1.1 Vegetation

The study area is described by Mucina & Rutherford, 2006, as undulating plains surrounded by high mountains with numerous hills varying in height. Vegetation can be described as low dense shrub-land with scattered tall shrubs. Asteraceous fynbos is rare within the environment; however, it is dominated by Proteoid, ericaceous and restioid fynbos. Due to the high mountains numerous drainage lines are present within the study area with mountain-plateau seasonally wetlands supported by restioid and ericaceous fynbos.

4.1.2 Geology

The Geology is described by Mucina & Rutherford (2006) as *“acidic lithosols soils derived from Ordovician sandstones of the Table Mountain Group. Deep sandy blankets develop in depressions and on slopes resisting erosion. Land types mainly include 1c, 1b and Gb”*. As per the Geology Map for South Africa (Please refer to Figure 5) the underlying geology consists of the following:

Table 3: Underlying Geology of the study area.

Reference	Description
002	Generally reddish, feldspathic and micaceous sandstone with subordinate

	quartz arenite, mudrock, granulestone and conglomerate.
005	Three sandstone and three shale units.
021	Quartzite, shale, subordinate, subgreywacke.
026	Three shale units separated by two sandstone units.
031	Sandstone/quartzite, shale, conglomerate, minor jaspilite.
300	Unconsolidated calcareous sand (coasted dunes) minor palaeosols.
306	Hornblendite.
370	Granite.
524	Shale, greywacke, quartzite, minor volcanic rocks.

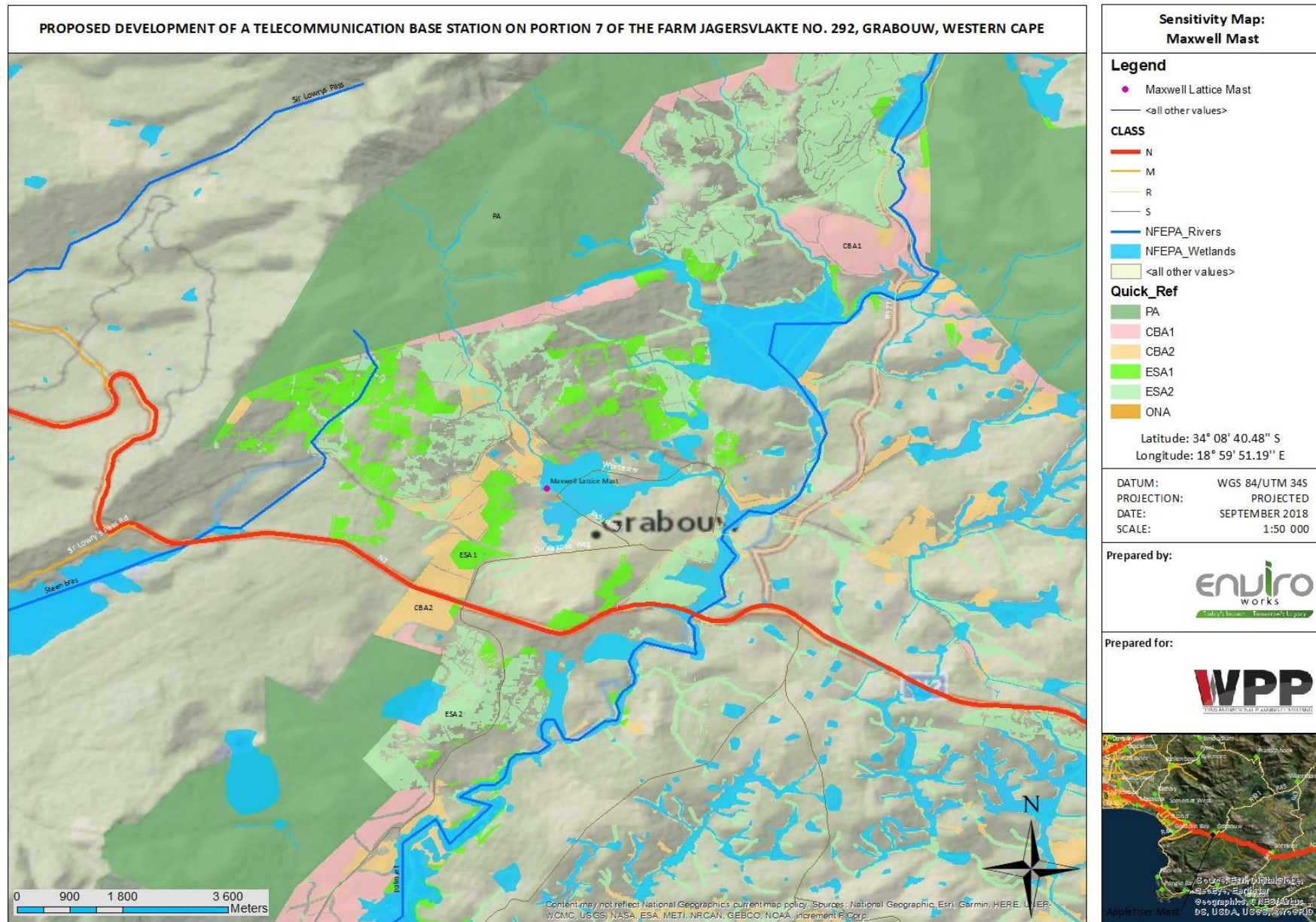


Figure 4: Sensitivity Map of the Study Area.

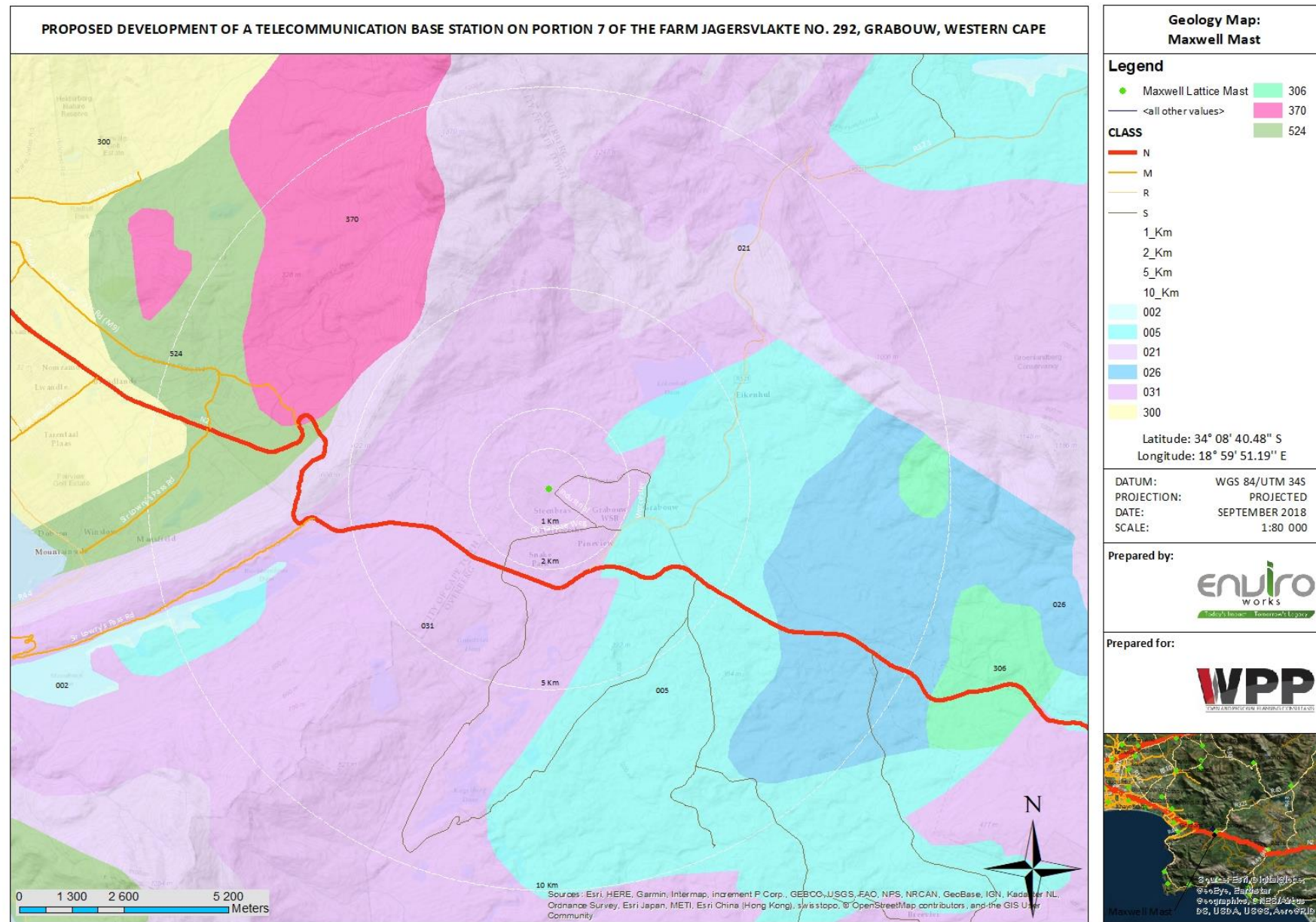


Figure 5: Geology Map of the Proposed Maxwell Lattice Mast.

4.1.3 Climate

The proposed project will be situated within the Kogelberg Sandstone Fynbos bio-region. The Mean Annual Precipitation (MAP) of the study area is one thousand three hundred and twenty eight millimetres (1328 mm) mostly occurring in the winter months with the highest rainfall measured in the months of June to August (Mucina & Rutherford, 2006). The Mean Annual Temperature (MAT) recorded for the study area is fourteen degrees Celsius (14°C), with summer temperatures averaging at twenty four degrees Celsius (24°C).

FFs 11 Kogelberg Sandstone Fynbos

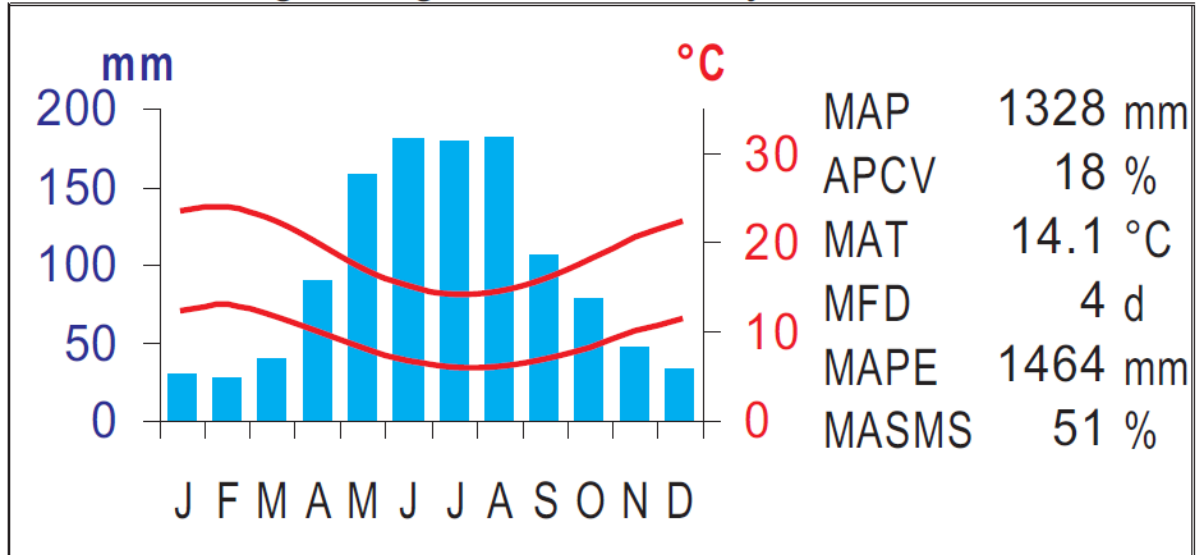


Figure 6: Climate Diagram for the Kogelberg Sandstone Fynbos.

5 RELEVANT LEGISLATION AND GUIDELINES

The following legislation and guidelines have been considered in the preparation of this report:

- This Visual Impact Assessment was undertaken in accordance with the Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes, as issued by the Department of Environmental Affairs and Development Planning (DEA&DP).
- The Environmental Impact Assessment Regulation as outlined in Government Notice Regulation 326 of 7 April 2017.

6 DEVELOPMENT CATEGORY

As per the Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes, the development categories are as follow:

Table 4: Development Categories.

Category 1	Items listed in this category include: <ul style="list-style-type: none"> ➤ Nature reserves; ➤ Nature related recreation; ➤ Camping; ➤ Picnicking; and, ➤ Trails and minimal visitor facilities.
Category 2	Items listed in this category include: <ul style="list-style-type: none"> ➤ Low-key recreation/resort/residential type developments; ➤ Small scale agriculture/nurseries/narrow roads; and, ➤ Small scale infrastructure
Category 3	Items listed in this category include: <ul style="list-style-type: none"> ➤ Low density residential/resort type development;

	<ul style="list-style-type: none"> ➤ Golf or polo estates; and, ➤ Low to medium-scale infrastructure.
Category 4	These include: <ul style="list-style-type: none"> ➤ Medium density residential development; ➤ Sport facilities; ➤ Small-scale commercial facilities/office parks; ➤ One-stop petrol stations; ➤ Light industry; ➤ Medium scale infrastructure.
Category 5	These include: <ul style="list-style-type: none"> ➤ High density township/residential developments; ➤ 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 agriculture land and commercial tree plantations; ➤ Quarrying and mining activities with related processing plants.

Derived from Table 4, the proposed project falls within Category 2 (Small Scale Infrastructure). From the aforementioned Table 5 was compiled in order to determine the Visual Impact of any proposed development.

Table 5: Expected Visual Impact of the Proposed Development.

Type of Environment	Type of Development				
	Category 1	Category 2	Category 3	Category 4	Category 5
Protected/wild areas of international 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 or historical significance/disturbed.	Little or no visual impact expected	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	Little or no visual impact expected	Little or no visual impact expected	Minimal visual impact expected.	Moderate visual impact expected

From the table above, it is anticipated that the proposed Maxwell Mast will have a moderate visual impact on the surrounding areas.

7 DESCRIPTION OF THE RECEIVING ENVIRONMENT

Landscape character is defined by the U.K Institute of Environmental Management and Assessment (IEMA) as the “*distinct and recognizable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, land form, soil, vegetation, land use and human settlement*” (GLVIA, 2002). According to DEA&DP Guideline Section 9.2, information describing the current state of the affected environment, as well as trends in the area, is required for visual input into the EIA process. The receiving environment was determined using the 2013-2014 South African National Land-Cover data as provided by the National Department of Environmental Affairs (DEA).

7.1 Sense of Place

The term sense of place captures the identity of places we recognize. It embraces natural and cultural features, the distinctive sights, sounds and experiences to the people residing in or nearby that place. Places with a strong sense of place have a clear identity and character that is recognisable by inhabitants and visitors alike.

Sense of place differs from place attachment by considering the social geographical context of place bonds and the sensing of place, such as aesthetic and a feeling of dwelling. An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

The application area consists of undulating topography and the Hottentots-Holland Mountain Range situated towards the north. Situated towards the south is the residential area of Pineview with the town of Grabouw situated towards the west. Towards the north are plantations fields which have been harvested. National Route 2 is situated towards the south with Worcester Road situated towards the north. The area can be classified as predominantly natural with agricultural activities towards the west.

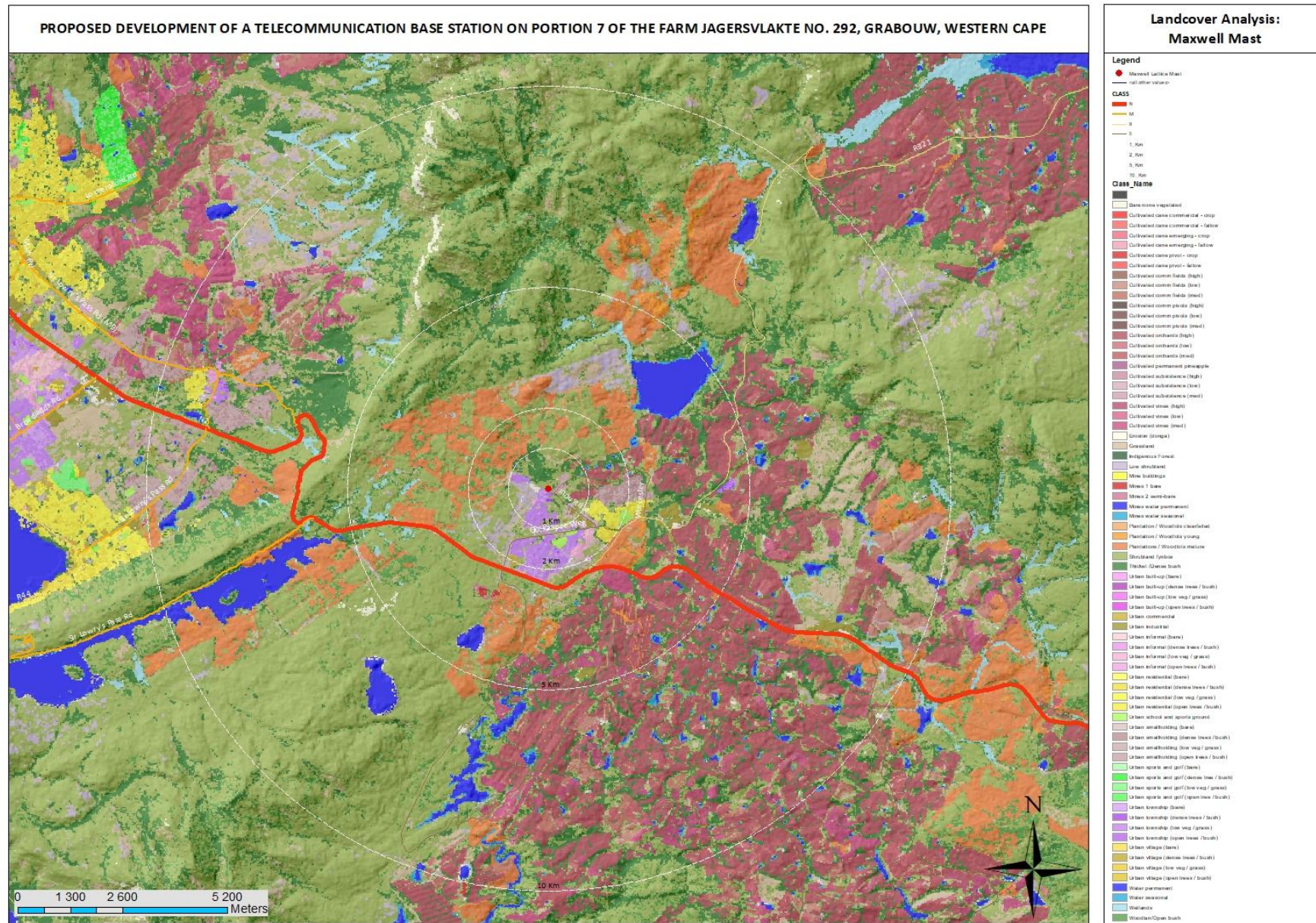


Figure 7: Land Cover Map of the Area.

8 RESULTS

8.1 Potential Visual Exposure (Preferred Mast Position)

The combined result of the viewshed analysis for the proposed Maxwell Lattice Mast is displayed on the map below (Figure 13). The visibility analysis was undertaken at the height of the Mast measuring in at thirty metres (30 m), in order to simulate the view from the mast and to indicate prominence of the structures within the landscape. Furthermore; Figure 13 indicates proximity radii from the proposed Maxwell Mast as a reference to determine the Visual Absorption Capacity. It must be noted that the Digital Terrain Model (DTM) utilised from the viewshed analysis do not include the effect of vegetation cover and built structures. These features may influence the visual exposure to some degree.

8.2 Maxwell Preferred Mast Position

8.2.1 0-1km (short distance)

As per Figure 13 (Viewshed Analysis) the proposed Maxwell Mast will be highly visible within the one kilometre (1km) radii. The topography within the one kilometer (1 km) radii can be described as flat, thus not limiting the visual exposure. Within a five hundred meter (500 m) numerous tall trees are present; however, as the mast is thirty meters (30 m) tall the top will be highly visible. There are numerous receptors within this zone especially residence residing in the neighbourhood of Steenbras. Situated towards the south east is the Grabouw Industrial Park, consisting of numerous businesses. Between the north west and south east within five hundred meters (500 m) there are a few small holdings; however, most of them are surrounded by tall trees thus limiting the visual impact to some degree. Situated seven hundred meters (700 m) towards the north are old plantations which have been harvested; however, the visual impact is considered to be low due to the limited observers present within this area.

8.2.2 1-2km (short to medium distance)

The visual impact of the proposed Maxwell Mast will decrease within the short to medium distance. Towards the south of the proposed development are the neighbourhoods of Pineview and Dennekruin. The viewshed illustrates that the mast will be visible; however, these areas are situated at a higher elevation (Please refer to Figure 8) so given the built up environment the visual exposure will be lowered and the top of the mast may be visible from certain vantage points. The town of Grabouw is situated one and a half kilometers (1.5 km) towards the east of the proposed development. The mast will be visible as you travel from town along Worcester Road as the road faces the Mast at a direct angle.

The visual impact on the small holdings area of Swannie River is considered low to unlikely due to the area being well vegetated with tall trees, bushes and tall shrubs. Swannies River is situated to the east and north east of the proposed development. From west to north east in a clockwise direction the environment consists of plantations which have been harvested. From these wind directions the visual exposure will be high; however, the visual impact will be low due to the limited observers within these areas.

8.2.3 2-5km (medium to long distance)

As per the viewshed analysis (Figure 13) the Maxwell Mast will be visible from certain vantage points as can be observed in Figures 8 to 11 within the medium to long distance zone. The proposed development will be visible from National Route 2 from certain vantage points; however, visual impact will be low due to foreground built up residential areas of Snake Park and Dennekruin. Three

and a half kilometers (3.5 km) towards the south west the mast will be visible; however, the visual impact will be low due to the distance between the observer and the mast as well as the foreground built up environment as mentioned. The viewshed analysis illustrates that the mast will be visible on kilometer four and a half (Km 4.5); however, taking into account the fruit/juice factories together with vegetation cover this occurrence will be highly unlikely. The biggest visual impact will be experienced from the Hottentots-Holland Nature Reserve. The foreground is primarily natural; however, given the background of the built up environment the visual exposure of the proposed development will be lowered. Observers within this area will consist of hikers; thus, the visual impact will be low as the observer numbers are considered to be low.

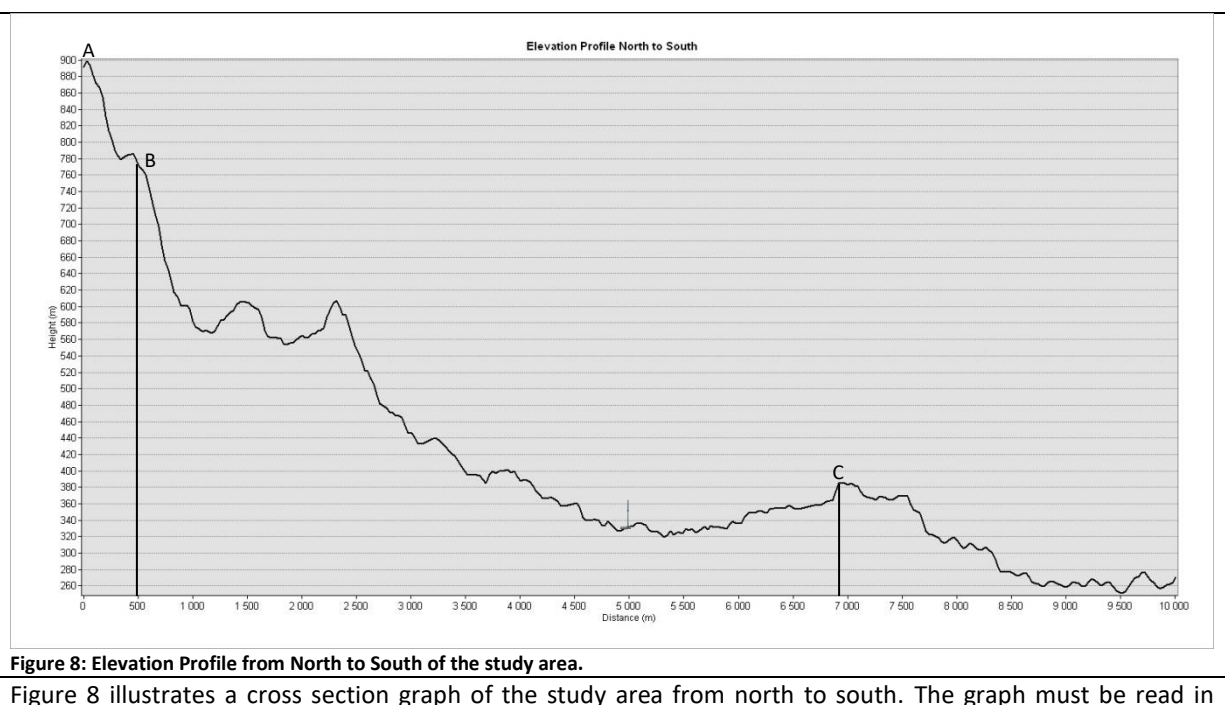
8.2.4 Greater than 5km (long distance)

Visibility beyond five kilometres (5km) from the proposed Maxwell Mast is expected to be negligible and low due to the distance between the object (proposed Maxwell Mast) and the observer. As per the viewshed analysis the proposed project will only be visible from elevated vantage points situated in the Hottentots-Holland Nature Reserve towards the north west, Groenland Nature Reserve towards the north east and Koegelberg Nature Reserves towards the south west. The visual exposure will be low due to the minimum observers within these areas. Due to the elevation of the mountains situated within the nature reserves the top of the mast will be visible, the bottom section will be restricted due to the built up environment surrounding the mast.

8.2.5 Conclusion

The proposed Visual Impact will be moderate due to the height of the mast; however, the high VAC within the short and short to medium zones as well as the undulating topography of the study area assist in reducing the visual impact. It is anticipated that the proposed Maxwell Mast will be moderately visible within the short distance zone; however, as distance between the proposed development and the observer increases the Visual Impact will decrease. If all mitigation measures are implemented by the Developer the visual impact will be low on residence residing within the area as well as to commuters making use of National Route 2 and tourists visiting the surrounding wine farms.

8.3 Elevation of the Area



conjunction with Figure 13 in order to better understand the visual exposure. The graph has been compiled within a five kilometre (5 km) radius from the proposed mast. The Maxwell Mast is situated at three hundred and forty meters (340 m) above sea level. The Mast will be visible within a four and a half kilometer (4.5 km) radius as illustrated in Point B. From Point B onwards the Mast will be visible from vantage points as illustrated in Point A with a height of nine hundred meters (900 m) above sea level. The visual exposure towards the south; however, will be restricted within a two kilometer (2 km) as illustrated in Point C with a height of three hundred and eighty meters (380 m) above sea level.

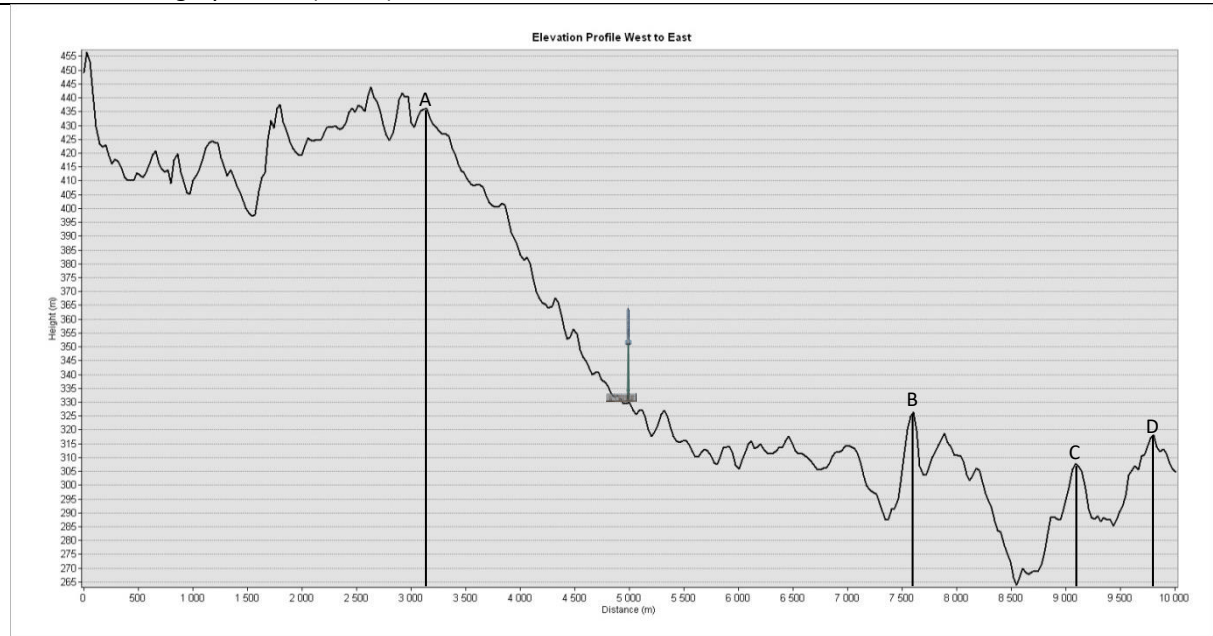


Figure 9: Elevation Profile from West to East of the study area.

Figure 9 illustrates the cross section of the study area from west to east. The proposed mast will be visible within one point eight kilometer (1.8 km) towards the west. From Point A onwards the visual exposure will be limited as Point A is situated at a height of four hundred and thirty five meters (435 m). Towards the east the proposed mast will be visible within a two and a half kilometer (2.5 km) radius as illustrated in Point B (elevation 325 m); however, as the area towards the east is situated at a lower altitude than the mast the proposed development will be visible from vantage points as illustrated in Point C with a height of three hundred and five meter (305 m) and Point D with a height of three hundred and twenty meters (320 m) respectively.

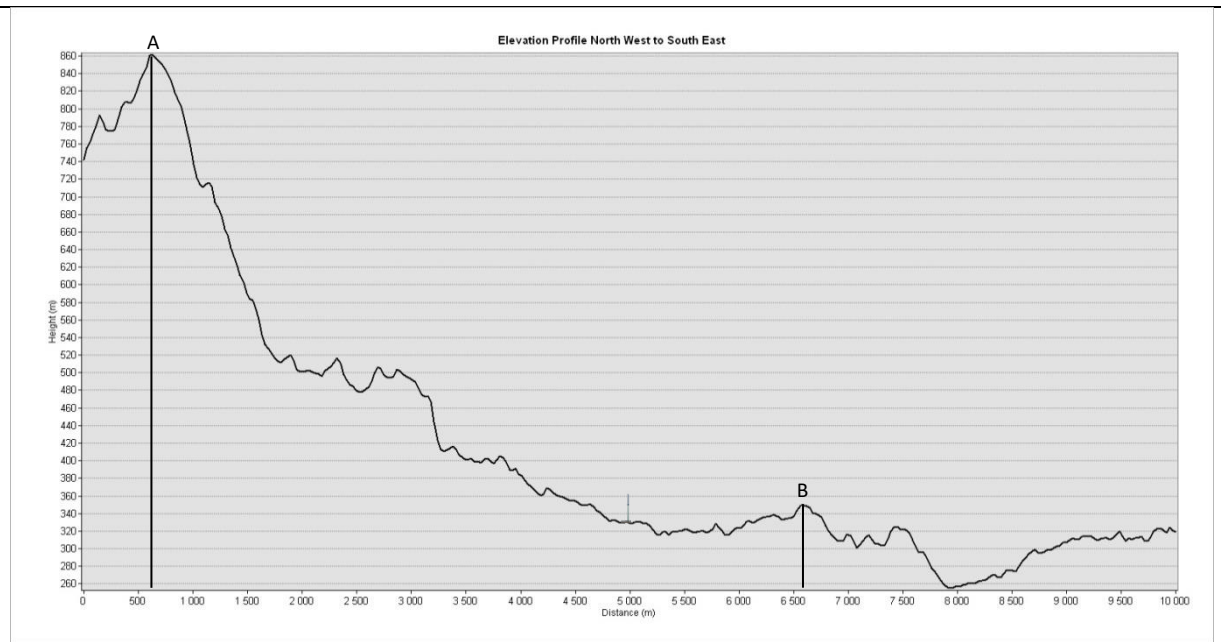


Figure 10: Elevation Profile from North West to South East of the study area.

Figure 10 illustrates the elevation from the north west towards the south east. The mast will be highly visible towards the north west over a distance of four and a half kilometers (4.5 km) where the visual exposure will be limited by Point A situated at a height of eight hundred and sixty meters (860 m) above sea level. The visual exposure towards the south east will be restricted to a distance of one and a half kilometers (1.5 km) as illustrated in Point B which is situated at a height of three hundred and sixty meters (360 m) above sea level.

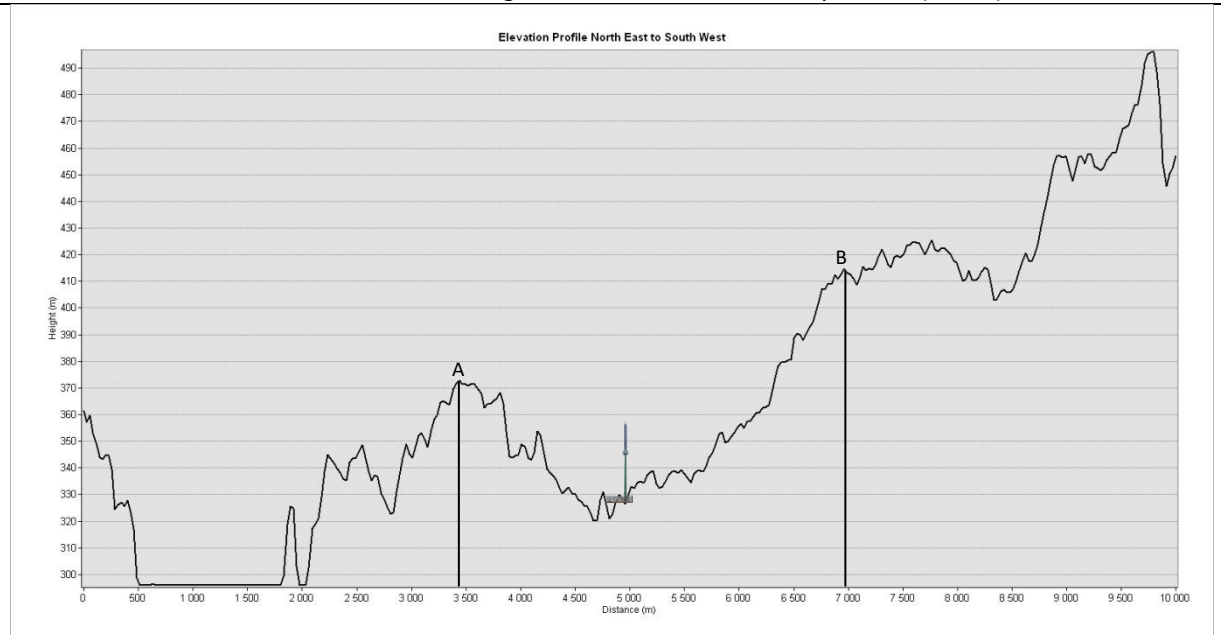


Figure 11: Elevation Profile from North East to South West of the study area.

Figure 11 illustrates the elevation of the study area from north east to south west. Within the aforementioned wind direction the proposed development will be visible within a two kilometer (2 km) radius as illustrated by Points A and B. The proposed development will be situated at a height of three hundred and thirty meters (330 m) with Point A (restricting the visual exposure towards the north east) situated at three hundred and seventy meters (370 m) and Point B (restricting the visual exposure towards the south west) situated at a height of four hundred and ten meters (410 m).



Figure 12: Visual Impression of the Proposed Maxwell Lattice Mast.

Figure 12 provide a visual impression of the Maxwell Mast from photo position No. 1.

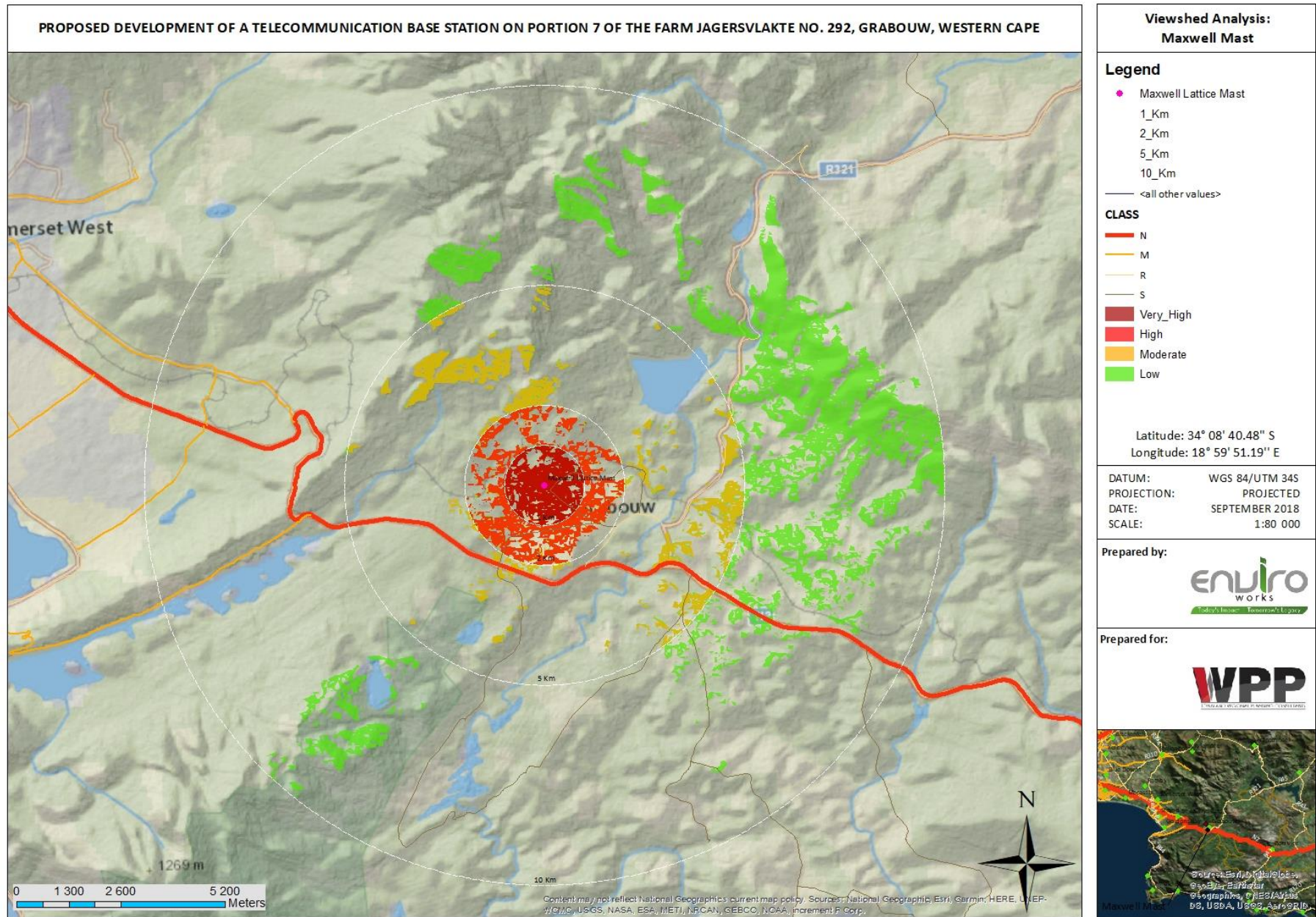


Figure 13: Viewshed Analysis of the proposed Maxwell Lattice Mast.

9 VISUAL ABSORPTION CAPACITY

The following section provides a description of the viewshed analysis via photographic evidence taken at a height of one point eight metres (1.8m). This will enable the reader to understand the Visual Absorption Capacity (VAC) of the area and provide a visual reference. The Visual Absorption Capacity of the surrounding area is considered to be high due to the undulating topography of the study area and scattered trees within the immediate area.



Figure 14: Photo Position 1 taken towards the south east of the Proposed Development.

Figure 14 was taken two hundred meters (200 m) towards the south east within the short distance zone of the proposed Maxwell Mast. Due to the height of the mast in conjunction with the rural setting the mast will be visible within the short distance zone. Figure 14 does; however, illustrate the moderate VAC of the area due to the numerous scattered trees and shrubs that occur.

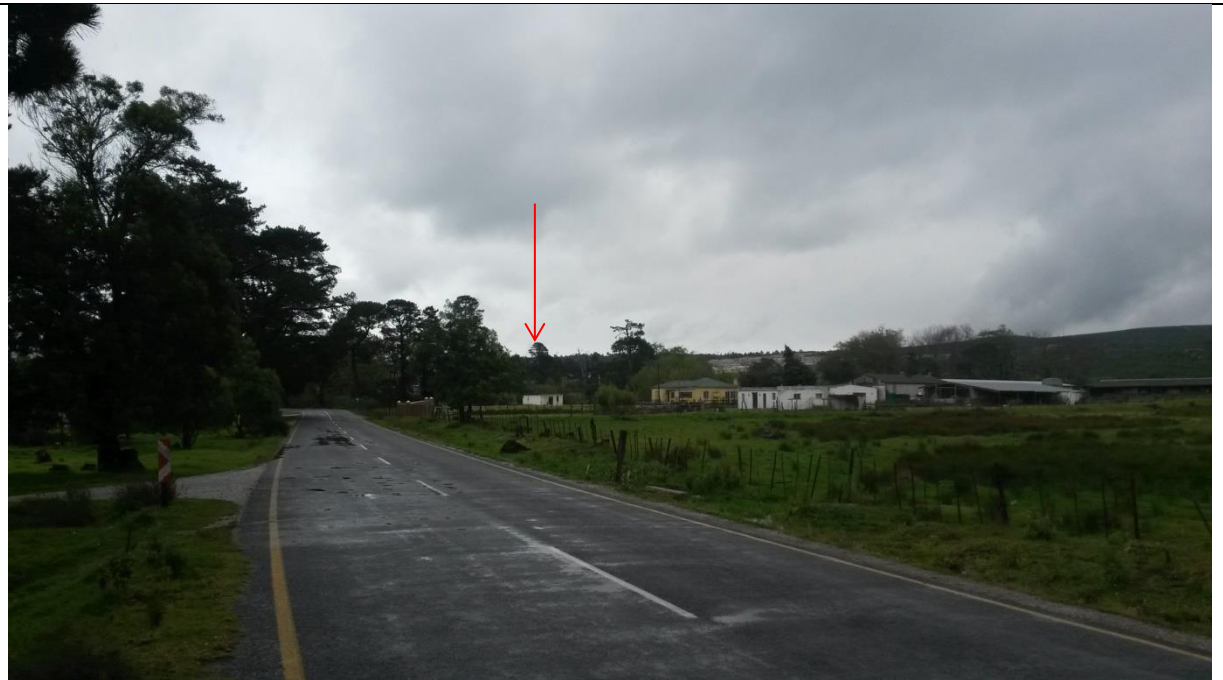


Figure 15: Photo Position 2 taken towards the north east of the Proposed Development.

Figure 15 was taken five hundred and seventy meters (570 m) to the north east of the proposed development. The VAC from Worcester road can be described as moderate; however, due to the observer distance coupled with the natural background the top quarter of the mast will be visible. The visual impact from Photo Position 2 can be defined as moderate.



Figure 16: Photo Position 3 taken towards the east of the Proposed Development.

Figure 16 was taken one and a half kilometers (1.5 km) towards the east of the proposed development. Due to the undulating topography of the study area and the high VAC of the surrounding environment the mast will be visible from certain vantage points. As Worcester Road is a secondary road coupled with scattered small holding the visual impact will be low due to limited observers.



Figure 17: Photo Position 4 taken towards the east of the Proposed Development.

Photo Position 4 is situated two and a half kilometers (2.5 km) towards the west of the proposed development. The photo was taken on Worcester Road as you enter the Town of Grabouw from the north. The VAC of the surrounding environment is considered to be high due to the numerous tall trees in the area coupled with the undulating topography of the study area. From this position there will be no visual impact.



Figure 18: Photo Position 5 taken to the south east of the Proposed Development.

Photo 5 was taken two and a half kilometers (2.5 km) towards the south east of the proposed development. The Grabouw NG Church is situated two hundred and eighty meters (280 m) from the Photo Position with a height of twenty five meters. As evident within the viewshed analysis coupled with Figure 18 there will be no visual impact.



Figure 19: Photo Position 6 taken towards the south east of the Proposed Development.

Photo 6 was taken from Oudebrug Road which is situated three and a half kilometers (3.5 km) towards the south east. As per the viewshed analysis the proposed development will be visible from Photo Position 6 to National Route 2. Looking at Figure 19 it is evident that the VAC of the environment is high as well as the built up effect. There will be no visual impact from this position.



Figure 20: Photo Position 7 taken towards the south east of the Proposed Development.

Photo 7 was taken at the entrance of Grabouw just off National Route 2. Due to the undulating topography of the study area there will be no visual impact from this position. The VAC within the area is low due to the dense occurrence of shrublets.



Figure 21: Photo Position 8 taken to the south of the Proposed Development.

Figure 21 was taken three kilometers (3 km) towards the south of the proposed Maxwell Mast. The VAC of the study area is considered to be high due to presence of numerous trees and tall shrubs. As per the viewshed analysis the mast will not be visible from this point and thus no visual impact will occur.



Figure 22: Photo Position 9 taken towards the south of the Proposed Development.

Figure 22 was taken from Rockview Dam Road approximately three and a half kilometers towards the south of the proposed development. As per the viewshed analysis the Maxwell Mast will be visible from this vantage point; however, the road is surrounded by dense vegetation cover resulting in a high VAC. Due to the high VAC the mast will not be visible from the proposed development thus there will be no visual impact.



Figure 23: Photo Position 10 taken towards the south west of the Proposed Development.

As outlined in Figure 23 the “koppie” serves as a visual obstruction limiting the visual exposure within a two kilometer (2 km) radius towards the south west. In this case the VAC is low due to small shrubs within the environment.



Figure 24: Photo Position 11 taken towards the north east of the Proposed Development.

Photo 11 was taken five kilometers (5 km) towards the east of the proposed development. There will be a visual impact from this vantage point due to it being positioned at a higher elevation. The VAC in the foreground is low; however, as the distance increase so does the VAC to a moderate level in the background. From this point the visual impact will be low as the top of the tower will be visible; however, it will be the dish at the top of the mast that will serve as the visual intrusion.

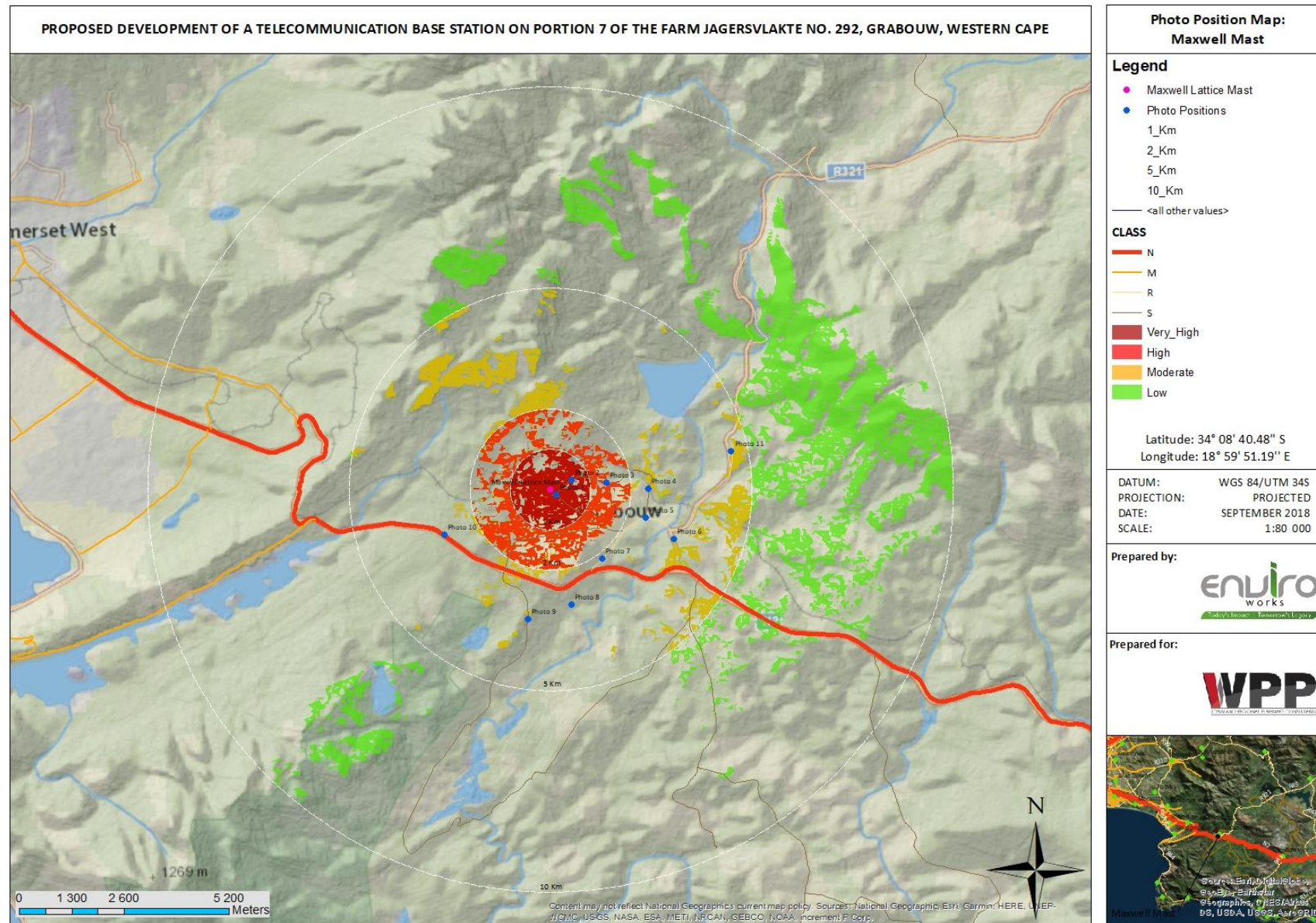


Figure 25: Locations from where the photos have been taken.

10 VISUAL IMPACT ASSESSMENT: IMPACT RATING METHODOLOGY

The previous section outlines all areas visible from the Maxwell Lattice Mast (viewshed analysis). This section will attempt to quantify these potential visual impacts in their respective geographical locations and in terms of the identified issues related to the visual impact. The methodology for the assessment of potential visual impacts states the nature of the potential visual impact (e.g. the visual impact on individuals who travel along National Route 2 as well as those residing within the project extent) and includes a table quantifying the potential significance of visual impact according to the following criteria:

- Duration of the impact (time scale);
- Extent of the impact (spatial scale);
- Degree to which the impact may cause irreplaceable loss of resources;
- Degree to which the impact can be reversed;
- Magnitude (or nature) of negative or positive impacts;
- Probability of the impact occurring;
- Cumulative Impacts; and the,
- Degree to which the impact can be mitigated.

The scales to be used to assess these variables and to define the rating categories are tabulated in the tables below.

Table 6: Evaluation components, ranking scales and descriptions (criteria).

Evaluation component	Ranking scale and description (criteria)
DURATION	5 - Permanent 4 - Long term: Impact ceases after operational phase/life of the activity (> 20 years). 3 - Medium term: Impact might occur during the operational phase/life of the activity (5 to 20 years). 2 - Short term: Impact might occur during the construction phase (< 5 years). 1 - Immediate
EXTENT (or spatial scale / influence of impact)	0 - None 5 - International: Beyond National boundaries. 4 - National: Beyond Provincial boundaries and within National boundaries. 3 - Regional: Beyond 5 km of the proposed development and within Provincial boundaries. 2 - Local: Within 5 km of the proposed development. 1 - Site-specific: On site or within 100 m of the site boundary.
IRREPLACEABLE loss of resources	5 - Definite loss of irreplaceable resources. 4 - High potential for loss of irreplaceable resources. 3 - Moderate potential for loss of irreplaceable resources. 2 - Low potential for loss of irreplaceable resources. 1 - Very low potential for loss of irreplaceable resources. 0 - None
REVERSIBILITY of impact	5 - Impact cannot be reversed. 4 - Low potential that impact might be reversed. 3 - Moderate potential that impact might be reversed. 2 - High potential that impact might be reversed. 1 - Impact will be reversible. 0 - No impact.

Evaluation component	Ranking scale and description (criteria)
MAGNITUDE of negative impact (at the indicated spatial scale)	10 - Very high: Bio-physical and/or social functions and/or processes might be <i>severely</i> altered. 8 - High: Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered. 6 - Medium: Bio-physical and/or social functions and/or processes might be <i>notably</i> altered. 4 - Low : Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered. 2 - Very Low: Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered. 0 - Zero: Bio-physical and/or social functions and/or processes will remain <i>unaltered</i> .
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	10 - Very high (positive): Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced. 8 - High (positive): Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced. 6 - Medium (positive): Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced. 4 - Low (positive): Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced. 2 - Very Low (positive): Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced. 0 - Zero (positive): Bio-physical and/or social functions and/or processes will remain <i>unaltered</i> .
PROBABILITY (of occurrence)	5 - Definite: >95% chance of the potential impact occurring. 4 - High probability: 75% - 95% chance of the potential impact occurring. 3 - Medium probability: 25% - 75% chance of the potential impact occurring 2 - Low probability: 5% - 25% chance of the potential impact occurring. 1 - Improbable: <5% chance of the potential impact occurring.
CUMULATIVE impacts	High: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern. Medium: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern. Low: The activity is localised and might have a negligible cumulative impact. None: No cumulative impact on the environment.

Once the evaluation components have been ranked for each potential impact, the significance of each potential impact will be assessed (or calculated) using the following formula:

$$\text{SP (Significance Points)} = (\text{Duration} + \text{Extent} + \text{Irreplaceability} + \text{Reversibility} + \text{Magnitude}) \times \text{Probability}$$

The maximum value is 150 significance points (SP). The unmitigated and mitigated scenarios for each potential environmental impact should be rated as per the table below.

Table 7: Definition of significance ratings (positive and negative).

Significance Points	Environmental Significance	Definition
100 – 150	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options. Cumulative Impact: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.
40 – 99	Moderate (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project. Cumulative Impact: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance

Significance Points	Environmental Significance	Definition
		on the natural, cultural, and/or socio-economic resources of local, regional or national concern.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation. Cumulative impact: The activity is localised and might have a negligible cumulative impact.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

11 VISUAL IMPACT ASSESSMENT

The primary visual impacts of the proposed Maxwell Lattice Mast are further assessed as follows:

11.1 Potential visual impact on sensitive visual receptors, located within a 5 km radii of the Maxwell Mast.

The Operational Phase of the Maxwell Lattice Mast could have a moderate visual impact (significance rating= 70) on observers within a 5 km radius should mitigation measures not be implemented.

Table 8: Impact Ratings of the Construction Phase within a 5 km radius.

Planning, design and construction phase	Design Alternative 1		Design Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
POTENTIAL VISUAL IMPACTS:					
Nature of impact: Impact on the sense of place for surrounding users.	Activity: The movement of construction vehicles, machinery and personnel on site shall result in a visual impact on surrounding users. Furthermore to this, the storage of materials and excavation shall result in disturbance and an unsightly character.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	4	2	4	2	-
Duration:	2	2	2	2	-
Extent:	2	2	2	2	-
Irreplaceable:	3	0	3	0	-
Reversibility:	3	1	3	1	-
Probability:	5	5	5	5	-
Total SP:	70	35	70	35	-
Significance rating:	M	L	M	L	-
Cumulative impact:	-	-	-	-	-
Proposed Mitigation:	<ul style="list-style-type: none">Access roads are to be kept clean and dust suppression techniques should be implemented to minimise impacts of vehicle movement;Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective;Construction camps as well as development areas should be screened with netting;Lights within the construction camp should face directly down (angle of 90°);Minimum vegetation should be removed to ensure the visual absorption capacity remain high;Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact; and,Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare.Mitigation of visual impacts associated with the construction phase would entail proper planning, management and rehabilitation of the construction site. Mitigation measures include the following:<ul style="list-style-type: none">Reduce the time of construction through careful planning of logistics and ensure the productive				N/A

Planning, design and construction phase	Design Alternative 1		Design Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
	implementation of resources; <ul style="list-style-type: none"> Limit disturbance of the environment to the development footprint; and, Limit construction activities to business hours (07:00 – 17:00). 				

Table 9: Impact Ratings of the Operational Phase within a 5 km radius.

Table 5: Impact Ratings of the Operational Phase within a 5 km radius:					
Operational Phase	Design Alternative 1		Design Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
POTENTIAL VISUAL IMPACTS:					
Nature of impact: Impact on the sense of place for surrounding users.	Activity: The development of the Maxwell Mast can cause a visual intrusion to observers within a five kilometre (5km) radius from the proposed development.				No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	4	2	6	4	4
Duration:	3	3	3	3	3
Extent:	2	2	3	2	2
Irreplaceable:	3	2	3	2	2
Reversibility:	3	2	1	2	1
Probability:	5	3	5	3	4
Total SP:	75	33	80	39	48
Significance rating:	M	L	M	L	P (+)
Cumulative impact:	-	-	-	-	-
Proposed Mitigation:	<ul style="list-style-type: none">Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare;The proposed mast should be galvanised and glare must be prevented in order to blend with the surrounding environment.Mitigation to minimise lighting impacts include the following:<ul style="list-style-type: none">Shielding the sources of light by physical barriers (walls, vegetation or structures itself);Limit mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights);Make use of downward directional lighting fixtures;Make use of minimum lumen or wattage in lights;The navigation light at the top of the mast must be shielded to prevent disturbance to adjacent landowners;				N/A

Operational Phase	Design Alternative 1		Design Alternative 2		No-Go Alternative
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
	and, <ul style="list-style-type: none"> • Use motion sensors to activate lighting ensuring light is available when needed. 				

12 CONCLUSION AND RECOMMENDATIONS

The viewshed analysis for the proposed Maxwell Lattice Mast illustrates that the visual impact will be moderate due to its exposure; however, the viewshed analysis does not take into account the Visual Absorption Capacity of the surrounding environment. As outlined in Section 8.2 of this report the mast will have a high visual impact within the short distance zone due to the height of the mast and the number of receptors especially towards the south east. Within the short to medium zone the visual impact will be low as the VAC of the receiving environment increases due to the undulating topography and high vegetation cover. Built up structures within the zone is considered to be high thus limiting the visual impact. As distance between observers and the proposed development increase so will the visual impact decrease.

Within the medium to long distance zone the mast will be visible from certain vantage points as illustrated in Figure 13; however, taking into account the foreground and background built up and natural environment the impact will be low towards the north and highly unlikely in the other wind directions. Visibility beyond the five kilometer (5 km) radius from the proposed Maxwell Mast is expected to be negligible and low due to the distance between the object and the observer. The mast will be visible from the Hottentots-Holland towards the north west, Groenland Nature Reserve towards the north east and Koegelberg Nature Reserve towards the south west.

If all mitigation measures are implemented by the Developer the visual impact will be low on residence residing within the area as well as to commuters making use of National Route 2 and tourists visiting the surrounding tourist attractions.

The following mitigatory considerations can assist in minimising the visual impact:

- Access roads are to be kept clean and dust suppression techniques should be implemented to minimise impacts of vehicle movement;
- Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective;
- Construction camps as well as development areas should be screened with netting;
- Lights within the construction camp should face directly down (angle of 90°);
- Minimum vegetation should be removed to ensure the visual absorption capacity remain high;
- Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact;
- Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare;
- The proposed mast should be galvanised and glare must be prevented in order to blend with the surrounding environment; and,
- The containers should be painted a brownish color to ensure it blends in with the natural environment.
- Mitigation to minimise lighting impacts include the following:
 - Shielding the sources of light by physical barriers (walls, vegetation or structures itself);
 - Limit mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights);
 - Make use of downward directional lighting fixtures;
 - Make use of minimum lumen or wattage in lights;
 - Use motion sensors to activate lighting ensuring light is available when needed.

Mitigation of visual impacts associated with the construction phase would entail proper planning, management and rehabilitation of the construction site. Mitigation measures include the following:

- Reduce the time of construction through careful planning of logistics and ensure the productive implementation of resources;
- Limit disturbance of the environment to the development footprint.
- Limit construction activities to business hours (07:00 – 17:00).

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