SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED TRANSMISSION POWER LINE CHAPTER 7

Three technically feasible alternative transmission power line alignment corridors (approximately 500 m in width) have been identified for investigation within the EIA process (refer to Figure 7.1). This chapter serves to comparatively evaluate the identified potential environmental (socio-economic and biophysical) impacts associated with the proposed power line alternatives in order to nominate one preferred alternative power line corridor for further investigation within the EIA phase. Recommendations are made regarding further studies required within the EIA phase of the process. Where possible, recommendations for the management of these impacts have been made.

The cumulative impacts associated with the proposed transmission power line are expected to be largely associated with visual impacts of the infrastructure on the surrounding environment. Cumulative effects can only be assessed once a preferred alternative has been nominated, and will be considered in the detailed specialist studies to be undertaken in the EIA phase.

7.1. Potential Impacts on Vegetation

The study area is located within a bioregion known as the Riversdale Plain, which lies within the Fynbos biome and the Cape Floristic Region (CFR). The South African vegetation map describes the PetroSA area as Albertinia Sand Fynbos. The vegetation in the Proteus area is indicated as being Swellendam Silcrete Fynbos, and much of the intervening area is Mossel Bay Shale Renosterveld.

Approximately 70% of the land crossed by Alternative 1 is agricultural land, with the remaining 30% being natural vegetation. In terms of Alternatives 2 and 3, this ratio is about 60% agricultural and 40% natural vegetation. However, the total distance of natural vegetation crossed is similar (within 15%) for all three alternatives. No natural vegetation of any consequence remains within the cultivated areas.

Very little Albertinia Sand Fynbos remains along any of the routes, and the bulk of the remaining natural vegetation is Swellendam Silcrete Fynbos and Mossel Bay Shale Renosterveld. There is significant overlap of species between these two vegetation types and they are also structurally rather similar, with Thicket elements occurring in fire protected and well watered areas. Remaining vegetation is generally in good condition with relatively few invasive alien species, although there are scattered *Acacia mearnsii* (black wattle) and *Acacia saligna* (Port Jackson).

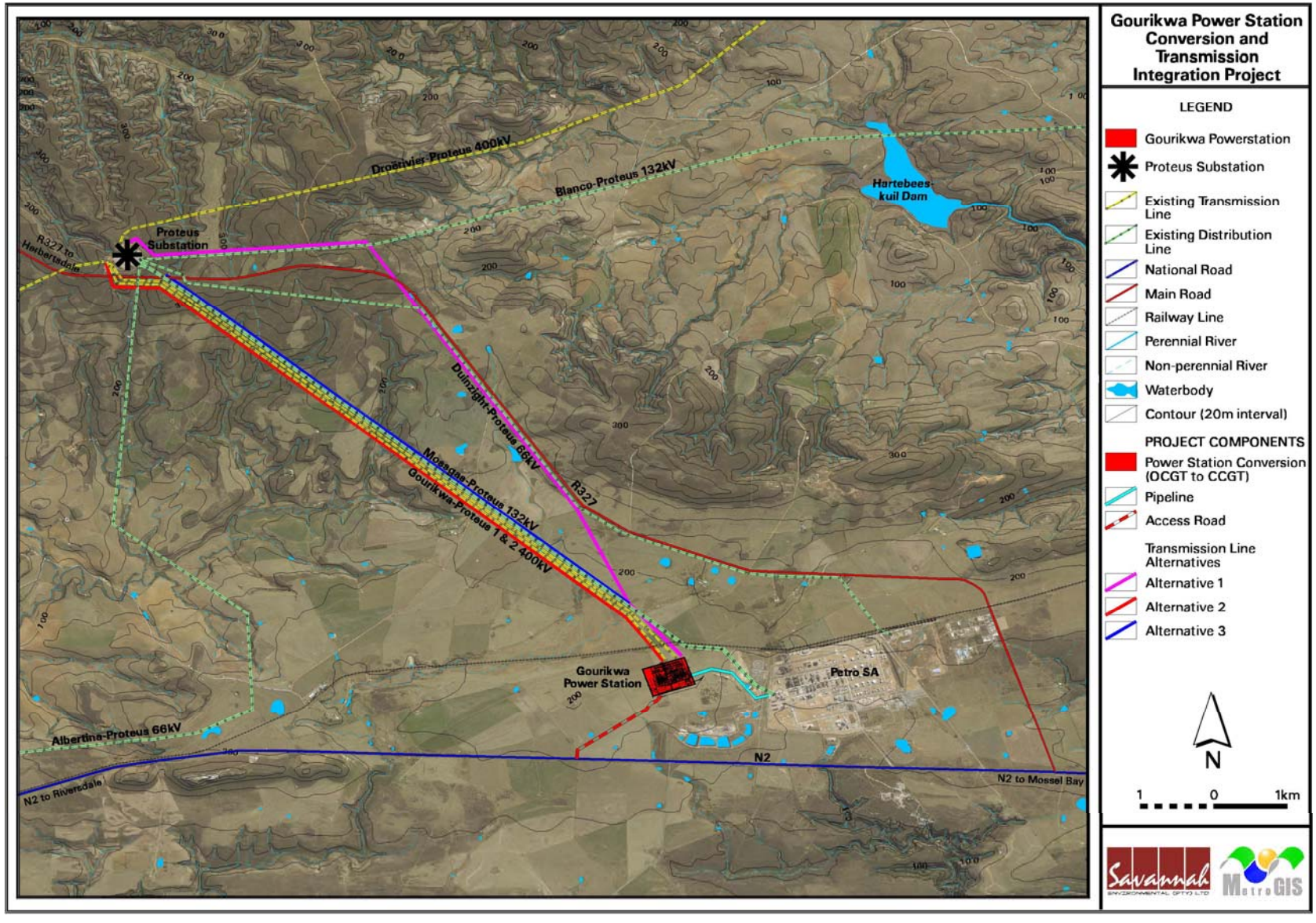

Figure 7.1: Locality map showing the feasible alternative transmission power line corridor alternatives between Gourikwa and Proteus Substation identified for investigation within the EIA process

The protected species Sideroxylon inerme (milkwood) was recorded as being present in the thicket elements of this vegetation.

Mossel Bay Shale Renosterveld is characterised by a high bulb diversity. The bulb *Bobartia robusta* (blombiesie) is very common in many natural areas along the proposed power line routes and was previously Red Data Book listed as Rare (Hilton-Taylor 1996), but has been downgraded to Least Threatened as the species no longer meets IUCN requirements for Red listing (Raimondo et al – in prep.). The species is however a regional endemic, and is found only in the area from Albertinia to Mossel Bay.

Protea lanceolata (lance leaf sugarbush) has recently been Red Data listed as 'Near Theatened'; Raimondo et al – In prep.), and is uncommon in the vicinity of Proteus, on the silcrete hills.

There is a low to moderate likelihood of certain very rare cryptic dwarf succulents such as *Euphorbia bayeri* (local endemic), various *Haworthia* species, and various bulbs occurring in the study area. There is also a small likelihood that the very rare *Satyrium muticum* (Endangered) could occur (the species is known from about 400m east of Proteus substation; B. Liltved - pers. comm.). Most of these would be likely to occur in rocky areas.

7.1.1. Nature and Extent of Impacts

Direct impacts occur primarily at the construction stage, and the nature of the impact is direct loss of vegetation within the development footprint. Indirect impacts occur mostly during the operational phase (post-construction), and in this case the nature would vary from the introduction of alien vegetation and alien animal species (such as Argentine ants), to partial disruption of ecological processes due to the effects of the alien species, to partial disruption of ecological processes due to fragmentation of habitat.

Direct impacts during the construction phase of the transmission line are essentially only in the tower footprints (usually less than 20 m^2), where vegetation loss would be permanent. Natural vegetation exists in only 30% – 40% of the linear extent of the alternative transmission line routes. The total extent of permanent vegetation loss on such tower footprints for any one of the three lines is likely to be less than 1 ha. Temporary vegetation loss may occur in the areas surrounding the towers, in the laydown areas, and in the access roads needed for stringing, laydown, and tower erection.

Potential indirect impacts which may be associated with the proposed project include introduction of alien species, to partial disruption of ecological processes due to the effects of the alien species, to partial disruption of ecological processes

due to fragmentation of habitats. Impacts are expected to be of low to negligible significance with the implementation of appropriate mitigation measures.

Extensive Eskom infrastructure development is taking place in the region, and on-going development inevitably has a cumulative negative impact on remaining natural vegetation. In this particular instance the cumulative impacts are likely to be of low negative significance, as most of the development is taking place in previously cultivated areas, and footprints and permanent vegetation losses are very small within the vegetated areas (<1 ha in total).

7.1.2. Comparison of Transmission Power Line Alternatives

All three alternative transmission line routes run parallel to and adjacent to existing disturbance. Alternative 1 runs across farmland until it joins the R321 to Herbertsdale, runs along the road, and then crosses the road and joins the existing 132kV line to Blanco from Proteus. Alternatives 2 and 3 run next to and parallel to the new transmission line from Gourikwa direct to Proteus Substation.

Given that all new routes cross similar extents of natural vegetation and run parallel and mostly adjacent to existing disturbances there is **no clearly preferred alternative** (amongst Alternatives 1, 2 and 30) from a botanical perspective. Overall botanical impacts associated with construction and operation of such a line are likely to be of low significance.

7.1.3. Conclusions and Recommendations

There is no clearly preferred transmission line route. Whichever alignment is selected botanical impact should be of low negative significance after mitigation. A field survey of the nominated preferred alternative power line route should be undertaken as part of a detailed EIA assessment, and standard impact assessment methodology employed to assess the potential impacts. The Impact Assessment should clearly outline practical mitigation that can be implemented to reduce any identified botanical impacts of significance.

7.2. Potential Impacts on Avifauna

The Southern African Bird Atlas Project (Harrison *et al*, 1997) recorded a total of 157 bird species in the quarter degree square within which the study area falls, i.e. 3421BB. This included seven Red Data species, four 'vulnerable' and three 'near-threatened' (Barnes, 2000). In addition, the White Stork (Protected internationally under the Bonn Convention on Migratory Species) is considered as a threatened species for the purpose of this study. This is a relatively low diversity of bird species, and consequently Red Data species, meaning that in terms of avifauna, this study area is not particularly unique.

7.2.1. Nature and Extent of Impacts

Due to their size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Typically, a development of this type could be expected to impact on the birds of the area through: collision of birds with earth wires and conductors; electrocution of birds on towers; destruction of bird habitat; disturbance of birds; and birds causing electrical faulting on the power line.

» **Electrocution** refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. This impact is practically impossible on the proposed power line due to the large clearances, and is therefore not considered further.

» **Collision** refers to the scenario where a bird collides with the conductors or earth wires of overhead power lines. The groups of birds most severely impacted by collision with overhead lines are bustards, storks and cranes. These species are generally large, heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines. An unknown number of smaller, fast-flying species – especially pursuit hunting raptors such as falcons - are also prone to colliding with power lines. Unfortunately, many collision-sensitive species are considered threatened in southern Africa, and many are long-lived, slow reproducing species poorly adapted to coping with high rates of adult mortality, inflated by power line casualties.

  Several of the Red Data species recorded in the study area are known to be extremely vulnerable to impacts of power lines, through collision. The Blue Crane, Secretarybird, Denham's Bustard and White Stork are all extremely vulnerable to collision, and several birds of these species have been reported colliding with the existing power lines in the study area previously. This impact is anticipated to be of high significance. The existing lines in the area have killed numerous birds, particularly Blue Cranes and White Storks.

» During the construction phase and maintenance of power lines some **habitat destruction and alteration** inevitably takes place. This happens with the construction of access roads and the clearing of servitudes. Taller vegetation (>4 m in height) within power line servitudes has to be trimmed at regular intervals in order to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors, and to minimise the risk of fire under the line which can result in electrical

flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity to the servitude through modification of habitat. Similarly, these activities impact on birds through disturbance, particularly during the bird's breeding activities.

This impact is anticipated to be of very low significance in the south of the study area, which is mostly transformed, and no longer natural habitat. In the north of the study area, natural fynbos exists which elevates the significance of habitat destruction slightly. However the area does not appear pristine and already has several existing power lines, which are mitigating factors for this impact.

7.2.2. Comparison of Transmission Power Line Alternatives

Two of the three alternatives involve construction of the new transmission power line in the same corridor as the existing four power lines (two 400kV and two 132kV lines). **Alternative 3** is the most preferred alternative, for the following reasons:

» Placing the new line adjacent to existing power lines (two 132kV and two 400kV power lines) is desirable from an avifaunal perspective as it:
  * reduces the amount of habitat destruction during construction and maintenance since there are existing roads;
  * reduces the amount of disturbance in the landscape as the existing lines are already a disturbance;
  * partially mitigates for the impact of collision, since the more lines are placed together the more visible the overhead cables become, and risks are kept together rather than spread out across the landscape.
» Placing a 400kV line on the outside of this consolidated corridor, would also be advantageous from a bird collision perspective as it would 'shield' the lower inner 132kV lines (the existing 132kV lines have recorded numerous collisions of Blue Cranes and other species – EWT Database).

Alternative 1 is the least preferred corridor from an avifaunal perspective for the following reasons:

» For most of its route it will be the only line of this size in the vicinity, this introduces new threats into the vicinity.
» It appears to pass more farm dams (3 medium size dams compared to one small one on the other three corridors). Dams will attract various bird species associated with water, many of which are vulnerable to collision with overhead cables.

7.2.3. Conclusions and Recommendations

Potential impact on avifauna as a result of collisions within the overhead power line is anticipated to be of high significance as the existing lines (particularly the existing 132kV lines) have killed numerous birds (through collisions), particularly Blue Cranes and White Storks. The selection of Alternative 2 or 3 would partially mitigate for this impact. **Alternative 3** is nominated as the preferred option, with Alternative 1 being the least preferred. It will be necessary to mark approximately half of the transmission power line with a suitable anti-collision marking device in order to further mitigate the potential for impacts (especially collisions).

7.3. Potential Impacts on Heritage Sites

Since the study areas are situated in rolling open landscape or coastal plains away from the coast, the expectation is that the kind of archaeological material that will be encountered will consist of open scatters of Early and Middle Stone Age artefacts (with rarer concentrations of later material). This kind of archaeology occurs ubiquitously throughout Southern Africa.

7.3.1. Nature and Extent of Impacts

Heritage sites can be negatively affected through disturbance of the land surface, destruction of significant structures and places as well as any action that will alter the feel and appearance of an historic place or building. Impacts can therefore be direct (through disturbance or destruction of sites) or indirect (as a result of visual impacts on the area or site).

7.3.2. Comparison of Transmission Power Line Alternatives

Alternative 1 runs very close to the R327, which is a scenic route. While significant impacts to generally protected heritage are not expected, it has been recommended in previous studies that this alternative not be utilised due to the negative changes to the aesthetics of the R327 route.

Alternatives 2 and 3 essentially follow a similar corridor on either side of the existing Gourikwa-Proteus and Mossgass-Proteus servitudes. The general corridor that these alternatives utilise has been previously inspected and was considered suitable for the proposed activity (Hart 2006). In terms of limiting impacts to the visual qualities of the general area and confining surface displacement of archaeological material, transmission line **Alternatives 2 or 3 are generally supported over Alternative 1**.

7.3.3. Conclusions and Recommendations

None of the transmission line options can be considered to be a fatal flaw in heritage terms. However **Alternatives 2 or 3 are generally supported over Alternative 1**.

A detailed heritage impact assessment of the nominated preferred alternative must be undertaken within the EIA phase in order to verify the presence of heritage sites in the area, assess potential impacts on identified sites and recommend appropriate mitigation measures to be implemented.

7.4. Potential Visual Impacts

Apart from its location close to the N2 National Road, the Gourikwa Power Station site is considered to be relatively remote and far removed from major centres and tourist attractions. It is located next to the N2 between Mossel Bay and Riversdale, approximately 1 km west of the PetroSA plant.

7.4.1. Nature and Extent of Impacts

The visibility of the transmission power line from the surrounding areas is considered to be the major impact associated with a development of this nature. An initial viewshed analysis within the study area from each of the transmission power line alternatives is shown in Figures 7.2 to 7.4. The visibility of the transmission power line towers where calculated at a maximum offset of 50 m above ground level.

7.4.2. Comparison of Transmission Power Line Alternatives

It is clear from the initial viewshed analyses that there is only a slight difference in the theoretical visibility between Alternatives 2 and 3. This is due to the two alignments running parallel to each other. Alternative 1 has a considerably larger area of visual exposure as it crosses over the ridge on which the Proteus substation is located and is exposed to areas both south and north of the ridge. In addition, Alternative 1 runs very close to the R327, which is a scenic route.

A set of criteria was used to allow for the comparison between the three transmission line alternatives in order to select the preferred alternative.

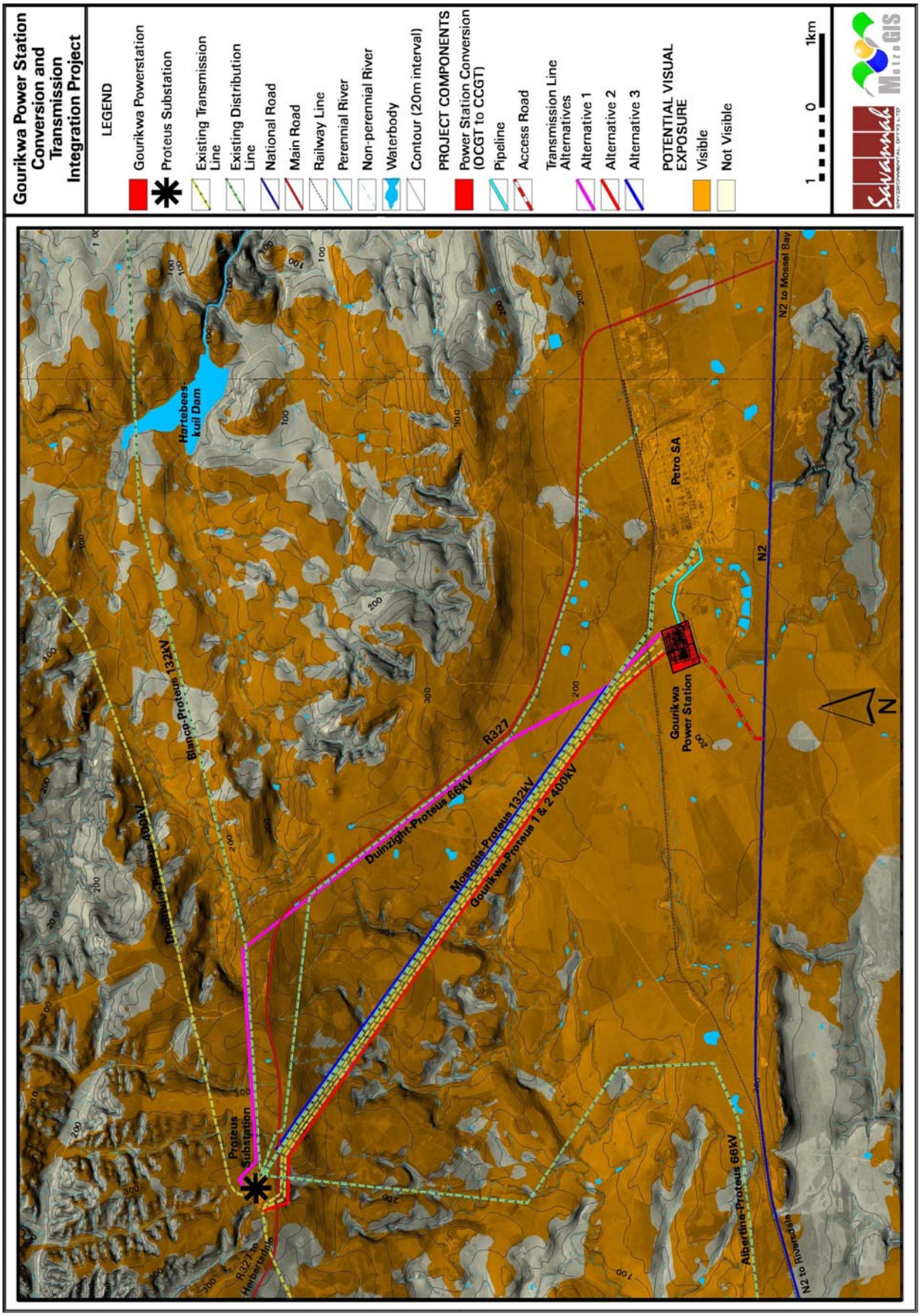

Figure 7.2: Potential visual exposure of transmission power line Alternative 1

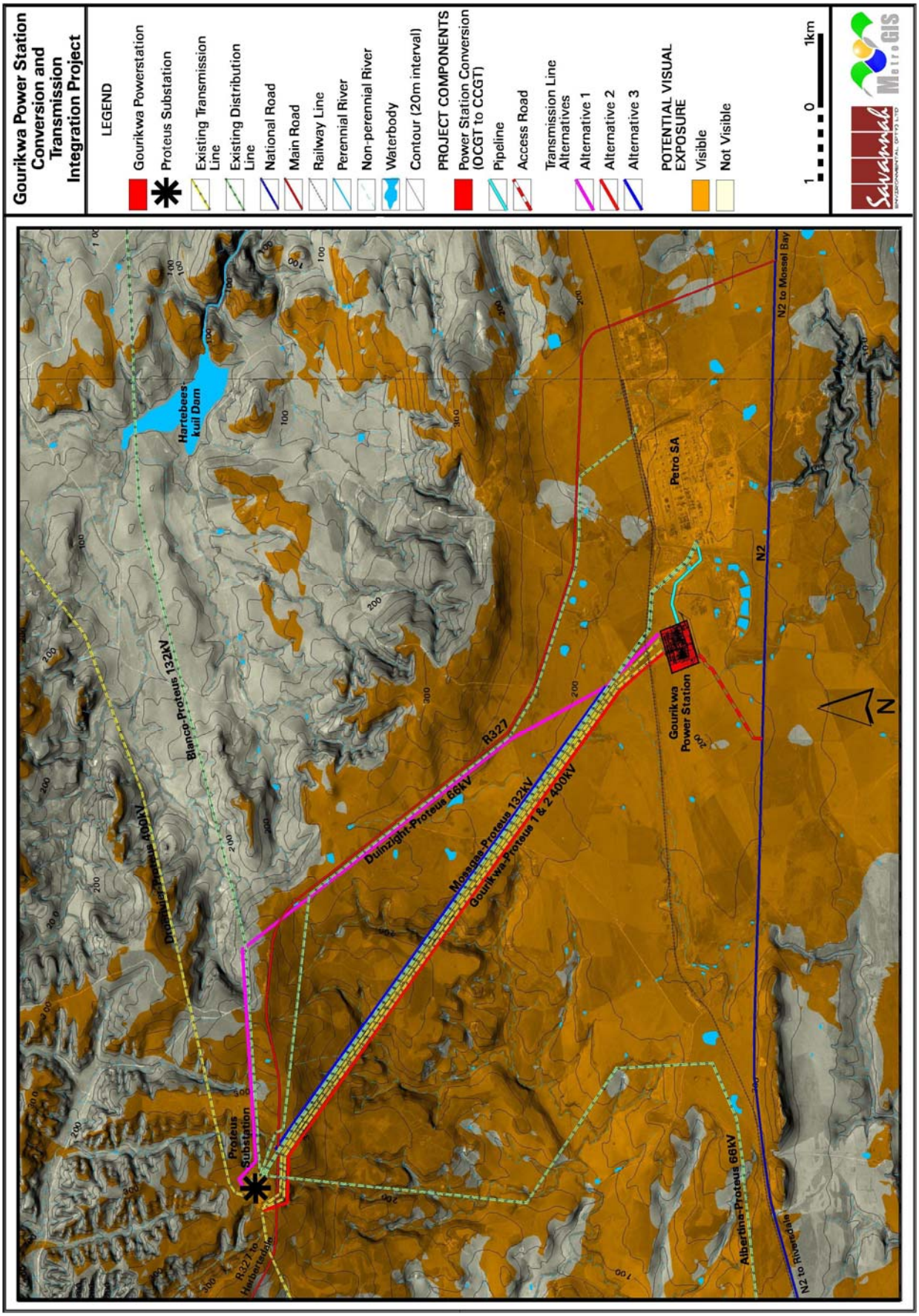

Figure 7.3: Potential visual exposure of transmission power line Alternative 2

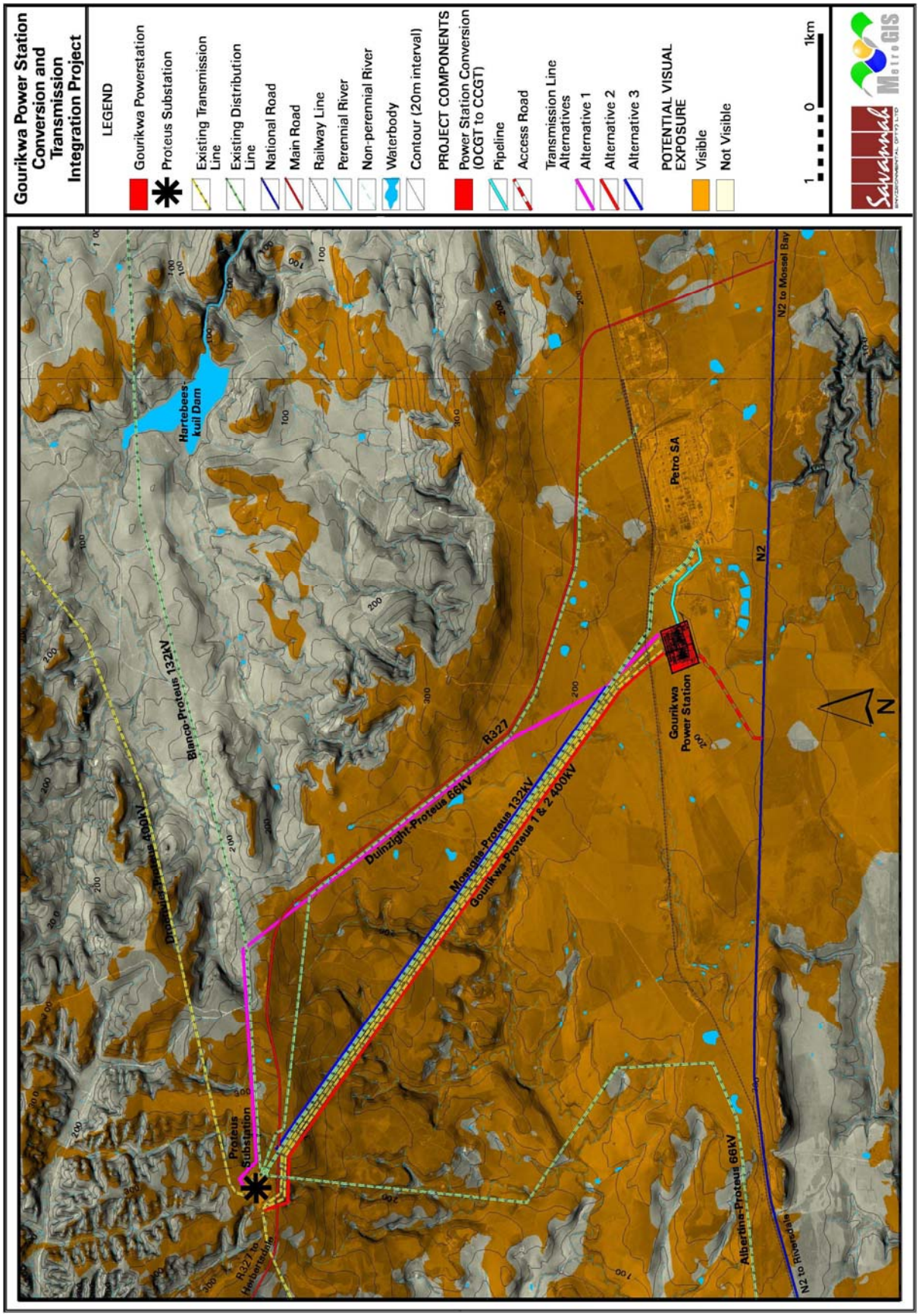

Figure 7.4: Potential visual exposure of transmission power line Alternative 3

The criteria used for the comparison includes:

» The length of the alignment
» The potential area of visual exposure within the study area
» The proximity and exposure to major roads (based on the distance the alignment traverses adjacent to major roads)
» The crossing of the transmission line over major elevated topographical units
» The potential consolidation of existing linear infrastructure (based on the distance the development corridor could be placed adjacent to (or even replace) existing power line infrastructure)

Table 7.1 provides a comparison of the identified alternatives in terms of the above criteria. Positive values were awarded for opportunities and negatives where constraints were identified.

Table 7.1: Comparative table of the proposed transmission power line alternatives

Alter-native	Length (Total)	Visible area	Proximity to major roads	Major ridge crossings	Consolidation of existing infrastructure	Total value
1	11.4km **(-1)**	152km^2 **(-1)**	4500m **(-1)**	1 crossing **(-1)**	Average potential (6.8km along Dx lines) **(+1)**	**(-3)** Not pre-ferred
2	10.2km **(0)**	124km^2 **(+1)**	<50m **(+1)**	None **(0)**	High potential (10.2km along Tx/Dx lines) **(+2)**	**(+4)** Pre-ferred
3	10km **(+1)**	126km^2 **(0)**	750m **(0)**	None **(0)**	High potential (10km along Tx/Dx lines) **(+2)**	**(+3)** Pre-ferred

The preferred alternatives, based on the above criteria are **Alternatives 2 and 3**. These two alternative have very little to distinguish them from each other, but they are preferred over Alternative 1. They have smaller areas of potential visual exposure; they are relatively far removed from major roads and have the best ability to consolidate the linear infrastructure (existing vertically disturbed landscapes) within this region. This is due to the alignments running parallel to the existing transmission and distribution lines.

Alternative 1 is not preferred as a potential alignment for the Gourikwa to Proteus transmission line due to its close proximity to the R327 main road (a sensitive visual receptor) and its relatively large area of visual exposure. The visual

impacts envisaged for Alternative 1 would far exceed the potential visual impacts associated with Alternative 2 or 3.

Figure 7.5: View of existing transmission and distribution lines between the Gourikwa Power Station and the Proteus Substation

7.4.3. Conclusions and Recommendations

Alternative 2 and 3 are preferred over Alternative 1 from a visual perspective. The nominated preferred transmission line alternative should be assessed in order to determine its potential visual impacts. The cumulative visual impact of the construction of another transmission line adjacent to the existing transmission/distribution lines (especially at the Proteus Substation) should also be addressed in the visual impact assessment report.

7.5. Potential Impacts on the Social Environment

The study area is located in a predominantly rural area, with the dominant land use being agriculture. The study area is located approximately 15 km west of Mossel Bay adjacent to the PetroSA plant, within the Mossel Bay Municipality of the Eden District. The KwaNonqaba, Joe Slovo and Dana Bay communities are the closest situated to the study area. Farms surrounding the Gourikwa site to the north and west include:

Farm	Owners/ Residents	Orientation
B&H Boerdery	Bennie & Hennie Pienaar	Located close to the Gourikwa Power Station, south of Alt 2
Patrysfontein	Ignatius Muller & Quintus Muller	Crossed by Alt 1, 2 & 3
Bartelsfontein	Henry Muller	Crossed by Alt 1
Harterus	Jacques & Annelie De Villiers (tenants residing on property)	East of Alt 1
Arum Valley	Gilbert Muller	South west of Alt 2
Kleinberg	Lucas Muller	South west of Alt 2

The residences of Ignatius Muller and Quintus Muller on the farm Patrysfontein are both situated within 1 km of the existing Gourikwa-Proteus 400kV servitude (Alternative 1 for proposed transmission line).

7.5.1. Nature and Extent of Impacts

Impacts on the social environment as a result of the proposed transmission power line will be associated with both the construction and operational phases.

» *Potential Impacts during the Construction Phase:*

Temporary local employment opportunities

Construction of the transmission power line will create a number of temporary employment opportunities in construction. Sourcing of construction workers from the local labour pool is likely to be limited to unskilled and semi-skilled workers due to the highly technical nature of the work to be undertaken. This impact can be maximised through an emphasis on local employment creation, where possible.

Impacts are expected to be of low to medium significance, regardless of the alterative selected. The significance of this impact will depend on the number of construction workers to be employed, either by Eskom itself or by contractors. This potential impact will be assessed within the EIA Phase.

Impact on current land-users

Current land uses that may be impacted by construction (and subsequent operation of) the proposed transmission power line include sheep, cattle and ostrich farming and wheat cultivation on the farm Patrysfontein. Potential impacts on livestock farming relate to the possibility of construction workers leaving gates open, as well as impacts to crops and harvesting if construction is undertaken during these periods. Impacts are expected to be of low to moderate significance.

» *Potential Impacts during the Operational Phase:*

Impact on current land-use

The proposed transmission line Alternatives 2 and 3 could potentially impact on the safety of livestock[16]. In addition, possible stock losses could be associated with maintenance teams that leave gates open.

An impact of existing transmission lines which was noted on the Farm Patrysfontein is that wheat crops on can no longer be effectively aerially sprayed. An additional line along this route could magnify this impact by increasing the affected area that cannot be sprayed. It was suggested by the Patrysfontein landowner that if a new transmission power line is required to be constructed over the property, that Alternative 2 to the left of the existing transmission line would be supported as it would have a reduced effect on farming practices.

Alternative 1 could potentially impact on an airstrip on land sold to Van Der Walt and Van der Walt developers. The existing airstrip is used mainly for flights for crop spraying. Plans are to upgrade this facility. While the existing transmission lines do not pose a significant impact, there is a concern about possible additional developments, and this impact may require further investigation.

Potential impacts on land use during the operational phase are expected to be of low to medium significance, depending on the alternative selected.

Impact on Sense of Place[17]

The proposed transmission power line across rural countryside may be expected to have an impact on the currently rural character of the area, and therefore potentially affect surrounding residents' 'sense of place'.

Impacts on sense of place and on residents of neighbouring farms would relate primarily to visual impacts. Residents on the Farm Patrysfontein currently within 1 km of the existing transmission lines along the route followed by Alignments 2 and 3 (Ignatius Muller and Quintus Muller) also note the corona generated by the existing lines to be an impact, particularly in misty conditions and at night.

[16] Mr Ignatius Muller of Patrysfontein noted that he has lost a number of sheep as a result of the existing lines on their property.

[17] The term sense of place has been defined and utilised in different ways by different people. To some, it is a characteristic some geographic places have and some do not, while to others it is a feeling or perception held by people (not by the place itself). It is often used in relation to those characteristics that make a place special or unique, as well as to those that foster a sense of authentic human attachment and belonging.

Due to the presence of the existing transmission power lines in the area, the impacts on sense of place are expected to be of low significance. Alternative 1, however, runs parallel to the R327 for part of its length, which is considered as a scenic route, and would impact on the overall aesthetics for the users of this route.

7.5.2. Comparison of Transmission Power Line Alternatives

Given that all three alternative alignments traverse private properties and mostly adjacent to existing disturbances there is **no clearly preferred alternative** (amongst Alternatives 1, 2 and 3) from a social perspective. Overall social impacts associated with construction and operation of a new transmission power line are likely to be of low to moderate significance, and dependant on the final alignment.

Alternative 1 minimises impacts on residents on the Farm Patrysfontein. This alternative, however, follows the R327 for part of its length, which is considered as a scenic route. In addition, this alternative may impact on an airstrip development next to the R327, which may need to be considered as part of the EIA.

Alternatives 2 and 3 follow the existing transmission and distribution lines across private properties, including the farm Patrysfontein. This will add cumulative impacts for those residents on the farm which live within 1 km of the existing lines. Impacts currently experienced which can be expected to increase are visual impacts and corona effects. Cumulative land use impacts relate to impacts on arable land as well as safety of livestock. It was suggested by the Patrysfontein landowner that if a new transmission power line is required to be constructed over the property, that Alternative 2 to the left of the existing transmission line would be supported as it would have a reduced effect on farming practices.

7.5.3. Conclusions and Recommendations

There is no distinctly preferred alternative from a social perspective, as all alternatives will result in some degree of impact on the social environment. Alternative 1 could impact significantly on a planned airfield development on the farm Bartelsfontein, which could be regarded as a fatal flaw. Alternatives 2 and 3 will have cumulative inconvenience as well as land use impacts for residents situated in close proximity to the existing line. Alternative 2 would be preferred over Alternative 3 as the latter would impact on a planned pivot irrigation point on the farm Patrysfontein. **Alternative 2** is supported by the local landowners due to the perceived reduced cumulative effect on farming practices.

In order to assess the potential impacts on the social environment associated with the construction and operation of the proposed transmission power line, a detailed Social Impact Assessment (SIA) must be undertaken within the EIA phase of the project.

7.6. Nomination of Preferred Transmission Power Line Alternative

From the specialist studies undertaken within the Scoping Phase, **Alternative 2 or Alternative 3** are nominated as the most preferred alternative/s in terms of all aspects considered, as these alternatives would result in impacts of least significance impacts on both the social and biophysical environments. The alternative alignments have a lower impact on the overall environment as a result of consolidation of infrastructure of a similar nature and the minimisation of impacts on current and planned land use. Therefore, both Alternative 2 and Alternative 3 are nominated **for further investigation in the EIA Phase**.

Alternative 1 is nominated as the least preferred alternative, and therefore this alternative is **excluded as an alternative for further investigation**.

7.7. Impacts associated with the 'Do-nothing' Alternative

The transmission power line is intrinsically linked to the additional power proposed to be generated at the Gourikwa power Station. The power line is required to evacuate the additional power generated from the power station to the National grid.

The 'do-nothing' alternative is the option of not constructing the proposed 400kV transmission power line between the Gourikwa Power Station and the Proteus Substation to transmit the additional power generated at this power station into the national electricity grid.

The 'do nothing' alternative will therefore result in the additional power generated from the CCGT units not having a means to be transmitted into the transmission network (and thereby rendering the power generated by the power station not available for use).

The 'do nothing' alternative is therefore not considered to be a feasible alternative, and will not be considered further within the EIA phase.

CONCLUSIONS AND RECOMMENDATIONS CHAPTER 8

Eskom Holdings Limited (Eskom) is investigating the conversion of the five units at the existing Open Cycle Gas Turbine (OCGT) plant at the Gourikwa Power Station (located near Mossel Bay) to a Combined Cycle Gas Turbine (CCGT) plant in order to increase the generating capacity of this existing power station by approximately 400 MW. The proposed conversion involves the addition of CCGT units to the existing OCGT plant, and all components associated with the proposed conversion will be established on the same site as the existing Gourikwa Power Station. Infrastructure associated with the proposed power station conversion includes the construction of a water pipeline between PetroSA and the power station site (a distance of approximately 1,3 km), as well as the construction of a direct access road off the N2 national road (a distance of approximately 1,6 km in length). The proposed pipeline and access road fall outside of the existing power station boundaries.

Eskom is also proposing the construction of a 400kV transmission power line between the Gourikwa Power Station and the Proteus Substation (approximately 11 km to the north-west) to transmit the additional power generated at this power station into the national electricity grid.

The Scoping Study has been undertaken in accordance with the EIA Regulations published in Government Notice 28753 of 21 April 2006, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998). This Draft Scoping Report aimed at detailing the nature and extent of the proposed Gourikwa Power Station conversion and integration project, identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project activities involving the project proponent, specialist consultants, and a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs). In accordance with the requirements of the EIA Regulations, feasible project-specific alternatives (including the “do nothing” option) have been considered and preferred alternatives nominated for consideration within the EIA process.

The conclusions and recommendations of this Draft Scoping Report are the result of on-site inspections and desk-top evaluations of impacts identified by specialists, as well as the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholder groupings in the study area and the Province.

A summary of the conclusions and recommendations of the evaluation of the proposed Gourikwa Power Station Conversion and Transmission Integration Project is provided below. Recommendations regarding the scope of investigations required to be undertaken within the EIA are provided within the Plan of Study for EIA (refer to Chapter 9).

8.1. Conclusions drawn from the Evaluation of the Proposed Power Station Conversion

Apart from the proposed direct access road and water pipeline, all components of the proposed power station conversion project (as discussed in Chapter 3) will be on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries.

Potential impacts associated with the proposed power station conversion project are expected to occur during both the construction and operational phases. In general, impacts are expected to be similar to those associated with the initial phases of the power station project (i.e. the initial three OCGT units currently in operation, and the additional two OCGT units currently under construction). New impact sources associated with the power station conversion project would include:

» **Visual impacts** as a result of the additional infrastructure associated with the conversion project to be added onto the existing power station (i.e. the heat recovery steam generator (HRSG), the 60 m high stacks, the 25 m - 30 m high air-cooled condensers, and the additional fuel storage tanks).
» **Air quality impacts** associated with the construction phase (dust emissions) and the operational phase (emissions from the power station).
» **Noise impacts** associated with the existing OCGT units as well as the additional CCGT components to be added onto the existing power station (i.e. air filters, the gas compressor, the gas turbine, the generator, the electricity transformers, the fans associated with the stacks, the heat recovery equipment, the steam generator, the steam turbine and the air-cooled condenser system associated with the dry-cooling system).
» **Impacts on the social environment** as a result of the creation of employment opportunities, influx of workers to the area, impacts on health and safety, and impacts on sense of place.

Impact sources associated with the proposed access road and water pipeline include:

» **Impacts on vegetation and ecology** as a result of the permanent loss of vegetation and habitats, and potential impacts on sensitive species within the footprint of the road and pipeline.

» **Impacts on heritage sites** as a result of the disturbance or destruction of heritage resources during the construction phase of the proposed road an pipeline.

No environmental fatal flaws have been identified to be associated with any of the components of the proposed power station conversion project at this stage of the project.

8.2.1. Nomination of Preferred Alternatives to be Considered in the EIA Phase

The proposed conversion which will involve adding additional components to the existing power generating units, will be on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries. Therefore, **no location alternatives** have been considered within this EIA process.

However, the following have been nominated for consideration within the EIA Phase:

» The use of **treated water, effluent and/or stormwater** from the PetroSA facility at the Gourikwa Power Station. The water is proposed to be piped to the power station from PetroSA via a new **~1,3 km water pipeline** proposed to be constructed parallel to the existing liquid fuel pipeline between the two facilities. Alternative routes for the fuel pipeline were previously investigated through an EIA process for the initial OCGT units at the power station (Ninham Shand, 2005). The fuel pipeline route constructed was considered to be the most appropriate and practical alignment from an environmental, technical and economic perspective. This alignment is now proposed to be mirrored though the construction of a parallel water pipeline.
» **Dry-cooling technology** (air-cooled condensers) at the power station to reduce water requirements.
» The construction of a new dedicated **access road** to the Gourikwa Power Station directly off the N2 national road. Alternative routes for access to the power station were previously investigated through an EIA process undertaken in 2005 (Ninham Shand, 2005). The route considered to be the most appropriate and practical alignment of the three alternatives considered in the previous EIA is now being re-considered through this EIA study.

8.1.1. Recommendations

In order to assess the potential impacts on the environment associated with the construction and operation of the proposed power station conversion project, detailed specialist studies to address the above issues must be undertaken within the EIA phase of the project. These studies must compare the impacts associated

with the conversion project to the current situation and must assess the potential cumulative impacts associated with the project.

8.2. Conclusions drawn from the Evaluation and Comparison of the Proposed Transmission Power Line Alternatives

Three technically feasible alternative transmission power line alignment corridors (approximately 500 m in width) have been identified for investigation within the EIA process (refer to Figure 7.1). These proposed transmission power line routes traverse an area that is generally rural in nature comprising largely of agricultural smallholdings. The area has been fairly extensively transformed by agricultural practises (largely as a result of cultivation). No natural vegetation of any consequence remains within the cultivated areas.

Potential impacts associated with the proposed transmission power line are expected to occur during the construction and operational phases, and have been identified through this scoping process include:

» **Impacts on flora and ecology** as a result of the disturbance of habitats within the power line servitude and at tower footprints.
» **Impacts on avifauna** as a result of collisions with the earthwire, electrocution and disturbance of habitats within the power line servitude.
» **Impacts on heritage sites** as a result of disturbance or destruction during the construction phase, as well as due to visual impacts on heritage sites.
» **Visual impacts** to sensitive receptors in the surrounding area.
» **Impacts on the social environment** as a result of the impacts on land use and impacts on sense of place.

In general, the nature and extent of impacts identified is dependent on the alignment which is selected.

8.2.1. Nomination of a Preferred Transmission Power Line Alignment

From the specialist studies undertaken within the Scoping Phase, **Alternative 2 or Alternative 3** are nominated as the most preferred alternative/s in terms of all aspects considered, as these alternatives would result in impacts of least significance impacts on both the social and biophysical environments. The alternative alignments have a lower impact on the overall environment as a result of consolidation of infrastructure of a similar nature and the minimisation of impacts on current and planned land use. Therefore, both Alternative 2 and Alternative 3 are nominated **for further investigation in the EIA Phase**.

Alternative 1 is nominated as the least preferred alternative, and therefore this alternative is **excluded as an alternative for further investigation**.

8.2.2. Recommendations

In order to assess the potential impacts on the environment associated with the construction and operation of the proposed power line project, detailed specialist studies to address the above issues must be undertaken within the EIA phase of the project. The Plan of Study for EIA (Chapter 9) describes what the specialist studies to be undertaken in the EIA phase will assess in order to appropriately inform decision-making.

PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT CHAPTER 9

A detailed description of the proposed Gourikwa Power Station and Transmission Integration Project, the scoping process, as well as the issues identified and evaluated through the Scoping Phase have been included in the Draft Scoping Report and provide the context for this Plan of Study for Environmental Impact Assessment (EIA).

This Plan of Study describes how the environmental impact assessment for the Gourikwa Power Station and Transmission Integration Project will proceed during the EIA phase. The EIA phase of the study includes detailed specialist studies for those potential impacts evaluated to be of significance. The key findings of the scoping process (which includes inputs from authorities, the public, the proponent and the EIA specialist team) have been used to inform this Plan of Study for EIA, together with the requirements of the NEMA EIA Regulations and associated guidelines.

It should be noted that no specific information requirements for the Scoping Report have been specified by DEAT in terms of Regulation 29(1)(j) of the EIA Regulations, besides the general requirement to meet Regulations 29 and 30 of Government Notice No. R385 of 21 April 2006.

9.1. Aims of the EIA

The EIA will aim to achieve the following:

» Provide an overall assessment of the direct, indirect and cumulative impacts on the social and biophysical environments affected by the proposed project.
» Assess potentially significant impacts associated with the Gourikwa Power Station conversion as well as the nominated preferred alternative transmission power line corridor.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public involvement process to ensure that I&AP are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with all phases of the project including design, construction and operation, and will aim to provide the environmental

authorities with sufficient information in order to make an informed decision regarding the project.

9.2. Authority Consultation

Consultation with the regulating authorities (i.e. DEAT and DEA&DP) has been undertaken through the scoping process and will continue throughout the EIA process. On-going consultation will include the following:

» Invitation to attend a feedback meeting during the review period of the Draft Scoping Report.
» Submission of a Final Scoping Report following a 30-day public review period (and consideration of comments received).
» A consultation meeting with DEAT and DEA&DP in order to discuss the findings of the Final Scoping Study and the issues identified for consideration in the EIA process.
» An opportunity to visit and inspect the site.
» Submission of a Final Environmental Impact Assessment Report following a 30-day public review period.
» A consultation meeting with DEAT and DEA&DP in order to discuss the findings and conclusions of the EIA Report.

9.3. Nomination of Preferred Alternatives to be assessed within the EIA

9.3.1. Power Station Conversion

The proposed conversion will be on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries. Therefore, **no location alternatives** have been considered within this EIA process.

However, the following have been nominated for consideration within the EIA Phase:

» The use of **treated water, effluent and/or stormwater** from the PetroSA facility at the Gourikwa Power Station. The water will be piped to the power station from PetroSA via a new **~1,3 km water pipeline** proposed to be constructed parallel to the existing liquid fuel pipeline between the two facilities. Alternative routes for the fuel pipeline were previously investigated through an EIA process for the initial OCGT units at the power station (Ninham Shand, 2005). The fuel pipeline route constructed was considered to be the most appropriate and practical alignment from an environmental, technical and economic perspective. This alignment is now proposed to be mirrored though the construction of a parallel water pipeline.

» **Dry-cooling technology** (air-cooled condensers) at the power station to reduce water requirements.
» The construction of a new dedicated **access road** to the Gourikwa Power Station directly off the N2 national road. Alternative routes for access to the power station were previously investigated through an EIA process undertaken in 2005 (Ninham Shand, 2005). The route considered to be the most appropriate and practical alignment of the three alternatives considered in the previous EIA is now being re-considered through this EIA study.

9.3.2. Transmission power lines

From the specialist studies undertaken within the Scoping Phase, **Alternative 2 or Alternative 3** are nominated as the most preferred alternative/s in terms of all aspects considered, as these alternatives would result in impacts of least significance impacts on both the social and biophysical environments. The alternative alignments have a lower impact on the overall environment as a result of consolidation of infrastructure of a similar nature and the minimisation of impacts on current and planned land use. Therefore, both Alternative 2 and Alternative 3 are nominated for further investigation in the EIA Phase.

9.4. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

A summary of the issues which require further investigation within the EIA phase, as well as the proposed activities to be undertaken in order to assess the significance of these potential impacts is provided within Table 9.1. The specialists involved in the EIA Phase are also reflected in Table 9.1.

Table 9.1: Summary of the issues which require further investigation within the EIA phase and activities to be undertaken in order to assess the significance of these potential impacts

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Air quality impacts » Power station conversion	A specialist study will be undertaken to determine existing air quality and potential air pollution impacts as a result of the proposed conversion project, and to make recommendations for mitigation measures, and air quality monitoring (if deemed necessary). The main aims of the air quality study will be: » The establishment of the dispersion potential of the area utilising localised meteorological data or data from the extended area. » The establishment of an emissions inventory for dust, total suspended particulates, PM10 SO_2, NOx, CO and CO_2, in which emissions from all project-related activities are quantified under the following conditions: * During construction * Under normal operations * During start-up and upset conditions. » The estimation of the potential emission reductions due to fuel conversion from diesel to natural gas. » The prediction of ambient air pollutant concentrations and dust fallout, in terms of dispersion modelling for each of the above-mentioned scenarios. Different climatic conditions for different times of the day and year will be utilised in order to determine the average and worst-case conditions. » The assessment of the impacts based on comparisons of the resulting concentration against the pre-construction ambient conditions, as well as against relevant standards and guidelines. » Detailed assessment considering direct, indirect and cumulative impacts for all phases of the project. » Identification of emission reduction opportunities and cost-effective emission abatement strategies. » Provision of recommendations regarding the optimum air quality monitoring positions and the establishment of an air quality monitoring programme, if necessary. The selected proposed air pollution dispersion model is the new-generation AEROMOD View, which is a complete and powerful package incorporating into one interface the popular preferred U.S. EPA models: AEROMOD, ISCST3, ISC-PRIME, and AEROMOD-PRIME. Different emission scenarios will be generated for the construction and operational phases of the project.	Demos Dracoulides of DDA

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Noise impacts » Power station conversion	The noise impact assessment study of the EIA phase will: » Determine the existing noise levels within and around the perimeter of the power station site, as well as within surrounding communities and sensitive receptors in the extended area. » Create a representative noise model in order to simulate the noise propagation and determine the resulting noise levels due to the upgrade. » Detailed assessment considering direct, indirect and cumulative impacts for all phases of the project based on South African legislation and international guidelines » Identify potential noise emission reduction opportunities and cost-effective emission abatement strategies. » Provide recommendations regarding the optimum noise monitoring positions and the establishment of a noise monitoring programme. The baseline noise study will be based on noise measurements in accordance with the SANS 10103: 2004 and SANS 10328:2001, or equivalent national or international standards required by Eskom or DEAT. The internationally recognised 3-dimensional software CADNAA for predicting noise contours from all the noise sources will be utilised in the noise study. This will enable different scenarios to be realised and tested to optimise layouts of potentially noisy activities, the plant and equipment and determine the resulting noise levels in the area.	Demos Dracoulides of DDA
Visual impacts » Power station conversion » Transmission power line	The specialist study to be undertaken in the EIA phase will include: » Additional spatial analyses are to be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. » The site-specific issues (as detailed in the specialist visual scoping report) and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of impact. » Specific areas of focus for the visual impact assessment of the power station conversion should include the additionally exposed areas and the potential cumulative visual impact of increased development. » Detailed assessment considering direct, indirect and cumulative impacts for all phases of the project. The detailed visual impact assessment will be informed by the DEA&DP Guidelines for visual specialist studies.	Lourens du Plessis of MetroGIS

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Impacts on heritage sites » Transmission power line	The specialist study to be undertaken in the EIA phase will: » Require a detailed physical survey of the study area so that the locations of visible generally protected heritage can be recorded and the layout of the development adjusted where necessary. » Include a detailed assessment considering direct, indirect and cumulative impacts for all phases of the project. » Include an environmental management plan to include follow up heritage work such as monitoring of excavations or archaeological sampling. The detailed heritage studies will be undertaken in accordance with the requirements of the DEA&DP specialist guidelines, as well as the requirements of Heritage Western Cape.	Tim Hart of the Archaeology Contracts Office, Department of Archaeology: University of Cape Town
Impact on vegetation » Transmission power line	The specialist study to be undertaken in the EIA phase will: » Assess local and regional impacts (direct and indirect) associated with the proposed power line infrastructure. » Include a detailed assessment considering direct, indirect and cumulative impacts for all phases of the project. » Make detailed mitigation suggestions for the planning, construction and operational stages, which will be included in the construction and operational phase EMPs. The specialist study will be undertaken in accordance with the requirements of the DEA&DP guidelines for biodiversity studies.	Nick Helme of Nick Helme Botanical Surveys
Impact on avifauna » Transmission power line	The specialist study to be undertaken in the EIA phase will: » A ground survey of the avifauna present along the nominated preferred power line route, specifically to * verify the presence or absence of key breeding species (including the Blue Crane) within the impact area of the transmission line * identify areas within the proposed site that may be more sensitive to potential collisions. » Include a detailed assessment considering direct, indirect and cumulative impacts for all phases of the project. The specialist study will be undertaken in accordance with the requirements of the DEA&DP guidelines for biodiversity studies.	Jon Smallie of the EWT

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Social Impact Assessment » Power station conversion » Transmission power line	The identification and assessment of social impacts will be guided by the specialist SIA Guidelines adopted by DEA&DP in the Western Cape. The SIA will assess impacts associated with the construction and operational phases of the power station and power line. The following criteria will be assessed: » Temporary and on-going employment opportunities. » Social investment. » Influx of people. » Impacts on health and safety » Current land-uses » Sense of Place	Liezl Coetzee of Southern Hemisphere

Through the Scoping process, additional issues requiring further investigation were identified. These include:

» Risks associated with the storage of additional fuel on the power station site. A risk assessment for the additional fuel tanks proposed to be located at the power station site will be undertaken by Riscom.

9.5. Methodology for the Assessment of Potential Impacts

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

» The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
» The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
» The **duration**, wherein it will be indicated whether:
  * the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  * the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  * medium-term (5–15 years) – assigned a score of 3;
  * long term (> 15 years) - assigned a score of 4; or
  * permanent - assigned a score of 5;
» The **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
» The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
» the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
» the **status**, which will be described as either positive, negative or neutral.
» the degree to which the impact can be reversed.

» the degree to which the impact may cause irreplaceable loss of resources.
» the *degree* to which the impact can be *mitigated.*

The **significance** is calculated by combining the criteria in the following formula:

S=(E+D+M)P

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

» **<30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
» **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
» **>60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

Recommendations for mitigation will be made and significance ratings before and after mitigation will be indicated.

9.6. Integration and Preparation of the EIA Report

The results of the specialist studies and other available information will be integrated and synthesised by the Savannah Environmental project team. An EIA report will be compiled in accordance with the requirements of the EIA Regulations, and will include:

» Detailed description of the proposed activity
» A description of the property(ies) on which the activity is to be undertaken and the location of the activity on the property(ies)
» A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity
» Details of the public participation process conducted, including:
  * steps undertaken in accordance with the plan of study for EIA
  * a list of persons, organisations and organs of state that were registered as interested and affected parties

  - a summary of comments received from, and a summary of issues raised by registered I&APs, the date of receipt of these comments and the response to those comments
  - copies of any representations, objections and comments received from registered I&APs.
- A description of the need and desirability of the proposed project and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.
- An indication of the methodology used in determining the significance of potential environmental impacts.
- A description and comparative assessment of all alternatives identified during the environmental impact assessment process.
- A summary of the findings and recommendations of specialist reports.
- A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures.
- An assessment of each identified potentially significant impact.
- A description of any assumptions, uncertainties and gaps in knowledge.
- An environmental impact statement which contains:
  - a summary of the key findings of the environmental impact assessment
  - a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives.
- A draft environmental management plan
- Copies of specialist reports

The draft EIA Report will be released for a 30-day public review period. The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the final EIA Report, for submission to the authorities for decision-making.

9.7. Public Participation Process

A public participation process will be undertaken by Sustainable Futures ZA in conjunction with Savannah Environmental.

Consultation with key stakeholders and I&APs will be on-going throughout the EIA process. Through this consultation process, stakeholders and I&APs will be encouraged to identify additional issues of concern or highlight positive aspects of the project, and to comment on the findings of the EIA process.

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs regarding the project, various

opportunities will be provided for stakeholders and I&APs to be involved in the EIA phase of the process, as follows:

» Focus group meetings (pre-arranged and stakeholders invited to attend).
» One-on-one consultation meetings (for example with directly affected landowners).
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The draft EIA report will be made available for public review for a 30-day period prior to finalisation and submission to DEAT for review and decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a public feedback meeting will be held during this public review period.

7.3. Key Milestones of the programme for the EIA

The envisaged key milestones of the programme for the Environmental Impact Assessment (EIA) phase of the project are outlined in the table below.

Key Milestone Activities	Proposed completion date[11]
Finalisation of Scoping Report	July 2008
Authority acceptance of the Scoping Report and Plan of Study to undertake the EIA	August 2008
Undertake detailed specialist studies and public participation process and compile Draft EIA Report and Draft EMP	August 2008 – October 2008
Make Draft EIA Report and Draft EMP available to the public, stakeholders and authorities	October 2008

[11] Indicative dates only

REFERENCES CHAPTER 10

Afrosearch, 2005. Social Impact Assessment for the proposed Open Cycle Gas Turbine Power Plant at Atlantis. Prepared for: Bohlweki Environmental.

Anderson, M.D. 2001. The effectiveness of two different marking devices to reduce large terrestrial bird collisions with overhead electricity cables in the eastern Karoo, South Africa. Draft report to Eskom Resources and Strategy Division. Johannesburg. South Africa.

Avian Power Line Interaction Committee (APLIC). 1994. Mitigating Bird Collisions with Power Lines: The State of the Art in 1994. Edison Electric Institute. Washington D.C.

Barbour, T. 2007. Guidelines for involving Social Specialists in an EIA. Prepared for: Western Cape Department of Environmental Affairs and Development Planning

Barnes, K.N. (ED.) 1998. The Important Bird Areas of southern Africa. Birdlife South Africa: Johannesburg.

Barnes, K.N. (ED.) 2000. The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. BirdLife South Africa: Johannesburg.

Beckman, R. 2008. Update on recent Gourikwa Issues. Presentation to the Mossel Bay Stakeholder Forum. 6 March 2008

Chief Director of Surveys and Mapping, varying dates. 1:50 000 Topo-cadastral Maps

Coetzee, L. 2007. Social Impact Assessment for the proposed expansion of Eskom's OCGT plant in Mossel Bay. Prepared for Ninham Shand.

Cowling, R. and C. Heijnis. 2001. The identification of Broad Habitat Units as biodiversity entities for sytematic conservation planning in the Cape Floristic Region. SA J Bot. 67: 15 – 38.

Cowling, R., A. Lombard, M. Rouget, G. Kerley, T.Wolf, R. Sims-Castley, A. Knight, J. Vlok, S. Pierce, A. Boshoff, and S. Wilson. 2003. A conservation assessment for the Subtropical Thicket Biome. Terrestrial Ecology Research Unit, Univ. of Port Elizabeth. Report 43.

Curtis W. Marean, Miryam Bar-Matthews, Jocelyn Bernatchez, Erich Fisher, Paul Goldberg, Andy I. R. Herries, Zenobia Jacobs, Antonieta Jerardino, Panagiotis Karkanas, Tom Minichillo1, Peter J. Nilssen, Erin Thompson, Ian Watts & Hope M. Williams, 2007 Early human use of marine resources and pigment in South Africa during the Middle Pleistocene Nature 449, 905-908

DEAT, 1992. Noise Control Regulations (Section 25). Environmental Conservation Act 73 of 1989. Gov. Gaz. No. 13717, 10 January 1992.

DEAT, 2006. Government Gazette, National Environmental Management Air Quality Act, 2004, No. 28899.

De Villiers, C., Driver, A., Brownlie, S., Clark, B., Euston Brown, D., Helme, N., Holmes, P., Job, N., and Rebelo, A. 2005. Fynbos Forum Ecosystem

Guidelines for Environmental Assessment in the Western Cape. Fynbos Forum c/o Botanical Society of SA: Conservation Unit, Kirstenbosch, Cape Town.

Environment Conservation Act, 1989 (Act 73 of 1989). Noise Control Regulations.

Eskom, 2008. Validation of the Atmospheric Dispersion Modelling Conducted for the Gourikwa Open Cycle Gas Turbine. Report No: GEM08_R004, 25 February 2008.

George Leith and T. Rupert Jones 1899 On the Caves, Shell-Mounds and Stone Implements of South Africa The Journal of the Anthropological Institute of Great Britain and Ireland, Vol. 28, No. 3/4 (1899), pp. 258-274 (Published by: Royal Anthropological Institute of Great Britain and Ireland)

Goodwin, AJH. 1929. The Stone Age Cultures of South Africa.

Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V And Brown, C.J. (Eds). 1997. The atlas of southern African birds. Vol. 1&2. BirdLife South Africa: Johannesburg.

Hart, TJG 2005. Initial heritage statement: proposed OCGT site and transmission lines at Mossel Bay. Specialist report prepared for Ninham Shand Consulting.

Hart, TJG 2006 Archaeological Impact Assessment: Proposed Eskom Transmission lines from OCGT site to Proteus substation, Mossel Bay, South Western Cape. Specialist report prepared for Eskom.

Helme, N. 2005. Botanical assessment of proposed Eskom OCGT plant and associated transmission lines and substation , Mossel Bay. Unpublished report for Ninham Shand, Cape Town. Nick Helme Botanical Surveys, Scarborough.

Hilton-Taylor, C. 1996. Red data list of southern African plants. Strelitzia 4. SANBI, Pretoria.

Hobbs, J.C.A. and Ledger J.A. 1986a. The Environmental Impact of Linear Developments; Power lines and Avifauna. (Third International Conference on Environmental Quality and Ecosystem Stability. Israel, June 1986).

Hobbs, J.C.A. and Ledger J.A. 1986B. “Power lines, Birdlife and the Golden Mean.” Fauna and Flora, 44, pp 23-27.

Kruger, R. and Van Rooyen, C.S. 1998. Evaluating the risk that existing power lines pose to large raptors by using risk assessment methodology: the Molopo Case Study. (5th World Conference on Birds of Prey and Owls: 4 - 8 August 1998. Midrand, South Africa.)

Kruger, R. 1999. Towards solving raptor electrocutions on Eskom Distribution Structures in South Africa. M. Phil. Mini-thesis. University of the Orange Free State. Bloemfontein. South Africa.

Ledger, J. 1983. Guidelines for Dealing with Bird Problems of Transmission Lines and Towers. Escom Test and Research Division Technical Note TRR/N83/005.

Ledger, J.A. AND ANNEGARN H.J. 1981. “Electrocution Hazards to the Cape Vulture (Gyps coprotheres) in South Africa”. Biological Conservation, 20, pp15-24.

Ledger, J.A. 1984. “Engineering Solutions to the problem of Vulture Electrocutions on Electricity Towers.” The Certificated Engineer, 57, pp 92-95.

Ledger, J.A., J.C.A. Hobbs and Smith T.V. 1992. Avian Interactions with Utility Structures: Southern African Experiences. (Proceedings of the International Workshop on Avian Interactions with Utility Structures, Miami, Florida, 13-15 September 1992. Electric Power Research Institute.)

Low, A.B. & Rebelo, A.G. (EDS). 1996. Vegetation of South Africa, Lesotho and Swaziland. Department of Environmental Affairs and Tourism, Pretoria.

Marean, CW, Nillssen, P., Brown, K., Jerardino, A., Stynder, D. 2004. Palaeoanthropological investigations of Middle Stone Age sites at Pinnacle Point, Mossel Bay, South Africa. On Line Journal of the Palaeoanthropological Society, Pennsylvania.

MasterQ, 2007. Social Impact Assessment conducted for the Proposed capacity expansion of the existing open cycle gas turbine (OCGT) plant and associated transmission lines and substation at Atlantis, Western Cape Province. Prepared for: Bohlweki Environmental

McCann, K., Morrison, K., Byers, A., Miller, P. & Friedman, Y. (eds). 2001. Population and Habitat Viability Analysis for the Blue Crane (Anthropoides paradiseus). Conservation Breeding Specialist Group (SA), Endangered Wildlife Trust, Johannesburg.

MetroGIS (Pty) Ltd, 2008. Ankerlig Power Station Conversion and Transmission Integration Project.

Mucina, L. and M. Rutherford. Eds. 2006. Vegetation map of South Africa, Lesotho, and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Ninham Shand, 2007. Environmental Impact Assessment: Open Cycle Gas Turbine Power Plant in Mossel Bay: Proposed Additional Units. Final Environmental Impact Report. April 2007.

Pule, D. 2008. Commercial Presentation to the Mossel Bay Stakeholder Forum. 6 March 2008

Raimondo, D. et al. In prep. Updated Red Data Book of threatened plants of South Africa. To be published by the South African National Biodiversity Institute.

Ramonotsi, C. Eskom Development Foundation Presentation to the Mossel Bay Stakeholder Forum. 6 March 2008

Rebelo, A., N. Helme, J. Victor, D. Euston-Brown, W. Foden, I. Ebrahim, B. Bomhard, E.G.H. Oliver, D. Raimondo, J. Van der Venter, R. van der Walt, C. Von Witt, C.N Forshaw, A.B. Low, C. Paterson Jones, D. Pillay, P.M. Holmes, S.H. Richardson, J.P. Rourke, and J. Vlok. In Preparation. Southern African Red Data list for Proteaceae.

Rouget, M., Reyers, B., Jonas, Z., Desmet, P., Driver, A., Maze, K., Egoh, B. & Cowling, R.M. 2004. South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 1: Terrestrial Component. Pretoria: South African National Biodiversity Institute.

South African National Standards (SANS) 10103:2004. The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.

South African National Standards (SANS) 1929: 2005. South African National Standard, Ambient air Quality – Limits for common pollutants.

Southern Hemisphere. 2008. Social Scoping for the proposed conversion of Eskom's OCGT plant in Atlantis. Prepared for Savannah Environmental.

Urban Econ. 2005. Eskom OCGT Power Plant Socio-Economic Impact Study.

Vanclay, F. 2002 'Social impact assessment', in Tolba, M. Responding to Global Environmental Change, Chichester: Wiley, 387-393.

Van Rooyen, C.S. and Ledger, J.A. 1999. "Birds and utility structures: Developments in southern Africa" in Ferrer, M. & G..F.M. Janns. (eds.) Birds and Power lines. Quercus: Madrid, Spain, pp 205-230

Van Rooyen, C.S. 1998. Raptor mortality on power lines in South Africa. (5th World Conference on Birds of Prey and Owls: 4 - 8 August 1998. Midrand, South Africa.)

Van Rooyen, C.S. 1999. An overview of the Eskom - EWT Strategic Partnership in South Africa. (EPRI Workshop on Avian Interactions with Utility Structures 2-3 December 1999, Charleston, South Carolina.)

Van Rooyen, C.S. 2000. "An overview of Vulture Electrocutions in South Africa." Vulture News, 43, pp 5-22. Vulture Study Group: Johannesburg, South Africa.

Van Rooyen, C.S. 2003. Mitigation programme for Avian Collisions with Eskom Transmission Lines. Unpublished Progress Report, September 2003. Endangered Wildlife Trust, Johannesburg, South Africa.

Van Rooyen, C.S. 2004. The Management of Wildlife Interactions with overhead lines. In The fundamentals and practice of Overhead Line Maintenance (132kV and above), pp217-245. Eskom Technology, Services International, Johannesburg.

Van Rooyen, C.S. and Taylor, P.V. 1999. Bird Streamers as probable cause of electrocutions in South Africa. (EPRI Workshop on Avian Interactions with Utility Structures 2-3 December 1999. Charleston, South Carolina)

Verdoorn, G.H. 1996. Mortality of Cape Griffons Gyps coprotheres and African Whitebacked Vultures Pseudogyps africanus on 88kV and 132kV power lines in Western Transvaal, South Africa, and mitigation measures to prevent future problems. (2nd International Conference on Raptors: 2-5 October 1996. Urbino, Italy.)

Vlok, J. and R. de Villiers. 2007. Vegetation mapping component of Fine Scale Mapping Project for Riversdale Plain. Unpublished report for CapeNature. Regalis Environmental Services, Oudtshoorn.