SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED POWER STATION CONVERSION CHAPTER 6

This section of the Scoping Report serves to evaluate the identified potential environmental (social and biophysical) impacts associated with the proposed conversion of the OCGT units at the Ankerlig Power Station to CCGT units. Potential direct and indirect impacts of the proposed conversion project are evaluated, and recommendations are made regarding further studies required within the EIA phase of the process.

The cumulative impacts associated with the proposed power station conversion project are expected to be associated with the addition of infrastructure onto the existing power station footprint and are largely associated with visual impacts of the facility on the surrounding environment. Cumulative effects can only be assessed once the detailed design information becomes available, and will be considered in the detailed specialist studies to be undertaken in the EIA phase.

6.1. Potential Impacts on Air Quality

The Ankerlig Power Station is situated on the western side of the Atlantis Industrial Zone. This area is located approximately 7 km inland from the Cape West Coast, approximately 40 km north of Cape Town. The existing Ankerlig Power Station is approximately 10 km northeast of Eskom's Koeberg Nuclear Power Station.

The existing air quality in the area is relatively good. There are several air pollution sources in the Atlantis Industrial area that could potentially have a negative impact on the ambient air quality. Apart from industrial activities in the area, other potential air pollution sources include vehicular traffic, domestic fires, ploughed fields and non-vegetated land.

Potentially sensitive receptors surrounding the power station site include (refer to Figure 6.1):

» The residential township of Atlantis
» The informal settlement of Witzand
» Open farmlands in the vicinity of the power station site

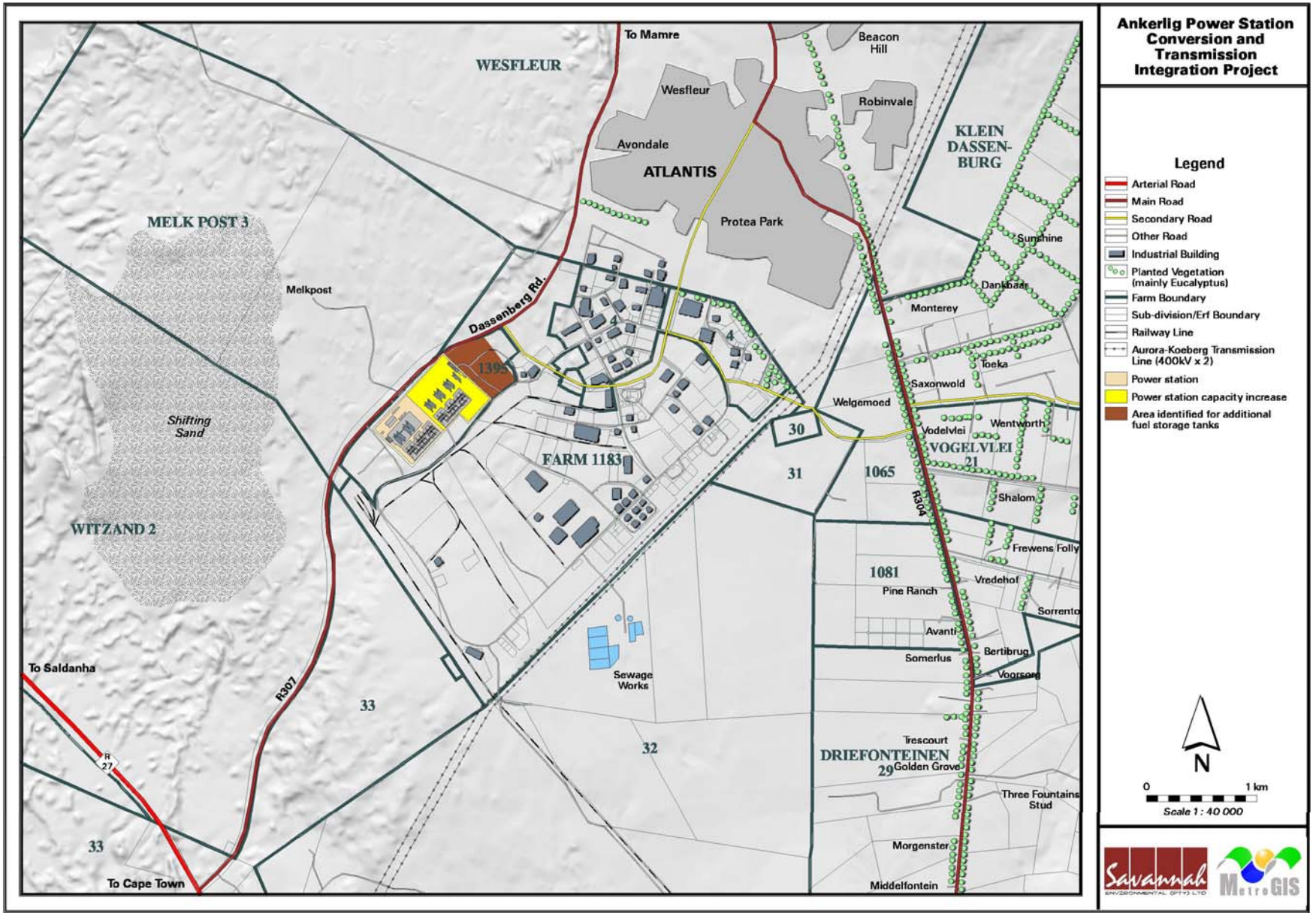

Figure 6.1: Locality map showing the power station site in relation to surrounding areas

6.1.1. Nature and Extent of Impacts

Potential impacts are associated with both the construction and operational phases of the proposed power station conversion project. The main air pollution sources identified to be associated with the proposed power station conversion include:

» The various construction activities during the construction phase.
» The turbine combustion emissions during the normal operation phase.
» The turbine combustion emissions during start-up and upset conditions.

» *Potential Impacts during the Construction Phase:*
Dust will be generated through the various construction activities of the proposed CCGT power station. The greatest impact of the dust will be limited to the immediate vicinity of the proposed site. With appropriate mitigation, such as dust suppression, this impact would be of low significance. Air pollution impacts arising from exhaust emissions during construction are expected to be of short duration and local extent. The air pollution impacts associated with these activities are anticipated to be small and localised and, therefore, do not require any further investigation.

» *Potential Impacts during the Operational Phase*
The exhaust emissions during normal operation, start-up and upset conditions can have a negative impact on the air quality of residential townships in close proximity to the power station. The type of emissions are not expected to change from those currently generated by the 9 OCGT units, since instead of being released into the atmosphere after the turbines, as the gases from the OCGT plant will pass through a heat recovery system and then be released. The only variations to the OCGT emissions will be the different release heights of the new stacks and the temperature of the emitted gases. These changes could have a small additional negative impact on potentially sensitive receptors in the vicinity of the power station. If vapour recovery systems are installed on fuel storage tanks, air pollution impacts associated with emissions from fuel storage tanks are anticipated to be small. The extent of potential impacts associated with all emissions from the power station will need to be quantified and assessed in the EIA.

Potential impacts on human health could potentially occur where people live in close proximity to the power station site. The duration of these impacts will be long-term, i.e. for the lifespan of the project. The extent of potential impacts will need to be assessed in the EIA.

It should be noted that the utilisation of natural gas as a replacement for diesel as a fuel source is currently under investigation. Should this fuel

source change occur, it is expected that the operational impacts could be reduced, since natural gas is expected to have lower SO_2, CO and particulate emissions than diesel. However, it is envisaged that the CCGT units would initially be diesel-fired, until such time that natural gas becomes available. The emission reductions due to the fuel conversion will be estimated and the impact reductions assessed in the detailed EIA. Air quality modelling will be undertaken for both the use of diesel and natural gas as fuel sources.

6.1.2. Conclusions and Recommendations

In order to determine existing air quality and potential air pollution impacts as a result of the proposed power station conversion project and to make recommendations with regards to mitigation measures, as well as air quality monitoring (if deemed necessary), a specialist air quality impact assessment must be undertaken in the EIA Phase. This study will consider the following conditions:

» Normal operations
» Start-up and upset conditions

6.2. Potential Noise Impacts

The existing noise environment in the residential areas surrounding the Ankerlig Power station is typical of a suburban residential area next to an industrial zone. The noise environment is affected by localised vehicular traffic from the R27 and R307, human activities and the industrial activities in the Atlantis Industrial area.

The acceptable daytime and night time rating levels in a residential district with little road traffic are, respectively, 50 dBA and 40 dBA. For a rural residential district the acceptable levels are, respectively, 45 dBA and 35 dBA. Noise levels measured in the Avondale area (within the Atlantis residential area) as part of the previous EIA processes (Jongens, 2005) were found to be between 35 dBA and 39 dBA, with an average of 38 dBA. The measured ambient noise levels within Atlantis Industria were significantly less than the acceptable daytime rating levels of noise for both a suburban residential district and a rural residential district.

Noise impacts associated with the existing OCGT units at the Ankerlig Power Station on the Atlantis residential area and surrounding farm areas is considered to be limited, and would decrease with increased distance from the power station (DDA, 2007).

6.2.1. Nature and Extent of Impacts

The conversion of the Ankerlig Power Station units from open cycle to combined cycle will introduce additional noise sources, including:

» The construction equipment and activities during the construction phase.
» The equipment during the operational phase such as:
  * the 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
  * the air-cooled condenser system associated with the dry-cooling system

» *Potential Impacts during the Construction Phase:*
  Noise associated with construction activities is generally of local extent and short duration. The construction operations are not expected to have any significant impact on the nearest communities in Atlantis. The noise impact therefore is expected to be of low significance.

» *Potential Impacts during the Operational Phase:*
  The introduction of additional noise sources could have additional impacts (direct and cumulative impacts) as a result of the increase of the noise levels within and around the power station site. The duration of the noise impact is expected to be long-term, i.e. for the duration of the operational life of the project. The extent is expected to be of low to medium significance, depending on the final design and any mitigation implemented.

6.2.2. Conclusions and Recommendations

In order to determine the nature and extent of the noise emissions from the CCGT units, the information regarding the reduction efficiency and the noise emissions will need to be obtained from the design engineers and included in the assessment within the detailed EIA phase. The noise sources will then be used in a noise model in order to calculate the resulting noise levels around the power station and assess the impacts. This detailed assessment will be performed in the EIA phase.

6.3. Potential Visual Impacts

The Ankerlig Power Station site is removed from major centres, tourist attractions and major roads. It is located next to the R307 (Dassenberg Road) that functions as the primary access route to Atlantis and Mamre (north of Atlantis) from Cape Town. The closest major road is the R27 (about 5 km from the site). The R27 functions as the primary connector between Cape Town, Saldanha and the West Coast National Park. Significant landmarks in the wider area are the existing Ankerlig Power Station, Koeberg nuclear power station located some 9 km to the south-west, and the town of Mamre located some 3 km to the north.

6.3.1. Nature and Extent of Impacts

The conversion of the power station from OCGT to CCGT technology, as a visual concern, primarily entails the increase of the dimensions of the gas turbine units. The tallest of the new components (such as the smokestacks) will be 60 m tall whereas the existing tallest structures (exhaust stacks) are 30 m tall. Additional infrastructure associated with the conversion project includes the construction of a small water reservoir (2 Ml) and eight additional fuel tanks (with a total capacity of approximately 43 million litres) east of the OCGT capacity increase area.

An initial viewshed analysis of the proposed Ankerlig Power Station conversion project, based on a 5 m contour interval digital terrain model of the study area, indicates the visibility of the OCGT plant at full capacity (i.e. nine turbine units) and the potential future visual exposure after the conversion (refer to Figure 6.2). The object offset for the current power station was taken at a maximum 30 m above ground level (i.e. the height of the OCGT smoke stacks) and the proposed converted power station was taken at 60m offset above ground level[21].

It becomes apparent that the facility would be relatively exposed due to the predominantly flat topography of the region. The general trend of the visual exposure (for the OCGT power station) shows a larger area with a short to medium distance exposure, and a smaller, scattered area with medium to long distance exposure. The areas shown in red in Figure 6.2 indicate the potential additionally exposed land after the conversion to a CCGT power station. The increase in dimensions of the power station following the conversion process will potentially increase the medium to long distance exposure of the power station, especially to the south-east of the industrial area.

[21] This viewshed analysis is based on the OCGT/CCGT plant alone and does not include the proposed Ankerlig - Omega transmission power line integration. Separate viewshed analyses were done for the three transmission power line alternatives (refer to Chapter 7).

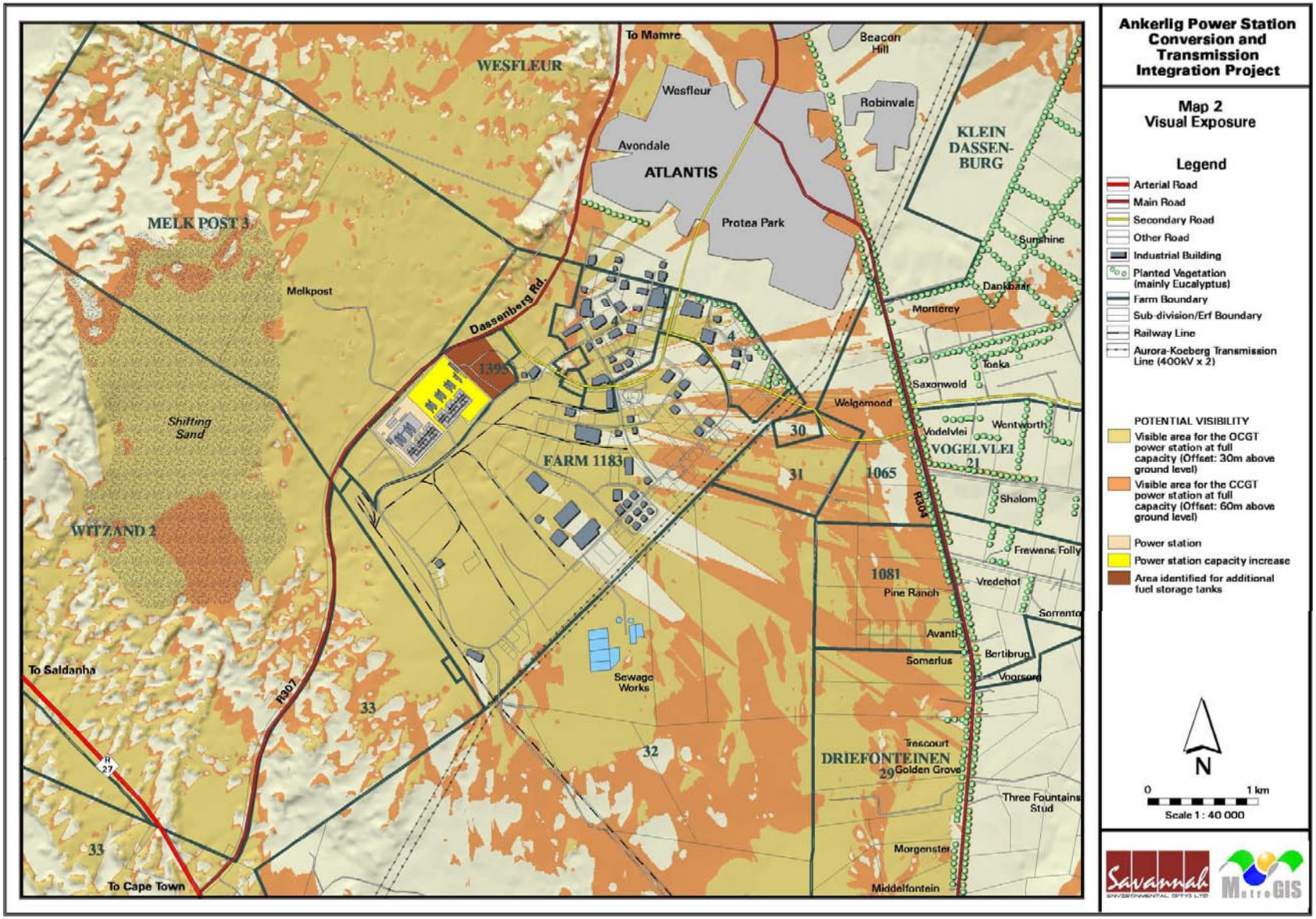

Figure 6.2: Potential visual exposure of the Ankerlig power station

6.3.2. Conclusions and Recommendations

The fact that these additional areas are exposed does not imply that it constitutes a significant visual impact, at least not for all of the exposed areas. Further investigation is necessary in order to determine the specific visual impact within these exposed areas (i.e. the potential occurrence of sensitive visual receptors).

The visual impact assessment within the EIA will address issues related to the visibility of the proposed OCGT to CCGT conversion project, as well as potential cumulative visual impact of the power station conversion project. These issues or criteria will aim to quantify the actual visual impact and to identify areas of perceived visual impact.

6.4. Potential Impacts on Vegetation

The study area is part of the Cape Floristic Region, a renowned botanical hotspot with a very high percentage of endemic plant species (species restricted to that area) and threatened plant species. Almost 85% of the threatened plants found in South Africa are restricted to the Cape Floristic Region. Cape Flats Dune Strandveld is the main vegetation type within the area surrounding the power station site. This vegetation type is regarded as an Endangered vegetation type in terms of the NSBA (Rouget et al., 2004), and is restricted to the Atlantis area, the Cape Flats, and the south Peninsula.

The ecology of the power station site has been largely transformed through the construction of the existing Ankerlig Power Station. Small portions of vegetation do, however, still exist in areas not directly impacted by construction, such as the area proposed for the establishment of additional fuel storage tanks.

6.4.1. Nature and Extent of Impacts

It is expected that the vegetation structure and species composition is likely to be very (>80%) similar to that on the adjacent portion to the west that was part of the recent application for the power station expansion. It is possible that up to three threatened plant species still occur in limited numbers on the site. However, it is considered fairly unlikely that these constitute regionally significant populations, partly because the site is fairly small, and partly because the site is already partly degraded (as evidenced by the patches of dense invasive *Acacia cyclops* and open sand, in total covering up to 30% of the site). The local conservation value of the site is likely to be Medium, and the regional conservation value is likely to be Low to Medium. The loss of the site is unlikely to have major regional consequences from an ecological process perspective, as the main part of the Atlantis Industrial area is to the east of the site, with no natural vegetation of significance.

6.4.3. Conclusions and Recommendations

It is recommended that a botanical survey of the site be undertaken as part of the EIA Phase. As far as possible, this survey should be undertaken during the period June – August. The aim of this survey will be to assess the condition and connectivity of the proposed fuel storage site from an ecological perspective, assess the likelihood of occurrence of threatened or localised plant species, assess the size and viability of populations of any such species, and make recommendations for mitigation, including recommendations in terms of a possible biodiversity offsets (if required).

6.5. Potential Impacts on the Social Environment

The Ankerlig Power Station site is located within the Koeberg and Blaauwberg sub-councils of the City of Cape Town Metropolitan Municipality in the Western Cape Province. The population potentially affected by the development include residents of Atlantis, particularly the suburbs of Avondale, Wesfleur, Protea Park, Beacon Hill and Robinvale, and the nearby informal settlement of Witsand, situated in close proximity to the Industrial area.

6.5.1. Nature and Extent of Impacts

Potential impacts on the social environment as a result of the proposed power station conversion project are expected to occur as a result of both the construction and operational phases. Potential impacts are expected to be similar to those that were identified for the initial OCGT development, which was assessed in 2005 (Afrosearch, 2005) as well as the expansion of the OCGT plant, which was assessed at the beginning of 2007 (MasterQ, 2007).

» *Potential Impacts during the Construction Phase:*

Temporary local employment opportunities

Construction activities will create a number of temporary employment opportunities, resulting in a positive economic impact, albeit limited. In addition to creating job opportunities for construction workers, the project may also offer other sources of temporary employment. These include possible indirect employment creation in the informal sector, for instance catering for construction workers (Afrosearch, 2005).

The issue of local employment has been raised as part of this EIA process (refer to Appendices H and I). It has been recommended in previous assessments that local labour be used as far as possible. The MasterQ (2007) assessment noted however that it seemed as if some community members were dissatisfied with the process followed to employ local labour through a third party labour broker during the initial OCGT construction process. It was

recommended that the procurement process followed for the expansion should be closely monitored by Eskom to ensure that the process is transparent and equal opportunities are afforded.

Potential impacts are expected to be of low to medium significance at the local level. The magnitude of this impact will depend on the number of construction workers to be employed, either by Eskom itself or by contractors.

Although the impact on employment will be temporary, due to high levels of poverty and unemployment, any impact on job creation in the area will have some positive impact and thus be of some positive significance. This impact can be optimised by focusing on local employment creation where possible, and addressing current community concerns. This will be discussed in more detail in the detailed SIA to be undertaken in the EIA phase of the process.

Influx of job seekers and housing of temporary workers

As news regarding the proposed project spreads, expectations regarding possible employment opportunities may take root. Consequently, the area surrounding the site could experience an influx of job seekers. This can result in an increase in social problems such as alcohol abuse, and prostitution (Afrosearch 2005). If the area experiences an influx of job seekers, competition over scarce employment opportunities may give rise to conflict between local residents and newcomers. An influx of newcomers might also be accompanied by an increase in crime' Even if particular instances of crime are not as a result of the newcomers, they may still be attributed to them by local communities (Afrosearch 2005).

If construction workers are not sourced locally, but are housed close to the site, this may also lead to conflict with locals (Afrosearch 2005). Conversely the presence of temporary workers could provide a small stimulus to the local economy if accommodation for such workers could be procured locally. Possible population influx that may be caused by additional developments at and around the power station site can be considered a cumulative impact related to general development in the area. Concerns regarding housing of temporary workers brought from other areas during the construction phases have been raised within the public participation process undertaken as part of this EIA process (refer to Appendices H and I).

The extent to which Eskom's operations associated with the power station conversion will specifically add to this impact cannot easily be quantified, but measures can be put in place to minimise possible social disruption caused by such influx.

Increase in traffic as a result of construction traffic

Increase in traffic during the construction phase can potentially result in the disruption of daily movement patterns. Depending on access routes that are used, construction vehicles could impact on safety and daily movement patterns of residents in surrounding communities. The magnitude of this impact will depend on current traffic volumes, traffic volumes that will be associated with construction activities, as well as construction schedules (Afrosearch 2005), but is expected to be similar to that experienced during the construction phases associated with the OCGT power station (initial 4 units) and the current expansion activities (additional 5 units). According to the traffic study undertaken by SSI for the power station expansion project (SSI, 2007), the traffic impact of construction traffic on traffic movements was expected to be negligible. No complaints regarding construction traffic movements were received during the construction phase of the initial OCGT units or as a result of current construction traffic associated with the power station expansion. The traffic impact of construction traffic on pavement loading was, however, expected to be significant, with the impact expected to accelerate road rehabilitation programmes by 10 – 14%. Quantification of the impact which the traffic associated with the power station has on the road pavement and the associated impact on road rehabilitation programmes is currently being undertaken. The results of this study will inform the assessment of impacts within the EIA Phase.

The potential impact on daily movement patterns as a result of construction traffic is expected to be of low to medium significance at a regional scale[22]. The assessment of this impact will be informed by the Transport Study undertaken for the initial OCGT process.

Impacts on Sense of Place[23]

As the proposed Ankerlig Power Station Conversion would take place in the Atlantis Industrial Area, on a site currently occupied by the Ankerlig Power Station, impact on sense-of place can be expected to be limited. It is however worth noting that the tallest of the new components (such as the smokestacks) will be 60 m tall whereas the existing tallest structures (exhaust stacks) are 30 m tall. Eskom are also proposing additional fuel storage on the site.

[22] Because this impact may be felt along access routes between the supply point of the power station components (possibly Cape Town harbour) and the Ankerlig Power Station site, and not only within communities adjoining the site, the extent of the impact may be widespread rather than concentrated in the study area (Afrosearch 2005).

[23] 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.

To the extent that such impacts may occur, their significance would relate largely to other impacts, notably visual and noise impacts, as well as impacts on air quality and traffic volumes, which need to be taken into consideration in assessing this impact. Potential visual, air quality and noise impacts that may be associated with the construction phase of the conversion project have been addressed in separate specialist assessments (refer to Sections 6.1, 6.2 and 6.3).

» *Potential Impacts during the Operational Phase:*

Provision of electricity: Local/regional/national linkages and macro-economy

The purpose of the Ankerlig Conversion project is to improve Eskom's capacity to provide for South Africa's increasing demands for electricity in the medium-term (i.e. until 2014). The most significant and far reaching social impact during the operational phase of the project will hence be the provision of electricity for the South African population.

Electricity supply makes an important contribution towards economic growth, and hence to employment creation and poverty alleviation on a national level. If peak demand exceeds supply, the reliability and quality of electricity services will be negatively impacted (Afrosearch 2005). Unreliable electricity supply is likely to have significant negative economic (and hence social) consequences, as has been evidenced particularly in the Western Cape in 2006. These impacts derive from the fact that several economic sectors - manufacturing industries, in particular - are dependent on the electricity sector for their operation and survival. Electricity generation and provision therefore constitute an enabling industry without which few other industries would be able to flourish (Afrosearch 2005).

Therefore, the impact associated with the proposed project is expected to be one of high positive significance at a national level.

Ongoing employment opportunities for locals

Given the technical nature of the operation, it is unlikely that employment opportunities will benefit members of local communities. However, local communities might reap benefits from employment opportunities created by the need for support services such as additional provision of stationary, cleaning services, gardening services, catering services, etc which may be associated with the proposed conversion project. Although some local people have also trained as operators and maintainers, it is unlikely that the operation of the CCGT power station units will employ more people than is currently the case at the existing power station. Therefore, an impact of low to no positive significance is expected at a local scale.

Social Investment

As the number of employment opportunities that will be created during the operational phase of the project will be limited, it will be necessary to augment the benefits for surrounding communities by implementing appropriate social investment activities. The Afrosearch assessment (2005) recommended that Eskom undertake a community needs analysis and consult with local community leaders to identify the most appropriate social investment activities.

Social development initiatives that have since been implemented by Eskom as well as the contractors involved during construction of the OCGT station include development assistance given to upgrade a Multi Purpose Community Centre (MPCC), as well as to various schools, the Wesfleur Hospital, and sporting facilities (MasterQ, 2007). Queries concerning Eskom's Social Responsibility and plans for Social Investment in the area were again raised within the public participation process being undertaken for this EIA process.

An impact of low to high positive significance can be expected, depending on the type and extent of Social Investment implemented by Eskom.

Increase in traffic as a result of increased fuel transport

Concerns regarding the potential impact that road transport of fuels to the Ankerlig site will have on traffic were raised in the public participation process being undertaken as part of the EIA for this project. Fuel is currently transported to the Ankerlig Power Station site from the fuel supply point in Milnerton by road.

The independent detailed investigation of Fuel Supply to the Atlantis Site undertaken in 2005 indicated that road based alternatives from the Caltex Refinery in Milnerton to Table Bay are the most cost effective and safest options. According to the traffic study undertaken by SSI for the power station expansion project (SSI, 2007), the traffic impact of fuel tanker traffic on traffic movements was expected to be small to insignificant. The cumulative pavement loading of the fuel tankers over 25 years is expected to vary with a maximum of 12,4% predicted to occur on Neil Hare Road. Quantification of the impact which the traffic associated with the power station has on the road pavement and the associated impact on road rehabilitation programmes is currently being undertaken. The results of this study will inform the assessment of impacts within the EIA Phase.

As a result of the higher load factor associated with the CCGT power station to meet the need for mid-merit capacity[24], additional fuel consumption would be

[24] Mid-merit capacity is during the daytime from about 6 am to about 10 pm on weekdays.

required. Eskom would therefore require additional fuel to be transported to the power station site. The findings of the traffic impact studies undertaken as part of the previous EIAs conducted, as well as the traffic study to be undertaken as part of this EIA process (refer to Chapter 9) will be used as the basis for the assessment of potential impacts on the social environment in this regard during the EIA process.

In addition, in order to limit impacts associated with fuel transport to the power station site, the installation of a liquid fuel pipeline to the Ankerlig Power Station, as well as transport of fuel by rail is currently being investigated as part of a separate EIA application being undertaken by Bohlweki Environmental (DEAT reference number 12/12/20/955).

Impacts on Health and Safety

Concern has been expressed throughout previous Public Participation processes, and again reiterated during the public participation process undertaken as part of this assessment, regarding potential health and safety implications that may result from:

* Transportation of fuel
* Storage of fuel
* Impacts on air quality during operation
* Potential impacts on water availability and quality of water

These potential impacts were assessed within the initial OCGT power station (Bohlweki Environmental, 2005) and the power station expansion (Bohlweki Environmental, 2007). The findings of these studies will be used as the basis for the assessment of these potential impacts on the social environment during the EIA process. Impacts are expected to be localised and of low to medium significance.

Impact on sense of place

As the proposed Ankerlig Conversion would take place in the Atlantis Industrial Area, on a site currently occupied by the Ankerlig OCGT power station, impact on sense-of place can be expected to be limited. It is however important to note that the community already perceives itself as vulnerable to a variety of developments which many feel are being 'dumped' on them. The impact on sense of place can thus be regarded as a cumulative impact, whereby Atlantis residents increasingly feel victim to broader developments in the area which potentially impact on them.

To the extent that such impacts may occur, their significance would relate largely to other impacts, notably visual and noise impacts, as well as impacts on air quality and traffic volumes, which need to be taken into consideration

in assessing this impact. These will be assessed based on a review of separate studies undertaken for this and previous processes.

» *Possible interest group activity*
The effects of exposure to risk (whether real or perceived) are among the most significant potential social impacts of the project. Apart from psychological effects such as increased stress and psychosomatic symptoms, it may lead to interest group activity and social mobilisation against the project. Some interest group activity was already evident at the time of the Afroseach (2005) assessment undertaken for the initial OCGT development (i.e. initial 4 units).

The MasterQ (2007) Assessment undertaken for the expansion project (i.e. additional 5 units) noted that some interest group activity was still evident. Potential interest group activity is linked to potential health and safety impacts (see above). Objections by members of the Atlantis community against industrial developments in the area were made during public/focus group meetings: "Atlantis has become a convenient dumping ground for these kinds of projects." (MasterQ 2007).

Following the previous EIA processes undertaken, a Community Monitoring Committee (CMC) was established to liaise between the project and the local community, but it was noted during the public participation process being undertaken as part of this assessment that this committee is no longer functional. Concerns were raised concerning the way the committee, which was not considered representative of the broader Atlantis community, was elected.

6.5.3. Conclusions and Recommendations

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

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

The 'do-nothing' alternative is the option of not converting the existing Open Cycle Gas Turbine units at Ankerlig Power Station to Combined Cycle Gas Turbine units.

The electricity demand in South Africa is placing increasing pressure on Eskom's existing power generation capacity. Using the strategic electricity planning in place (refer to Chapter 2) and taking into account the continued growth in

electricity demand, Eskom has determined that there is a need for additional power generation capacity in the medium-term. In considering the most suitable options to meet the increased electricity demand in the mid-term (i.e. by 2011), Eskom has concluded that the most feasible option is the conversion of the existing Ankerlig OCGT units to CCGT units, thereby generating additional capacity for the same amount of fuel (under a similar operating regime). The CCGT units can be operated for longer periods than the OCGT units, and can therefore be successfully utilised as mid-merit capacity, with the OCGT units still being available for use during peaking periods.

The do-nothing option will result in electricity demands in the medium-term not being met. This has serious short- to medium-term implications for economic growth, and hence to employment creation and poverty alleviation on a national level.

An economic analysis conducted by Global Insight (2005) for the first phase of the OCGT Development offers an estimate of the cost of un-served energy that would result if the OCGT power station at Atlantis were not constructed. If it is assumed that the power station will operate at a 5% load factor and that failure to construct the power station will result in an inability to meet peak electricity demand for 438 hours per year over a five-year period, the analysis indicates that the resultant cost of un-served energy will amount to a total of nearly R20 billion (Afrosearch 2005).

It should be noted that this estimate is a conservative one, as it ignores the possibility of additional indirect economic cost effects associated with un-served energy. In the context of a global economy, for example, industries faced with a situation where they are unable to depend on a reliable and uninterrupted electricity supply may well decide to invest in other locations where this need is adequately satisfied. The cost incurred through such indirect impacts could be many times higher than the estimated provided above (Afrosearch 2005).

Therefore, this option is rejected as a feasible alternative.

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

Three technically feasible alternative transmission power line alignment corridors (each approximately 500 m in width) have been identified for the proposed 400kV transmission power line between the Ankerlig Power Station and the already authorised Omega Substation (to be located on the Farm Groot Oliphantskop 81)

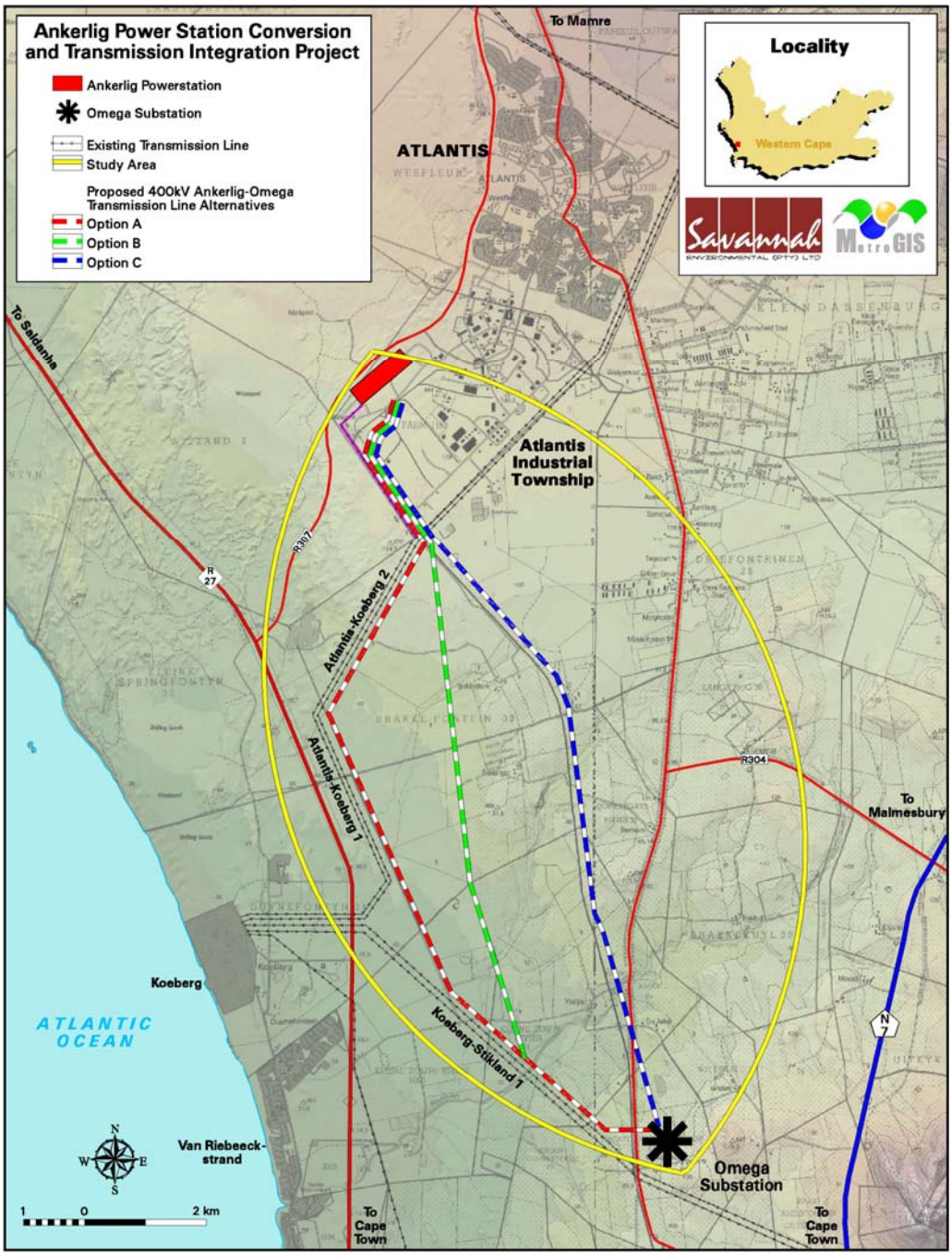

Figure 7.1: Transmission power line alternatives identified for investigation within the EIA process

This chapter serves to comparatively evaluate the identified potential environmental (social and biophysical) impacts associated with the proposed power line alternatives. 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 part of the Cape Floristic Region, a renowned botanical hotspot with a very high percentage of endemic plant species (species restricted to that area) and threatened plant species. Almost 85% of the threatened plants found in South Africa are restricted to the Cape Floristic Region. The vegetation of the area is Cape Flats Dune Strandveld in the north-western section, Atlantis Sand Fynbos on the sandy sections and Swartland Shale Renosterveld on the clayey sections (Mucina & Rutherford 2006). Alien plant infestation in the area is considerable and large sections have been transformed.

Most of the study area has been heavily disturbed by agriculture and industry, but particularly along Option A there are still substantial patches of natural vegetation. The proposed power line alternative routes cross a number of seasonal and permanent wetlands, which constitute the bulk of the remaining sensitive areas along the preferred route. Large parts of the proposed alternative routes are heavily impacted by alien invasive vegetation, as a result of previous soil disturbance. On-going industrial development in the Atlantis area continues to disturb natural vegetation in close proximity to the proposed power line alternatives. Option B crosses the SANDF shooting range and the Western Province shooting club (private), which supports isolated patches of high quality vegetation, although these are often invaded by aliens.

7.1.1. Nature and Extent of Impacts

Figure 7.2 provides an indication of the general areas where potentially sensitive vegetation was recorded within the study area.

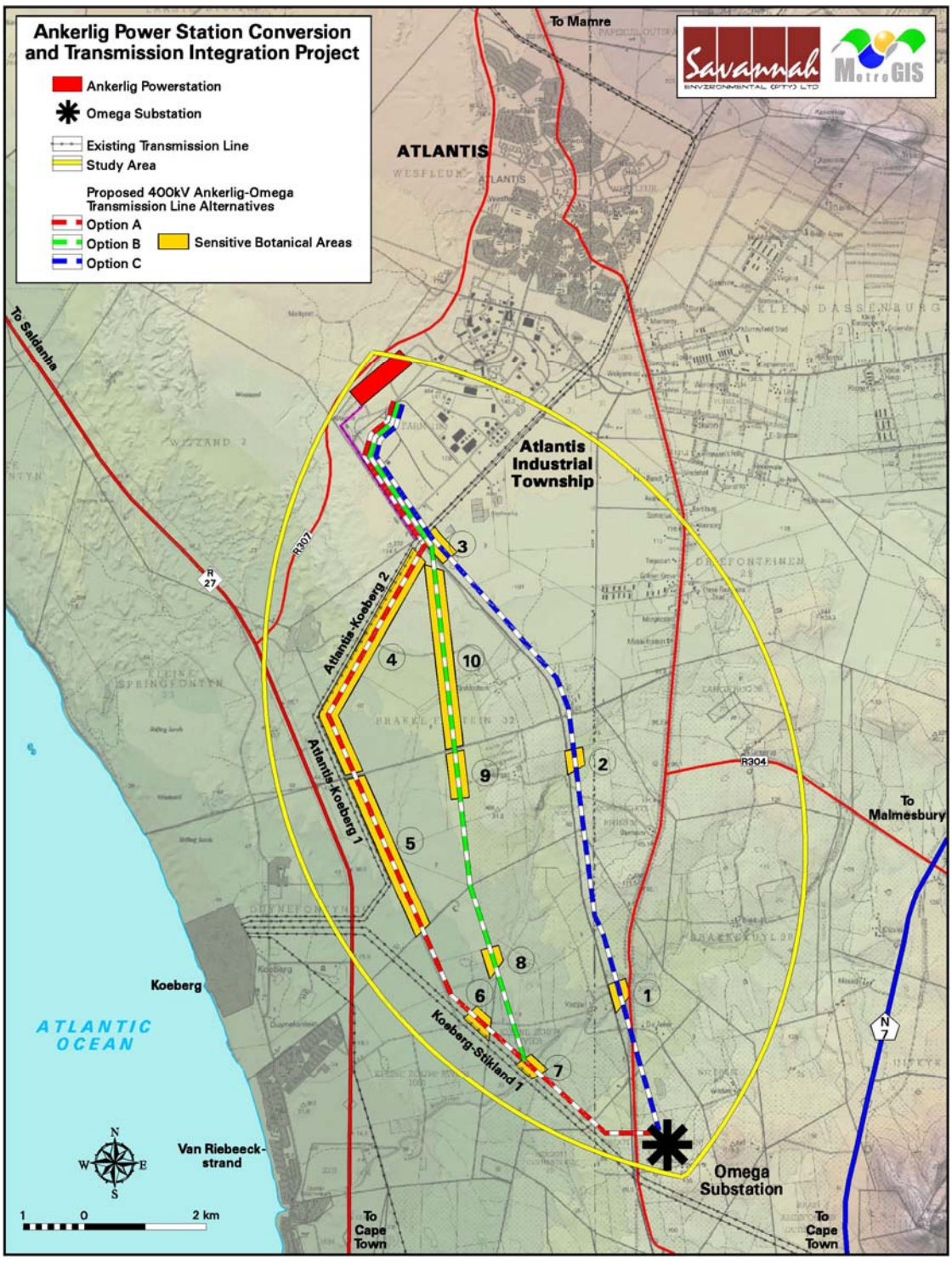

Figure 7.2: Map of the 3 alternative power line routes showing sensitive botanical areas (numbered, in yellow) identified through the scoping study. Unhatched areas are of Low or Very Low botanical sensitivity

Impacts on natural vegetation during construction and operation will include permanent direct loss of vegetation in the footprints of the towers, temporary damage to vegetation in the areas around the towers and along the cable stringing route (construction phase), and damage to natural vegetation within the

servitude as a result of repeated bushcutting for stringing (construction phase) as well as line maintenance (operational phase).

Fynbos vegetation is very sensitive to any form of soil disturbance, and plant community structure generally becomes degraded after any disturbance. The greater the disturbance, the greater the levels of community degradation and species loss. Fynbos is also renowned for its high levels of plant diversity, high numbers of very localised species, and large numbers of threatened plant species. Most of these threatened species occur in lowland habitats (below 300 m), such as the current study area. It is, therefore, likely that disturbances, such as may be associated with the power line construction and operation, will have at least some impact on rare and/or threatened plant species, assuming that the line passes through areas of extant natural vegetation in reasonable condition. As many of these plant species of concern can occur as very small, isolated populations, or may only be evident is spring and winter (e.g. bulbs), it is very difficult to predict the exact magnitude of potential impacts. Many indigenous species could be directly impacted by annual bushcutting, and gradually the bushcut areas could become dominated by alien invasive annual grasses, which are in themselves a major fire hazard.

In the case of the study area very little natural vegetation remains, except in the sensitive areas indicated in Figure 7.2. Most of the remaining natural vegetation occurs along alternative routes A and B. Negative impacts on rare and/or threatened plant species are thus likely to be greatest for Options A and B, especially if servitudes in these areas are bushcut on a regular basis.

The operation of a power line in the area could have a limited positive effect on the natural vegetation if invasive alien vegetation is properly controlled within the servitudes. Alien invasive plants (notably *Acacia saligna* and *A. cyclops*) are a major threat to the remaining natural vegetation in this general area, and are degrading the remaining natural habitat, with little being done to curb their spread. Therefore, if alien vegetation is properly controlled and eliminated within at least the servitudes this will have a small positive effect on the natural vegetation in the immediate area. However, this positive effect will only be realised if alien vegetation removal and control is undertaken in the correct manner, where stems are hand cut and cut stumps are immediately painted with herbicide to prevent resprouting. Simply bushcutting the servitude with a tractor once a year may appear to control the invasive vegetation, but in reality will worsen the problem by encouraging resprouting (coppicing) of aliens, and causing loss of indigenous plant diversity which is not adapted to being bushcut annually.

7.1.2. Comparison of Transmission Power Line Alternatives

Table 7.1 overleaf provides a comparison of the three alternative power line routes in terms of botanical criteria.

Option C presents fewer botanical constraints in that it is both shorter and of lower sensitivity due to there being larger areas of minimal natural vegetation. From a botanical perspective it is therefore the **preferred alternative**, and overall impacts are likely to be low negative prior to mitigation.

However, there are no botanical reasons why Options A or B could not be considered as preferred alternatives, provided that the recommended mitigation is implemented. Development impacts prior to mitigation would be low to medium negative. If comprehensive alien clearing of the servitudes is undertaken, and the more sensitive areas are not bushcut, benefits could actually outweigh the negatives, from a botanical perspective.

7.1.3. Conclusions and Recommendations

Option C is the preferred power line alternative from a botanical perspective as this option presents fewer botanical constraints in that it is both shorter and of lower sensitivity due to there being larger areas of minimal natural vegetation. However, Options A and B are also considered to be acceptable from a botanical perspective.

Regardless of the alternative selected, mitigation measures which should be implemented to minimise impacts include:

» No vehicles should be driven through seasonal or permanent wetlands.
» There should be no construction or tower placement in any sort of wetland or floodplain area (seasonal or permanent). As most of the wetlands in the study area are less than 250 m wide it should be possible to span them.
» Existing access tracks for vehicles should be used where possible in order to minimise the creation of new tracks.
» Mixing of concrete should not be undertaken in areas of natural vegetation. No concrete residue should be left in any areas of natural vegetation. If concrete is to be used in natural areas, the concrete should be mixed in low sensitivity areas and brought in where needed.
» If Option A or B is selected no bushcutting should be undertaken in Areas 3, 4, 9 and 10 (refer Figure 7.2) as this will significantly reduce the indigenous species diversity and will encourage the spread of alien invasive grasses.
» As a general guideline bushcutting should take place only once every two or three years, in order to allow some of the potential rare indigenous species to flower and set seed.

Table 7.1: Comparative evaluation of the three identified alternative transmission power line alternatives in terms of botanical criteria

Criteria	Option A	Option B	Option C
Botanical sensitivity	About half of this route is considered to be botanically sensitive, in that it passes through vegetation that is still in good or moderate condition, or across wetlands.		90% of this route is of low or very low regional botanical sensitivity.
Sensitive species	Rare species are likely to occur in **Area 4** on Figure 7.2. There is a moderate chance of rare species being present in **Area 5**.	A previous survey of parts of the shooting range area (Helme 2004) (**Area 10** on Figure 7.2) found various patches of High quality vegetation, supporting a number of Red Data Book listed plant species, such as *Afrolimon purpuratum* (Critically Endangered), *Leucospermum tomentosum* (Vulnerable), and *Leucospermum hypophyllocarpendron* (Vulnerable). These may or may not fall within the proposed power line corridor, and it is very likely that at least parts of the corridor support High sensitivity vegetation of this nature, which is currently severely threatened by alien vegetation.	No rare or threatened plant species are likely to persist in viable or regionally significant numbers in these areas. At least two Red Data Book listed plants were recorded in **Area 3**, i.e. *Serruria decipiens* (sandveld spiderhead) listed as Vulnerable, and *Lampranthus auranticus* (golden sand vygie), listed as Endangered. Both were found in low numbers within the proposed corridor, just east of the railway. It is likely that other Red Data species would be found in this area.
Condition of vegetation	Vegetation is still in good or moderate condition for much of this route. In some places the adjacent power line servitude has been heavily bushcut. This has reduced the species diversity and eliminated	Properties owned by the SANDF shooting range and the Western Province shooting club (private), which is heavily disturbed in places but also supports isolated patches of high quality vegetation, although these are often invaded by alien	The vegetation has been heavily disturbed, and now supports less than 10% of its original plant diversity. Alien grasses and herbs dominate, along with woody invasives such as *Acacia saligna*.

Criteria	Option A	Option B	Option C
	many of the rarer species so that these areas are now of medium sensitivity, with higher sensitivity vegetation sometimes still present in the immediately adjacent un-buschcut areas, although the adjacent areas may be heavily invaded by alien *Acacia saligna*.	vegetation.	
Sensitive areas	The bulk of the sensitive vegetation occurs in areas 4 and 5 (refer to Figure 7.2): **Area 4** can be regarded as being of High sensitivity (rare species likely), and **Area 5** as being of Medium sensitivity. **Areas 6 and 7** are river crossings – the former being the lower Donkergat river and the latter the Sout River. The latter is significantly larger, with extensive *Typha* (bulrush) and *Phragmites* (reed) beds. No rare species are likely to persist in these areas but they are ecologically important.	Three distinct areas of botanical sensitivity have been highlighted along this route (refer to Figure 7.2): **Area 7** - crossing of the Sout River, and is shared with Alternative A. **Area 9** - area of Medium sensitivity. Most of it has been previously disturbed, but there is still a moderate plant diversity in the area, with a small chance of some rare species. Alien grasses and woody Acacias are common. **Area 10** consists of Atlantis Sand Fynbos in fairly good condition, although it has been bulldozed in places for the creation of the shooting ranges, and extensive areas have been invaded by alien *Acacia saligna*.	Three sensitive areas have been identified along the route (refer to Figure 7.2): **Area 1** is the crossing of the Klein Zouterivier, and **Area 2** is the Donkergat River crossing. Both are less than 200m wide, with the actual channels and floodplain being less than 80m wide. No rare species were recorded in the wetland areas, but they are ecologically important areas. Vegetation in **Area 3** is classified as Atlantis Sand Fynbos, which is restricted to deep acid sands in the Atlantis region. It is regarded as an Endangered vegetation type in terms of the NSBA ratings (Rouget et al 2005; 60% remaining, 2% protected, 30% conservation target), and supports a significant number of rare and threatened plant species. The conservation-worthy portions in this

Criteria	Option A	Option B	Option C
			area tend to be small and patchy and cannot be accurately mapped at this stage.

» All invasive woody aliens (mainly *Acacia saligna*) must be cleared at least every two years within the servitudes, which should help reduce the fuel load and hence the risk of fire. Alien clearing should be according to Eskom Bushclearing Standards, and specific mention should be made of the immediate painting of suitable dyed herbicide onto the cut stumps of resprouting species such as Port Jackson (Acacia saligna). If this is not done the cut stems will rapidly regrow. As alien invasive vegetation is one of the primary threats to natural vegetation in this area the regular removal of woody invasive alien species could in fact have a slight positive impact overall.

It is recommended that a more detailed survey of the preferred route be undertaken as part of the detailed EIA phase in order to refine the recommendations and mitigation requirements.

7.2. Potential Impacts on Terrestrial Fauna

Five potential faunal habitats are present within the study area, i.e. Rocky habitat, coastal fynbos/coastal sand, Renosterveld, water bodies, such as rivers, streams, pools, lagoons, estuaries and other wetland areas, and Mountain fynbos. Although unconfirmed[25], animal species of conservation importance may be present in the study area.

7.2.1. Nature and Extent of Impacts

Risks to faunal species would be similar for all routes under consideration. Those species that can not effectively vacate affected areas during the construction phase of the proposed transmission power line, e.g., burrowing lizards and burrowing mammals, will suffer **direct mortality** during construction. Although the natural habitat has been highly degraded in the study area, the construction of a new power line may result in the **loss of habitat** of faunal significance.

» *Direct mortality:*
At least five reptile and two frog species of conservation concern may be present in the Atlantis study area. The presence of these species is, however, unconfirmed and appears to be unlikely due to the degraded nature of the habitats in the study area. If present, these species may be directly impacted on through mortality of individuals during construction of the proposed power line.

It is accordingly concluded that the impact of direct mortality on species of conservation concern in the study area will be of local importance, of short

[25] Presence unconfirmed but possible due to habitats present.

duration, of low intensity and of low probability. The impact is, therefore, rated to be of overall low significance. Due to the higher probability that some of the species of conservation concern may be present in areas closer to the coast, the significance of the potential impact will be lower in the interior than closer to the coast, although it will be low in the case of all three route options. This rating is given with high confidence.

» *Loss of faunal habitats:*

The original habitat within the study area has been severely degraded/destroyed in large parts by various human activities. In the sandy northern half of the study area there is a mixture of natural vegetation and dense Acacia infestation and this half, although highly degraded, may still offer suitable habitat to animal species, particularly the burrowing species of conservation concern. The middle and southern sections of the study area are less suitable for burrowing animals as these parts are more clayey. The southern portion is also mostly smallholdings. Although construction of a power line may result in a loss of faunal habitat, the impact of this will only be at a local level because of the small footprint of the construction activities, the highly degraded nature of the habitat and the lack of evidence that coastal species of conservation concern in fact occur this far inland and that Red Data frog species are in fact present in the southern more clayey portion of the study area. The tower footprint and therefore the permanent loss of habitat will be relatively small and localised. The intensity of the impact will therefore be low. The probability that habitat loss will impact on threatened animal species is likewise low. Against this background, the overall significance of the impact is rated as low. This rating is given with high confidence.

7.2.2. Comparison of Transmission Power Line Alternatives

From a terrestrial fauna perspective, there are no apparent significant risks associated with the construction of a power line between the Ankerlig Power Station and the Omega Substation. With a number of fauna species of conservation concern known from the coast (Cape Flats Dune Strandveld), the immediate coastal zone should be considered the most sensitive, with a gradual decrease in sensitivity towards the interior.

From a terrestrial fauna perspective, all three alternative routes are considered feasible. Based on the sensitivity of terrestrial fauna habitats in the study area, the most inland route for the transmission power line (**Option C**) is nominated as the preferred alternative. However, Options A and B are considered to be acceptable from a terrestrial fauna perspective.

7.2.3. Conclusions and Recommendations

Option C is the nominated as the preferred alternative from a terrestrial fauna perspective. It must be stressed, however, that the presence of Red Data species in the study area has not been confirmed, although the habitats for some of these species are present. The potential impacts will all be of low significance. Therefore, the conclusion above should not have any direct influence on the decision regarding the feasibility of the three alternative power line routes.

Regardless of the alternative selected, mitigation measures which should be implemented to minimise impacts include:

» Every effort should be made to save and relocate any amphibian, reptile or mammal that cannot flee of its own accord encountered during the construction phase. These animals should be relocated to a suitable area immediately outside the construction footprint area. No formal searches will be required before construction starts, as these will be highly ineffective.
» During construction, the destruction of potential faunal habitat should be limited to the absolute minimum.

It is recommended that a more detailed survey of the preferred route be undertaken as part of the detailed EIA phase in order to determine whether any of the Red Data species that potentially occur in the study area, are in fact present, as well as to identify sites along the route that may be more sensitive than others in terms of animal occupation.

7.3. Potential Impacts on Avifauna

The area supports 201 bird species, of which 15 species are Red-listed, 44 species are regional endemics or near-endemics, and 3 species are Red-listed endemics. Of the 5 avian microhabitats identified, natural (if generally degraded) Strandveld/Fynbos areas and wetlands support or partially support the bulk of the local avian diversity and most of the Red-listed and endemic species.

7.3.1. Nature and Extent of Impacts

Due to their size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in southern Africa are electrocution of birds (and other animals) and birds colliding with power lines. Other problems are: electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure; and disturbance and habitat destruction during the construction and maintenance activities associated with electrical infrastructure.

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.

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.

About 40 species of the total estimated avifauna reported to occur in the study area are considered susceptible to either collision with overhead lines and/or electrocution. In terms of an integrated impact and mitigation assessment for the line (refer to Table 2 of the specialist study contained in Appendix O), only 8 of these species are considered (i) to be of national conservation concern, (ii) to occur in the impact area of the line with sufficient regularity to warrant special accommodation, and (iii) to be potentially impacted by the line to the extent that proactive mitigation is required (moderate-high significance of impact). Due to the high voltage being carried (i.e. 400kV), and the resulting large air gaps between the conducting elements of the tower assemblies, the risk of birds being electrocuted on the proposed power line is considered negligible.

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 (>4m 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.

Blue Crane, African Marsh Harrier (*Circus ranivorus*) and Black Harrier (*C. maurus*) are all Red-listed species (the former and the latter are also regional endemics) which nest on the ground and could occur as breeding residents within the impact area of the proposed power line. Both the harrier species breed in the

adjacent Koeberg Nature Reserve, and Blue Cranes have been reported breeding over an increasingly wide area in the western Swartland. All three are likely to favour situations close to water – Blue Crane on open ground, often near dams or pans, Black Harrier in tall, damp vegetation adjacent to small pans or wetlands, and African Marsh Harrier in wet reedbeds. Should any of these species be breeding close to the selected route for the line at the time at which the line is erected and/or serviced or maintained, these nests could be subject to damaging levels of disturbance.

7.3.2. Comparison of Transmission Power Line Alternatives

Option A runs close to and parallel with the existing Ankerlig-Koeberg and Koeberg-Stikland 1 power lines along nearly its entire length. This option has the distinct advantage from an avifauna perspective as this option minimises the length of a new, isolated power line, and effectively reduces the collision risk for both the new line and the existing ones by grouping the entire assemblage together, hugely improving the conspicuousness of all the overhead lines traversing this area. Widening of the current, cleared servitude area (to accommodate an additional line) will probably also have a long-term, positive effect on the local avifauna, as the resulting cleared area is likely to support a greater biomass and diversity of birds. The existing road infrastructure on this alignment would also largely negate the need for new construction and maintenance roads, reducing the overall impact of the power line. The only negative aspect of this alignment is that it, of the three options, runs closest to the wetlands at the junction of the R27 and the R307.

Option B runs centrally through the Brakkefontein area, and was the most difficult of the three options to access and evaluate. Suffice to say that it does not run close to any existing infrastructure, has poor road access (and therefore new roads would have to be established, increasing the impact footprint of the line), and includes some relatively open, un-infested Sand Dune Fynbos areas.

Option C runs parallel to the Atlantis railway line for almost its entire length, through what is mostly heavily infested Sand Fynbos, with some open, cultivated areas in the southern half of its length. It also runs through at least one area either permanent or ephemeral wetland, although even this is thickly covered by alien acacias. As this option runs parallel to the railway, existing road infrastructure on this alignment is present, which would largely negate the need for new construction and maintenance roads, reducing the overall impact of the power line.

All three options are considered feasible. **Option A** is the preferred option, with Option C an acceptable alternative, and Option B the least preferred.

7.3.2. Conclusions and Recommendations

The proposed Ankerlig-Omega 400 kV transmission line does not traverse any avian habitats of high conservation value and, provided that full cognisance is taken of the suggested mitigation, it is unlikely to have any long-term, significant negative impacts on the local avifauna. **Option A** is the preferred option, with Option C an acceptable alternative, and Option B the least preferred.

Beyond verifying the presence or absence of key breeding species (Blue Crane, African Marsh Harrier, Black Harrier and possibly others) within the impact area of the line (once an alignment has been selected), there is no obvious, outstanding work still required for the EIA Phase of this evaluation. This verification could easily be done during the pre-construction walk-through, which would essentially negate the need for a more detailed assessment of the impacts of this power line on birds within the EIA Phase.

Regardless of the transmission power line alignment selected, the following mitigation measures are recommended:

» *Collisions with the earth wire:*
  * Sections of the line which either cross or run adjacent to croplands and wetlands should be marked on the earth wire with a suitable marking device.
  * Sections of the line crossing drainage lines and farm dams should be marked on the earth wire with a suitable marking device.
  * On a micro-scale, wherever possible, the line should be routed away from any of the above situations.
  * The final selection of sections of the power line that should be marked with marking devices should be identified after the tower positions have been pegged by way of a walk-through conducted jointly by Eskom and a suitably qualified ornithologist.

» *Electrocution:*
  In the unlikely event that bird electrocutions are recorded on the line post-construction, all relevant perching surfaces should be fitted with bird guards as deterrents. It may also be necessary to fit bird guards to certain lengths of the new line should any bird streamer-related line faulting occur.

» *Disturbance and habitat destruction:*
  * All construction and maintenance activities should be carried out according to generally accepted environmental best practice, and the temporal and spatial footprint of the line should be kept to a minimum. In particular, care should be taken in the vicinity of wetlands, and

existing roads must be used as far as possible for access during construction.

* Ideally, a walk-through of the selected alignment should be done by an experienced ornithologist once a final alignment within the corridor has been surveyed. The purpose of this walk-through survey will be to check key areas for nests of threatened species should be done immediately before construction commences. Any bird nests that are found subsequently should be reported to the EWT to allow expert advice on how to deal with the situation.

7.4. Potential Impacts on Heritage Sites

Numerous fossil and archaeological sites have been recorded in the broader study area. No specific heritage surveys have been carried out for this project at this stage, as sufficient information was obtainable from existing information.

7.4.1. 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. Therefore, the transmission power line is likely to result in moderate impacts to the land surface during the construction phase but permanent changes in terms of visual impacts and changes to the feel of a landscape.

7.4.2. Comparison of Transmission Power Line Alternatives

Very little heritage material has been recorded on or close to the alignment of Option A. Orton (2007) has described various ephemeral Late Stone Age sites along the R27, however very few of these a worthy of further investigation. A single significant archaeological site (termed by Orton as site 11) is known to exist on Groot Olifantskop. This is described in detail within Appendix A of the specialist study contained within Appendix P of this report. Option A runs parallel to an already existing power line corridor which does not lie close to any significant historical sites or places of tourism potential. In heritage terms, this option is considered appropriate for the proposed activity.

Option B passes directly through or close to the farms Brakkefontein and Vaatjie, both of which contain known archaeological material as well as historic structures. While the archaeological sites consist primarily of ESA open scatters which are of limited heritage and scientific value, concern is expressed that the landscape context of historic structures at Brakkefontein and Vaatjie will be compromised by the visual intrusion of the power line. While option B is by no means a “no go option” it is has the potential to cause the greatest level of impact to the historic

cultural landscape of early farming as well as pre-colonial archaeology, and is therefore the least favoured of the three alternative routes.

Option C follows the existing railway line from Atlantis before branching off to the Omega substation on the Farm Groot Olifantskop. No archaeological sites have been recorded along the alignment. The use of an existing area of disturbance and prior landscape impact will decrease the likelihood of new impacts occurring to the surrounding properties. This option is therefore considered suitable for the proposed activity. Due to the fact that Option C is a relatively direct and shorter route than Option A, the possibility of any impacts on heritage sites occurring is considered to be less. **Option C** is therefore the most favoured route in heritage terms.

7.4.3. Conclusions and Recommendations

None of the transmission line options can be considered to be a fatal flaw in heritage terms, however option B has the potential to cause the greatest level of impact to the historic cultural landscape of early farming as well as pre-colonial archaeology. **Option C** is nominated as the preferred alternative from a heritage perspective.

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.

7.5. Potential Visual Impacts

The Ankerlig Power Station site is relatively remote and far removed from major centres, tourist attractions and major roads. Significant landmarks in the wider area are the existing Ankerlig Power Station, Koeberg nuclear power station located some 9 km to the south-west, and the town of Mamre located some 3 km to the north.

The area between the Ankerlig Power Station and the Omega Substation is largely rural in nature (smallholdings and agricultural lands), with some limited industrial and infrastructural developments (such as the Wesfleur wastewater treatment works located to the south of the Atlantis industrial area, and the Apollo Brick Works located to the east of the railway line). Existing transmission power lines are also present within the study area.

7.5.1. Nature and Extent of Impacts

The visibility of the transmission power line from the surrounding areas is 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 7.3 to 7.5. The visibility of the transmission power line towers where calculated at a maximum offset of 50 m above ground level and limited to a 5 km radius (i.e. that distance which is regarded as being the reasonable limit of visibility of a power line).

7.5.2. 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 the three alternatives. This is due mainly to the flat topography and the relatively low growth form of the natural vegetation within the study area. Another set of criteria was used to allow for the comparison between the three transmission power line alternatives.

The criteria used for the comparison includes:

» The potential area of visual exposure within the study area.
» The length of the alignment.
» The proximity and exposure to major roads (based on the number of road crossings).
» The proximity (less than 1 km) and exposure to farmsteads along the alignment (as identified from the 1:50 000 topo-cadastral maps).
» The potential consolidation of existing linear infrastructure (existing power line servitudes, access roads, railway lines, etc.).

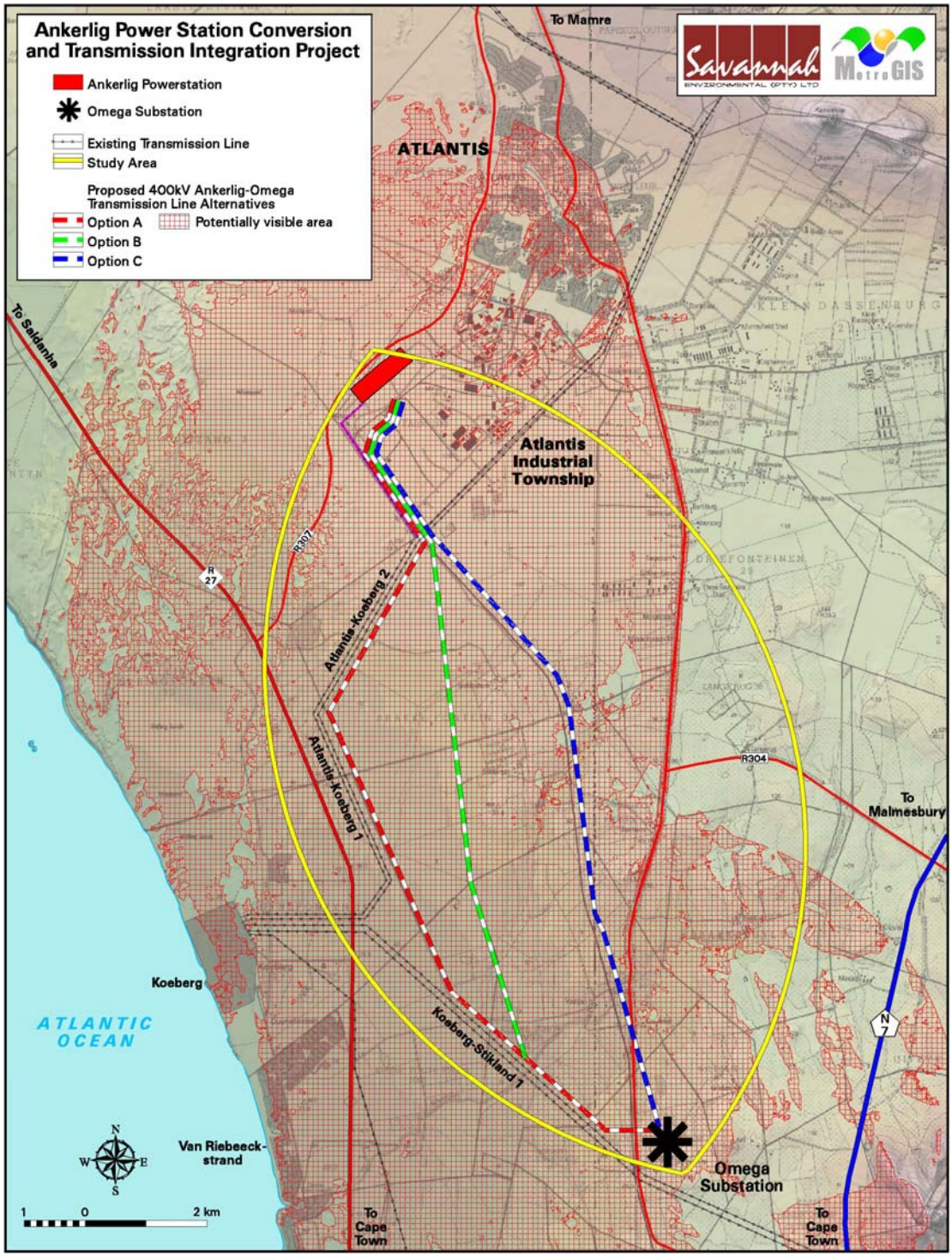

Figure 7.3: Potential visual exposure of transmission power line Option A

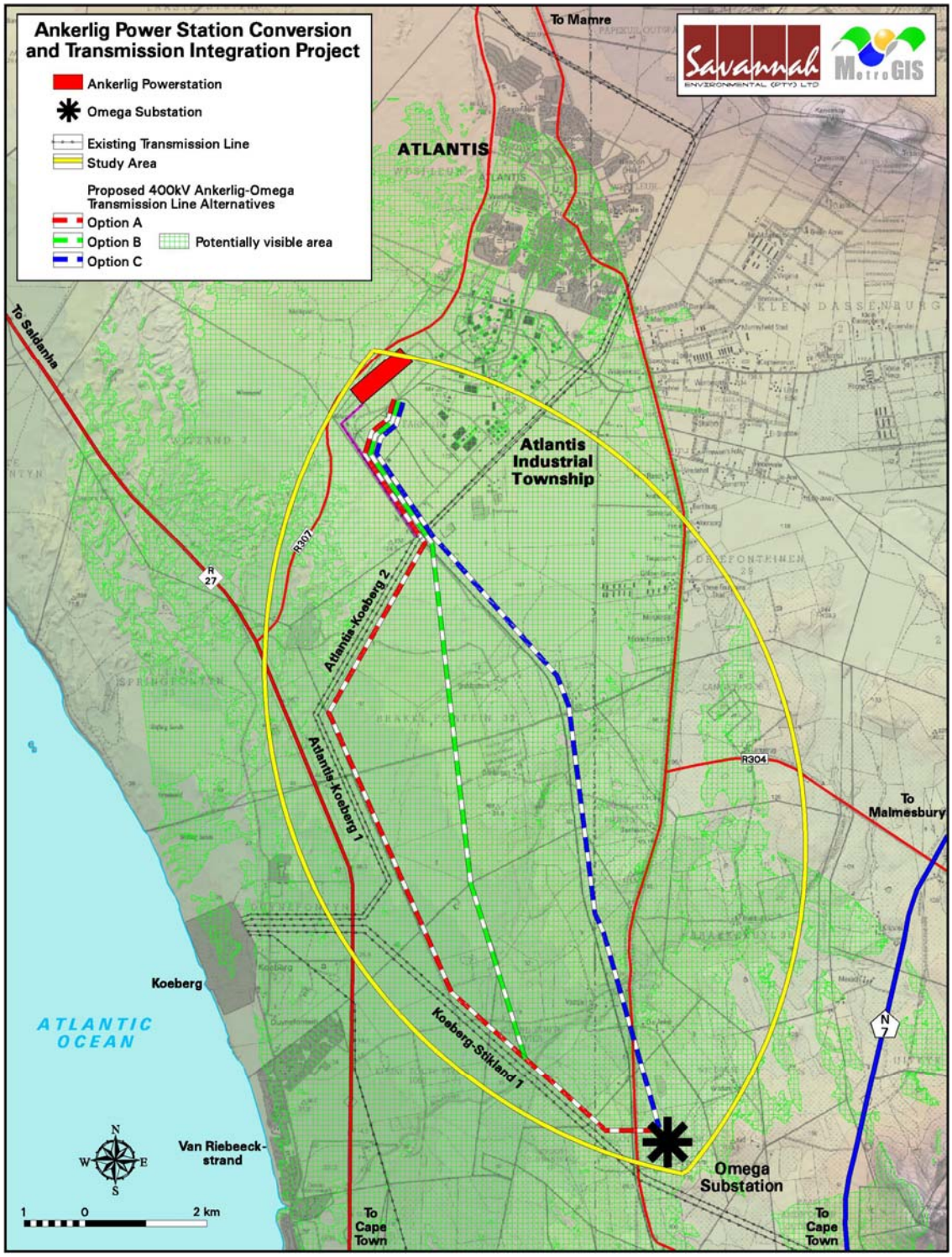

Figure 7.4: Potential visual exposure of transmission power line Option B

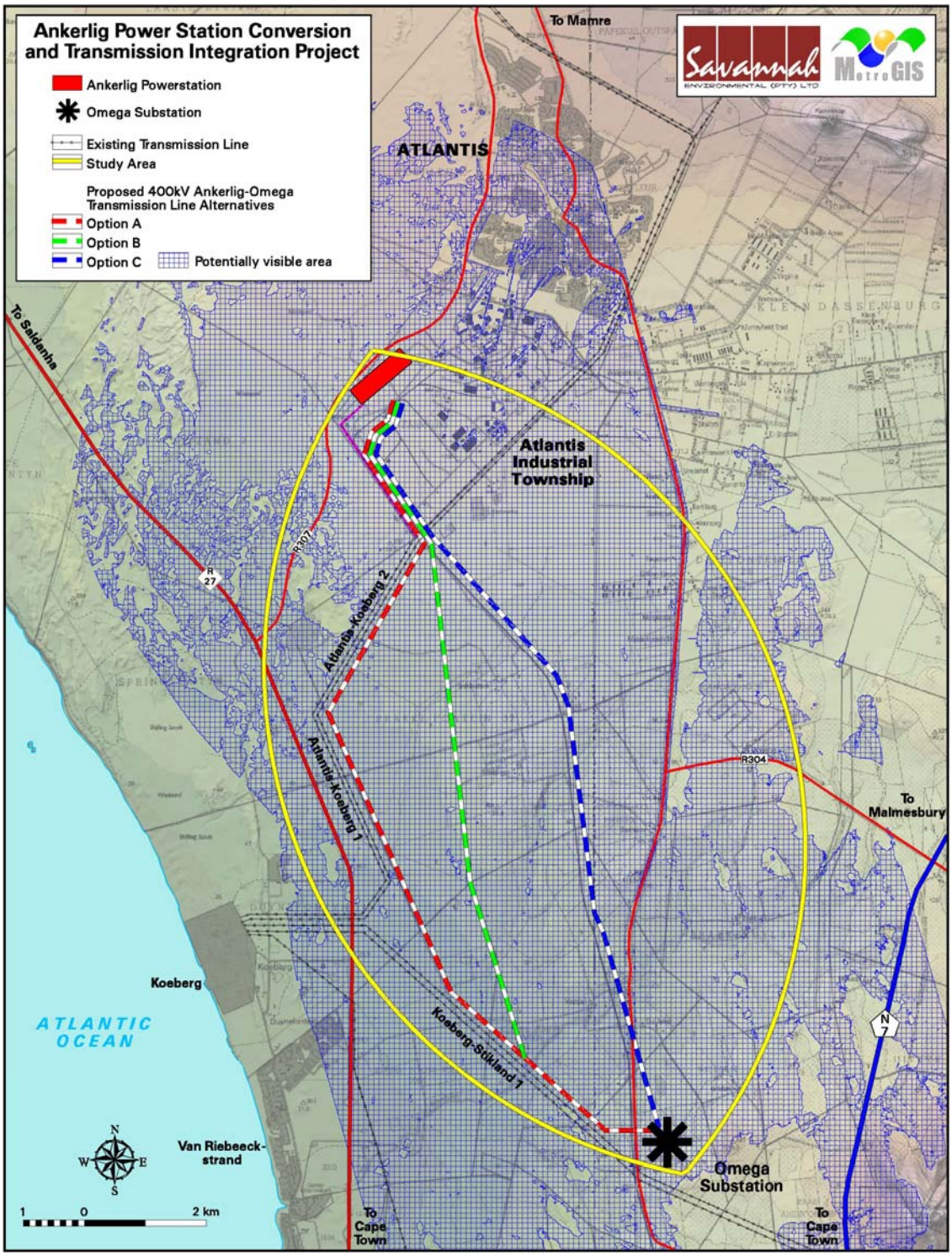

Figure 7.5: Potential visual exposure of transmission power line Option C

Table 7.2 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 7.2: Comparative table of the proposed transmission power line alternatives

Option	Length (Total)	Visible area	Proximity to major roads	Proximity to farmsteads	Consolidation of existing infrastructure	Total value
A	15.3km (-1)	74km^2 (+1)	1 crossing (-1)	Remote (+1)	High potential (up to 13.3km along existing Tx lines) (+2)	(2) Pre-ferred
B	14km (0)	77km^2 (0)	1 crossing (-1)	Close proximity to Brakfontein and Donkergat, (-2)	Low potential (less than 5km) (-1)	(-4) Not pre-ferred
C	13.3km (+1)	81km^2 (-1)	1 crossing (-1)	Close proximity to Brakfontein, Donkergat, Blenheim, Vaatjie and Die Anker (-5)	Average potential (12.5km along railway line) (+1)	(-5) Not pre-ferred

All options are considered feasible from a visual perspective. Based on the above criteria, the preferred alternative is **Option A**. It has the smallest area of potential visual exposure even though it is the longest alignment; it is relatively far removed from settlements and has the best ability to consolidate the linear infrastructure (existing vertically disturbed landscapes) within this region. This is due to the alignment running parallel to the existing transmission power lines.

Options B and C are not considered favourable due to the close proximity of Option C to a number of settlements (sensitive visual receptors) and the nearly 9 km of "greenfields" alignment associated with Option B, effectively removing it from existing access roads and servitudes. Although not fatally flawed, these two alternatives are not preferred as proposed transmission power line alternatives from a visual impact point of view. The visual impacts envisaged for Options B and C are expected to far exceed the potential visual impacts associated with Option A since the visual impacts associated with Option A is minimised largely due to the alignment running parallel to the existing transmission power lines.

7.5.3. Conclusions and Recommendations

Option A is nominated as the preferred transmission power line alternative from a visual perspective. It is recommended that the potential visual impact of the nominated preferred transmission power line alternative should be assessed in order to determine the potential visual impacts on the surrounding areas.

7.6. Potential Impacts on the Social Environment

The study area is located within the Koeberg and Blaauwberg sub-councils of the City of Cape Town Metropolitan Municipality in the Western Cape Province. The population potentially affected by the development include:

» Residents of Atlantis, particularly the suburbs of Avondale, Wesfleur, Protea Park, Beacon Hill and Robinvale, and the nearby informal settlement of Witzand, situated in close proximity to the Industrial area.
» Residents of Atlantis non-urban[26]
» Residents of Melkbosstrand, Duynefontein and Van Riebeeckstrand
» Users of land which could be affected by the proposed power line, including:
  * Brakkefontein Clay Products Pty Ltd/Apollo Bricks (current works and proposed expansion)
  * Users of the Delta 200 Airstrip (used as a drop zone by the sky divers club)
  * Users of the Corobrick Four Wheel Drive Challenge site
  * Residents of Klein Zoute River Agricultural Holdings
  * Landowners of farms situated in the Malmesbury non-urban area immediately south of Atlantis Industrial Area.

7.6.1. 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. Impacts are expected to be similar for all alternatives under consideration.

» *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

[26] Comprised of the rural area surrounding Atlantis to the north, south, east and west stretching South to include the Klein Zoute Rivier and Morning Star Agricultural Holdings, as well as the regions indicated as 'Malmesbury non-urban' and 'Koeberg' on the City of Cape Town Census suburb map (refer to Appendix L).

could have some economic benefits for surrounding communities, although only of a temporary nature (Afrosearch 2005).

In addition to creating job opportunities for construction workers, the project may also offer indirect employment creation for entrepreneurs in the informal sector, for instance food stalls for the convenience of construction workers (Afrosearch 2005).

Impacts are expected to be of low to medium significance. The magnitude of this impact will depend on the number of construction workers to be employed, either by Eskom itself or by contractors.

Influx of job seekers and temporary workers

The linear nature of the transmission power line development could create additional impacts of temporary construction workers felt by land users along the selected alignment. As the distance covered is relatively short (~20 km) it can be expected that such impacts will be limited in extent and of medium significance.

Increase in traffic

Increase in traffic can result in the disruption of daily movement patterns. Depending on access routes that are used, construction vehicles could impact on safety and daily movement patterns of residents in surrounding communities. The magnitude of this impact will depend on current traffic volumes, traffic volumes that will be associated with construction activities, as well as construction schedules (Afrosearch 2005), but is expected to be similar to that experienced during the construction phases associated with the power lines from the OCGT power station (initial 4 units).

» *Potential Impacts during the Construction and Operational Phase:*

Impact on current land-use

Existing land uses that may be impacted by construction and subsequent operation of the proposed transmission power line are summarised in Table 7.3.

Table 7.3: Current Land uses along proposed alternative alignments (refer to Figure 7.6)

Current Land-use	Project Alternatives:
Portions of Farms falling within the Malmesbury non-urban (classified as part of Atlantis non-urban for suburb population profiles) area between Atlantis and Klein Zoute River AH. - predominantly fallow land	Transmission Line: Options A, B, C

Current Land-use	Project Alternatives:
Cape West Coast Biosphere Reserve	Transmission Line: Options A, B, C
Klein Zoute Rivier Agricultural Holdings	Transmission Line: Options A, B, C
Existing Transmission Line to Koeberg	Transmission Line: Option A
Brakkefontein Shooting Range	Transmission Line: Option B
Proposed Municipal Landfill Site	Transmission Line: Option B
Delta 200 Flying School	Transmission Line: Option B
Brickworks: Apollo Bricks (existing works and proposed expansion)	Transmission Line: Option C
Municipal sewage works	Transmission Line: Option C
Railway line	Transmission Line: Option C
Corobrick Four Wheel Drive Challenge site	Transmission Line: Option B

The impact is expected to be of low to medium significance, depending on the alternative selected.

Impact on Sense of Place[27]

The construction and operation of 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 relate to other impacts, notably visual impacts and construction noise impacts, which need to be taken into consideration in assessing this impact. Construction noise impacts associated with the transmission line are expected to be of low significance and of short duration. Assessment of impacts on sense of place will be informed by the visual impact, noise impact and air quality specialist studies to be undertaken in the EIA Phase of the study. The impact is expected to be localised and of low to medium significance, depending on the alternative selected.

7.6.2. Comparison of Transmission Power Line Alternatives

Table 7.4 provides a comparison of the transmission power line alternatives in terms of social criteria.

[27] 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.

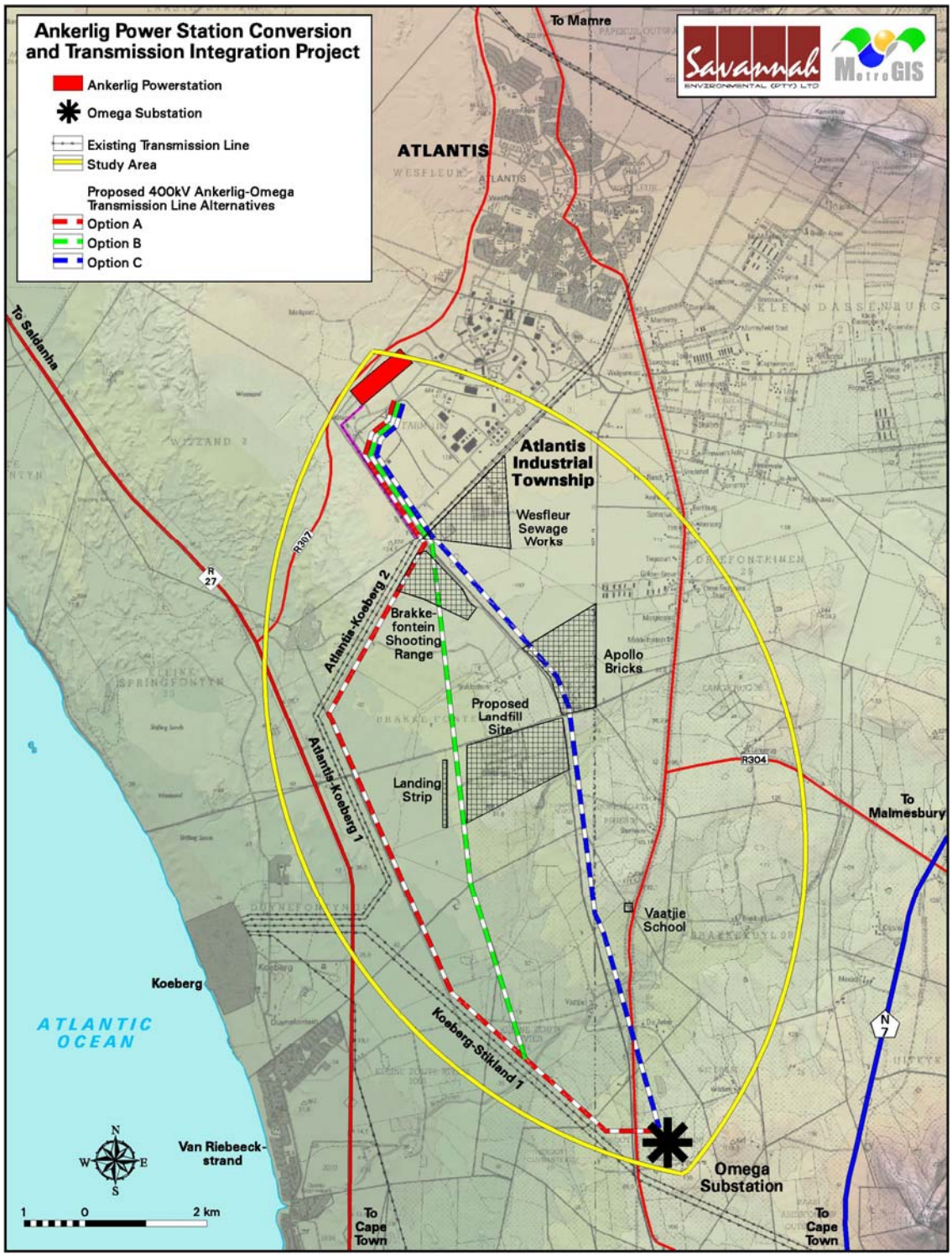

Figure 7.6: Map indicating land uses between Ankerlig Power Station and the Omega substation site which may be impacted by the proposed transmission power line alternatives

Table 7.4: Comparison of transmission power line alternatives in terms of social criteria

Criteria	Option A	Option B	Option C
Temporary local employment opportunities (construction phase)	Impacts of low to medium significance at a local scale	Impacts of low to medium significance at a local scale	Impacts of low to medium significance at a local scale
Influx of job seekers and temporary workers (construction phase)	Impacts of medium significance at a local scale	Impacts of medium significance at a local scale	Impacts of medium significance at a local scale
Increase in traffic (construction phase)	Impacts expected to be similar to that experienced during the construction phases associated with the power lines from the OCGT power station	Impacts expected to be similar to that experienced during the construction phases associated with the power lines from the OCGT power station	Impacts expected to be similar to that experienced during the construction phases associated with the power lines from the OCGT power station
Impact on Land-use (construction & operational phase)	Limited impact, as this alignment largely runs parallel to that of existing transmission power lines from the Ankerlig and Koeberg power stations. Potential cumulative impacts associated with additional transmission power lines on Klein Zoute River AH would need to be investigated. Significance: **Low**	Potential impacts on: » Brakkefontein Shooting Range » Delta 200 Airstrip – this airstrip is currently utilised by the Stellenbosch sky divers club 7 days a week (weather permitting). This alternative would impact on the air space and drop zone associated with these activities » Klein Zoute River AH » Proposed municipal landfill site – this site is located on the west of the railway line and extends up to the railway line. This alternative would impact directly on the landfill area should the power line be located to the west of the railway line. » Agricultural small-holdings. The extent of the impact on these	Potential impacts on: » Railway line » Apollo Bricks – the existing brick works is located to the east of the railway line. There are currently proposals to expand this works to the west up to the railway line and to the south up to the Old Dassenberg Road. This alternative would impact directly on the planned expansion area alongside the railway line should the power line be located to the east of the railway line. » Portion of Klein Zoute River AH; Farms » Users of the Corobrick Four Wheel Drive Challenge site. The extent of the impact on these land uses would be direct and would

Criteria	Option A	Option B	Option C
		land uses would be direct and would require further investigation. Significance: **Medium**	require further investigation. Significance: **Medium**
Impact on Sense of Place (construction & operational phase)	Limited impact, as this alignment largely runs parallel to that of existing transmission power lines from the Ankerlig and Koeberg power stations. Potential cumulative impacts associated with additional transmission power lines on Klein Zoute River AH would need to be investigated. Significance: **Low**	Potential impacts on: Brakkefontein Shooting Range; Delta 200 Airstrip; Klein Zoute River AH; Proposed municipal landfill site; Farms. These would require further investigation. Significance: **Medium**	Potential impacts on: Railway line; Apollo Bricks; Portion of Klein Zoute River AH; Farms; Users of the Corobrick Four Wheel Drive Challenge site. These would require further investigation. Significance: **Medium**

Option A is considered the preferred alternative for the proposed Transmission power line from a social perspective, as impacts to current land-uses and sense of place will be minimal along this route. Options B and C may both be considered acceptable, but would result in more significant impacts on current and planned land uses and sense-of-place in the area.

7.6.3. Conclusions and Recommendations

Option A is nominated as the preferred transmission power line alternative from a social perspective. Option B would be the least preferred option from a social perspective.

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.

7.7. Nomination of Preferred Transmission Power Line Alternative

From the specialist studies undertaken within the Scoping Phase, **Option B** was nominated as the least preferred alternative in terms of all aspects considered, as this option would result in the most significant impacts on both the social and biophysical environments. Therefore, this option is **excluded as an alternative for further investigation**.

In terms of **Option A**, the following conclusions have been drawn:

» Option A follows existing power lines for the majority of the route.
» The consolidation of power line infrastructure results in a reduction in visual impacts.
» The alignment is considered preferable from an avifauna perspective as this option minimises the length of a new, isolated power line, and effectively reduces the collision risk for both the new line and the existing ones by grouping the entire assemblage together, hugely improving the conspicuousness of all the overhead lines traversing this area.
» Impacts on the social environment are reduced as the alignment minimises impacts on existing and planned land uses in the area.
» Option A does not lie close to any significant historical sites or places of tourism potential. No archaeological sites have been recorded along the alignment and the use of an existing area of disturbance and prior landscape impact will decrease the likelihood of new impacts occurring to the surrounding properties.
» Although not the preferred alternative from a botanical perspective, this option is considered feasible. It is expected that benefits could actually

outweigh the negatives if comprehensive alien clearing of the servitudes is undertaken, and the more sensitive areas are not bushcut.

In terms of **Option C**, the following conclusions have been drawn:

» Option C follows the Atlantis railway line for the majority of the route.
» This option presents fewer botanical constraints in that it is both shorter and of lower sensitivity, due to there being larger areas of minimal natural vegetation.
» As the most inland route of the options considered, Option C was considered to be least sensitive in terms of potential impacts on terrestrial faunal species and associated habitats.
» No archaeological sites have been recorded along the alignment. The use of an existing area of disturbance and prior landscape impact will decrease the likelihood of new impacts occurring to the surrounding properties.
» Option C may be considered acceptable from a visual and social impact perspective, but would potentially have an impact of higher significance on current and planned land-uses and sense-of-place.
» Expansion plans currently under investigation by Apollo Bricks (located to the east of the railway line) and the recently authorised Regional Landfill site (located to the west of the railway line) are likely to pose technical constraints (in terms of space requirements) to the construction and operation of the proposed power line.

From the above, it is concluded that the adoption of Option A would potentially have the 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, **Option A** is nominated as a preferred alternative for further investigation in the EIA phase.

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

The transmission power line is intrinsically linked to the additional power proposed to be generated at the Ankerlig 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 Ankerlig Power Station and the Omega Substation (to be located on the Farm Groot Oliphantskop 81) 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.

CONCLUSIONS AND RECOMMENDATIONS CHAPTER 8

Eskom Holdings Limited (Eskom) is investigating the conversion of the nine units at the existing Open Cycle Gas Turbine (OCGT) plant at the Ankerlig Power Station (located in Atlantis Industria) to a Combined Cycle Gas Turbine (CCGT) plant in order to increase the generating capacity of this existing power station by approximately 720 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 Ankerlig Power Station.

Eskom is also proposing the construction of a 400kV transmission power line between the Ankerlig Power Station and the already authorised Omega Substation (to be located on the Farm Groot Oliphantskop 81) to transmit the additional power generated at this power station into the national electricity grid.

The Draft Scoping Report 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 report aimed at detailing the nature and extent of the proposed Ankerlig 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 Ankerlig 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

All components of the proposed power station conversion project (as discussed in Chapter 3) will be on the site of the existing Ankerlig 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 4 OCGT units currently in operation, and the additional 5 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, the additional fuel storage tanks and the water reservoir).
» **Air quality impacts** associated with the construction phase (dust) 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, traffic movements, and impacts on sense of place.
» **Traffic and transportation impacts associated with the transportation of additional fuel to the power station site** as a result of the need to operate the power station at a higher load factor (i.e. for longer hours) than is currently the case.

No environmental fatal flaws have been identified to be associated with 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 will be on the site of the existing Ankerlig 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 alternatives associated with the power station operation have been nominated for consideration within the EIA Phase:

» The **use of potable water** from the Witzand Water Treatment Works within the power station process.
» **Dry-cooling technology** (air-cooled condensers).
» The use of diesel and natural gas as **alternative fuel sources**.

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 (including cultivation and grazing and trampling by cattle), as well as too frequent fires. Alien invasive vegetation is therefore a prominent feature of the area. Soils are typically acid to neutral sands overlying shale–derived clays.

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 fauna** 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** on the surrounding area.
» **Impacts on the social environment** as a result of the creation of employment opportunities, influx of workers to the area, 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, **Option B** was nominated as the least preferred alternative in terms of all aspects considered, as this option would result in the most significant impacts on both the social and biophysical environments. Therefore, this option is **excluded as an alternative for further investigation**.

In terms of **Option A**, the following conclusions have been drawn:

» Option A follows existing power lines for the majority of the route.
» The consolidation of power line infrastructure results in a reduction in visual impacts.
» The alignment is considered preferable from an avifauna perspective as this option minimises the length of a new, isolated power line, and effectively reduces the collision risk for both the new line and the existing ones by grouping the entire assemblage together, hugely improving the conspicuousness of all the overhead lines traversing this area.
» Impacts on the social environment are reduced as the alignment minimises impacts on existing and planned land uses in the area.
» Option A does not lie close to any significant historical sites or places of tourism potential. No archaeological sites have been recorded along the alignment and the use of an existing area of disturbance and prior landscape impact will decrease the likelihood of new impacts occurring to the surrounding properties.
» Although not the preferred alternative from a botanical perspective, this option is considered feasible. It is expected that benefits could actually outweigh the negatives if comprehensive alien clearing of the servitudes is undertaken, and the more sensitive areas are not bushcut.

In terms of **Option C**, the following conclusions have been drawn:

» Option C follows the Atlantis railway line for the majority of the route.
» This option presents fewer botanical constraints in that it is both shorter and of lower sensitivity, due to there being larger areas of minimal natural vegetation.
» As the most inland route of the options considered, Option C was considered to be least sensitive in terms of potential impacts on terrestrial faunal species and associated habitats.

» No archaeological sites have been recorded along the alignment. The use of an existing area of disturbance and prior landscape impact will decrease the likelihood of new impacts occurring to the surrounding properties.
» Option C may be considered acceptable from a visual and social impact perspective, but would potentially have an impact of higher significance on current and planned land-uses (in particular Apollo Bricks and the proposed Regional Landfill site) and sense-of-place.
» Expansion plans currently under investigation by Apollo Bricks (located to the east of the railway line) and the recently authorised Regional Landfill site (located to the west of the railway line) are likely to pose technical constraints (in terms of space requirements) to the construction and operation of the proposed power line.

From the above, it is concluded that the adoption of Option A would potentially have the 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, **Option A** is nominated as a preferred alternative for further investigation in the EIA phase.

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.

PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT CHAPTER 9

A detailed description of the proposed Ankerlig 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 EIA for the Ankerlig 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 Ankerlig 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 throughout the scoping process and will continue throughout the EIA process. On-going consultation will include the following:

» Invitation to attend a key stakeholder workshop during the review period of the Draft Scoping Report (i.e. 13 February 2008).
» 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 Ankerlig 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 alternatives associated with the power station operation have been nominated for consideration within the EIA Phase:

» The use of **potable water** from the Witzand Water Treatment Works within the power station process.
» **Dry-cooling technology** (air-cooled condensers).
» The use of diesel and natural gas as **alternative fuel sources**.

9.3.2. Transmission power lines

From the specialist studies undertaken within the Scoping Phase, it is concluded that the adoption of transmission power line alternative Option A would potentially have the 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, **Option A** is nominated as a preferred alternative for further investigation in the EIA phase.

9.4. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

Based on the findings of the Draft Scoping Report, potential impacts on avifauna are expected to be of low significance and further investigations are only required to verify the presence or absence of key breeding species (Blue Crane, African Marsh Harrier, Black Harrier and possibly others) within the impact area of the line (once an alignment has been selected). These studies can only be adequately undertaken once the authorised power line route has been surveyed and the tower positions are known. Therefore, these should be undertaken as part of a walk-though survey within the site-specific EMP phase for the power line.

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.

A Peer Review of the EIA process will be undertaken by Jeremy Blood of CCA Environmental.

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 adjacent to the R307 (Dassenberg Road). » 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 fauna » Transmission power line	The specialist study to be undertaken in the EIA phase will: » A ground survey of the terrestrial fauna present along the nominated preferred power line route, specifically to: * ascertain whether any of the Red Data species that potentially occur in the study area, are in fact present on the site. * identify areas within the proposed site that may be more sensitive than other parts in terms of animal occupation. » Include an assessment of the feasibility of pre-construction removal of animals from the site, based on numbers present on the site. » 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.	Prof. Le Fras Mouton of the Department of Botany & Zoology, Stellenbosch University

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 » Increase in traffic (assessment based on the findings of the specialist traffic and transportation studies undertaken within the previous EIA processes and that to be undertaken within this process) » Impacts on health and safety (assessment based on the findings of the specialist air quality studies undertaken within the previous EIA processes and that to be undertaken within this process) » Current land-uses » Sense of Place	Liezl Coetzee of Southern Hemisphere

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

» Traffic and transportation impacts associated with the transportation of additional fuel to the power station site. In order to assess potential impacts in this regard, a review and update of the traffic and transportation studies undertaken for the OCGT units will be undertaken by Arup Transport Planning.
» 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 meeting and key stakeholder workshop 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[21]
Finalisation of Scoping Report	End-February 2008
Authority acceptance of the Scoping Report and Plan of Study to undertake the EIA	April 2008
Undertake detailed specialist studies and public participation process	April 2007 – mid-June 2008
Compile Draft EIA Report and Draft EMP	June 2008
Make Draft EIA Report and Draft EMP available to the public, stakeholders and authorities	July 2008

[21] Indicative dates only

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