VISUAL IMPACT ASSESSMENT FOR THE PROPOSED GOURIKWA – BLANCO 400kV TRANSMISSION LINE – DESKTOP STUDY AND SCOPING PHASE

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EXECUTIVE SUMMARY

I-scape was appointed by Envirolution Consulting (Pty) Ltd to provide input during the Scoping phase of the proposed Gourikwa – Blanco 400kV transmission line, on the issues pertaining to visual impacts (Figure 1). The proposed project is located within the Western Cape Province between the existing Gourikwa Substation (approximately 15 km west of Mossel Bay Town) and the Blanco Substation (approximately 60 km north east of Gourikwa Substation).

A Visual Impact Assessment (VIA) is a study that assesses and predicts the potential changes to an existing visual environment when a project or development will be implemented. The associated visual changes could potentially impact on the character and aesthetic value of the visual resource and affect the views and perceptions of observers in the study area. This VIA will form part of the Scoping and EIA study as required by the National Environmental Management Act (NEMA) and the EIA Regulations (2014). The Scoping phase requires specialist input on a desktop level to identify the potential issues that needs further investigation during the EIA phase.

At the time of the scoping phase, the project was in a conceptual stage and limited detail information was available. The proposed project joins the existing Gourikwa Substation to the future Blanco Substation with a 400kV transmission line. The distance between the substation sites is approximately 60 km. Three alternative alignments are proposed within a corridor of 2 km. The type of tower/pylon is still under consideration but will probably be steel lattice or monopole structures, or a combination. The height of such towers may vary depending on the terrain it traverses, but on average, it can reach heights of 50-60 m making it rather large structures.

Within the study area, observers experience and interact differently with their environment and therefore value it differently. They may be affected by the proposed project due to additions or alterations to the visual resource, which may influence their experience and views of the study area. In this assessment, a distinction is made between impacts on the **observers** and impacts on the **visual resource**. The observers represent all people that may be affected visually while the impacts on the visual resource exclusively assess the changes to the landscape and the impact on its aesthetic value.

The study area is defined as the area 10 km from the proposed corridors. This includes all affected landscape and visual receptors. To address the potential impacts on the appropriate scale, the study area is sub-divided into landscape types, which have been classified according to generic characteristics of topography, land use and land cover. The four main landscape types are:

1. Mountainous and wilderness areas;
2. Mixed agricultural and natural landscape;
3. Coastal towns and cities; and
4. Exclusively agricultural.

The first two landscape types are in the western and northern regions of the study area and are mainly in a natural condition. It features pristine vegetation communities as well as picturesque scenes of the Outeniqua Mountains and -foothills, ravines and open water bodies. These landscapes are highly regarded for their scenic quality and numerous outdoor activities and tourism industries have developed in this region. The coastal towns and cities are hugging the coastline

and are very popular holiday destinations, and attract large numbers of tourists to the study area. The exclusively agricultural landscape is mainly situated in the eastern region of the study area and has a rural character that filters in between the foothills. The Outeniqua Mountains are always present to provide a spectacular backdrop to the study area.

The study area includes landscape features that contribute to a highly valued visual resource in specific regions. Outdoor recreational activities and the tourism industry as a whole, latches on to the opportunities the visual resource offer. Many activities and industries are specifically located in areas of pristine natural landscapes or at points where scenic views can be experienced. Game farms, lodges and hiking trails are some of the industries that are found in the study area.

The climate also ensures that an abundance of water is available and spectacular ravines and dams are present between the endless hills. Probably the most spectacular landscape feature is the ever-present Outeniqua Mountain Range that provides a picturesque backdrop to almost every view.

The proposed project will traverse landscapes of high scenic quality and will impact on the value of the visual resource. The transmission line is considered a large-scale project and will be in contrast with the existing landscape characters that have been identified in each landscape type.

The sensitivity of the landscape and visual receptors, in combination with the intensity of the proposed project, is expected to cause highly significant visual and landscape impacts. This judgment is supported by Oberholzer's (2005) *Guidelines for involving visual and aesthetic in EIA processes*, which classifies this as a category 5 development in an area with high scenic significance that are regularly experienced from public areas or routes.

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LIST OF ABBREVIATIONS

DEM	Digital Elevation Model
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
GIS	Geographical Information System
LCA	Landscape Character Assessment
NEMA	National Environmental Management Act
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VRA	Visual Resource Assessment
ZMVE	Zone of Maximum Visual Exposure
ZVI	Zone of Visual Influence

1 INTRODUCTION

I-scape was appointed by Envirolution Consulting (Pty) Ltd to provide input during the Scoping phase of the proposed Gourikwa – Blanco 400kV transmission line, on the issues pertaining to visual impacts (Figure 1). The proposed project is located within the Western Cape Province between the existing Gourikwa Substation (approximately 15 km west of Mossel Bay Town) and the Blanco Substation (approximately 60 km north east of Gourikwa Substation). The Blanco Substation is not yet built and is part of another Environmental Impact Assessment (EIA) process that should conclude during 2015.

A Visual Impact Assessment (VIA) is a study that assesses and predicts the potential changes to an existing visual environment when a project or development will be implemented. The associated visual changes could potentially impact on the character and aesthetic value of the visual resource and affect the views and perceptions of observers in the study area. This VIA will form part of the Scoping and EIA study as required by the National Environmental Management Act (NEMA) and the EIA Regulations (2014).

2 METHODOLOGY

Within the study area, observers experience and interact differently with their environment and therefore value it differently. They may be affected by the proposed project due to additions or alterations to the visual resource, which may influence their experience and views of the study area. In this assessment, a distinction is made between impacts on the **observers** and impacts on the **visual resource**. The observers represent all people that may be affected visually while the impacts on the visual resource exclusively assess the changes to the landscape and the impact on its aesthetic value. A highly significant impact on the observers will not necessarily be a highly significant impact on the visual resource and vice versa.

The Scoping phase requires specialist input on a desktop level to identify the potential issues that needs further investigation during the EIA phase. The following methodology is implemented:

- Assess broad scale aerial and geographical data provided by the client and available on public accessible web sites such as Google Earth;
- Research the character of the study area and divide it into a preliminary classification of landscape types (to be refined during EIA phase);
- Assess layout maps of the proposed alternative routes;
- Provide a description of the study area and the different landscape types;
- Provide a brief project description;
- Highlight the potentially affected landscape features and visual receptors and discuss their sensitivities;
- Highlight possible issues that may cause visual and landscape impacts;
- Select the appropriate approach to follow during the EIA phase;
- Clarify and summarise the final terms of reference for the Visual and Landscape Assessment during the EIA phase;
- Identify information gaps and provide further recommendations if required.

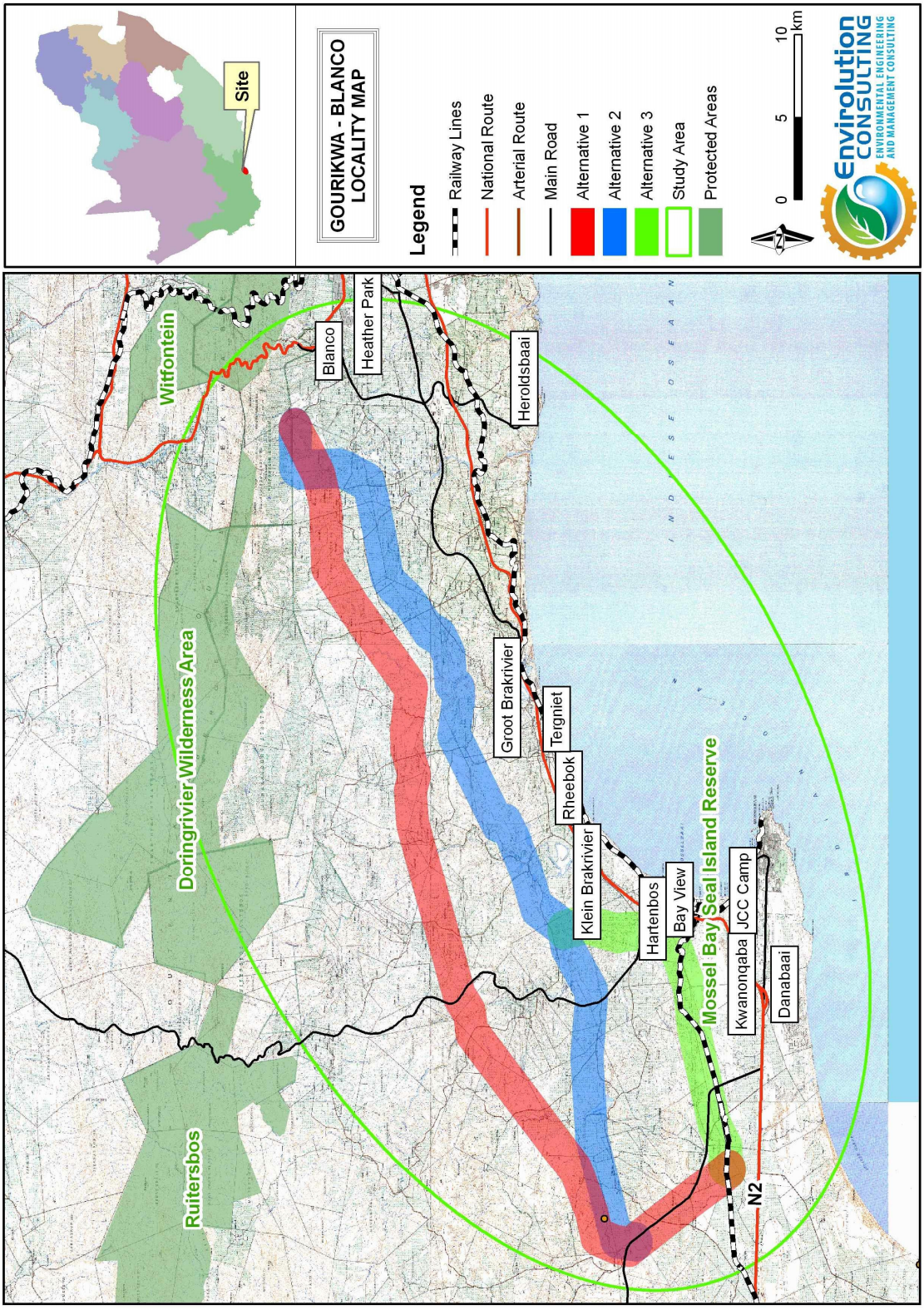

Figure 1: Locality map

3 DESCRIPTION OF THE STUDY AREA

The study area can be described as the area affected by visual impact and usually extends beyond the boundaries of the construction site, especially when tall structures are erected. A study by Hull&Bishop (1988) concluded that a power line has its maximum impact on the visual resource when viewed from distances =< than 1 km. Beyond this distance, the impact decreases considerably to a point where it is virtually insignificant. This should not be confused with the visibility of a power line. It is possible to visually detect a power line over much greater distances, but Hull&Bishop specifically assessed the impact of a power line on the visual resource. A Zone of Maximum Visual Exposure (ZMVE) can therefore be delineated around the corridor at 1 km, but the study area will include an area of 10 km from the corridor.

Within the study area a Zone of Visual Influence (ZVI) or viewshed will be defined, which delineates the areas of anticipated visual impact as calculated by computer software (This will be included in the EIA phase). The factors that most significantly influence the ZVI are topographic variations and land cover that could potentially screen the proposed project from critical viewpoints. These factors also contribute to the prevailing landscape character, which establishes the context in which the project is proposed. The project traverses many different landscape types, each with its own character and aesthetic value. Figure 2 provides a preliminary classification of the different landscape types, based on generic characteristics of topography, land use and land cover[1]. Table 1 is a descriptive account of each landscape type and discusses the landscape character as well as touches on the aesthetic value. The aesthetic value will be carried further through a Visual Resource Assessment (VRA) during the EIA phase.

Table 1: Landscape types

LANDSCAPE TYPE
1. MOUNTAINOUS AND WILDERNESS AREA
The Outeniqua Mountain Range is considered the most northern part of the study area and consists of extreme topographic variation and pristine natural environment. The mountain range rises up to elevations of over 1000m in places and provides a spectacular backdrop to the coastal towns. Due to its inaccessibility, the Outeniqua Mountains are mostly in pristine natural condition and areas such as Ruiterbos Nature Reserve and Doringrivier Wilderness Area conserves parts of the mountain range. The vegetation patterns are diverse. It falls under the Fynbos Biome but many different vegetation communities exist, from ravine forests, subtropical thickets to fynbos and grasslands. This area is part of the Garden Route, a region sandwiched between the Indian Ocean and the inland mountain ranges, which is renowned for its picturesque environment and diverse ecology. The scenic quality of the mountains is highly regarded and a feature point in many photographs taken in the study area. It plays an important part in the identity of the larger study area and greatly contributes to the aesthetic value and scenic quality of the region.
2. AGRICULTURE AND NATURAL LANDSCAPES
A large percentage of the central and western part of the study area is a mixture of agricultural land uses and intact, natural landscapes (Figure 3). The specific agricultural sector is livestock farming and the natural vegetation is often used for grazing. A concentration of game farms are found in this region, which are popular tourist destinations. Gondwana Private Game Reserve is an 11 000ha farm in the study area and conserves the natural fauna and flora species. Other game farms such as Nyaru Game Lodge, Cheetah Lodge and Botlierskop Private Game Reserve are also identified, to name a few.

[1] The classifications are done by combining Google Earth (2015) images and visiting several internet websites to confirm place names and do overlays to extract the regions.

The topography consists of hilly terrain and undulating landscapes with numerous valleys, streams and rivers. This is considered the foothills of the Outeniqua Mountain Range. The Hartbeeskuil Dam is the largest water body in this landscape type and is fed by the Hartenbos River. The Klipheuwel Dam is smaller and in the catchment of the Moordkuilriver. The Brandwag and Kleinbrak Rivers also traverses the landscape. These water bodies often facilitate tourist and recreational activities such as fishing or river rafting. This area appears to be well conserved and tourist attractions rely on the natural environment. A high aesthetic value is present through most of this landscape.
3. COASTAL TOWNS AND CITIES
The greatest population density is along the coastline in towns such as Hartenbos, Dana Bay, Groot Brak and Klein Brak. These towns are strictly residential and are slumbering during the non-holiday season but are very popular vacation destinations. The largest cities are Mosselbay and George and is considered the economic hubs of the region. Other smaller inland towns are Brandwacht and Friemersheim and are considered farming communities.
4. AGRICULTURE
The eastern part of the study area is much more intensely cultivated and it is presumably due to the more even topography (Figure 4). Cultivation practices are more prominent although livestock such as sheep and dairy cows also feature in this landscape type. The character is predominantly rural, but a transition to a peri-urban character occurs near the city of George. One of the largest water bodies is the Wolwedans Dam and is considered a visual amenity as it meanders into the valleys of the Groot Brak River. This is a visual amenity and a tourist attraction.

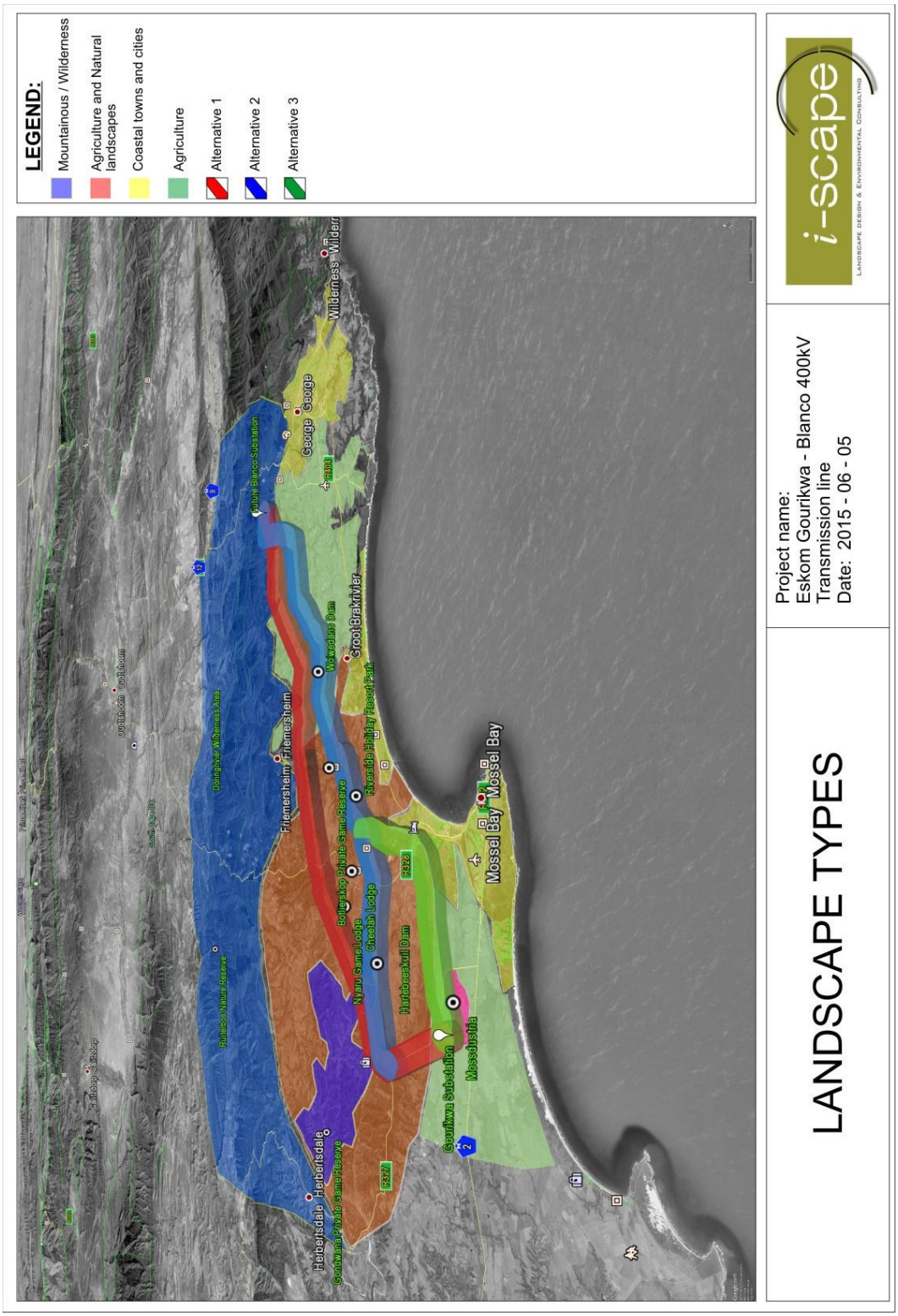

Figure 2: Landscape types

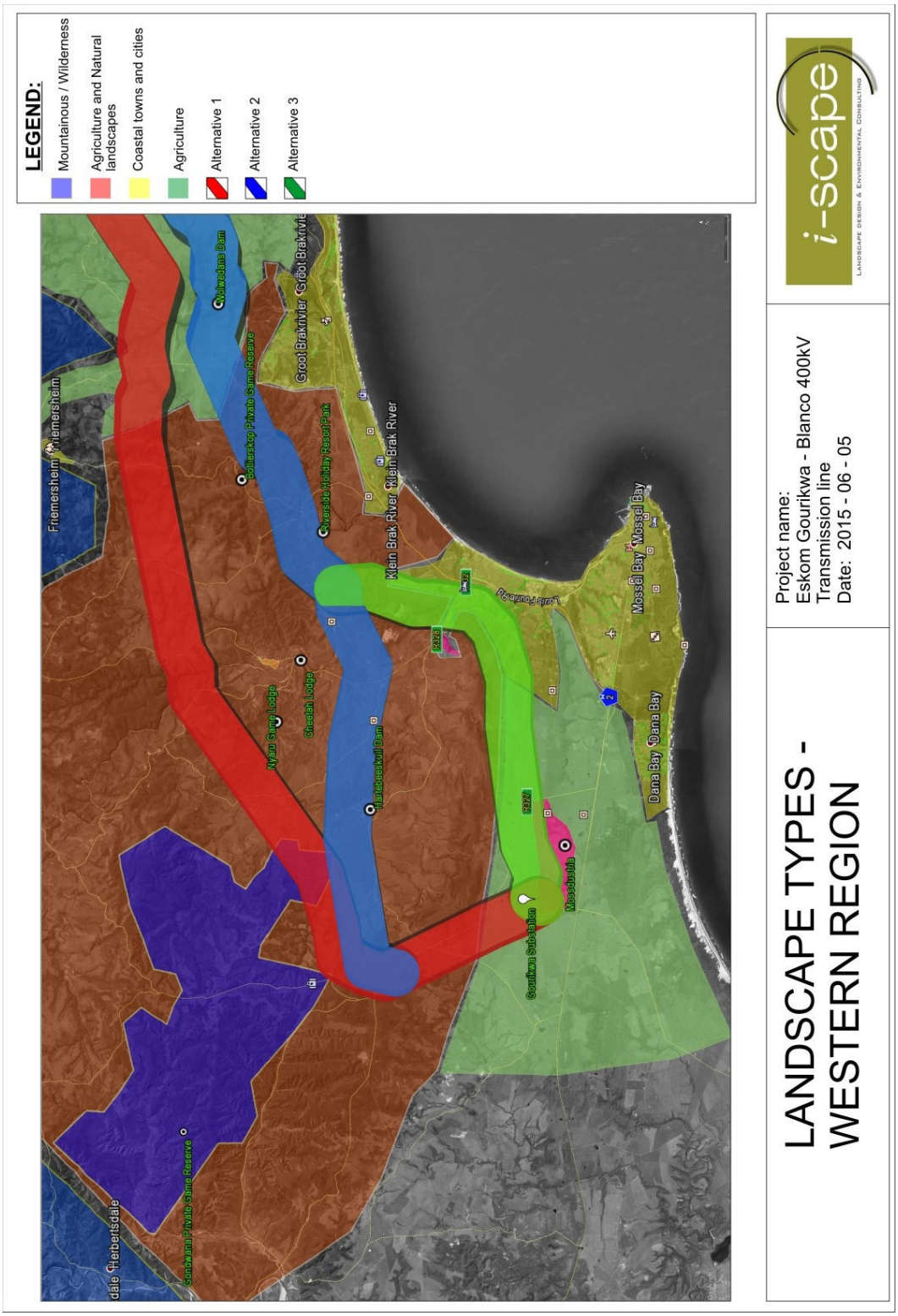

Figure 3: Landscape types – Western Region

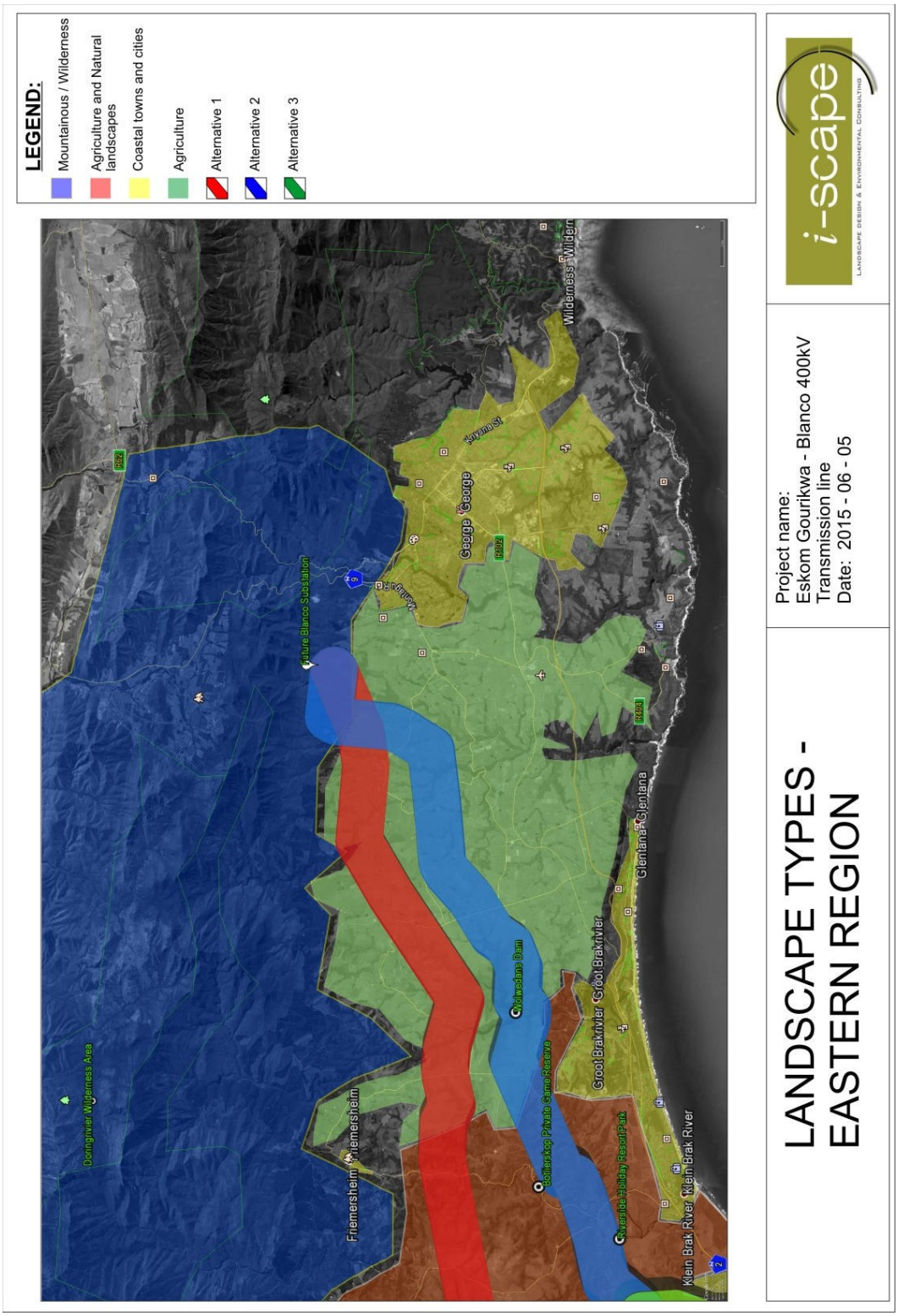

Figure 4: Landscape types – Eastern Region

4 PROJECT DESCRIPTION

At the time of the scoping phase, the project was in a conceptual stage and limited detail information was available. Information gaps and uncertainties may become clearer during the assessment process but for the purpose of the scoping phase, a worst-case-scenario will be considered. Information gaps are addressed in Section 9.

The proposed project joins the existing Gourikwa Substation to the future Blanco Substation with a 400kV transmission line. The distance between the substation sites is approximately 60 km. Three alternative alignments are proposed within a corridor of 2 km, as indicated in Figure 1.

- Alternative 1: This corridor exits Gourikwa Substation in a north easterly direction and follows the R327 for approximately 8 km. It turns east and cuts across the mixed agricultural and natural landscape type, passing through the most eastern part of the Gondwana Private Game Reserve. It maintains a northeastern direction, nearing the mountainous terrain of the Outeniqua Mountains, until reaching the proposed site for the Blanco Substation. The Blanco site is approximately 3-4 km west of the city of George and the very picturesque Outeniqua Pass (N9)
- Alternative 2: This corridor starts in the same direction as Alternative 1 but turns east just south of the Gondwana Private Game Reserve. It follows an easterly direction, crossing the Hartebeeskuil Dam before turning north east as it reaches the R328 between Hartenbos and Brandwacht. It passes south of Botlieskop Private Game Reserve and crosses Wolwedans Dam before turning north and reaching the Blanco Substation site.
- Alternative 3: This corridor is a variation of Alternative 2 and exits the Gourikwa Substation in an easterly direction. It brushes past the western outskirts of Hartenbos before turning north and joining Alternative 2.

The type of tower/pylon is still under consideration but will probably be steel lattice or monopole structures, or a combination. The height of such towers may vary depending on the terrain it traverses, but on average, it can reach heights of 50-60 m making it rather large structures.

The duration of the construction process is unknown at this stage. This is considered a large-scale project, mainly due to the distance of the project area and the physical size of the towers/pylons that will be constructed. The width of the servitude is normally 55 m but could be wider through forested areas. Clearing of vegetation in the servitude is normally required to comply with safety standards.

The following construction procedures are generic stages, normally associated with power line construction, and may vary slightly:

- Survey and pegging of pole/tower positions through ground and air survey teams;
- Construction of additional access roads and gates if required. Existing roads will be used as far as possible but it can be expected that new roads will typically be established by means of driving over the vegetation continuously and creating a two-tread passage as oppose to a graded gravel road;
- Clearing or trimming of vegetation in the servitude that may interfere with the line;
- Establishment of a construction camp and stockyards;

- Construction of foundations by means of earthmoving equipment such as tlb's and back actors.
- Tower assembly and erection by means of a ground team. Helicopters may also be used in inaccessible places;
- Conductor stringing and tensioning;
- Servitude rehabilitation;
- Testing and commissioning; and
- Sporadic maintenance.

5 AFFECTED LANDSCAPE FEATURES AND OBSERVERS

The study area is categorised in different landscape types, determined by the topography, land uses and land covers that are identified on large-scale maps. Within these landscape types, various landscape features/receptors and observers will be affected as a result of the implementation of the proposed project. These receptors are considered to have a sensitivity or tolerance towards the proposed project.

LANDSCAPE RECEPTORS AND OBSERVERS
MOUNTAINOUS AND WILDERNESS AREA
CORRIDORS AFFECTING LANDSCAPE TYPE
The mountainous and wilderness landscape type will be affected by all three corridors as it nears the Blanco Substation site. The Blanco site is located in this landscape type, on the foothills of the Outeniqua Mountains. It should be mentioned at this stage that the boundaries of the landscape type might change once a thorough site investigation is done.
AFFECTED RECEPTORS
The affected landscape features will be small tributaries that originate from the mountains, farm dams and the forested foothills of the mountains. They should be seen as a unit that collectively contribute towards a single visual resource. These features are important as it contributes to the value of the visual resource and any alternation to it could affect the character of the landscape. The affected observers are expected to be the farmers that regularly travel on the dirt roads along the foothills of the mountains. Protected wilderness areas exist along the crest of the Outeniqua Mountains and possible hiking trails may look down on the Blanco Substation site and the transmission line. It is unclear at this stage where the hiking trails are, but further investigation will follow. The very picturesque Outeniqua Pass (N9) passes 3 km east of the Blanco Site. This is a gateway to the Garden Route and considered a scenic route. It is a much-travelled route by tourists visiting the area and is an important transportation connection between the Klein Karoo and George. The visibility analysis and site investigation will reveal if the proposed project will be visible from this route. The most north western part of George are within 5km from the proposed corridors. The residents in the area may experience views to the power line. Their views of the magnificent Outeniqua Mountains may be affected but further investigation will follow during the fieldwork.
SENSITIVTY OF RECEPTORS
The sensitivity of the visual resource is considered high as this is a region with very little anthropogenic elements and borders the pristine Outeniqua Mountains. The transmission towers are considered large structures and in contrast with the existing landscape character. Their presence will change the pristine natural character that currently prevails. This will impact on the value of the visual resource. The residents in the study area are classified as visual receptors of high sensitivity owing to their sustained visual exposure to the proposed development as well as their attentive interest towards their living environment. Tourists, such as hikers, are also regarded as receptors of high sensitivity. Their main reason for visiting the area is to experience and enjoy the picturesque and pristine natural environment. They have high expectations in terms of the scenic quality.

DISTANCE FROM SOURCE OF IMPACT
It appears that a couple of farmsteads in the Molen Drift area will be within the Zone of Maximum Visual Exposure, i.e. within 1 km of the proposed corridors. Most other farmsteads are more to the south as the Outeniqua Mountain range is a physical border for any development further north. A couple of dirt roads provide access to this part of the study area but it is unclear who uses the roads. It is presumably the local farmers. The western outskirts of George and the Outeniqua Pass (N9) are within 3-4km of the corridors. The visibility of the proposed project will be assessed on site to determine if these observers will be impacted, and to what degree.
AGRICULTURE AND NATURAL LANDSCAPES
CORRIDORS AFFECTING LANDSCAPE TYPE
Alternative 1 &2 traverses the central and eastern part of this landscape type. Alternative 3 brushes past the southern part between this landscape type and the town of Hartenbos, before linking up to Alternative 2.
AFFECTED RECEPTORS
The affected landscape receptors will be the undulating hills occupied by natural vegetation, streams, rivers, valleys and other unique topographical features. A concentration of game farms is located in this region and conserves large areas of fauna and flora. The Hartenbos River feeds the Hartebeeskuil Dam, which will be affected by Alternative 2. Alternative 2&3 will pass close to the smaller Klipheuwel Dam. Some of the other larger rivers in the study area that will be traversed by the corridors are the Brandwag- and Moordkuil Rivers. The proposed power line will add anthropogenic structures to a landscape that is predominantly natural. It will impact on the character of the landscape and influence the value of the visual resource. Within this landscape type, many game farms and private reserves are tourist attractions and cater for luxury outdoor activities and experiences. Tourists will be affected because they'll enter the study area through the local road network and visit these tourist attractions. Robinson Pass (R328) connects Oudtshoorn to Mosselbay and is considered as one of the major transport routes. Other observers in this landscape type will be the local farm residents.
SENSITIVTY OF RECEPTORS
The sensitivity of the visual resource is considered high as this is a region with very little anthropogenic elements and are generally free of electrical infrastructure of this scale. The transmission towers are considered large and in contrast with the existing landscape character. Their presence will change the pristine natural character that currently prevails. This will impact on the value of the visual resource. The residents in the study area are classified as visual receptors of high sensitivity owing to their sustained visual exposure to the proposed development as well as their attentive interest towards their living environment. Tourists are also regarded as receptors of high sensitivity. Their main reason for visiting the area is to experience and enjoy the picturesque and pristine natural environment. They have high expectations in terms of the scenic quality.
DISTANCE FROM SOURCE OF IMPACT
Alternative 1 will traverse a part of the Gondwana Private Game Reserve. The exact locations of the camps and accommodation will be confirmed during field investigation. Alternative 2 passes over the northern part of the Hartebeeskuil Dam and will also pass in very close proximity to Riverside Holiday Resort and Botlierskop Private Game Reserve. These locations are considered sensitive viewpoints due to the tourism potential. Other nearby tourism locations are Nyaru Game Lodge and Cheetah Lodge near Brandwacht. These lodges are between Alternative 1 & 2, approximately 2km from the corridor. These tourist attractions were identified, using a Google search and Google Earth geographical data. More may be identified during the fieldwork. Farmers residing in the area will also be affected due to the corridor passing close to their farmsteads or over their farms.
COASTAL TOWNS AND CITIES
CORRIDORS AFFECTING LANDSCAPE TYPE
Alternative 3 will affect the town of Hartenbos as this corridor traverses the northern and western side of the town. The north western part of George is approximately 4km from the proposed Blanco Substation site. A couple of guest farms and tourist accommodation are situated in the outskirts of the Blanco Suburb and is considered in the Zone of Visual Influence (ZVI). This will be confirmed during the fieldwork.
AFFECTED RECEPTORS
The western and northern part of the town of Hartenbos will be directly affected due to the close proximity of Alternative 3. The town is expanding in this direction and the transmission line will impact on settlement patterns as well as impact on views towards the mountainous terrain to the north. Residents and motorists are the observers that will be most affected. The town of Hartenbos is also a popular tourist attraction during holiday seasons, adding tourists as a receptor group. The N2 highway is a prominent transport route

that carries high volume traffic. Alternative 3 passes very close to the N2 and motorists may experience glimpses of the transmission line. This will be confirmed during the fieldwork.
SENSITIVTY OF RECEPTORS
The residents in the study area are classified as visual receptors of high sensitivity owing to their sustained visual exposure to the proposed development as well as their attentive interest towards their living environment. Tourists are also regarded as receptors of high sensitivity. Their main reason for visiting the area is to experience and enjoy the picturesque and pristine natural environment. They have high expectations in terms of the scenic quality. Motorists are often classified as viewers with a low sensitivity due to their momentary view and experience of a potential visual impact. As a motorist's speed increases, the sharpness of lateral vision declines and the motorist tends to focus on the line of travel (USDOT, 1981). This adds weight to the assumption that under normal conditions, motorists will show low levels of sensitivity as their attention is focused on the road and their exposure to roadside objects are brief.
DISTANCE FROM SOURCE OF IMPACT
Alternative 3 are within 1km from the N2 highway and traverses the western and northern parts of Hartenbos.
AGRICULTURE
CORRIDORS AFFECTING LANDSCAPE TYPE
All three alternative corridors will traverse this landscape type.
AFFECTED RECEPTORS
The rural landscape is predominantly agriculturally orientated and consists of large grazing areas as well as cultivated fields. Due to the relatively high rainfall region, it is mostly green and the fields create interesting patterns in the landscape. The ever present Outeniqua Mountains provide a spectacular backdrop and views are enjoyed of the fields in the foreground, and the mountains in the background. The Wolwedans Dam twists and turns between the valleys of the Groot Brak River. It is particularly beautiful with a lookout point near its dam wall. The smaller Klipheuwel Dam appears to be less accessible by the public but is considered a landscape amenity. These landscape features have tourism and recreational value. Small rural communities and farm residents are scattered across this landscape type. Roads are mostly dirt roads used by the local farmers.
SENSITIVTY OF RECEPTORS
The residents in the study area are classified as visual receptors of high sensitivity owing to their sustained visual exposure to the proposed development as well as their attentive interest towards their living environment. Tourists are also regarded as receptors of high sensitivity. Their main reason for visiting the area is to experience and enjoy the picturesque and pristine natural environment. They have high expectations in terms of the scenic quality.
DISTANCE FROM SOURCE OF IMPACT
Alternative 2 crosses the Wolwedans Dam that is considered a valuable natural feature. Alternative 1 passes more to the north of the dam, crossing the inlet from the Groot Brak River. Tourism and recreational activities are believed to be practiced on and around the dam. Alternative 2 & 3 are in very close proximity to Klipheuwel Dam, passing just north of it. Numerous farmsteads and farming communities can be found along the corridors. They are within the 1km Zone of Maximum Visual Exposure.

6 POSSIBLE SOURCES THAT MAY CAUSE VISUAL AND LANDSCAPE IMPACTS

The following are typical negative impacts that may be expected as a result of the construction and operation of the proposed project:

- The project activities or components are visually intrusive and noticeably change the existing features and the qualities of the visual resource, thereby impacting on observers' views;
- The project introduces new features which are uncharacteristic, incompatible or in contrast with the existing character of the landscape; and/or

- The project removes or blocks aesthetic features in the landscape, which subsequently affect the aesthetic value and scenic quality of the visual resource, and intrude on observers' views.

The significance of an impact is a function of:

- The intensity of the impact;
- The sensitivity of the receptors, both observers and the visual resource; and
- The exposure of the observer to the impact. (For further explanation refer to APPENDIX 1)

The significance of the visual and landscape impacts will be addressed and discussed during the EIA phase. In the Scoping phase, the possible sources of impacts are highlighted but will be refined after the site investigation.

Each landscape type is expected to experience different impacts or different levels of the same impact. The sensitivity of the observers and the visual resource will be different and factors such as the exposure to the source of impact as well as the Visual Absorption Capacity (VAC), at specific locations, will aggravate or mitigate the significance of the impact.

6.1 CONSTRUCTION PHASE

The construction of the transmission line will cause a change to the condition of the existing baseline environment. Landscape and visual impacts will result from the temporary presence of construction camps and material stockyards as well as activities and disturbances within the transmission line servitude. Typical visual impacts often relate to the unsightly character of such construction sites brought about by the untidy and disorderly placement of ancillary elements and the associated surface disturbances. Construction vehicles will travel up and down the servitude as foundations are prepared and the building materials are conveyed. Vegetation around the tower bases will be removed or trampled which will expose the underlying soil. The physical damage to the existing vegetation impacts on the visual resource and its visual value. It may also cause intrusive views from sensitive viewpoints.

The construction of towers is often regarded as low intensity construction due to the localised damage to vegetation (i.e. around the tower base). The damage to the vegetation is contained within the servitude and easily rehabilitated. A practice that causes severe physical damage over a large area is the clearing of high growing vegetation in the servitude. This often results in a very distinct linear corridor that is devoid of trees or large shrubs. Such clearing is only necessary where safety standards are bridged. Through the assessment of large-scale maps and photos of the study area, it appears that most of the vegetation in the study area is low growing thickets or grasslands, with the exception of larger trees occurring in certain valleys and higher up the Outeniqua Mountains. The need for extensive clearing in the servitude is regarded minimal, but will be assessed during the site investigation.

6.2 OPERATIONAL PHASE

Once the project is completed, the most visually prominent elements will be the transmission towers, which will be spaced rhythmically inside the proposed servitude and the conductors between the towers. Landscape and visual impact will result from the addition of new elements in

the environment that will alter the existing character of the landscape and intrude on the views of observers.

The following table identifies possible sensitive landscape features and observers that may be significantly affected by the construction and operation of the project.

Table 2: Affected receptors

LANDSCAPE TYPE
1. MOUNTAINOUS AND WILDERNESS AREA
Landscape receptors: The foothills of the Outeniqua Mountains are partly transformed by agricultural practices but many of the valleys and crests remain natural. It is possible that vegetation clearing will be done in the servitude to lower the safety risk of trees interfering with the conductors. This will negatively affect the natural features of the visual resource. The pristine character of the visual resource will be affected due to the introduction of new anthropogenic elements in an otherwise natural environment. **Visual receptors:** Farmers within 1km of the servitude will experience maximum visual exposure. It is possible to detect the power line over larger areas up to 5km. All farmers in this zone may experience an impact on their views to the mountains. Tourists travelling along the N9 may experience glimpses of the transmission line. (to be confirmed) Hikers hiking through the Outeniqua Mountains may have very clear views of the transmission line when viewed from the crest of the mountains. Hiking trails will be assessed during EIA phase.
2. AGRICULTURE AND NATURAL LANDSCAPES
Landscape receptors: The foothills of the Outeniqua Mountains are mostly conserved and protected by privately owned game farms and reserves. Large areas consist of natural vegetation and pristine landscapes. The pristine character of the visual resource will be affected due to the introduction of new anthropogenic elements in an otherwise natural environment. Unique landscape features that will be affected are Hartebeeskuil Dam, Klipheuwel Dam, Brandwacht and Groot Brak Rivers as well as all the smaller ravines and hillcrests. **Visual receptors:** Farmers within 1km of the servitude will experience maximum visual exposure. It is possible to detect the power line over larger areas up to 5km. All farmers in this zone may experience an impact on their views to the mountains. Tourists visiting the game farms such as Botlierskop-, Gondwana Private Game Reserve, Nyaru-, Cheetah Lodge to name a few, will experience an intrusion on their views. Tourists travelling along the main transport routes such as the R327 and R328 may experience glimpses of the transmission line. (to be confirmed) Hikers on hiker trails that intersects the proposed corridors
3. COASTAL TOWNS AND CITIES
Landscape receptors: The towns have transformed the landscape to create a new landscape character that can generally be classified as a coastal town character. Hartenbos is the town that may experience the greatest impact with the implementation of Alternative 3. It will impact on the town's expansion and settlement patterns as it has to maintain a servitude where no development can occur. **Visual receptors:** Residents from the town of Hartebos will experience the greatest impact due to the proximity of the servitude to their houses. Also during the holiday season large numbers of tourists visit the area and will also be affected due to the presence of the transmission line. Their views of the mountain ranges to the north will be affected. Motorists travelling on the N2 highway will experience a brief exposure to the transmission line.
4. AGRICULTURE
Landscape receptors: The rural landscape character is normally sparsely developed and characterised by open fields, bordered by low wire fences or tree avenues leading up to farmsteads or farming communities. The introduction of a 400kV transmission line will contrast with the existing character.

Unique landscape features that will be affected are Wolwedans Dam, Groot Brak River and Maalgat River as well as all the smaller ravines and hillcrests.

Visual receptors:

Farmers within 1km of the servitude will experience maximum visual exposure. It is possible to detect the power line over larger areas up to 5km. All farmers in this zone may experience an impact on their views to the mountains or other landscape amenities.

Tourists visiting guest farms and guest houses, especially those on the western outskirts of George.

6.3 CONCLUSION

The study area includes landscape features that contribute to a highly valued visual resource in specific regions. Outdoor recreational activities and the tourism industry as a whole, latches on to the opportunities the visual resource offer. Many activities and industries are specifically located in areas of pristine natural landscapes or at points where scenic views can be experienced. Game farms, lodges and hiking trails are some of the industries that are found in the study area.

The climate also ensures that an abundance of water is available and spectacular ravines and dams are present between the endless hills. Probably the most spectacular landscape feature is the ever-present Outeniqua Mountain Range that provides a picturesque backdrop to almost every view.

The proposed project will traverse landscapes of high scenic quality and will impact on the value of the visual resource. The transmission line is considered a large-scale project and will be in contrast with the existing landscape characters that have been identified in each landscape type.

The sensitivity of the landscape and visual receptors, in combination with the intensity of the proposed project, is expected to cause highly significant visual and landscape impacts. This judgment is supported by Oberholzer's (2005) *Guidelines for involving visual and aesthetic in EIA processes*, which classifies this as a category 5 development in an area with high scenic significance that are regularly experienced from public areas or routes.

7 ESTABLISH APPROACH FOR EIA PHASE

According to a recent study by the Transportation Research Board of the National Academies (2013) a criteria of ten points can be implemented to evaluate a VIA methodology. The ten points defining a good standard of reporting are described as being:

1. Objective – the procedure should be designed to eliminate individual bias;
2. Valid – the procedure should be defendable and legitimate within a legal framework;
3. Reliable – adequately trained professionals following the same procedure should reach similar results;
4. Precise – the data required by the procedure should be measured at a grain or scale sufficiently fine to validly measure or describe characteristics of substantive interest and sufficiently coarse to be pragmatically implemented;
5. Versatile – the procedure supports valid assessment of different types of proposed changes from the perspectives of different viewer groups interacting with different landscape settings;
6. Pragmatic – the procedure can be easily and efficiently implemented by a trained professional;

7. Easily understood– the procedure and assessment are accessible by the public and decision makers;
8. Useful – the procedure and assessments affect location, design or mitigation decisions.
9. Consistently implemented – the procedure can be applied consistently among different projects and individual assessments are consistent with the chosen procedure;
10. Legitimate – the procedure is supported by laws, regulations or other legal mechanisms, uses socially/culturally accepted standards and uses scientifically accepted standards.

These ten points are considered international benchmarks in the compilation of a Visual Impact Assessment and will dictate the VIA methodology and assessment strategy.

8 TERMS OF REFERENCE

The scope for the visual impact assessment is outlined below:

- Conduct a site investigation in which a photographic record of the study area is compiled and sensitive viewpoints are documented along with aesthetic landscape features and sense of place;
- Divide the study area into logical sub-sections/landscape types in order to assess impacts on an appropriate scale;
- Conduct a Visual Resource Assessment to determine the aesthetic value of the study area's sub-sections and what role the project corridors fulfil in the greater study area;
- Generate viewshed maps of the different alternatives to refine the extent of the impact and to identify affected viewers;
- Determine the nature of the impacts on the observers in the study area and the landscape character due to the change in the visual characteristics of the environment;
- Determine the significance of the visual and landscape impacts;
- Analyze and compare the different alternative corridors;
- Address cumulative visual impacts;
- Recommend mitigation measures to alleviate or reduce the anticipated impacts; and
- Address the concerns that are raised during public participation events, which relate to aesthetic or any visual impact related aspects.

9 INFORMATION GAPS AND RECOMMENDATIONS

In order to achieve accurate results, detailed and accurate information is required. The following list summarises information that is paramount to the success of the Visual Impact Assessment Study:

- Provide clarity on the construction duration and specific actions that will be taken during that phase, such as the location of construction camps and lay down yards, etc.;
- Provide clarity on the type of tower/pylon to be used and the width of the servitude;
- Provide information on the existing and future electrical infrastructure in the study area in order to fully understand the impact of cumulative impacts;
- Provide access to comments received from Interested and Affected Parties that relates to aesthetic and visual impact aspects;
- Make available information of future developments from both private or public enterprises that may be affected by the proposed project;

APPENDIX 1

The significance of this change/impact is a function of:

- The intensity of the impact;
- The sensitivity of the observers which are impacted or the sensitivity of the visual resource; and
- The exposure of the observer to the impact.

Intensity of impact

The intensity of an impact is a measure of how severe a particular impact is considered to be. It can be described according to scale and extent, but human perceptions also play a significant role although difficult to measure.

- **Scale** refers to the size of the project/development relative to the context it is located in.
- **Extent** refers to the Zone of Visual Influence (ZVI) of the particular project/development and the coverage relative to the study area. This is determined through visibility analysis and will be included during the EIA phase; and
- **Human perceptions** are for all practical reasons subjective, but are considered a valuable indication as to how people respond to a proposed project. Often the general acceptance or non-acceptance of a project/development will be reflected in public consultations. The first public consultations did reveal that many residents or business owners in the study area are opposed to the transmission line due to the visual intrusion and impact on the scenic quality of the visual resource. This indicates that these receptors are highly sensitive towards changes in their environment.

Visual Absorption Capacity

The intensity of an impact is often mitigated by the inherent Visual Absorption Capacity (VAC) of the landscape to absorb changes or to screen the impacts. The VAC of a landscape refers to the robustness of its character and its resulting ability to tolerate changes from a particular intervention without detrimental effects to its original qualities and/or values.

A landscape with a high capacity may have one or more of the following attributes:

- A high screening capacity which screens views from sensitive vantage points;
- Is often intensely developed or transformed by exploitive human activities and therefore has a low value and scenic quality as a baseline condition to start with;
- Has characteristic land uses that are compatible with the proposed project; and/or
- Has a low concentration of valued attributes or its attributes are of a low value.

On the other end of the scale, a landscape with a low capacity may:

- Be an open or exposed landscape with few topographic or surface features that can act as visual screens from sensitive vantage points;
- Comprises of land uses that are incompatible with the proposed project; and/or
- Has a very high concentration of valued attributes or its attributes are of a high value.

Sensitivity of observers

The sensitivity of an observer is related to the value an observer has for the particular visual resource being impacted on. To determine viewer sensitivity a commonly used rating system is utilised but it is also informed by public consultations.

Table 3: Viewer Sensitivity

VIEWER SENSITIVITY	DEFINITION (BASED ON THE LANDSCAPE INSTITUTE, 2002 ED PP90-91)
High	Views from major tourist or recreational attractions or viewpoints promoted for or related to appreciation of the landscape, or from important landscape features. Users of all outdoor recreational facilities including public and local roads or tourist routes whose attention or interest may be focussed on the landscape; Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; Residents with views affected by the development; People generating an income from the visual resource or pristine quality of the environment.
Moderate	People engaged in outdoor sport or recreation (other than appreciation of the landscape); People commuting between work place and home or other destinations.
Low	People at their place of work or focussed on other work or activity; Views from urbanised areas, commercial buildings or industrial zones. Views from heavily industrialised or blighted areas

Exposure to impact

An observer's exposure to an impact is influenced by a combination of the following aspects:

- Distance from the source of impact. A study done by Hull & Bishop (1988) demonstrates that the impact of a power line tower on the scenic quality of a landscape is most significant when the viewing distance is within 500 m from the tower sites. Up to 1 km the impact is still regarded as significant but greatly reduced over the distance. Further than 1 km the change in the scenic quality is exponentially reduced and are sometimes considered minimal or negligible. This should not be confused with the visibility of a power line. Although a power line, and more specifically the towers, is sometimes visible from great distances, it is the impact on the scenic quality that is calculated in Hull & Bishop's (1988) study. However, the study does not address viewers' sentiment or the existing opposition towards a project. These factors are considered to contribute to viewers' sensitivity and will arguably increase the distances/zones described in Hull & Bishop's (1988) study;
- True visibility of the project; keeping in mind visual contrast and the decrease in visibility over distance. True visibility is greatly influenced by the type of tower to be used as well as atmospheric conditions and the relative position of the tower in relation to the sun and observers. It has been noted through empirical research that new towers have a much more shiny appearance than older towers. When light reflects off the new towers it is more visible from greater distances. In addition, towers set against a backdrop of muted colours are less visible than those protruding above the skyline and having the sky as backdrop. It has also been noted that towers are fairly visible up to distances of 3-5 km, but atmospheric conditions and the lack of contrast with the background makes it increasingly more difficult to see towers at greater distances. This can also be attributed to the slender lattice type construction that is permeable and easily blends in with the background at this

distance[2]. Exceptions do exist but in general 8-10 km are considered the furthest a tower is visible with the naked eye;

- Duration, i.e. sustained, temporary, intermittent exposure, etc; and
- Viewer incidence is a measure of determining the frequency and number of viewers viewing the proposed project. Due to a lack of quantitative data the rating is based on an arbitrary scale from high to low specifically designed for this project:
    - For a high viewer incidence to occur the corridor should be located within 1 km of a relatively densely populated area, cross or run in parallel to a major transport route and/or pass through a recognised public gathering area such as a park or viewpoint;
    - A medium viewer incidence occurs if the servitude is within 5 km of a densely populated area or major transport route, or cross through or nearby a sparsely populated area such as a farming community or agricultural holdings; and
    - A low viewer incidence occurs if the servitude passes through vacant-/farmland with no or limited populated areas within 5 km and only a tertiary road network is present.

[2] These are observations made in the field and are not scientifically proven.