VISUAL IMPACT ASSESSMENT FOR THE PROPOSED BLANCO – DROëRIVIER 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 Blanco - Droërivier 400kV transmission line, on the issues pertaining to visual impacts. The proposed project is located within the Western Cape Province between the future Blanco Substation (approximately 5 km north west of George) and the existing Droërivier Substation (approximately 7 km south west Beaufort West).

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.

The proposed project will join the future Blanco Substation to the existing Droërivier Substation with a 400kV transmission line. The distance between the substation sites is approximately 170 km. Two 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. Outeniqua Mountains;
2. Karoo Mountains;
3. Klein Karoo and Mountain Foothills; and
4. Groot Karoo.

The Outeniqua Mountains and Karoo Mountains are the most prominent natural features in the study area. Due to its inaccessibility, it features pristine vegetation communities as well as picturesque scenes of the mountains. The climate on the southern slope of the Outeniqua Mountains is different to the more arid northern slopes. A similar climate can be found all the way to the Swartberg Mountain Range. These landscapes are highly regarded for their scenic quality and numerous outdoor activities and tourism industries have developed in this region.

The Klein Karoo is flanked by the Swartberg and Outeniqua Mountains and features a couple of towns and ostrich farms. Due to its semi-arid climate, the vegetation is limited to succulents and low growing scrub. It is surrounded by mountains and picturesque views of the high peaks.

The Groot Karoo landscape is monotonous but features a very strong desolate and isolated sense of place. Expansive views over the landscape are possible and one experiences a sense of simplicity and solitude. Distant views of the Swartberg Mountains and the mountains north of Beaufort West are always present, providing a prospect of variation.

The study area includes landscape features that contribute to a highly valued visual resource in specific regions. Outdoor recreational activities and the tourism industry, 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.

The Klein Karoo has managed to redefine itself over the last couple of decades to become a tourist destination. Festivals such as the Klein Karoo Arts Festival have reached enormous popularity and draws people from all over the country. Focus has been placed on the unique agriculture industry in the region and ostrich farming is now synonymous with the Karoo region. In addition, the hop plantations in the Waboomskraal Valley are just as unique and contribute to a specific landscape character.

The study area consists of many different landscape types, each with its unique character and areas of very high scenic quality. The natural pristine mountain ranges provide a picturesque backdrop to almost every view. Even the furthest northern part of the study area still enjoys views of the Swartberg Mountains in the distance, or the mountains in the Karoo National Park, north of Beaufort West.

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. This can potentially impact on the tourism industry and affect observers' perceptions of the study area.

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 Blanco - Droërivier 400kV transmission line, on the issues pertaining to visual impacts (Figure 1). The proposed project is located within the Western Cape Province between the future Blanco Substation (approximately 5 km north west of George) and the existing Droërivier Substation (approximately 7 km south west Beaufort West). 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.

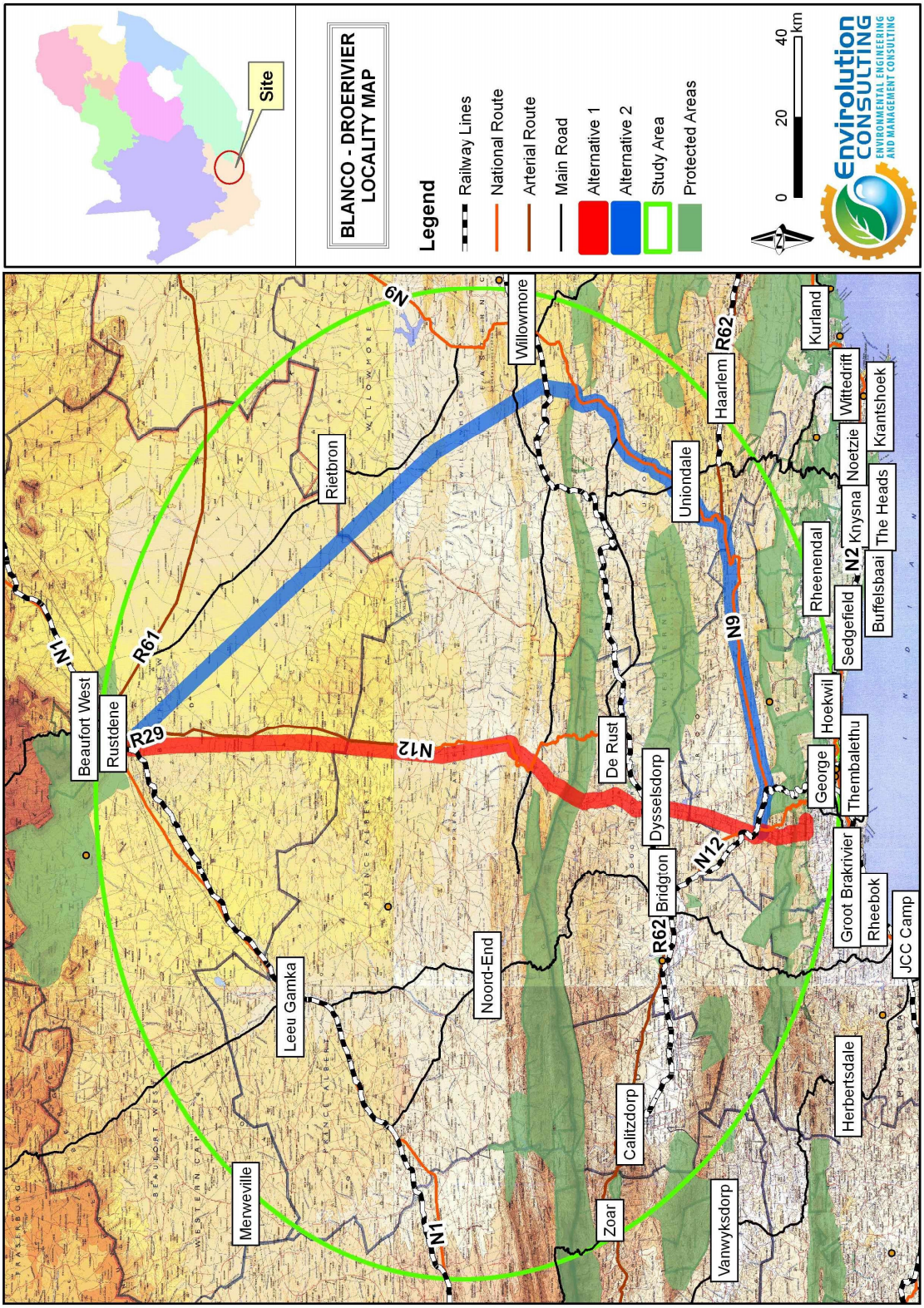

Figure 1: Locality map

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. It should be mentioned at this stage that the landscape types might be adjusted subsequent to a site investigation. The aesthetic value will be carried further through a Visual Resource Assessment (VRA) during the EIA phase.

Table 1: Landscape types

LANDSCAPE TYPE
1. OUTENIQUA MOUNTAINS
The Outeniqua Mountain Range is considered the most southern part of the study area and consists of extreme topographic variation and pristine natural environment. The northern and southern slopes of the Outeniqua Mountains are very different, climatically and ecologically, and are therefore split in two landscape types. The southern slope is considered a high rainfall area and features vegetation communities that varies from forests to fynbos vegetation. The northern slopes are a lot more arid and fall under the Karoo Mountains landscape type. Due to the inaccessibility of the mountains, large parts remain in a pristine natural condition and areas such as Ruiterbos Nature Reserve and Doringrivier Wilderness Area conserves parts of the Outeniqua Mountain Range. 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. KAROO MOUNTAINS
The Karoo Mountains landscape type include the northern slope of the Outeniqua Mountains, the Swartberg Mountain Range that are approximately 50 km north of the Outeniqua Mountains and the Kammanassie Mountain which is a 50 000ha mountainous outcrop between the two mountain ranges. These are considered one landscape type due to its similar vegetation communities. Low growing fynbos and succulent, thicket vegetation occurs on the mountains. The Swartberg Mountain Range is protected by the Groot Swartberg Nature Reserve and the Swartberg East Nature

[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.

Reserve. The Kammanassie Mountains is currently protected by the Kammanassie Nature Reserve.
Due to its inaccessibility, the mountains are largely in a pristine natural condition. It provides a picturesque backdrop to the farms and towns in the Klein Karoo and is the feature point of many photographs. It is a unique landscape with a high topographical elevation, and distinctive vegetation communities, and contributes significantly to the character of the study area.

3. KLEIN KAROO AND MOUNTAIN FOOTHILLS

The Outeniqua- and Swartberg Mountain Ranges are parallel to each other, defining an area known as the Klein Karoo. The Klein Karoo is mostly undulating topography, with the exception of the Kammanassie Mountains. Ostrich farming is synonymous with the Klein Karoo and is considered the largest commercial industry. Sheep farming in conjunction with game farming is also a popular agricultural practice. Due to the arid climate, small-scale cultivation practices are mostly concentrated along rivers.
The Klein Karoo features a couple of small towns. The largest is Oudtshoorn but is considered outside of the visibility zone. Other small towns that are within 10km from the proposed corridors are De Rust, Dysseldorp and Uniondale. Many farmsteads and farming communities are scattered across this part of the study area. Most are situated close to the main roads through the Klein Karoo such as the N12 and N9, or along streams and rivers.
The main road network are often travelled by tourists on their way to the coast. The Klein Karoo has redefined itself as a tourist destination over the last couple of decades. Many guesthouses and lodges can be found along the foothills of the Outeniqua- and Swartberg Mountain Ranges.

4. GROOT KAROO

The Groot Karoo is the region of the study area north of the Swartberg Mountain Range, up to the Droërivier Substation. This is an arid and sparsely populated region known for its exceptionally large Karoo sheep farms. The topography is relatively flat, with the odd ridgeline creating a small degree of variance. The vegetation is characterised by low growing shrubs and succulents.
The N12 is an important link between Beaufort West and Meiringspoort and is much travelled. A sparse dirt road network connects the isolated farmsteads to the main roads.
This part of the study area is considered unique due to its desolate character and the absence of anthropogenic elements. Expansive views of pristine Karoo landscape can be experienced with vague profiles of the Swartberg Mountains in the distance.

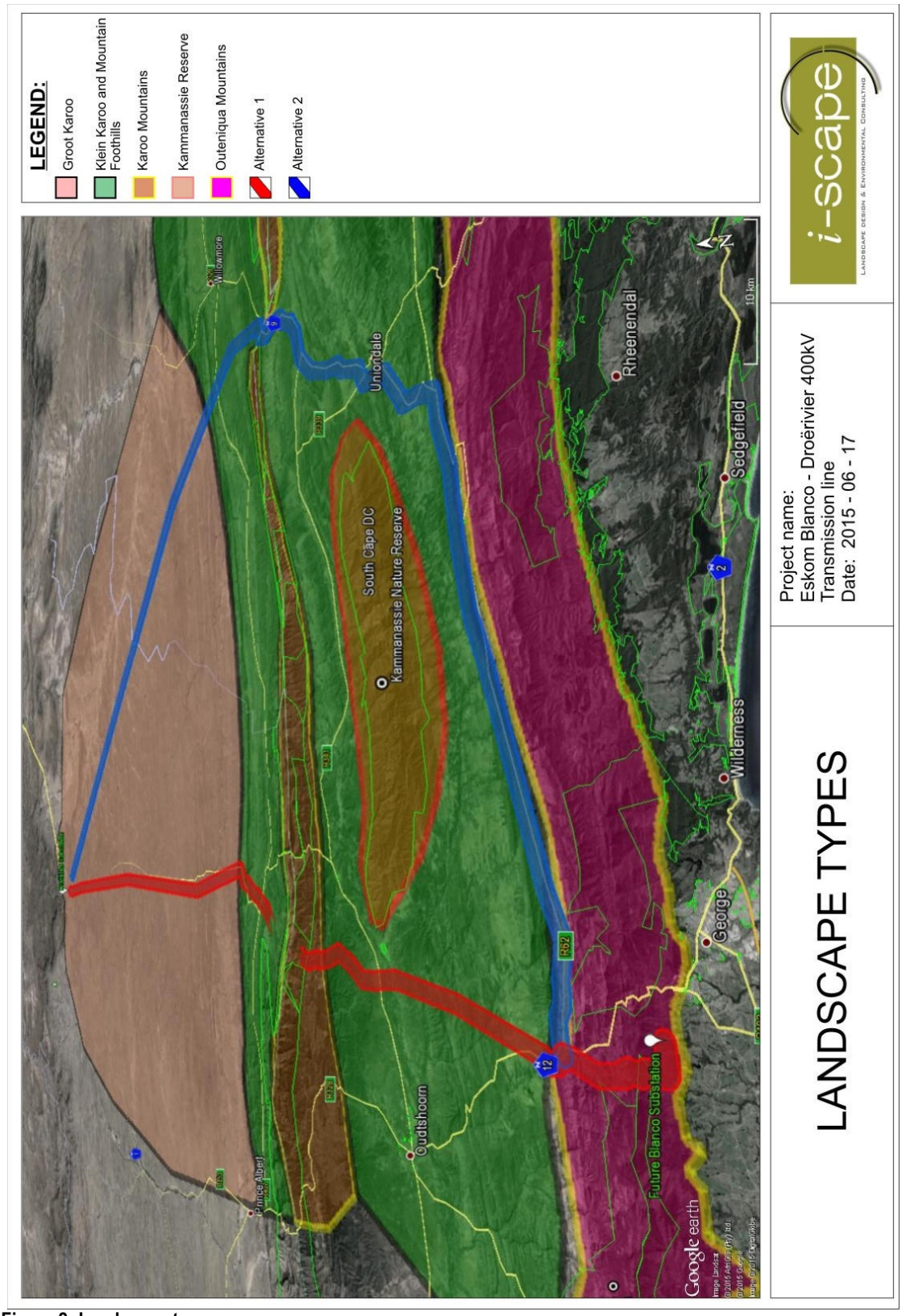

Figure 2: Landscape types

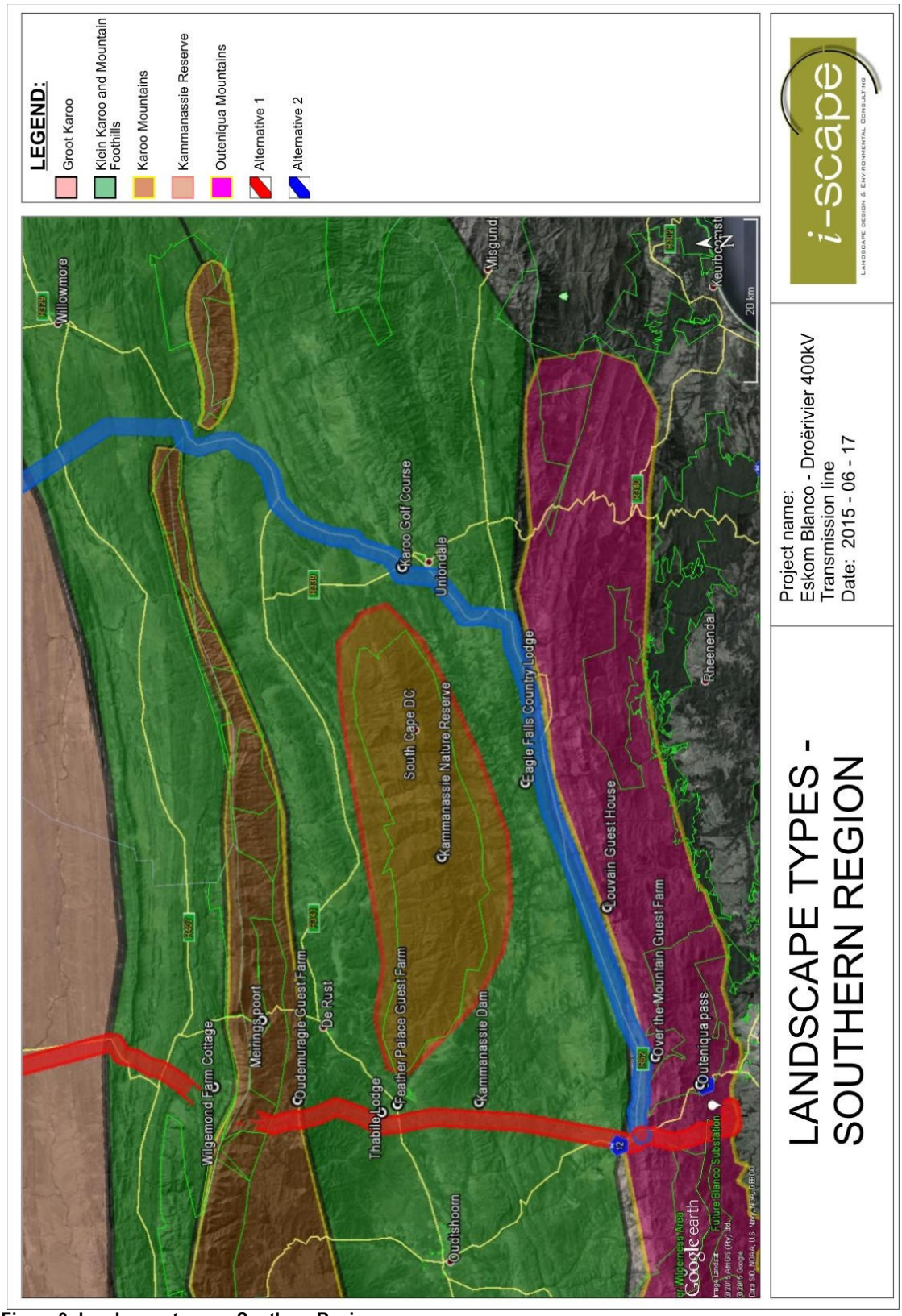

Figure 3: Landscape types – Southern Region

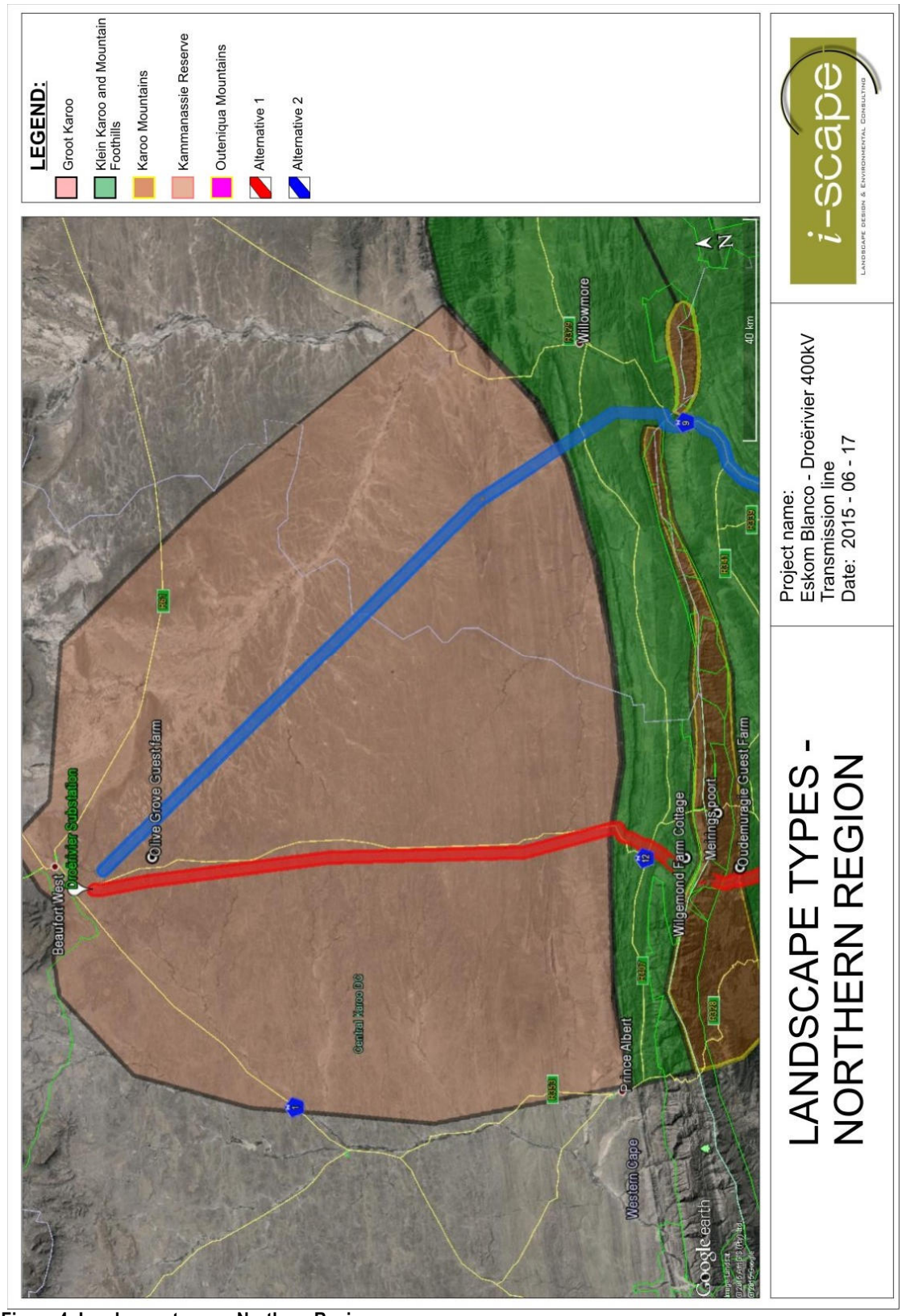

Figure 4: Landscape types – Northern Region

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 will join the future Blanco Substation to the existing Droërivier Substation with a 400kV transmission line. The distance between the substation sites is approximately 170 km. Two alternative alignments are proposed within a corridor of 2 km, as indicated in Figure 1.

- Alternative 1: This corridor exits the Blanco Substation site in a westerly direction after which it turns north within 3 km. It traverses the Outeniqua Mountain Range and carries on through the Klein Karoo, passing between the towns of Oudtshoorn and De Rust. It traverses the Swartberg Mountain Range, 10 km west of Meiringspoort Pass. For the remaining 100 km it roughly follows the N12 to Beaufort West through the Groot Karoo, until reaching the Droërivier Substation.
- Alternative 2: The first couple of kilometres follow the same route as Alternative 1. It turns in an easterly direction shortly after traversing the Outeniqua Mountain Range and roughly follows the R92/N9 towards Uniondale. 12 km from Uniondale the corridor turns in a north easterly direction and pass between Uniondale and the Kammanassie Nature Reserve, maintaining its direction towards Willowmore. It passes over the eastern extremities of the Swartberg Mountain Range before turning north west through the Groot Karoo towards Beaufort West until reaching Droërivier Substation.

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
OUTENIQUA MOUNTAINS
CORRIDORS AFFECTING LANDSCAPE TYPE
The Outeniqua Mountains will be affected by both corridors as it crosses over the mountains from the Blanco Substation site. This approximately a 12 km stretch and also traverses the Waboomskraal Valley.
AFFECTED RECEPTORS
The affected landscape features will be small tributaries that originate from the mountains, farm dams and the forested valleys 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. A section of the line traverses a valley known as Waboomskraal. This is one of the few places where hops are grown in South Africa. It is considered a unique crop in South Africa due to the few places it can be grown and the plants' interesting growth habit. It is uncertain how the transmission line will impact on the hops plantations but it may have an impact on the cultivation patters in the servitude. The affected observers are expected to be the farmers that regularly travel on the dirt roads in the Outeniqua 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) enters the Outeniqua Mountains from the north and winds through the Waboomskraal Valley until it exits on arrival to George. 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 N9 section that crosses through the Waboomskraal Valley will also be affected as well as a section of the N12 that joins Oudtshoorn to the N9.
SENSITIVTY OF RECEPTORS
The sensitivity of the visual resource is considered high as this is a region with pristine natural ecosystems. 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 hop plantations in the Waboomskraal Valley are a unique agricultural practise in South Africa and the practise of letting the plant creep up a high trellis is considered interesting. Further more, the Waboomskraal Valley is surrounded by the Outeniqua Mountains and creates a small basin in which hop is grown successfully. The landscape are considered highly sensitive due to its uniqueness. 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. The N9 is considered a scenic route and motorists travelling through the mountains are considered highly sensitive.
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 both 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. Alternative 1 will affect the N9 through the Waboomskraal Valley and a section of the N12 towards Oudtshoorn as it follows the road infrastructure and crosses over the N12 towards Dysseldorp. Alternative 2 follows the R62/N9 along the northern foothills of the Outeniqua Mountains towards Uniondale for approximately 120 km.
KAROO MOUNTAINS
CORRIDORS AFFECTING LANDSCAPE TYPE
Alternative 1 crosses over the Swartberg Mountain Range, 12 km west of Meiringspoort Pass (N12). Alternative 2 avoids crossing over mountains in this landscape type but it traverses the Klein Karoo along the foothills of the Outeniqua Mountains and through a gap in the Swartberg Mountain Range between Uniondale and Willowmore. Although it doesn't impact directly on the mountains, it is considered close enough to cause an impact.
AFFECTED RECEPTORS
The affected landscape receptors will be small tributaries, valleys and mountain crests. Collectively they contribute to a unique landscape character that is relatively free of anthropogenic structures and consists of pristine environments. These may be impacted when a transmission line traverses over the mountains, or pass in close proximity. Residents of the area and tourists may utilise dirt roads to travel through the mountains. The terrain is considered difficult to access by roads but small dirt roads might cross the proposed corridors. Tourists visiting the Klein Karoo or passing through the region will be impacted when the transmission line is in their field of view. Tourists may stay over in some of the overnight guest houses or travel on the scenic routes that cross, or follow the proposed corridors. Alternative 2 follows the R62/N9 for approximately 120 km.
SENSITIVTY OF RECEPTORS
The sensitivity of the visual resource is considered high as this is a region with very little anthropogenic elements and is 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 farming communities 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 or people utilising the overnight accommodation, 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. It is unclear whether there are hiking trails in the protected areas in the Swartberg Mountains, Kammanassie Reserve and northern slopes of the Outeniqua Mountains. This will be explored during the EIA phase.
DISTANCE FROM SOURCE OF IMPACT
Alternative 1 will traverse the Swartberg Mountain Range and pass through the Groot Swartberg Nature Reserve. Alternative 2 follows the N9 Route between Uniondale and Outeniqua Pass. It is approximately 3-6 km from the northern slopes of the Outeniqua Mountains. Farmers residing in the area will also be affected due to the corridor passing close to their farmsteads or over their farms. A couple of guest farms and lodges that are within 10 km from the proposed corridors have been identified. They will be mentioned in Table 2.
KLEIN KAROO AND MOUNTAIN FOOTHILLS
CORRIDORS AFFECTING LANDSCAPE TYPE
Both alternatives traverse the Klein Karoo and the mountain foothills.
AFFECTED RECEPTORS
Some farming practices such as ostrich farms might be affected. Small tributaries and farms dams will be in the corridor and may be affected. The Kammanassie Dam appears to be

the largest dam in this landscape type. Farm residents are expected to be impacted by the transmission lines if it crosses over their farms or near their farmsteads. Tourists visiting the Klein Karoo or passing through the region will be impacted when the transmission line is in their field of view. Tourists may stay over in some of the overnight guesthouses or travel on the scenic routes that cross, or follow the proposed corridors. Alternative 2 follows the R62/N9 for approximately 120 km.
SENSITIVTY OF RECEPTORS
The sensitivity of the visual resource is considered high as this is a region with very little anthropogenic elements and is generally free of electrical infrastructure of this scale. The transmission towers are considered large and in contrast with the existing landscape character. 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. Residents include farming communities and towns such as Dysseldorp and Uniondale 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
Dysseldorp and Kammanassie Dam are within 2 km from Alternative 1. A couple of lodges and guest farms are within 10 km from the proposed corridor. Alternative 2 roughly follows the R62/N9 between the Outeniqua Pass and Uniondale. Motorists and tourists travelling on this route will be confronted with views of the transmission line. A couple of guest farms are located along the foothills of the mountains and are within 5 km from the corridor. Alternative 2 pass 1 km west of Uniondale.
GROOT KAROO
CORRIDORS AFFECTING LANDSCAPE TYPE
Both alternative corridors will traverse this landscape type.
AFFECTED RECEPTORS
The desolate landscape consists predominantly of large farms and is free of large developments. The rural character will be impacted by the introduction of a transmission line. Small rural communities and farm residents are scattered across this landscape type. Roads are mostly dirt roads used by the local farmers. Alternative 1 roughly follows the N12 route between Meiringspoort and Beaufort West. Motorists will be confronted with views of the transmission line.
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. There are few tourist attractions in this landscape type. The only guest farm that are identified is Olive Grove Guest Farm 12 km south east from the Droërivier Substation and within 5 km from both alternatives. 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 1 follows the N12 all the way from Meiringspoort to the Droërivier Substation. For the entire 100 km stretch, the corridor is within 5 km from the N12. A couple of farmsteads are within the ZMVE of both alternatives. Olive Grove Guest Farm are within 5 km from both alternatives.

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 exceeded. 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

SPECIFIC RECEPTORS IN THE CORRIDORS
1. OUTENIQUA MOUNTAINS
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. Alternative 1 may affect the hop plantations in the Waboomskraal Valley, but it is unsure at this stage to what degree. **Visual receptors:** Farmers on the southern slopes of the Outeniqua Mountains and in the Waboomskraal valley that are 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 and motorists travelling along the N9 may experience glimpses of the transmission line. The potential for visual intrusion becomes greater as the corridor nears the N9 before Alternative 1 & 2 split in their separate directions, 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. KAROO MOUNTAINS
Landscape receptors: The northern slope of the Outeniqua Mountains, the Swartberg- and Kammanassie Mountains are mostly conserved and protected by 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. **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 guest farms and lodges will be impacted. Some that are identified during the desktop study are; Oudemuragie Guest Farm, Over the Mountain Guest Farm, Louvaine Guest House, to name a few. Tourists travelling along the main transport routes such as the R62/N9 and N12 may experience glimpses of the transmission line. (to be confirmed) Hikers on hiker trails near the proposed corridors
3. KLEIN KAROO AND MOUNTAIN FOOTHILLS
Landscape receptors: Alternative 1 passes west of the Kammanassie Dam wall. This is considered the largest open water body in the region. Rivers such as the Kammanassie-, Olifants-, and Doring Rivers will also be crossed.

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. Residents in Dysseldorp and Uniondale will be affected by the transmission line brushing past the towns. The towns are within 2 km from the proposed corridors. Motorists and tourists travelling on the R62/N9 highway will experience a exposure to Alternative 2. Tourists visiting overnight facilities such as those mentioned previously and Thabile Lodge and Eagle Falls Country Lodge.
4. GROOT KAROO
Landscape receptors: The large expanse of the Groot Karoo allows one to experience extensive views of the landscape. Its character is monotonous but has a very strong sense of place. **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. Tourists visiting guest houses such as the Olive Grove Guest Farm. Motorists travelling on the N12 between Beaufort West and Meiringspoort.

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, 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.

The Klein Karoo has managed to redefine itself over the last couple of decades to become a tourist destination. Festivals such as the Klein Karoo Arts Festival have reached enormous popularity and draws people from all over the country. Focus has been placed on the unique agriculture industry in the region and ostrich farming is now synonymous with the Karoo region. In addition, the hop plantations in the Waboomskraal Valley are just as unique and contribute to a specific landscape character.

The study area consists of many different landscape types, each with its unique character and areas of very high scenic quality. The natural pristine mountain ranges provide a picturesque backdrop to almost every view. Even the furthest northern part of the study area still enjoys views of the Swartberg Mountains in the distance, or the mountains in the Karoo National Park, north of Beaufort West.

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. This can potentially impact on the tourism industry and affect observers' perceptions of the study area.

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.