

4. ASSESSMENT OF POTENTIAL IMPACTS ASSOCIATED WITH THE PROPOSED TRANSMISSION LINE BETWEEN THE POSEIDON AND GRASSRIDGE SUBSTATIONS

In order to recycle the 220 kV Transmission line servitude, it will be required that the existing 220 kV Transmission line be dismantled and removed along its length and new towers constructed within this servitude to accommodate the 400 kV line conductors. Therefore, the project activities associated with the proposed third 400 kV Transmission line between Poseidon and Grassridge Substations which may impact on the environment (biophysical and social) are:

- the decommissioning and dismantling of the existing 220 kV Transmission line; and
- the construction of the new 400 kV Transmission line.

It is assumed that these project activities will be undertaken simultaneously. The activities which would be required during this recycling process will involve the dismantling of existing 220 kV Transmission line towers, the breaking up and removal of foundations, the digging and laying of new foundations and the erection of the 400 kV Transmission line infrastructure. Potential impacts associated with these proposed construction activities are discussed below.

4.1. Potential Impacts on Agricultural Potential

Agricultural practices within the study area include the following:

- *Irrigation Land:*
Several cultivated lands on commercial farms along the Sundays, Little Fish and Great Fish rivers have been identified. Irrigation methods in these areas may include centre pivot operations.
- *Natural Rangeland:*
Agricultural production from natural rangeland in the region has changed significantly in the past 10 years, resulting in important changes in land-use. Many commercial farmers in the succulent thicket originally focussed their efforts on goat (Angora and Boer) and ostrich farming. Changes in the mohair and ostrich markets have affected their margins, and there has been a dramatic change to game farming in the succulent thicket.

- *Grazing Land:*
Where agricultural practices have not been altered on rangelands occurring within the study area, grazing activities are still undertaken.
- *Citrus Farming:*
Citrus farming has been identified as the major agricultural activity which is currently being actively undertaken in the area surrounding Addo, and within the Sundays River Valley.

4.1.1. Potential Impacts

Although a Transmission line is a linear development, it does not result in the sterilisation of all the land within the servitude, and certain agricultural practices can be successfully maintained within the servitude area. The potential impact on agricultural land and agricultural potential associated with the Transmission line is anticipated to be localised and restricted to the tower positions. The existing 220 kV Transmission line has an existing impact on agricultural practices. With the replacement of the 220 kV infrastructure with CRS towers, it is anticipated that this existing impact could be minimised, as the members of the CRS tower have a smaller footprint than the self-supporting towers currently erected. The impact on agricultural potential and land within the servitude is, therefore, anticipated to be of low significance.

Windbreaks (i.e. a row of trees planted with the aim of reducing the wind exposure of citrus orchards; see Figure 4.1 overleaf) are used extensively by the citrus farmers within the study area. As the operation and reliability of a Transmission line can be adversely affected by vegetation taller than 4 m interfering with the line, the height of trees below and directly adjacent to overhead lines is restricted. As the height of the windbreak determines the size of the orchard protected, a reduction in the height of the windbreaks reduces their effectiveness and can have an impact on the product harvested from these orchards. This will impact significantly on the productivity of the citrus farm.

Table 4.1: Potential impacts on agricultural potential associated with the construction of new Transmission line between the Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|--------------------|--------|-----------|-------------|--------------|----------|
| Irrigated lands | Local | Long-term | Probable | Low | Negative |
| Natural Rangelands | Local | Long-term | Probable | Low | Negative |
| Grazing lands | None | Long-term | Definite | Low | Negative |
| Citrus Farming | Local | Lon-terms | Probable | High | Negative |

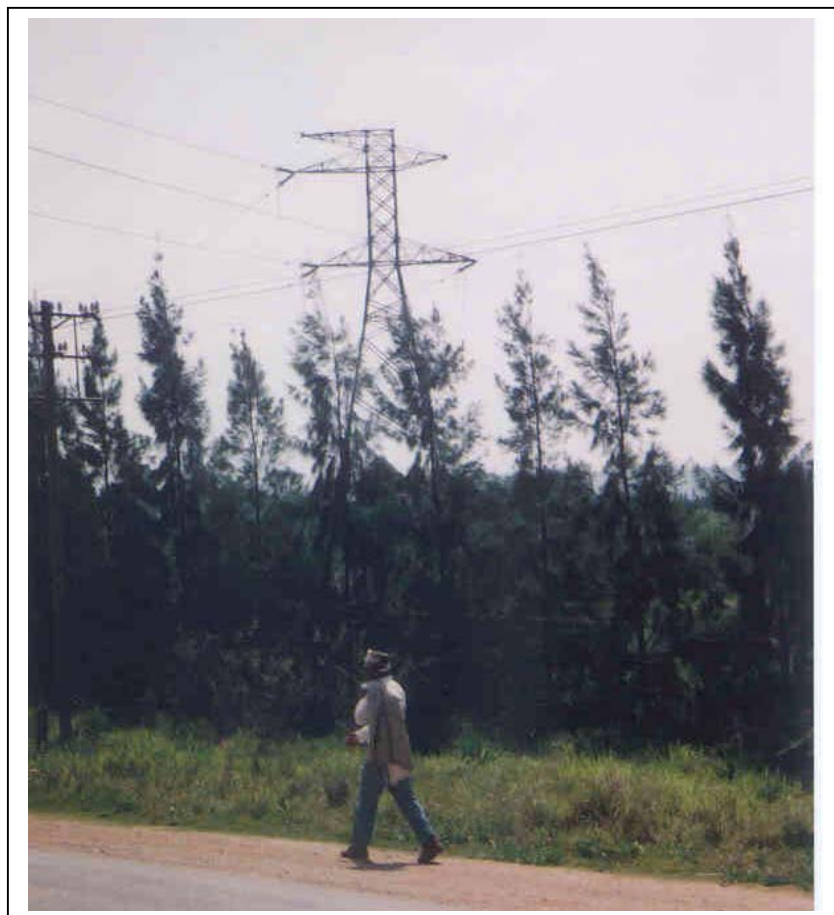


Figure 4.1: Windbreaks (i.e. a row of trees planted with the aim of reducing the wind exposure of citrus orchards) are used extensively by the citrus farmers within the study area

4.1.2. Recommendations

The issue regarding potential impacts on citrus farming as a result of the proposed project has been raised by those I&APs within the Addo area, and should be taken into consideration when confirming the final alignment of the proposed line. The final alignment of the proposed third 400 kV Transmission line must be in line with the agreements reached with landowners during negotiations which undertaken for the Poseidon-Grassridge No 2 400 kV Transmission line.

4.2. Potential Impacts on Flora

A wide range of vegetation types can be distinguished within the study area, including Bonteveld, Valley Bushveld (including Mesic Succulent Thicket, Xeric Succulent Thicket and Tall Succulent Thicket), Afro-Montane Forest, Grassy Fynbos, Arid Savanna, Grassy Dwarf Shrublands and Grassland.

Natural vegetation in all areas within the study area (except where the route traverses the Zuurberg range and the riparian zones of the Little Fish River) is disturbed by the intensive irrigation activities, or by urban areas and roads. With the exception of some alien invasives (*Opuntia* spp.) in the Xeric Succulent Thicket, most rangeland is considered to be in moderate to good condition. Large areas of the karroid dwarf shrublands and grasslands are in a healthy state, showing little evidence of disturbance, which could be attributed to overstocking by domestic stock.

It is anticipated that the regrowth within the servitude and around towers has occurred. With the implementation of Eskom's current vegetation clearance practices, this vegetation is currently largely undisturbed through maintenance activities (Figure 4.2).



Figure 4.2: Vegetation within the existing 220 kV Transmission line servitude and at tower positions is largely undisturbed through current maintenance activities

- *Bontveld:*

The bontveld is located on soils of a generally poor quality, and occurs in regions with round-the-year rainfall. Rich fynbos elements are characteristic of this vegetation type. Agricultural potential within this vegetation type is limited due to the calcareous nature of the soils. Examples of this vegetation type are present in the southern section of the study area.

- *Valley Bushveld:*

This veld type occurs within the southern and central sections of the study area. The Sundays River Scrub and Addo Bush variations of this veld type are endemic to this region, and contain many unique structures and floristic elements. This veld type has been divided into the following:

- * *Mesic Succulent Thicket*

The mesic succulent thicket comprises those thicket communities associated with moderate to higher rainfall areas, and is located on cooler, southern aspects. Leafy succulent species (e.g. *Portulacaria afra* and *Aloe* spp) are rare, and the woody component is dominated by *Scutia myrtina* (droogie), many *Rhus* species, *Sideroxylon inerme* (milkwood) and *Pteroxylon obliquum* (sneezewood). Some stem succulent taxa are present, for example *Euphorbia tetragona*.

- * *Xeric Succulent Thicket*

The xeric succulent is well conserved in the Eastern Cape, with numerous formal (AENP, Great Fish River complex) and informal (Shamwari Game Reserve, Schotia Game Reserve) conservation areas in existence. This vegetation type is sensitive to disturbance, and does not easily recover (Figure 4.3).



Figure 4.3: Xeric succulent is well conserved within the Eastern Cape, but does not recover well from disturbance. Within the AENP, elephants have long-term impacts on this vegetation type (Bannister, *et al*, 1987)

* *Tall Succulent Thicket*

The tall succulent thicket is defined throughout the Eastern Cape region by the presence of canopy-emergent, stem succulents (*Euphorbia triangularis*, *Euphorbia tetragona*). This is a uniquely Eastern Cape growth form, and gives the countryside its distinctive appearance. This vegetation type is largely associated with existing conservation areas, particularly forests. Although not specifically threatened, it does contain habitat in which threatened taxa may occur (e.g. orchidaceae found on the trunks).

• *Afro-Montane Forest:*

The Afro-montane forest comprises tall evergreen trees with canopy heights of 10-14 m. The forest is relatively well protected in the AENP. Existing developments in the study area have had an impact on this vegetation, as it has been necessary to disrupt the canopy to undertake development activities.

• *Grassy Fynbos:*

This veld type, described by Acocks (1988) as False Fynbos (veld type 70), contains a large number of endangered, rare, threatened and endemic species. A list of all known endangered, rare and threatened vegetation species within the entire study area is provided in Appendix E.

• *Arid Savanna:*

The arid savanna is a unique structural vegetation type, associated with the arid, northern aspects on the sandstones in the central parts of the study area. The landscape is dominated by the single-stemmed woody shrubs (e.g. *Pappea capensis* and *Boscia oleoides*), with the understorey comprising grasses and dwarf shrubs of Karoo affinity. The woody component includes species such as *Nymania capensis*, *Eulcea undulata*, *Grewia robusta* and *Maytenus polyacantha*. This vegetation type is not formally conserved.

• *Grassy Dwarf Shrublands:*

The grassy dwarf shrublands comprise the large extent of rangeland in the central and northern parts of the study area. The dominant grass species are *Pentzia incana*, *Eragrostis lehmaniana*, and *Eragrostis curvula*. The dwarf shrublands are in good condition, with relatively low productivity. Although no rare or endangered taxa were observed during site investigations, some of the low-growing *Euphorbia* and *Gasteria*

species could be encountered when during bush clearance activities during the construction phase.

- *Grassland:*

The grasslands of the area south of the Poseidon Substation are an important agricultural resource, as they support the livestock production systems of the Smaldeel. The erection and maintenance of Transmission lines have little impact on this vegetation.

- *Alien Vegetation:*

The following alien species were encountered during a brief survey of the study area, and are regarded as having a negative impact on the natural environment:

- * *Opuntia ficus-indica* (prickly pear)
- * *Opuntia aurantiaca* (jointed cactus)
- * *Acacia mearnsii* (black wattle)
- * *Acacia longifolia* (long-leaved wattle)
- * *Acacia saligna* (Port Jackson willow)
- * *Solanum mauritianum* (bugweed)
- * *Lantana camara* (lantana)
- * *Pinus pinaster* (cluster pine)
- * *Eucalyptus* sp. (blue gums)

4.2.1. Potential Impacts on Rare, Endangered and Threatened Flora

With the recycling of the existing 220 kV Transmission line servitude, the new 400 kV towers could be constructed at sites within the servitude which may not have been previously disturbed by construction and maintenance activities. Therefore, there is the potential for impacts on endangered, rare and threatened flora species which have been identified to potentially occur within the area (refer to Appendix E). Although this impact will be localised and confined to tower positions, it will be permanent, and therefore will be significant.

4.2.2. *Potential Impacts on Vegetation Structure*

- *Afro-Montane Forest and Tall Succulent Thicket:*

These vegetation types are associated with steeply sloping terrain, and are, therefore, extremely vulnerable to disturbance. Potential impacts associated with the construction of a Transmission line, and thus disturbance to the vegetation in these areas include increased water runoff and erosion.

- *Xeric Succulent Thicket:*

The long-term impact of vegetation clearance within this vegetation type are clearly visible at other sites of disturbance. Post-disturbance recovery is extremely slow, with the cut-lines for fences throughout the succulent thicket bearing evidence to the problems with mitigating disturbance effects. Edges of cut-lines are also more vulnerable to invasion by alien taxa. Therefore, extensive clearance of the Transmission line servitude in areas where this vegetation type occurs (such as in the AENP) could potentially have a highly significant negative impact on the vegetation structure due to slow recovery periods.

4.2.3. *Potential Impacts on the Occurrence of Alien Species*

The minimum standards implemented by Eskom during the construction of a new Transmission line include the clearance of all alien vegetation species within the servitude area. This is achieved through the use of appropriate cutting and treatment with herbicides. During the operation and maintenance of the Transmission line, regrowth is cut and treated with an appropriate herbicide in order to prevent recolonisation of the area by these species. Therefore, the potential impact associated with the construction of the proposed Transmission line in terms of alien vegetation species will be positive and will be of a long-term nature.

Table 4.2: Potential impacts on flora associated with the construction of the new Transmission line between the Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---|----------|-------------|-------------|--------------|----------|
| Endangered, rare and threatened species | Local | Permanent | Probable | High | Negative |
| Vegetation Structure | Local | Medium-term | Definite | High | Negative |
| Occurrence of alien vegetation | Regional | Long-term | Definite | High | Positive |

4.2.4. Recommendations

With the implementation of appropriate mitigation measures, it is anticipated that the potential impacts on vegetation can be effectively reduced to impacts of moderate to low significance. The implementation of mitigation measures is particularly important within the xeric succulent thicket (i.e. the AENP area), as the vegetation in these areas is not known to recover easily from disturbance.

The following mitigation measures are recommended:

- *Endangered, Rare and Threatened Species:*

As it is likely that rare and endangered plant species may occur within the area along which the proposed Transmission line is to be constructed, a detailed survey of the final tower positions, as well as all additional access roads and other structures should be undertaken by a qualified vegetation specialist prior to the commencement of construction activities.

Where rare or endangered plants are identified within the proposed construction area, various mitigation measures can be implemented:

- * Many rare or endangered plant species can be successfully relocated to similar habitats. This should be undertaken in the winter months as far as possible.
 - * Where it is not undesirable, or possible to successfully relocate rare or endangered plants (e.g. low-growing endemic geophytes such as *Euphorbia* and *Gasteria* species) due to sensitivities of the species with regards to habitat preferences, the specific location of each disturbance (tower construction, access road construction, clearing of servitude) should be undertaken under the supervision of a suitably qualified vegetation specialist. This will result in the avoidance of unnecessary disturbance to sensitive habitats.
 - * In addition, where feasible, a slight shift in the position of the tower to avoid disturbance of rare or endangered species will result in an impact of low to no significance.
- *Vegetation Structure:*
Standard practices implemented by Eskom (and included as part of all contracts; Eskom, 2000) include a number of mitigation measures which will result in the amelioration of the above potential impacts. These include:

- * the implementation of reasonable measures to prevent soil erosion at all times.
 - * no clearance of sensitive and/or protected areas, provided that the vegetation poses no threat to the operation and reliability of the Transmission line. During construction, however, a 1 m “trace-line” may be required to be cut through the vegetation for stringing purposes only. In areas where no vehicle access is permitted, stringing will be undertaken by helicopter.
 - * where no access roads are available (i.e. in sensitive and/or protected areas where no vegetation clearance is permitted), a helicopter is to be used for the erection of towers and maintenance of the line during operation.
 - * in all areas along the servitude, vegetation clearance will be minimised during construction and maintenance.
 - * the use of existing access roads to the existing Transmission line servitude will minimise cut-lines and the establishment of additional access roads.
- *Mitigation Factors to Minimise Re-colonisation of Alien Vegetation:*
Mitigation measures already implemented by Eskom (as discussed above) must be implemented to ensure that the potential impacts associated with alien invasive vegetation is ameliorated. In addition, post-fire herbicide treatment should be implemented, particularly for woody species.

Appropriate site-specific management measures should be detailed within an Environmental Management Plan (EMP) for construction, operation and maintenance of the Transmission line.

4.3. Potential Impacts on Terrestrial Fauna

The study area is considered to be rich in biodiversity and habitat as a result of the topographic and botanical diversity. The current distribution of terrestrial fauna within the study area has historically been influenced by human interference and habitat disturbance or destruction.

- *Mammals:*
Although the smaller mammal species (in particular the insectivores, bats and rodents) have been less impacted upon by human activities, habitat change as a direct consequence of human intervention remains a threat for species, particularly those with limited distribution ranges or specific habitat requirements.

Those species which have retained viable populations outside of protected areas include those animals associated with dense woodlands, such as kudu, bushbuck and bushpig. Such habitats are found primarily in the thickets south-east of the Zuurberg mountain belt, and in forested valleys and thicket within the mountain range. The remoteness of much of the mountain fynbos, as well as its low agricultural potential has limited impacts on large mammal species, such as the grey rhebok and grysbok. However, these species tend to occur in relatively low densities.

The more arid, karroid area to the north-west of the mountain belt has been extensively utilised for livestock grazing. Those indigenous terrestrial fauna species which still occur naturally are species which may have benefited directly from this land use, such as the medium-sized carnivores (e.g. the black-backed jackal and caracal), and the smaller, low density ungulates, such as the grey duiker and grysbok. Larger herbivores, such as the eland, red hartebeest and black wildebeest only occur where they have been reintroduced.

- *Herpetofauna:*

The herpetofauna (reptiles and amphibians) of the Eastern Cape is rich in species. Reptiles which occur in this area include tortoises, lizards and snakes. Endemic species, such as Tasman's girdled lizard and the southern dwarf chameleon, are both likely to occur within the study area and would be restricted to the densely wooded vegetation in the Algoa region.

4.3.1. Potential Impacts

The study area is considered to be rich in biodiversity and habitat as a result of the topographic and botanical diversity. The current distribution of terrestrial fauna within the study area has historically been influenced by human interference and habitat disturbance or destruction. However, with the recycling of the existing 220 kV Transmission line servitude, the new 400 kV towers could be constructed in areas which may not have been previously disturbed by construction and maintenance activities. Therefore, there is the potential for impacts on sensitive habitats and associated faunal species. Although this impact will be localised and confined to tower positions, it will be permanent, and therefore will be significant.

Table 4.3: Potential impacts on terrestrial fauna associated with the construction of the new Transmission line between the Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|-------------------------|--------|-----------|-------------|--------------|----------|
| Habitat Destruction | Local | Permanent | Probable | High | Negative |
| Sensitive Fauna Species | Local | Permanent | Probable | High | Negative |

4.3.2. Recommendations

Standard practices implemented by Eskom (and included as part of all contracts) include a number of mitigation measures which will limit the clearance of vegetation and construction of access roads in sensitive areas. This will limit the extent of open areas created, thus ameliorating any impacts associated with over-exploitation of particular areas. In addition, the use of existing access roads to the existing Transmission line servitude will minimise cut-lines and additional access roads, and will thus minimise any impacts on terrestrial fauna. The anchor cables of the cross rope suspension towers should be clearly marked and be visible to animals in order to avoid injury.

Appropriate site-specific management measures should be detailed within an EMP for construction, operation and maintenance of the Transmission line in order to ensure the minimisation of impacts.

4.4. Potential Impacts on Avifauna

The avifauna of the study area has been well documented, and was surveyed systematically during fieldwork for the Atlas of Southern African Birds. In addition, a revised Red Data Book for South African birds has recently been published (Barnes, 2000). More than 300 bird species have been recorded within the study area. A list of bird species which have been reported to occur within the study area is included within Appendix F.

4.4.1. Potential Impacts

The primary impacts on avifauna associated with the construction and operation of a Transmission line include habitat destruction or alteration, and electrocution and collisions.

- *Habitat Destruction and Human Disturbance:*

Species which have been recorded as being sensitive to habitat destruction and human disturbance include Stanley's Bustard, the Kori Bustard and the Secretary Bird. In addition, small birds, such as the kingfisher, woodpecker, lark and blackcap, are

susceptible to changes in the local habitat, including the clearing of vegetation. However, with the implementation of Eskom’s Standard Practices in terms of vegetation clearance in sensitive areas, impacts in terms of habitat alteration will be small-scale, and will have no significant influence on these populations.

- *Collisions:*

All Transmission lines in South Africa are fitted with one or more earth wires for protection against lightening. These wires are thinner than the conductors, and are therefore less visible to flying birds. A number of bird species occurring within the study area have been reported to be highly susceptible to collisions with Transmission lines including the Cape Vulture, the Martial Eagle, the Blue Crane, the Kori Bustard, Stanley’s Bustard and Ludwig’s Bustard. However, the existing 220 kV and 400 kV Transmission lines between the Poseidon and Grassridge Substations have an existing impact in the study area, and resident birds will most likely have become accustomed to the existing lines and learnt to avoid them. Therefore, the impact associated with the construction of the proposed 400 kV Transmission line is anticipated to be of low significance.

- *Electrocutions:*

Large birds of prey are most commonly electrocuted on powerlines. As a result of the replacement of the existing 220 kV Transmission line infrastructure (which makes use of self-supporting towers) with new infrastructure (i.e. CRS towers for the majority of the route), it is anticipated that the potential occurrence of electrocutions within the study area will be effectively reduced due to the large clearances and lack of perching space on the CRS tower. Therefore, a positive impact is anticipated.

Table 4.4: Potential impacts on avifauna associated with the construction of the new Transmission line between the Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---|--------|-----------|-------------|--------------|----------|
| Habitat Destruction and Human Disturbance | Local | Long-term | Probable | Low | Negative |
| Collisions | Local | Long-term | Probable | Low | Negative |
| Electrocution | Local | Long-term | Probable | High | Positive |

4.4.2. Recommendations

Eskom have identified bird collisions as a major impact on both the environment and the operation and reliability of Transmission lines. Therefore, appropriate mitigation measures have been developed in the form of different types of bird diverters (e.g. flappers). Investigations regarding the effectiveness of these diverters have indicated an approximate 80% reduction in bird collisions with lines fitted with these diverters (Mail and Guardian, June 2000). In addition, different types of bird guards (Figure 4.4) have been developed in order to prevent roosting on towers, and have been shown to effectively reduce the incidents of bird induced line faults. It is recommended that areas in which potentially sensitive bird species are located should be identified and mapped prior to construction, and appropriate mitigation measures implemented in order to minimise the potential impact associated with collisions.



Figure 4.4: Bird guards should be implemented in areas where the streamer effect could pose a threat to the reliable operation of the powerline

Appropriate site-specific management measures should be detailed within an EMP for construction, operation and maintenance of the Transmission line.

4.5. Potential Visual Impacts

The study area is considered to be visually diverse due to the varying landscape characteristics and different vegetation types. Any change in a local view through the introduction of a new development in the line-of-sight can be considered as a visual impact.

Visual impacts are subjective, and are usually considered most significant when the development is not of a similar nature to other developments in the area, or is readily viewed from areas of public access, paths, roads and view points, or in areas which are characterised by significant natural features.

4.5.1. Landscape Characteristics of the Study Area

The Poseidon and Grassridge Substations lie approximately 100 km apart (as the crow flies), and are separated by a varying landscape ranging from open agricultural areas in the north, through the mountainous Zuurberg down towards the coastal plateau. The study area incorporates three distinct biotic regions, i.e. the Karoo section in the north, the Zuurberg section in the centre, and the coastal section in the south. As discussed in Section 4.2, the study area is characterised by a number of vegetation types including bonteveld, valley bushveld, afro-montane forest, grassy fynbos, arid savanna, grassy dwarf shrublands and grassland.

4.5.2. Views/Visibility of the Study Area

The study area is considered to be visually diverse due to the varying landscape characteristics and different vegetation types.

Visibility will be greater in the open, flatter terrain characteristic of the northern portion of the study area. The vegetation characteristic of this section has been largely disturbed by agricultural practices and, therefore, new developments within this area are anticipated to be highly visible from the surrounding area. The central portion of the study area has a great variance in visibility due to the spurs and valleys associated with the deeply dissected mountainous terrain. Views are influenced by the relative heights of the viewer and the subject being viewed, as well as topographical constraints. In addition, the nature of the vegetation of the Zuurberg area results in poor visibility when on the ground. Visibility in the undisturbed Addo Bush is no more than a few metres, as the thicket ranges from 13 000 to 20 000 woody stems per hectare, creating a maze 3-4 m in height (Bannister *et al.*, 1987). The southern portion of the study area flattens out towards the coast. The vegetation is mainly grassland, and has been disturbed to some extent by agricultural activities.

The study area is currently dissected by several national roads, provincial roads and local roads. Views from these public routes are impacted on where introduced infrastructure is located close to, or crosses the road.

Critical areas within the study area in terms of views and visibility include tourist attraction areas, such as private game lodges and the AENP (and proposed Greater Addo National Park (GANP)), public routes, residences and towns located in close proximity to proposed Transmission line.

4.5.3. Development Feature Characteristics of the Study Area

- *Land use:*

The study area extends from Cookhouse in the north, through the Golden Valley, Middleton, Kommadagga, Ann's Villa, over the Zuurberg in the vicinity of the AENP, past Paterson in the east, including Colchester and Cannonvale in the south, and the Grassridge Substation near Coega. Current land-use within the study area is mainly agricultural, including small- and mixed-stock farming, game farming and annual crops (predominantly citrus). Part of the AENP falls within the study area, and the majority of the southern portion of the study area is proposed to be incorporated into the proposed GANP.

- *Existing Developments within the Study Area:*

The existing 220 kV and 400 kV Transmission lines, which transmit power between the Poseidon and Grassridge Substations, form a corridor which crosses the northern leg of the AENP for an approximate 5 km distance, and skirts the western extremity of the AENP in the vicinity of Addo town. These lines present an existing visual intrusion on the local area. The existing 220 kV Transmission line has been in the area since the 1970s, and the existing 400 kV Transmission line since the 1990s.

4.5.4. Assessment Methodology

Maps indicating the visibility of the proposed Transmission line have been calculated from a digital elevation model (DEM) and provide an indication of positions within the study area from which the feature is visible (viewsheds). In using a DEM the maps are based on topography alone. They, therefore, represent the worst-case scenario as they do not account for buildings, vegetation or other man-made structures which may obscure views of the development from viewers. The extent of the visibility of an object in the landscape diminishes at an exponential rate as the distance between the observer and the object increases (Hull and Bishop, 1988).

Viewsheds indicate positions within a study area from which a development feature is visible. They are useful for analysing the visual impact of point features, such as the towers associated with

the linear powerline feature. The approach followed was to calculate viewsheds at intervals along the line representing tower positions, and then to combine these to provide a graduated scale of potential visibility. The graduated scale reflects the number of points along the feature which are visible from any specific location within the study area.

In order to assess the potential visual impact of the proposed Transmission line, the following criteria were used in addition to the viewshed analysis:

- Character quality or value of the existing view or viewpoint – as determined by existing land use, topographic features, vegetation, etc.
- Visibility of development/visual intrusiveness – visibility of the Transmission line based on sight and distance of critical viewpoints, as well as the design and extent of the development feature .
- Visual absorption capacity – the potential of the landscape to absorb the proposed development.
- Compatibility with surrounding land uses.
- Scale of the development relative to local elements.
- Critical views.

Impacts associated with the proposed Transmission line were evaluated using the set of criteria described in Table 4.5 below.

Table 4.5: Visual assessment criteria ratings

| Criteria | High Impact | Moderate Impact | Low Impact |
|---|--|---|---|
| Character, quality or value of the existing view or viewpoint | The development is set within a very attractive setting, which is largely uninfluenced by other developments of a similar nature. | The development is set within an area which has some aesthetic and visual merit, which is partially influenced by other developments of a similar nature. | The development is set in an area which has little or no aesthetic value and is largely influenced by other developments of a similar nature. |
| Visual intrusiveness of the proposed development | The development is visible from many places beyond 1 km. | The development is visible from within 1 km, but is partially obscured by intervening objects. | The development is only partly visible or not visible at all from within 1 km. |
| Visual absorption capacity | The development is not visually accepted by the surrounding landscape due to the landscape being of uniform texture, flat slope and having | The development is visually accepted into the surrounding landscape less easily due to the landscape being less diverse in terms of landform, texture and | The development is visually easily accepted into the landscape due to the landscape being diverse in terms of landform, texture and |

| Criteria | High Impact | Moderate Impact | Low Impact |
|---|---|---|--|
| | limited vegetation cover. | vegetation. | vegetation. |
| Compatibility with surrounding land uses | The development appears totally out of place with regards to the surrounding area. | The development can be accommodated within the surrounding area to some degree. | The development can easily be accommodated within the surrounding area. |
| Scale of development relative to local elements | Vertical variation of the landscape is limited and most elements are related to the human and horizontal scale. | A landscape with some horizontal and vertical elements in some contrast to the human scale. | A landscape which has horizontal and vertical elements in high contrast to the human scale. |
| Critical views | Views of the development detract from the natural views from private properties or natural areas. | Views of the development partially detract from the natural views from private properties or natural areas. | Views of the development do not detract from the natural views of private properties or natural areas. |

4.5.5. *Potential Impacts*

- *Visual intrusiveness:*

The tower structures are regarded as being the most visually intrusive component of Transmission lines. It is anticipated that the construction of the proposed 400 kV Transmission line will impose a visual impact on the immediate surrounding area (refer to Figure 4.5 overleaf), as is the case with the existing 220 kV line.

However, it is proposed that the new 400 kV Transmission line be constructed using CRS towers for the majority of the route. These towers are smaller, less steel-intensive, and less visually intrusive than those towers of the existing 220 kV Transmission line (refer to Figures 4.6 and 4.7).

Therefore, it is anticipated that the construction of the new 400 kV Transmission line within the existing 220 kV line servitude will minimise the visual intrusiveness of the Transmission line, resulting in a lower visual impact on the surrounding area.

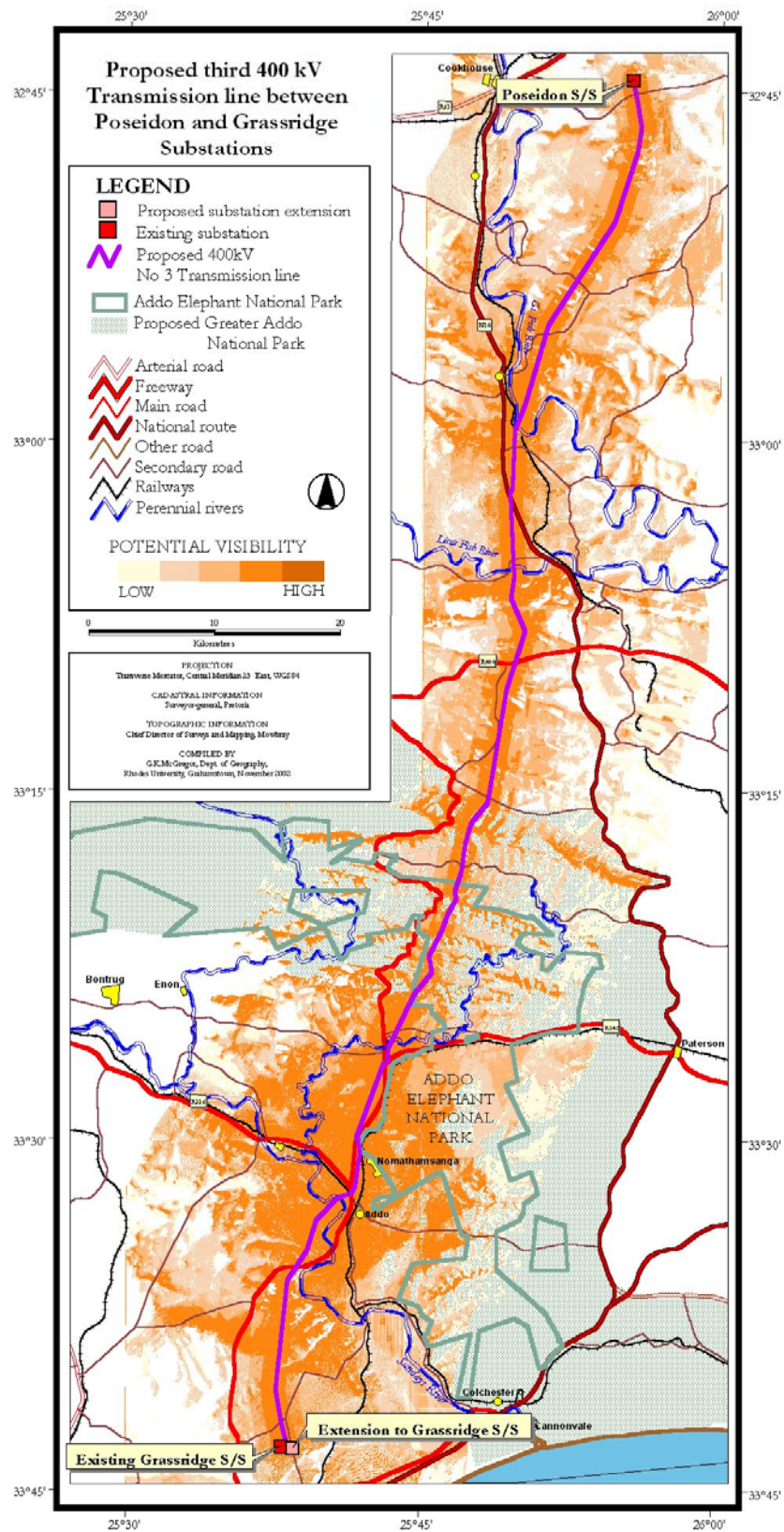


Figure 4.5: Potential visibility of the proposed third 400 kV Transmission line between Poseidon and Grassridge Substations



Figure 4.6: The proposed Transmission line will be constructed using CRS towers

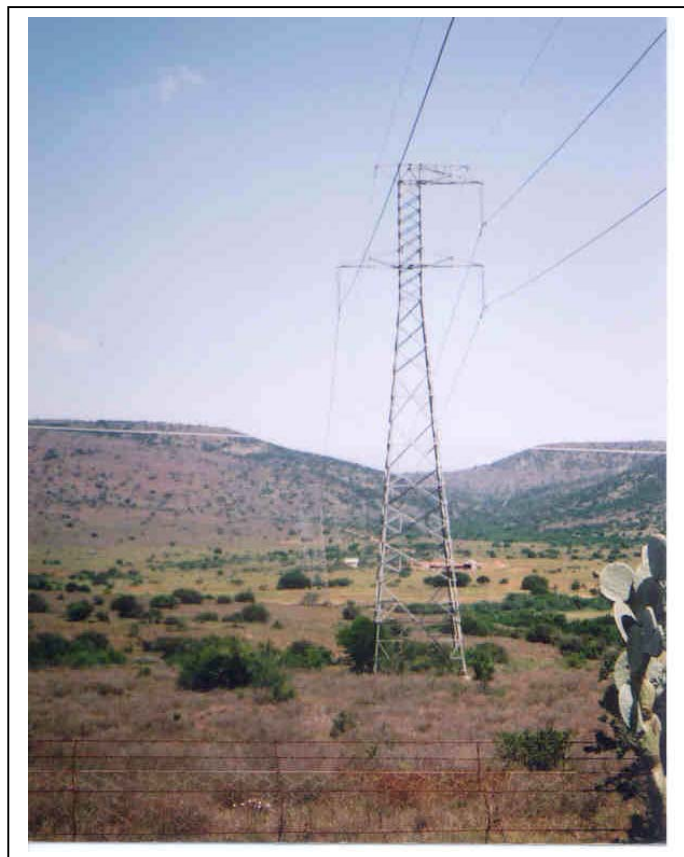


Figure 4.7: The self-supporting towers of the existing 220 kV Transmission line are more steel-intensive, and visually intrusive than the CRS towers

- *Degree of view obstruction:*

The frame-like structure of the Transmission line tower presents a low degree of view obstruction as a result of it not being a solid structure, and allows for blending with background colour/patterns of most landscapes. With the use of the CRS towers, the degree of view obstruction will be further reduced as these towers are less steel-intensive than the self-supporting towers which are currently in place within the existing 220 kV servitude. Shortly after erection, once natural weathering of the steel frame has occurred, the towers are typically marginally shiny and reflective.

- *Character, quality or value of the existing view or viewpoint and compatibility with the surrounding land use:*

The study area is currently largely free of heavy urban and industrial development. The majority of the area is sparsely populated and largely characterised by agricultural activities. The two existing Transmission lines (i.e. the Poseidon-Grassridge No 1 400 kV and 220 kV lines) extend for the length of the study area. These existing Transmission lines have played a role in pre-determining the character and views for the western portion of the study area. AENP (and the proposed GANP) land falls within the study area, and, as a conservation area, is considered to have a high scenic value. However, the visual quality within the north-eastern portion of the AENP has, since the 1970s, been impacted on by the presence of existing Transmission lines which cross an approximate 5 km section of the Park.

It is anticipated that, the construction of the proposed 400 kV Transmission line using CRS towers will result in a reduced visual impact on the surrounding area, due to these structures being less visually intrusive than the existing self-supporting structures associated with the 220 kV Transmission line. Therefore, a positive impact on the character and quality of views in the AENP (and proposed GANP) is anticipated.

- *Scale of development relative to local elements:*

The height of the towers and total length of the development in this particular topographical setting has a potentially significant visual impact. However, the scale of the structures and the length of the line viewed will be influenced greatly by the position of the viewer relative to the position of the development feature being viewed. A high impact is anticipated to be associated with a new Transmission line where it is located close to dwellings or homesteads, or is adjacent to, or crosses a road. However, it is not

anticipated that the new line would significantly add to the existing visual impact associated with the existing 220 kV line.

- *Critical views:*

The occurrence of critical views or critical viewpoints in close proximity to the development will have a potentially significant visual impact. However, the overall significance of the impact will be influenced by the distance of the development from these critical views. The existing Transmission lines which pass through the study area have an existing impact on the critical views in this area. The AENP (and proposed GANP) area can be regarded as a critical view area due to the tourist potential of this development. It is anticipated that, the construction of the proposed 400 kV Transmission line using CRS towers will result in a reduced visual impact on the surrounding area, due to these structures being less visually intrusive than the existing self-supporting structures associated with the 220 kV Transmission line. Therefore, a positive impact on the character and quality of views in the AENP (and proposed GANP) is anticipated.

Table 4.6: Potential visual impacts associated with the construction of new Transmission line between the Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---|--------|-----------|---------------|--------------|----------|
| Visual intrusiveness | Local | Long-term | Highly likely | Moderate | Positive |
| Degree of view obstruction | Local | Long-term | Probable | Low | Positive |
| Character, quality or value and compatibility with surrounding land use | Local | Long-term | Highly likely | High | Positive |
| Scale of development | Local | Long-term | Probable | Low | Positive |
| Critical views | Local | Long-term | Highly likely | High | Positive |

4.5.6. Recommendations

The factors which have been identified in this study as influencing the degree of visual impact of the powerline development are:

- distance from viewer;
- difference in elevation between viewer and feature;
- the degree of view obstruction by other features;
- nature of the backdrop to the feature;

- the existing value/character of the view; and
- the occurrence of similar development-types.

In addition, it is evident that visual impacts can be reduced through:

- The consolidation of powerline infrastructure, rather than dispersing the impact across a greater area. This effectively limits the impact to one direction/view angle. Negative visual impacts can be mitigated against by other surrounding sensitive developments through their orientation.
- The use of a servitude which lies within a landscape with a high capacity to absorb visual impacts (e.g. one which has topographical constraints such that the viewpoints are restricted), or a previously disturbed area.
- The avoidance of intersecting the skyline/horizon.
- The use of the natural topography and vegetation cover as a natural backdrop to reduce visibility.
- The use of CRS towers as far as possible, particularly within the AENP (and the proposed GANP).
- Ensuring that the placement of towers is carefully considered in order for them to be as inconspicuous as feasible, i.e. towers are not to be placed on hill-tops, but rather on lower-lying land. Also, they must be placed in-line with other existing tower structures.

Once the final tower positions have been determined, appropriate site-specific mitigation measures (e.g. the use of topography and the lie of the land where possible) should be detailed within an EMP for construction, operation and maintenance of the Transmission line.

4.6. Potential Impacts on Archaeological, Cultural and Historical Sites

From a database survey undertaken of archaeological sites in the area, it is clear that, although the history of the area is well-recorded, only a few archaeological sites were reported, with little known about the density and visibility of sites and cultural material. However, the data available provides sufficient information to predict what types of sites are likely to be encountered during the construction of the proposed Transmission line.

The most important archaeological features in the study area are the caves, shelters, rock art, freshwater mussel shell middens and the Earlier and Middle Stone Age deposits. The cave, shelters and rock art sites are mainly situated in the Zuurberg region, but may also be found in the

numerous hills and rocky outcrops included in the study area. These are not likely to be impacted on by construction activities associated with a new Transmission line.

There are possible Earlier Stone Age (may date older than 500 000 years) and Middle Stone Age sites with fossil bone remains (older than 40 000 years) in the Addo area. These sites, buried by spring and lime deposits are not only important for studying human ways of life, but also for reconstructing the previous environments for the past half a million years.

Most of the Later Stone Age sites anticipated to be concentrated near or along the banks of the Sundays River. The freshwater mussel shell middens (may date to 6000 years old) are also important for studying Khoesan subsistence strategies, as well as for providing data on past environments which are locked in these sites. Relatively little is known from these sites because they have not yet been extensively studied. Burials are usually associated with these sites, but may be found anywhere throughout the study area. All human remains and graves are extremely sensitive to local communities, and should be treated with care should any remains be found.

Historical sites and material are reported throughout the area. These range from indigenous kraal settlements, military camps and foundations of buildings to scatters of artefacts. The area is a vault of information for historians and historical archaeologists. All features and material are protected by the National Heritage Resources Act (No 25 of 1999) and may not be casually collected.

4.6.1. Potential Impacts

It is anticipated that there will be both positive and negative impacts on heritage sites as a result of the construction of a new Transmission line.

A positive impact is that sites previously not known of/identified may potentially be discovered (before or during construction activities) through excavation activities associated with development. Artefacts can be retrieved, and these sites can then be recorded/reported, which will enlarge site records and assist in managing and conserving the region's heritage resources and provide insights for future research.

As cultural heritage resources are non-renewable and economic values cannot be placed on these resources, should damage or loss of these resources occur, potential destruction of the sites is considered as a significant negative impact. Care should, therefore, be taken such that minimal damage occurs to these sites during the construction of access roads, camps, tower sites and

during other worker activities. No historical artefacts should be removed by unqualified personnel at any time.

It is difficult to establish what the impact will be on the cultural and historical resources with construction activities taking place, as the number and location of sites is largely unknown. However, in general, the construction of a Transmission line should have little impact on the local archaeological and historical sites.

Table 4.7: Potential impacts on archaeological, cultural and historical sites associated with the construction of the new Transmission line between the Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---------------------------------|--------|-----------|-------------|--------------|----------|
| Impacts on archaeological sites | Local | Permanent | Probable | Moderate | Negative |
| Impacts on historical sites | Local | Permanent | Unlikely | Moderate | Negative |

4.6.2. Recommendations

All archaeological remains, artificial features and structures older than 100 years, and historic structures older than 60 years are protected by the National Heritage Resources Act (No 25 of 1999). In order to remove, disturb or demolish these, a permit is required from the South African Heritage Resource Agency (SAHRA) and in certain cases, permission from the local communities (e.g. the removal or disturbance of human remains) must be negotiated.

The following is required to be considered and incorporated into a management plan prior to construction activities being initiated.

1. Plans of construction infrastructure, i.e. access roads, camps and tower positions should be made available to archaeologists/historians to inspect and visit. Archaeologists should inspect a number of identified tower and other construction sites to investigate and assess the nature and density of possible heritage sites and cultural material on and around them. From this it would be possible to make recommendations and to motivate for the removal of material before construction starts.
2. Following the inspections, archaeologists and historians should then inform construction managers, prior to construction activities commencing, of what heritage sites and cultural material may be encountered, and the procedures to follow in the event of such sites being encountered.

3. It is recommended that all construction workers are informed not to disturb historic sites, make any collections of material (i.e. medallions, cartridges or other artefacts), and not to disturb (dig, camp or make fires within) cave or shelter deposits, or to touch or throw fluids on rock paintings.
4. If heritage sites and/or cultural material are found, work should be stopped at that site, and archaeologists immediately informed. Sufficient time should be allowed for archaeologists to excavate, remove or collect material from the site, should it be deemed necessary.

4.7. Potential Impacts on the Social Environment

The northern portion of the study area to the south of the Poseidon Substation up to the northern boundary of Zuurberg mountains includes centres such as Cookhouse, Golden Valley and Middleton. This area is characterised by small stock, cattle and sheep farming, crop farming and cultivated lands, as well as ostrich farming in places.

The central area of the study area includes the Zuurberg mountain range, the AENP and other areas proposed to be included within the proposed GANP. South of the Zuurberg mountains lies the town of Addo. Addo is well known for its citrus farming, tourism (predominantly from the AENP) and various small-scale game farms and resorts. Small stock farming also occurs within the Addo area. Paterson lies to the east of this central portion of the study area, and has developed mainly around farming activities, with the two primary employers for the area being East Cape Agriculture Corporation and Bulkop.

The southern portion of the study area includes the area around the Grassridge Substation, which is earmarked to be included within the proposed Coega IDZ and Port. The small town of Coega falls within this area. Activities that take place in the area are small stock farming, pig farming and industrial activities (including La Farge and PPC). To the east of Grassridge is Colchester/Sundays River. Colchester is a small resort town that has developed along the banks of the Sundays River within the valley.

4.7.1. Potential Impacts

It is anticipated that the social impacts associated with the replacement of the existing 220 kV Transmission line will be limited due to the presence of the existing line. The majority of impacts identified through the Social Impact Assessment (SIA) are associated with issues associated with during the construction and operation of the existing 220 kV Transmission

line (discussed below). These potential issues are perceived by the landowners to be transferred to the proposed new 400 kV Transmission line.

4.7.2. *Influx of Workers*

Given the specialist nature of the construction of a Transmission line, Eskom would make use of expert contractors. During the construction and maintenance of the existing 220 kV line, property owners have experienced numerous problems with contractors when entering or working on their properties. The property owners, therefore, perceive the intrusion and disruptive impacts associated with the construction activities as severe, due to their past experiences. This could lead to possible clashes between the contractors and property owners.

The potential exists for similar problems associated with contractors to be experienced during the operation and maintenance of the proposed new 400 kV Transmission line. However, through the implementation and monitoring of appropriate contract worker conduct through the Environmental Management Plan (EMP), the impact associated with these workers is anticipated to be negligible.

Table 4.8: Potential impacts associated with the influx of workers as a result of the construction and operation of the new Transmission line between the Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|--|--------|------------|----------------|--------------|----------|
| Influx of workers – construction phase | Local | Short-term | Highly likely | Moderate | Negative |
| Influx of workers – operation phase | Local | Long-term | Highly likely* | Moderate | Negative |

*based on current experience with maintenance contract workers

- *Mitigation Measures:*

It is proposed that the following mitigation measures be implemented:

- * Conditions stipulated by property owners in terms of the construction activities should be included within the EMP, implemented and monitored.
- * Contractors and permanent Eskom employees should adhere to conditions outlined within the EMP.
- * Workers should be subject to penalties and fines should they not adhere to the conditions outlined within the EMP.

- * Workers should be made aware of the farmers' and adjoining property owners' concerns so that they are familiar with the sensitive issues.
- * When maintenance is undertaken, the property owners should preferably be notified in advance. Different notification methods could be used (e.g. telephonic contact or reporting to the farmers or farm workers prior to entering the property).
- * Communication between Eskom management, personnel and property owners should be encouraged in order to improve relations.
- * A specific contact person should be identified to allow I&APs (especially farmers) to easily direct their queries and concerns and obtain general information (e.g. reporting problems with the line, enquiring about Eskom workers on the property, lodging complaints etc).

4.7.3. Construction Camps

One of the main impacts relating to the construction period is the establishment of construction camps. Construction camps are usually perceived as being a source of increase in crime in the immediate vicinity of a construction camp, environmental pollution (water, sanitation, littering etc.), and health risks (e.g. the spread of sexually transmitted diseases). Although these negative impacts are not necessarily justified or cannot be attributed solely to the construction camps, the conduct of the contractors should be appropriately managed through the implementation of strict measures outlined within the EMP.

Table 4.9: Potential impacts associated with construction camps as a result of the construction of the new Transmission line between the Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|--|--------|------------|-------------|--------------|----------|
| Impacts associated with construction camps | Local | Short-term | Likely | Moderate | Negative |

- *Mitigation Measures:*

The following mitigation measures are proposed:

- * Construction camps for the construction of the Transmission should be located near support services, and ideally not in the vicinity of residential dwellings.
- * Construction workers should not have to cross over busy roads to access support services and/or the construction site.

- * The construction camps should be equipped with the necessary water and sanitation facilities.
- * Local labour should be used, where practically feasible.
- * Contractors and permanent Eskom employees should adhere to conditions outlined within the EMP.
- * Communication channels should be implemented in order to enable I&APs to report misconduct and/or environmental damage observed as a result of the activities associated with construction camps. Such duties should ideally be undertaken by an Environmental Site Officer.

4.7.4. Construction Related Activities

It is perceived by the majority of property owners that during construction activities the contractors damage the veld, which leads to erosion at affected sites. This is worsened by the fact that the veld in certain areas along the proposed route (particularly where xeric succulent thicket occurs) does not recover easily after it has been disturbed. During the construction of the existing 220 kV Transmission line, some mature trees were apparently removed. This is a very sensitive issue to the farmers, as these trees (especially the “Wilde Pruim”) supply their animals with food during the dry periods. Further concerns include the startling and/or poaching of animals (game and livestock), littering, leaving gates open, driving through the veld, damaging private roads with heavy machinery, damaging infrastructure (e.g. fences and pipes etc.) and leaving materials behind after construction activities are completed.

Table 4.10: Potential impacts associated with construction related activities as a result of the construction of the new Transmission line between the Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---|--------|------------|---------------|--------------|----------|
| Impacts associated with construction related activities | Local | Short-term | Highly Likely | High | Negative |

- *Mitigation Measures:*

In terms of construction related activities, the following mitigation measures are proposed:

- * A site-specific Environmental Management Plan for construction should be developed.

- * Conditions relating to construction activity concerns raised by landowners should be included in the EMP for contractors.
- * Should construction workers make use of property owners' private roads during the construction period, this should be discussed with the affected parties prior to the construction period.
- * An environmental officer should be on-site to monitor the decommissioning and construction process. The contact details of the environmental officers should be provided to the farmers to enable them to easily contact this person in the case of emergencies or if they want to lodge complaints.
- * The environmental officer or other responsible individual should be easily reachable and must be in the area to inspect any damages and solve the problems immediately.
- * The use of bulldozers should be limited, especially in environmentally sensitive areas.
- * Construction activities should be stopped during and for the period immediately after heavy rains.
- * Damage to trees should be limited as far as possible, and any removals should be undertaken in consultation with the landowner.
- * Eskom workers should be aware of the sensitive issues and should comply with the specifications outlined within the EMP.
- * Contractors should make sure that no materials are left on the properties after construction and maintenance activities have been completed.
- * Adequate rehabilitation measures should be implemented at tower sites and along access roads after construction has been completed.

4.7.5. Disruption in Daily Living and Movement Patterns

It is anticipated that the construction activities will result in some intrusions and disruptions in the daily living and movement patterns of the property owners. Such disruptions are anticipated to be of high significance, but of a short-term nature, and could be caused by the movement of construction vehicles and frequent entries to the properties as a result of the construction activities. This would especially occur in the following cases:

- where private dwellings and farm worker accommodation are situated near to the proposed Transmission line;
- where private dwellings and farm worker accommodation are close to the construction camps;

- during the citrus harvesting season; and
- on game farms during the hunting season.

The negative social impacts on the living and movement patterns of the property owners during the operation phase of the project are anticipated to be of low significance and of a short duration, as maintenance of the Transmission line would not be undertaken on a daily basis.

Table 4.11: Potential impacts associated with disruption of daily living and movement patterns as a result of the new Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---|--------|------------|-------------|--------------|----------|
| Disruption of daily living and movement patterns – construction phase | Local | Short-term | Likely | High | Negative |
| Disruption of daily living and movement patterns – operation phase | Local | Short-term | Likely | Low | Negative |

- *Mitigation Measures:*

Possible mitigation measures include:

- * Property owners and nearby communities should be informed well in advance of the construction schedule and any changes to this work schedule.
- * Heavy vehicles should make use of the existing access roads on private properties as far as possible. In cases where private roads are to be used, this should be negotiated with the property owner before the construction period commences.
- * Construction vehicles should keep to the speed limit and should avoid busy roads, as far as possible.
- * Construction activities should not be undertaken after-hours or over weekends.
- * Construction camps should not be located near private dwellings and communities.
- * Construction should preferably not take place during the hunting or harvesting season.
- * Property owners should be informed when maintenance of the Transmission line will be undertaken on their properties.

4.7.6. *Employment Opportunities*

Due to the highly-skilled nature of the construction activities associated with the establishment of a Transmission line and the short construction period, it could not be expected that a large number of jobs would be created by the proposed project. However, local labour could be employed for unskilled activities such as the digging of foundations or the erection of gates, etc. Given the limited employment opportunities along the route, it is therefore also highly unlikely that unemployed individuals would be drawn to the areas along the route in search of employment.

As there are existing Transmission lines between Poseidon and Grassridge Substations, the upgrading of the existing Transmission line is not anticipated to result in any additional personnel being required to undertake the maintenance during the operation phase of the project.

Therefore, it is not anticipated that there would be any long-term benefit with regards to the creation of employment as a result of this proposed project.

Table 4.12: Employment opportunities associated with the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---|--------|------------|-------------|--------------|----------|
| Employment opportunities – construction phase | Local | Short-term | Likely* | Low | Positive |
| Employment opportunities – operation phase | Local | Short-term | Likely* | Low | Positive |

*Skilled labourers

- *Mitigation Measures:*

The following mitigation measures are proposed:

- * If there is a need for unskilled labour during the construction or operation phases of the project, local community members (e.g. from the Addo, Motherwell or Port Elizabeth areas) should be employed.
- * Ensure on-site training is provided to locals, where necessary.

4.7.7. *Impact on Citrus Farming Activities*

Stakeholders, mainly in the Addo area, have expressed concern regarding the loss of viable agricultural land as a result of the construction of the proposed Transmission line. Impacts on agricultural lands are predominantly confined to the citrus industry, and where crop farmers have several existing powerlines (including traction lines and distribution lines) on their land. The accumulation of these servitudes is of concern to the landowners, who's farming viability is potentially threatened in some areas.

The primary concern to local citrus farmers relates to the overhead lines, which restrict the height of windbreaks required for protecting citrus orchards. The height of the windbreaks planted on the citrus farms determines the area of orchard protected from wind. A reduction in the height of these windbreaks can have an impact on the success of the orchards. A special meeting was held with affected farmers in the Addo area to determine the extent of the concern and identify possible solutions. At this meeting, Eskom undertook to investigate the possibility of re-routing the portion of corridor 1 which affects these properties to lie adjacent to the railway line, should this alternative corridor be considered favourable. This would effectively divert the Transmission line away from affected farmers and reduce concerns to a minimum.

It was perceived that the possibility of a wider servitude would add to the existing impact which the existing 220 kV Transmission line has on the citrus farming activities in the Addo area (i.e. negative impacts on the windbreaks associated with this agricultural activity). Some of the citrus farmers argued that they must export a certain amount of their harvest, otherwise they would suffer financial losses. It is, therefore, crucial that their crops do not suffer from wind damage in order for them to produce export quality fruit.

Some farmers also indicated that additional trees could be planted in the area occupied by the existing towers. The type of towers to be used and the detailed alignment of the upgraded Transmission line will determine the extent and nature of the impact on the valuable agricultural land.

The citrus farmers, therefore, suggested that when the existing 220 kV Transmission line is upgraded, the line should be relocated in order to minimise the impact on the citrus farming activities currently negatively affected by the existing line. The suggestion to move the servitude adjacent to the railway line (and traction line) was put forward by the affected landowners. This would have a positive impact of moderate to high significance on the

affected citrus farms, when compared to the current situation. The feasibility of such a realignment is required to be investigated by Eskom, and be considered in terms of the Poseidon-Grassridge No 2 400 kV Transmission line.

Table 4.13: Impacts on citrus farming activities associated with the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|--|--------|------------|---------------|-------------------|----------|
| Impact on citrus farming activities – construction phase | Local | Short-term | Highly Likely | Moderate to high* | Negative |
| Impact on citrus farming activities – operation phase | Local | Long-term | Likely | Moderate to high* | Positive |

*Depending on the final alignment of the proposed Transmission line

- *Mitigation Measures:*

The following mitigation measures are proposed:

- * The upgrading of the Transmission line and the specific alignment of the upgraded line should be communicated to and discussed with the citrus farmers.
- * Should the Transmission line not be re-aligned, the existing tower positions should be used in order to avoid shifting of the existing windbreaks.
- * If the upgraded line is constructed along the alignment of the existing line that crosses the citrus farms, the construction should preferably not take place during the harvesting season, which extends between April and September.
- * No citrus trees should be damaged during the construction or maintenance of the Transmission line.
- * Economic losses of the citrus farmers should be minimised, and when finalising the route alignment this aspect should be taken into account.

4.7.8. Impact on Game Farming

During the construction period, game could be disturbed as a result of the construction activities and increase in noise. Some farmers noted that the game run into the fences as they are startled by the behaviour of the construction workers. This is especially the case where the line is near the farm fences such as on the farm T'Zoetgeneugd.

Game farmers within the Addo vicinity have raised concerns with regards to the impact of Transmission lines on game farms. Impacts identified include visual impacts, the reduction of vegetation for grazing, and limitations for game capture by helicopter. Those game farmers

who already have existing lines on their property expressed concerns regarding the future maintenance of the Transmission line, and problems they have historically experienced with game escaping through open gates, etc.

Table 4.14: Impacts on game farming activities associated with the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|--|--------|------------|-------------|--------------|----------|
| Impact on game farming activities – construction phase | Local | Short-term | Likely | Moderate | Negative |
| Impact on game farming activities – operation phase | Local | Long-term | Likely | Moderate* | Negative |

*Due to the presence of the existing Transmission line in these areas, which has an existing impact

- *Mitigation Measures:*

The following mitigation measures could be implemented:

- * The construction related timeframes should be communicated and finalised with the affected property owners.
- * Construction activities should be undertaken in such a manner that the game is not disturbed.
- * Property owners and Eskom should take short-term preventative measures to ensure that the game is not in the vicinity of the construction activities (e.g. monitoring of game by farm workers and fencing off the construction sites).
- * Construction activities should preferably not take place during the hunting season.

4.7.9. *Impact on Livestock Farming*

Livestock farming (sheep, goats and ostriches) mainly takes place to the north-west of the Zuurberg mountain area. It is not anticipated that the upgrading of the Transmission line will result in severe negative impacts on the livestock farming activities, although the majority of farmers experience maintenance problems with the existing 220 kV Transmission line. The loss of livestock due to maintenance workers leaving gates open could, however, have a negative impact on the livestock farming activities, and subsequent financial losses. However, with the implementation of the specifications within the EMP, this impact can be ameliorated to an impact of low significance

Table 4.15: Impacts on livestock farming activities associated with the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|--|--------|------------|-------------|--------------|----------|
| Impact on game farming activities – construction phase | Local | Short-term | Likely | Low | Negative |
| Impact on game farming activities – operation phase | Local | Long-term | Likely | Low* | Negative |

*Due to the presence of the existing Transmission line in these areas, which has an existing impact

• *Mitigation Measures:*

Possible mitigation measures include:

- * Farmers should be informed of the construction timeframes.
- * The EMP should specify that all gates should be closed after entering or exiting properties so as to minimise the potential for loss of livestock.
- * If stock theft or losses takes place, and it can be confirmed that Eskom was negligent, the property owners should be compensated without delay.
- * Construction activities should preferably not take place during February and March, as this is lambing season.
- * Eskom workers should report to farmers and/or farm workers when undertaking maintenance on the line.

4.7.10. Impact on Conservation Areas

The Addo Elephant National Park (AENP) plays an important conservation role in the Eastern Cape and is also a popular tourist destination. The Zuurberg is also considered to be an important conservation area, as large parts of this area are undisturbed. It is, therefore, vital that the upgrading of the Transmission line does not result in any negative impacts on these conservation efforts. It is, however, expected that the upgraded line would not have additional social impacts on these areas due to the presence of the existing Transmission lines (i.e. the Poseidon-Grassridge No 1 400 kV and 220 kV lines). Care should, however, be taken during the construction phase to limit any negative impacts on the fauna and flora in these areas.

The replacement of the self-supporting towers with cross-rope suspension towers with the construction of the new line will result in a reduced visual impact in this area. This will have a positive impact on the views from the AENP and Zuurberg areas.

The building of access roads and the use of local roads for maintenance activities could result in erosion. Various concerns have been expressed in this regard, as the farmers are of the opinion that their conservation efforts are in vain due to the increase in erosion. The use of existing access roads as far as possible, as well as the implementation of appropriate erosion control measures in accordance with Eskom’s standard practices will minimise the extent of this potential impact.

Table 4.16: Impacts on conservation areas associated with the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|--|--------|------------|---------------|--------------|----------|
| Impacts on conservation areas – construction phase | Local | Short-term | Likely | Moderate | Negative |
| Impacts on conservation areas – operation phase | Local | Long-term | Highly Likely | High | Positive |

- *Mitigation Measures:*

Possible mitigation measures include:

- * The use of bulldozers within conservation areas should be limited, as far as possible, during the construction phase.
- * It was suggested that the old towers and other materials of the existing Transmission line be removed, and new tower construction be undertaken using a helicopter in sensitive areas in order to avoid any damage to sensitive vegetation.
- * Eskom should ensure that contractors are supervised when undertaking construction activities.
- * Existing access roads should be used, where possible.
- * Care should be taken where access roads are required to be constructed to the construction camps. Erosion as a result of these roads must be avoided.
- * Adequate rehabilitation should be undertaken as soon as possible after construction is completed in an area.
- * Maintenance vehicles should be clearly marked.
- * Entry to the AENP to undertake construction and maintenance should be discussed with and confirmed by the relevant Parks officials.

4.7.11. *Disruption of Infrastructure and Services*

Without the implementation of appropriate management measures, general services (such as underground pipes, existing distribution lines and irrigation systems) could be damaged during the construction period. Any disruption in the services (especially in the local electricity supply should distribution lines be damaged) could potentially have a negative impact on local enterprises (e.g. businesses, dairy farming and irrigation activities). The nature and extent of the impact will depend on the length of the interruption in general services.

It is not anticipated there will be any disruption in power as a result of the decommissioning of the existing 220 kV line, as the new Poseidon-Grassridge No 2 400 kV line will be commissioned prior to the decommissioning of the 220 kV line.

Areas in which impacts on infrastructure are possible include:

- The planned use of centre pivots in lucern fields in the Addo area. The erection of a Transmission line through these fields would hamper the utilisation of these centre pivots;
- The proposed Transmission line crosses a private road used by PPC on the farm Grassridge 227. The towers should, therefore, not be lower than the existing lines (during stringing) as large trucks make use of this road.

Table 4.17: Impacts on infrastructure and services associated with the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---|--------|------------|-------------|--------------|----------|
| Impacts on infrastructure and services – construction phase | Local | Short-term | Likely | Low | Negative |

- *Mitigation Measures:*
 - * Eskom should establish whether there is any infrastructure located near or inside the Transmission line servitude in order to avoid any damage to these during the construction phase.
 - * Discussions should be held with the relevant parties whose infrastructure could be negatively affected.
 - * The Local Authorities should be informed of the construction schedules to ensure the minimum disruption of such infrastructure.

4.7.12. Management and Maintenance of the Proposed Transmission Line and Servitude

The majority of property owners experience problems with the management and maintenance of the existing Transmission line and raised issues with regards to:

- gates left open;
- fences cut;
- poaching of small animals;
- littering;
- driving across the properties and not on the dedicated roads thereby worsening the erosion problem;
- unauthorised entrance to properties;
- theft of sensitive plant species (specifically during the construction of the existing Transmission line); and
- damage to trees (specifically during the construction of the existing Transmission line).

Negative attitudes towards Eskom and opposition to any contractors and construction activities have formed as a result of the poor maintenance practices, the behaviour of Eskom maintenance workers and experiences with contractors during previous construction and maintenance activities associated with the existing 220 kV Transmission line (refer to 4.8.14). Some of the farmers, therefore, want guarantees that the requirements of the EMP will be adhered to before they will support the upgrading of the existing line.

Table 4.18: Impacts associated with the management and maintenance of the proposed Transmission line and servitude

| Nature | Extent | Duration | Probability | Significance | Status |
|---|--------|------------|---------------|--------------|----------|
| Impacts associated with the management and maintenance of the Transmission line and servitude | Local | Short-term | Highly Likely | High | Negative |

- *Mitigation Measures:*

It is recommended that the following mitigation measures be implemented:

- * Eskom should ensure that the contractors' have dedicated supervision (e.g. through the appointment of Environmental Site Officer) on site at all times.

- * Conditions stipulated by the farmers should be included within the EMP and should be enforceable.
- * Eskom should not use heavy machinery in the periods immediately after heavy rains, as this has the potential to permanently damage the veld.
- * Eskom workers should comply with the specifications of the EMP (e.g. avoid littering, closing gates and keeping to the dedicated roads).
- * Clear communication channels between the contractors and property owners should be established.
- * An environmental officer should oversee the maintenance and management of the Transmission line and servitude.
- * Property owners should be notified of the contact details of the responsible person at Eskom where complaints can be lodged.

4.7.13. Health, Safety and Security

Construction camps are usually associated with an increase in the spread of fires posing a health and safety risk to the surrounding property owners and animals.

Concerns regarding health and safety with construction workers residing in the area, as well as the potential for the spread of sexually transmitted diseases and specifically HIV/AIDS have been raised. The construction activities associated with the erection of the Transmission line are such that construction workers move quickly along the length of the line (approximately 100 km), and would not be housed in the same place for extended periods. It is, therefore, unlikely that there would be frequent contact between the construction workers and local communities, thereby minimising the spread of sexually transmitted diseases. This issue should, however, be sensitively dealt with, especially where local communities are involved.

Safety and security of private landowners is a serious source of concern, and unauthorised entry of workers on private properties should be avoided at all times.

There is a growing concern over the long-term health risks associated with exposure to electro-magnetic fields (EMFs) from Transmission lines, although there are still disparities in scientific circles regarding the real health threat of these EMFs and what levels could be considered as safe. Irrespective of research findings, the perception still exists that Transmission lines are detrimental to human and animal health. Although the 55 m servitude

area limits the constant exposure to these EMFs and Eskom has indicated that they do not allow anyone to live within the servitude, this issue should be sensitively dealt with. As the proposed Transmission line is to be constructed within the existing 220 kV Transmission line servitude, it is not anticipated that there will be any dwellings which are affected by the proposed line.

Table 4.19: Impacts on health, safety and security associated with the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|--|--------|------------|-------------|--------------|----------|
| Health, safety and security impacts – construction phase | Local | Short-term | Likely | High | Negative |
| Health, safety and security impacts – operation phase | Local | Long-term | Likely | Low | Negative |

- *Mitigation Measures:*

The following mitigation measures are proposed:

- * A protocol for communication between the Eskom workers and the property owners should be developed.
- * A fire emergency plan should be established and implemented through the EMP.
- * Construction workers living in construction camps should be discouraged from using fires for cooking or heating purposes.
- * Firebreaks should be burnt, where necessary, and should be undertaken in consultation with the affected landowner/s.
- * Eskom should not unnecessarily clear the mountainous forest areas or thicket.
- * Local labour should be used wherever practical.
- * AIDS awareness campaigns should be provided to workers.
- * General safety measures in terms of construction work should be implemented and relevant regulations adhered to (Occupational Health and Safety Act).
- * Property owners should be notified when the Eskom workers or contractors are to access their properties. It was also suggested that the workers should report to the farmers or farm workers before commencing their activities on the farm.
- * Property owners should fulfil a monitoring role in terms of safety measures taken during the construction work and unauthorised entry to properties.
- * Eskom vehicles and workers should be easily identifiable.

4.7.14. *Impact on the Local Economy*

It is expected that the proposed upgrading of the 220 kV Transmission line to a 400 kV Transmission line would indirectly benefit the regional economy and electricity users, as a more reliable power would be supplied to the greater Port Elizabeth area, with possible ensuing economic development.

Some property owners along the existing 220 kV Transmission line the proposed project as having no direct economic benefit to them, despite them housing the Transmission line on their properties.

Table 4.20: Impacts on the local economy as a result of the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|-------------------------------|--------|-----------|---------------|--------------|----------|
| Benefits to the local economy | Local | Long-term | Highly Likely | High* | Positive |

*Indirect benefits through the provision of power to the Greater Port Elizabeth area and the Coega development

- *Mitigation Measures:*

It is proposed that:

- * Any possible local benefits should be maximised.
- * Make use of local contractors where possible, as well as the use of local equipment and machinery.

4.7.15. *Attitude Formation*

Due to the past activities of construction workers, as well as the maintenance undertaken on the line, there is a definite attitude formation by the property owners against the upgrading of the Transmission line on their properties. Property owners expressed concern regarding negligence of Eskom workers while on their properties, and are of the opinion that they do not have a free choice in accepting the proposed upgrading of the line due to the existing Transmission line and servitude.

Property owners in the Addo area, specifically the citrus farmers, raised concerns regarding the existing alignment of the Transmission line and the uncertainty as to whether the upgraded Transmission line would be moved closer to the railway line. The alignment of the Poseidon-

Grassridge No 2 and No 3 400 kV Transmission lines through the Addo area is critical, and is to be investigated during the negotiation phase.

Table 4.21: Attitude formation as a result of the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---|--------|-------------|---------------|--------------|----------|
| Attitude formation – construction phase | Local | Short-term | Highly Likely | High | Negative |
| Attitude formation – operation phase | Local | Medium-term | Highly Likely | High | Negative |

- *Mitigation Measures:*

Possible mitigation measures include:

- * Ongoing liaison and communication with property owner to ensure that their concerns regarding the construction period and operational phase of the project be addressed.
- * Eskom should consider an alternative alignment in the Addo area where the existing line traverses the citrus orchards, in consultation with the landowners.
- * Construction related impacts must be minimised.

4.7.16. Tourism Related Impacts

The tourism industry in the area includes the AENP (and proposed GANP), conservation areas within the Zuurberg, and game farming activities.

Construction related activities could have a short-term impact on the tourism industry in the area due to disturbances associated with the construction phase (increase in vehicular movement, noise, dust, movement of workers etc.).

Due to the fact that there is already an existing line, it is concluded that the upgrading of the line would not have additional adverse effects on the aesthetics of the area, as well as on the tourists' sense of place and wildlife experience in the long-term. With the replacement of the existing 220 kV Transmission line self-supporting towers with cross rope suspension towers, it is anticipated that the proposed project will have a positive impact on the aesthetics in the area (refer to Section 4.5).

Table 4.22: Tourism related impacts associated with the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|--|--------|------------|---------------|--------------|----------|
| Tourism related impacts – construction phase | Local | Short-term | Likely | High | Negative |
| Tourism related impacts – operation phase | Local | Long-term | Highly Likely | High | Positive |

- *Mitigation Measures:*

The following mitigation measures are proposed:

- * Construction should preferably not take place during the times when tourists most frequently visit the area or during the hunting season.
- * Special care should be taken with construction activities and scheduling construction timeframes in the AENP. Scheduling should be undertaken in consultation with SANParks.
- * Construction vehicles should avoid main tourist routes.
- * Construction camps should not be located in close vicinity of main tourist attractions or facilities.

4.7.17. *Intrusion Impacts*

Potential intrusion impacts associated with the proposed project include:

- visual impacts associated with the proposed Transmission line;
- noise impacts during the construction phase;
- air/dust pollution during the construction phase; and
- potential water pollution during the construction phase.

- *Visual impact:*

Powerlines are perceived to have a negative impact on the visual quality of an area. The upgrading of the existing 220 kV Transmission line would, however, have a reduced impact on the aesthetics of the study area as the cross rope suspension towers which are proposed to be used for the new 400 kV line are visually less intrusive. Some I&APs, however, are of the opinion that due to the increase in size and height, the new 400 kV line would have a greater impact on the aesthetic quality of the area. The nature and intensity of the visual impact would depend on the detailed alignment of the

Transmission line, the topography of the area and the type of vegetation. From a social perspective, the negative visual impacts would be more marked where the Transmission line is situated in close proximity to residential areas and houses (e.g. on the farms Voorspoed, Die Vlakte (Paauwkom) and Quaggaskuyl) or where towers are situated on high-lying areas such as hill tops. The proximity of residential areas and houses can be taken into consideration with the erection of the new line, and can be addressed during the negotiation process.

- *Noise impact:*

Noise impacts associated with the construction phase and construction camps are anticipated. The proximity of residences, communities and businesses to the construction sites and camps would determine the intensity of this impact. This impact is anticipated to be of a short duration and of low significance.

- *Air/Dust pollution:*

Vehicular movement on gravel roads could lead to dust pollution in some areas during dry conditions. This impact would be of a short duration during the construction phase.

Dust pollution could also take place during maintenance and inspection of the lines. This impact will be localised and of a short duration, and is anticipated to be of low significance.

- *Water pollution:*

A lack of proper water and sanitation facilities at the construction camps could result in water pollution. Eskom, however, have requirements which are required to be adhered to by contractors, including the handling of waste, water usage, etc. These guidelines will be stipulated in the Environmental Management Plan (EMP).

Table 4.23: Intrusion impacts associated with the proposed Transmission line between Poseidon and Grassridge Substations

| Nature | Extent | Duration | Probability | Significance | Status |
|---|--------|------------|-------------|--------------|----------|
| Visual impacts | Local | Permanent | Likely | Moderate | Positive |
| Noise impacts – construction phase | Local | Short-term | Likely | Low | Negative |
| Air/dust pollution – construction phase | Local | Short-term | Probable | Low | Negative |
| Water pollution – construction phase | Local | Short-term | Probable | Moderate | Negative |

- *Mitigation Measures:*

The following mitigation measures are recommended:

- * Eskom should aim to keep to areas of lower elevation as far as possible, in order to minimise the visual impacts associated with the proposed Transmission line.
- * Routing of the lines should preferably not be in close proximity to residential dwellings.
- * Noise-generating construction activities (especially those associated with vehicles and heavy machinery) should be restricted to working hours.
- * Construction equipment and vehicles should be maintained in a good working condition so as to minimise the generation of noise.
- * The conduct of workers residing in the construction camps should be monitored, and should be in compliance with the specifications of the EMP.
- * The construction schedule should be communicated with potentially affected parties.
- * Construction timeframes should be discussed with property owners.
- * Dust-suppression techniques should be used along gravel roads, when required.
- * Adequate water and sanitation facilities are to be supplied at construction camps.
- * Fuels and chemicals must be stored in appropriate containers where these are kept on-site.
- * An EMP for construction should be compiled outlining management measures which must be implemented in order to minimise intrusion impacts.

4.8. Conclusions

The majority of the potential impacts associated with the proposed recycling of the existing 220 kV Transmission line servitude are anticipated to be restricted to the construction phase, and are thus of a short-term nature. These construction impacts can largely be minimised through the compilation and implementation of a site-specific EMP, which should form part of the construction contractors contract. Therefore, no significant impacts are anticipated as a result of the construction of the proposed 400 kV Transmission line.

No significant impacts are anticipated as a result of the operation and maintenance of the proposed 400 kV Transmission line, provided that appropriate mitigation measures are implemented through a site-specific EMP. This is due to the fact that the existing 220 kV line

has an existing impact on the surrounding area, and the new line is not anticipated to add significantly to this impact.

The existing 220 kV Transmission line has an existing visual impact on the surrounding area. With the replacement of the existing 220 kV Transmission line self-supporting towers with cross-rope suspension towers, it is anticipated that existing visual impacts will be lowered, as these towers are smaller and less steel intensive than the existing towers. Therefore, it is anticipated that the proposed project will have a positive impact of moderate to high significance on the aesthetics of the area.