8 IDENTIFICATION OF POTENTIAL IMPACTS

8.1 Introduction

Scoping is widely recognised as a critical step in the Environmental Impact Assessment (EIA) process. This Scoping Study is twofold as it identifies significant issues that require further investigation as well as identifying the preferred site/s that will go through for further investigation. These issues and sites will be carried forward into the EIA phase and subsequently the Environmental Management Plan.

The scoping of all environmental issues was assessed according to the following factors:

- The nature of the proposed activities and the receiving environment;
- the legal, policy and planning context of the proposed new substation; and
- the socio-economic and environmental priorities of the Interested and Affected Parties (I&APs).

The focus of an EIA ultimately narrows down to a judgement (decision based on the results from specialist studies) on whether the predicted impacts are significant. Significance is, however, relative and must always be set in a context, e.g. competition for resources, social sensitivity or the scale and rate of development.

The following section of the Scoping Report provides a discussion on the findings of the specialist studies, undertaken to date, with regards to identified issues and impacts.

8.2 Identification of Impacts of the Identified Alternatives – Technical Analysis

The following potential technical issues and descriptions have been identified to date with regards to each of the identified alternative sites (**Table 8.1**):

Table 8.1: Eskom's initial descriptions of the of the five alternatives

Alternative	Location and GPS Co-ordinates	Description
1	At North east corner of the KNPS for the 400kV yard and the southern part of the parking area south of the incoming 400kV lines for the 132kV yard 400kV yard:	• Located approximately 250 m from the Koeberg Power Station and a part of the site is partially transformed. This site is the closest to Koeberg power station with an existing HV yard, thus line deviations will be shorter • All lines will come from one side, thus lines will stay almost completely within the Koeberg security area

	33°40'15.73"S 18°26'1.39"E 132kV yard: 33°40'26.64"S 18°26'11.32"E	• No crossing of transmission lines will be necessary • Utilises a large portion of the existing lines which has known reliability. • 400KV and 132KV substations split AIS configuration as well as GIS combined configuration. <u>Disadvantages</u> • Limited space for future lines and narrow servitude means taller structures. • Little useable land left for future expansion (especially because of close proximity to ocean which blocks lines on west side) • Space constraints are increased because it is not allowed to construct underneath existing lines: Construction underneath the existing lines is not viable because the current vertical clearance underneath the 400kV lines is 8.1m as per SABS 10280 specification. The height of the 500kV gantries proposed for the AIS will infringe the phase-to-earth clearances causing flashovers. Picking up AIS equipment with cranes or truck-mounted cranes will also infringe on the required phase-to-earth clearances and will lead to serious injury or death of the workers. Similarly construction of buildings (for housing the GIS) underneath the lines will infringe on the clearance requirements. The following also have reference in terms of this disadvantage: A GIS alternative in the parking area has been proposed by the City of Cape Town. Contrary to the initial perception, as raised during the Focus Group meeting on 13 August 2013, construction of the GIS on the parking area is not an option as the existing power lines cross the entire parking area and an equally large area to the north of the parking area. • Marine pollution and heavy corrosion • The 400kV AIS yard, as well as the combined 400kV and 132kV GIS yards, enters the sand dune area • The large 400kV AIS yard enters the sand dune area extensively; hence a buffer would have to be designed in order to prevent the

		sand from covering the yard stone in the Substation. • The area surrounding Koeberg has high levels of ground water. • The 400kV AIS yard extends over the proposed Nuclear 1 site and has a very large footprint (**Figure 4.9**). <u>Pre-requirements</u> • Move of existing parking lot, security gates and buildings etc. • Connection space for overhead connection to generators is limited and the connection type should be checked for acceptance from the NNR. • Outage requirements will be at least one week per out-going line for swap over during construction as well as a month per generator transformer for the swap over to the cable/overhead gantry connections. • The AIS alternative will have massive implications during constructability phase on security at Koeberg, cost implications due to move of parking lot, entrance gates etc. and is therefore not viable due to constructability concerns. • The GIS alternative is a viable alternative due to the small size and deviation of lines which is constructible.
2	The area at the south eastern corner of the KNPS where part of the PBMR was planned 33°40'48.14"S 18°26'10.34"E	• Site is located partially transformed land to the south of the Power Station • 400KV and 132KV substations combined AIS configuration as well as GIS combined configuration. • All lines can come from one side thus sequence of events can be clearly planned • No crossing of transmission lines will be necessary • Utilises a large portion of the existing lines which has known reliability <u>Disadvantages</u> • Little useable space for future expansion due to close proximity to the ocean • Limited space for future lines and also long distance from existing lines – longer line deviations than option 1 • AIS will too large and will clash with Duine Substation and the research centre

		• The GIL ducts for a GIS substation will be too long • Extremely high marine pollution and heavy corrosion • Limited space for the overhead line route from the Gen Transformers to the new 400kV yard. • Limited space for the overhead line route from the Station Transformers to the new 132kV yard. <u>Pre-requirements</u> • Connection space for overhead connection to generators is limited and the connection type should be checked for acceptance from the NNR as well as move of buildings etc. • Move of Duine station and Research station is required. • Outage requirements will be at least one week per out-going line for swap over during construction as well as a month per generator transformer for the swap over to the cable/overhead gantry connections. • The site will have massive implications during constructability phase on security at Koeberg, cost implications due to move of various stations, research centres etc. and is therefore not viable due to constructability concerns.
3	The area on the corner of the main access road just east of the road to the conservation offices and north of the main access road south of the incoming 400 kV lines 33°40'34.95"S 18°26'32.81"E	• Site is located east of the main Koeberg Power Station. • 400KV and 132KV substations combined AIS configuration as well as GIS combined configuration. • Is in close proximity with existing power lines • Utilises a large portion of the existing lines which has known reliability. Disadvantages • There is not enough space to turn in the lines and construction underneath the existing lines poses a high safety risk and the alternative is therefore not technically viable for the AIS option. • Exporting of power on distribution lines difficult due to space constraints of AIS • No useable land left for future expansion.

		• The GIL ducts for a GIS substation will be too long • Large visual impact on the nature reserve (Koeberg nature reserve) • New Lines are required for the Gen Transformer and Station Transformer connections. • Line crossings <u>Pre-requirements</u> • The site is not technically viable
4	Offsite option to the east of the R27 on the farm Brakke Fontein 32 33°40'00.54" S 18°28'17.32" E	• Site is located on private property that has been intensively invaded by alien vegetation. • 400KV and 132KV substations combined AIS with existing GIS combination or 400KV and 132KV with AIS only. • Very few transmission line crossings are needed but there is a lot more space to accommodate this. • Further from the R27, thus less visual impact. • Sufficient space • Provides possibility of keeping existing GIS after integration with the new AIS and swap between the AIS and GIS if there is a problem with one. • Suitable overhead line route for the connection from the Gen Transformers to the new 400kV yard. (New lines might be required due to the 400kV insulation level requirement) • Existing 400kV lines can be used for the connection from the Station Transformers to the new 132kV yard. • The AIS only options without the existing GIS will allow for the removal of a few lines after completion of the project when the new yard has proven reliability. • Within the 5km restriction zone of Koeberg and allowed since it supports the operation of Koeberg. <u>Disadvantages</u> • Longer distance from Koeberg means longer lines from generation transformers to the new yard (two new lines need to be built at 500kV level to accommodate construction outage requirements as well as the move of the

		132kV dedicated supply line). • Longer deviations from existing lines to the South. • The GIL ducts to substation will be too long. • New Lines might be required for the Gen Transformer connections due to the 400kV insulation requirements. • Only AIS is viable <u>Pre-requirements</u> • 132kV Koeberg-Ankerlig line will have to be shifted North of current position to accommodate 2 (or 3 for future reactor) 500kV line servitudes of 45m each. This will have to be done before construction of the other lines start as this will be the dedicated supply line. The dedicated supply line will have to feed into the new HV yard and can thus be a temporary line until it is turned into the new yard. The last piece of the dedicated line will be cable where it crosses underneath the generator and station transformer lines. • The 400kV Ankerlig Sterrekus line will have to be deviated around the yard's position to minimize line crossings. In its current position it will cross underneath 14 lines and after deviation will cross underneath only 3 lines. This might be possible before the line construction starts. • The connection of the generator transformers via overhead lines will have to be further investigated with an accurate survey to avoid the use of 400kV cables as far as possible. • 132kV double circuit Koeberg-Dassenberg line will have to be deviated around site. • Outage requirements will be at least one week per out-going line for swap over during construction as well as a month per generator transformer for the swap over to the cable/overhead gantry connections.
5	Offsite option next to the existing Sterrekus (Omega) Substation 33°41'55.68" S 18°30'48.50" E	• Site 5 is situated on the farm Groot Oliphantskop and its surrounding terrain is one of gently sloping hills covered with wheat fields. It is situated alongside the R304 and the Mamre Road. There are a few hills that stand out above the rest.

		• 400KV and 132KV substations combined AIS configuration • Suitable overhead line route for the connection from the generator transformers to the new 400kV yard. (New lines might be required due to the 400kV insulation level) • Existing 400kV lines can be used for the connection from the Station Transformers to the new 132kV yard although the swop between the existing GIS and new AIS will not be possible. <u>Disadvantages</u> • Blocks negotiated route for 765kV Kappa – Sterrekus line which will be in construction shortly (2014). • Longer distance from Koeberg means longer lines from generation transformers to the new yard which will severely impact on the performance in the high marine pollution environment leading to possible faults on the generator transformers. • Swap between AIS and GIS not possible • Far from Koeberg means performance problems on connections from the generator transformers. • Due to above mentioned reasons the site is not deemed technically viable.

Table 8.2 presents a summary of all the alternatives that have been considered to date and the viability of these alternatives. The technical analysis of all the alternatives was also undertaken the same period when the scoping studies were undertaken. Details on all the alternatives that have been considered for the proposed Weskusfleur Substation have been captured in Chapter 4.

Table 8.2: Alternative Summary - Technical Analysis

Issue		1	2	3	4	5
Proximity to Koeberg power station		Next to KNPS	Next to KNPS	700m	2.8km	7km
Space for expansion		Limited - ocean etc.	Limited – ocean etc.	Limited – existing lines etc.	enough	enough
Transmission Line crossing		none	none	√	√	Not determined
Land Use		Eskom - Rural	Eskom - Rural	Eskom - Rural	Private Utility/residential/Agriculture	Eskom - Agriculture
Access		Good	Good	Good	Good	Good
AIS		Not technically viable Due to constructability (cost to move parking lot, entrance gates etc.) and security concerns	Not technically viable AIS will be too large & will clash with Duine Substation and research centre. Not enough space to turn in the lines	Not technically viable Not enough space to turn in the lines & construction underneath existing lines safety risk	Viable Sufficient space, few line crossings and within 5km restriction zone of KNPS and allowed as it support KNPS	Not technically viable Blocks route for 765kV Kappa-Sterrekus Line & long distance from KNPS (long lines from Gen transformers will impact performance
GIS		Viable Due to small size and deviation of lines which is constructible	Not technically viable Due to GIL ducts for GIS substation will be too long	Not technically viable Due to GIL ducts for GIS substation will be too long	Not technically viable Due to GIL ducts for GIS substation will be too long	Not technically viable Due to GIL ducts for GIS substation will be too long
Footprint	GIS	400x180m	400x180m	400x180m	400x180m	
	AIS	760x550 m	760x550 m	760x550 m	760x550 m	760x550 m
Marine pollution		Heavy Corrosion	Heavy Corrosion	medium	medium	medium

8.3 Identification of Potential Biophysical Impacts

8.3.1 Geology

Potential geological issues that should to be taken into consideration are as follows:

- Impacts related to the construction-related earthworks
- Impacts related to the pollution in case of spillage/leakage of hydrocarbon and other hazardous material from storage facilities

Potential groundwater issues that should to be taken into consideration are as follows:

- Contamination of ground water due to hydrocarbon spillage and seepage into groundwater reserves, affecting groundwater quality.
- Further construction of infrastructure and compaction of the area will further contribute to reduced water infiltration rates to replenish groundwater aquifers.

A geohydrological study will also be included in the EIA phase to evaluate the sites with regard to their suitability.

The desktop geotechnical scoping study concluded the following:

- Based on the performance of the existing engineered structures around Site Option 1, this site is considered feasible for the proposed new substation.
- The land area available on *Alternative 2* may be inadequate to locate the proposed substation.
- The Fynbos vegetation observed on *Alternative 3* makes this site not suitable from an environmental perspective.
- Based on the information obtained from the desktop study the soil properties on *alternatives 4* & *5* fall in the class with the least engineering geological problems which is the most desirable developmental option but the gradient of Site Option 5 is moderately steep compared to the other sites and this would make the earthworks volumes (cut and fill) costly during development.

8.3.2 Soil and agricultural potential

The proposed new substation development will not have large impacts on *Alternatives sites 1 – 4* due to the overall low agricultural potential and the current land use. *Alternative 5* may have slightly higher impact due to the low to medium agricultural potential where there are indications of dryland cultivation and slightly better soils.

Potential soil and agricultural issues that should to be taken into consideration are as follows:

- Increased wind and water erosion susceptibility due to the sandy nature of the soils when vegetation is removed.
- The occurrence of water tables during the rainy season can also be expected in depressions at most of the sites.

8.3.3 Avifauna

The Alternatives and in particular the AIS on intact vegetation areas are least favourable from an avifaunal perspective as this would result in the largest extent of habitat loss and would also place the development in closer proximity to a greater variety of bird species with increased probability of secondary impacts such as electrocution and collision with the power line infrastructure. In terms of the GIS options within the transformed habitats, a large proportion of the impact associated with the substation would stem from the additional power line infrastructure that would be required to connect the new substation to the grid.

Nature:

- The presence of the substation would result in some habitat loss for avifauna, but the greatest potential threat comes from the risk of collisions with any new power lines required by the development.
- A number of listed species occur in the area and impacts on these species would be highly undesirable given their slow breeding rates and high conservation status.

Extent: The extent of the impact would be largely restricted to the local area.

Potential Significance: The significance of habitat loss would be relatively minor, but as the power lines remain in place for decades, collisions pose a long-term cumulative impact that could have high long-term significance.

- **General description of impacts of substations and power lines on birds**

Because of its 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 (Ledger 1983; Verdoorn 1996; Kruger 1999; Van Rooyen 1999; Van Rooyen 2000). Other problems are electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure, (Van Rooyen & Taylor 1999) and disturbance and habitat destruction during construction and maintenance activities.

- *Electrocutions*
  Electrocution of birds on overhead lines is an important cause of unnatural mortality of raptors and storks. It has attracted plenty of attention in Europe, USA and South Africa (APLIC 1994; van Rooyen & Ledger 1999). 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 (van Rooyen 2004).

- *Collisions*
  Collisions are the biggest single threat posed by over-head transmission power lines to birds in southern Africa (van Rooyen 2004). In general, large transmission lines with earth wires that are not always visible to birds can have the largest impact in terms of collisions. Most heavily impacted upon are korhaans, bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (van Rooyen 2004, Anderson 2001). The Red Data species vulnerable to power line collisions are generally long living, slow reproducing species under natural conditions. Some require very specific conditions for breeding, resulting in very few successful breeding attempts, or breeding might be restricted to very small areas. These species have not evolved to cope with high adult mortality, with the results that consistent high adult mortality over an extensive period could have a serious effect on a population's ability to sustain itself in the long or even medium term. Many of the anthropogenic threats to these species are non-discriminatory as far as age is concerned (e.g. habitat destruction, disturbance and power lines) and therefore contribute to adult mortality, and it is not known what the cumulative effect of these impacts could be over the long term.

- *Habitat destruction*
  During the construction phase and maintenance of substations and power lines some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, and the clearing of servitudes, as well as clearing

vegetation at the substation site. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimize 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 of the servitude through modification of habitat. Habitat destruction is anticipated to be of moderate to high significance in this study area.

- *Disturbance*
  Similarly, the above mentioned construction and maintenance activities impact on bird through disturbance, particularly during bird breeding activities. Disturbance of birds is anticipated to be of moderate significance.

8.3.4 Critical Biodiversity Areas and Broad-Scale Ecological Processes

Potential issues in relation to Critical Biodiversity Areas and Broad-Scale Processes (**Figure 8.1**):

- The site lies within the planning domain of the Cape Town City Biodiversity Network. Various corridors have been implemented within the network to maintain or restore connectivity to the general highly fragmented urban landscape.
- Although a large proportion of the Koeberg property has been proclaimed as part of the Koeberg Private Nature Reserve, the area around the power station itself is not part of the reserve and consequently, none of the *Alternatives 1 -3* actually fall within the Nature Reserve itself.
- Eskom is yet to sign a binding stewardship agreement for the site or commit any parts of the Koeberg property to formal conservation.
- *Alternatives 3* and *4* pose the greatest risks to disrupt broad-scale ecological processes (both within natural or semi-natural habitats within areas that are likely to play an important role for landscape connectivity and act as corridors for the movement of fauna and flora).
- The AIS options at *Alternatives 1* and *2* would also significantly impact intact vegetation and their proximity to the coastline also increases the likelihood that the connectivity of the coastal strip would be disrupted by the development of these sites.
- The GIS options at *Alternatives 1* and *2* are restricted largely to transformed habitats in close proximity to existing infrastructure and the additional contribution to the loss the landscape connectivity would be low.
- As *Alternative 4* is currently highly degraded, *Alternative 3* is identified as the least preferred option in terms of biodiversity impact and the potential for disruption of broader-scale ecological processes.
- However in the longer term, the protection of Koeberg Nature Reserve cannot be guaranteed and the maintenance of the corridor to the north of Koeberg is considered essential as this would be the only corridor linking the Blaauberg Nature Reserve with the Dassenberg Coastal Catchment Corridor to the north.
- As such, *Alternative 4* is not considered a viable option by the City of Cape Town due to the potential for development at this site to disrupt the north-south corridor.

- It is also important to note that *Alternatives 1* and *2* for both GIS and AIS would result in significant changes to the layout of the overhead power lines at the site and as the vegetation under the lines may need to be cleared to comply with Eskom standards, this would also significantly increase the likely impact of these Alternatives, even in the GIS cases where the substation itself is restricted to transformed areas.

A preliminary comparative assessment of the likely sensitivity of each alternative for each element based on the preliminary ecological data for each site is presented in **Table 8.3**.

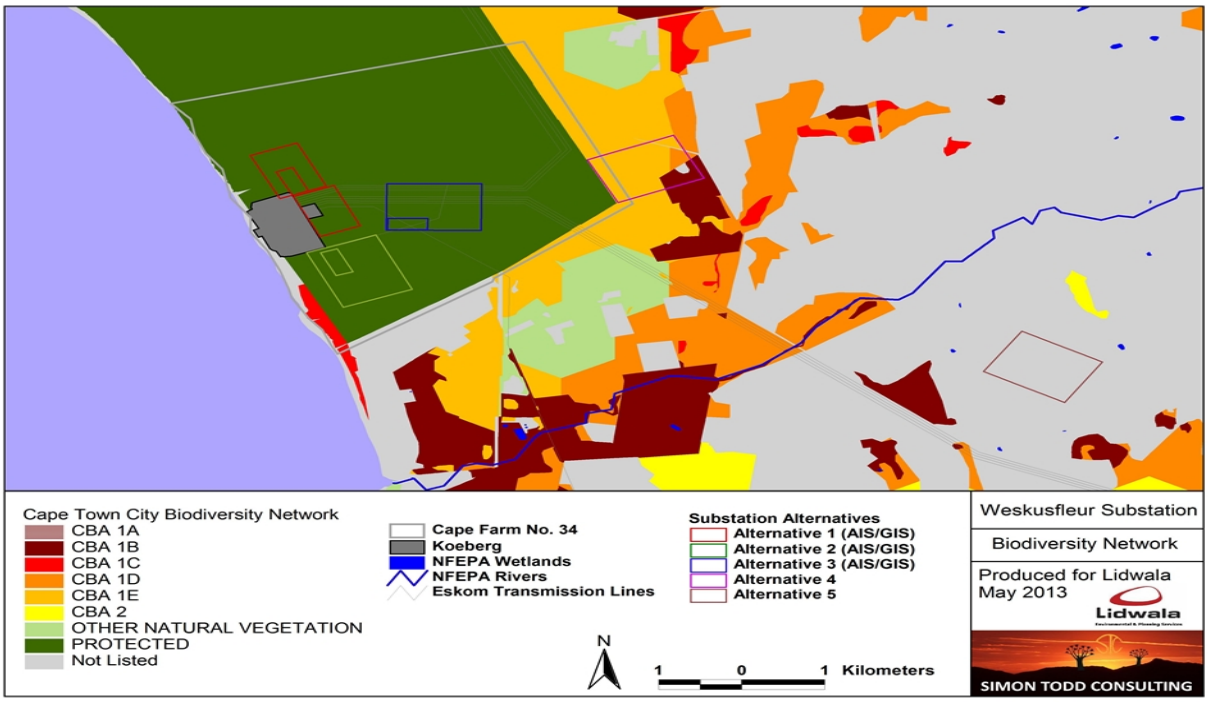

Figure 8.1: Alternatives 1,2 and 3 all lie within a Critical Biodiversity Area delineated by the Eskom Koeberg property. Although the map indicates that these options fall within a protected area, this is not correct as the area around the power station is not included as part of the proclaimed Koeberg Private Nature Reserve (Figure 7.12). Alternative 4 lies within CBA Tier 1 areas and only Alternative 5 lies outside of an area considered important from a biodiversity and ecosystem process perspective**.**

The sensitivity features as identified in the proposed Nuclear 1 Power Station and associated infrastructure are indicated in **Figure 8.2** below.

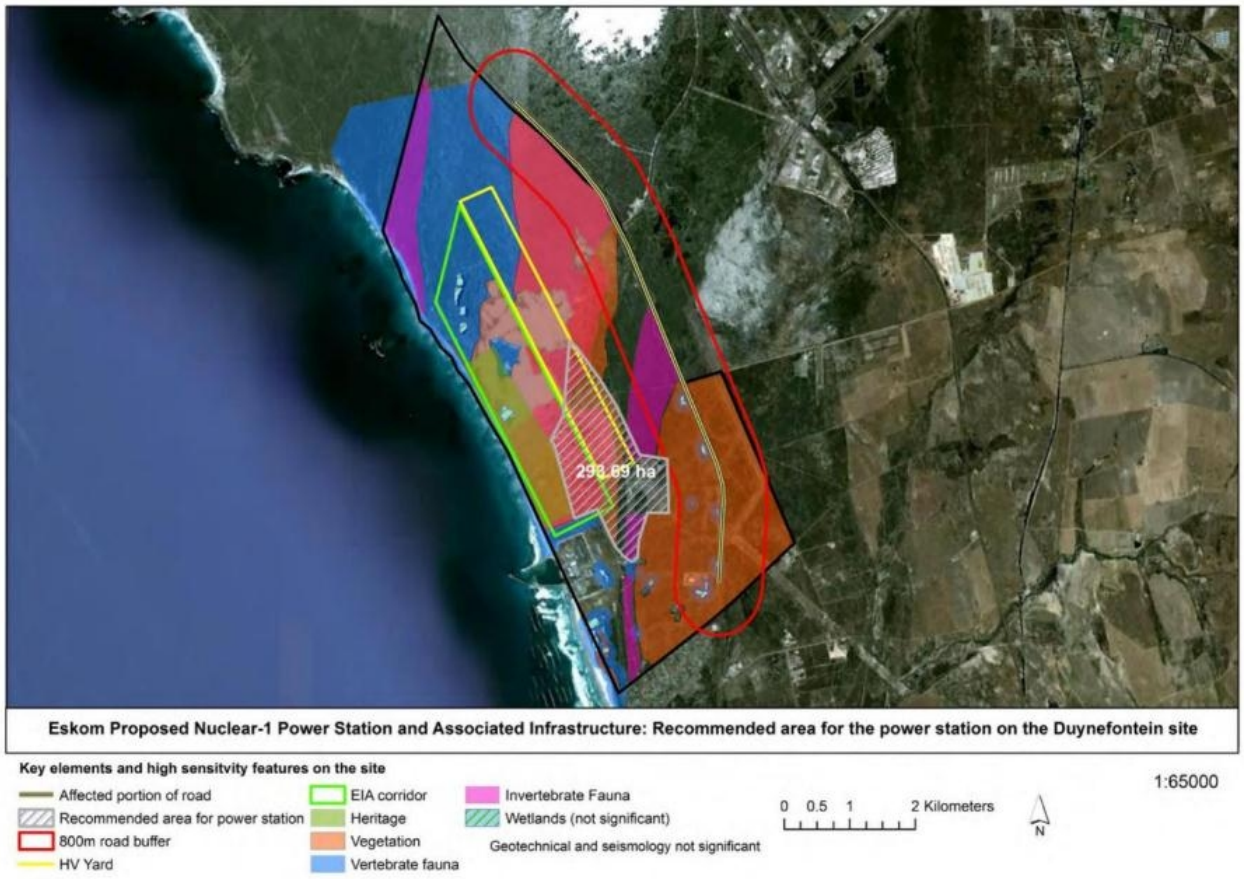

Figure 8.2: Nuclear-1 Duynefontein sensitivity map *Source: Arcus GIBB (Pty) Ltd. 2011*

8.3.5 Flora

The Alternatives within the intact vegetation would be almost certain to impact listed plant species, a relatively large number of which have been recorded in the Koeberg Private Nature Reserve. As the affected vegetation types are themselves also listed as Endangered or Critically Endangered, impacts to intact vegetation would be highly undesirable and the options within the transformed habitats are highly preferred as a result.

Nature:

- Site preparation and construction will result in a lot of disturbance which would impact indigenous vegetation at all the AIS Alternatives except *Alternative 5*.
- Given the abundance of listed species in the area and the high conservation status of the constituent vegetation types, a high negative impact on the vegetation and listed species can be expected to occur under such a scenario.

Extent: Although the extent of the development is relatively low, the conservation significance of the intact vegetation and the presence of numerous listed species means that any transformation within these areas would have an impact that must be considered to have relevance beyond the local area. Should the development be restricted to the transformed habitats the extent of impact would be restricted to the site.

Potential Significance: The significance of this impact would depend entirely on the final location of the substation. Within the Alternatives restricted transformed areas, the significance would be low, while within the intact vegetation the significance would be very high and could not be effectively mitigated.

Impacts can therefore be placed in three categories, namely:

- Direct impacts:
  - Destruction of threatened and protected flora species;
  - Destruction of sensitive/ pristine habitat types;
- Indirect Impacts:
  - Floristic species changes subsequent to development;
  - Impacts on surrounding habitat/ species;
- Cumulative Impacts:
  - Increase in local and regional fragmentation/ isolation of habitat; and
  - Increase in environmental degradation.

Table 8.3 presents a summary of past, current and future Eskom EIA Environmental Authorizations within vicinity of Koeberg Power Station excluding high voltage line projects. The aim of the table is to illustrate the cumulative impact of developments in the study area.

Table 8.3: Past, Current and Future Eskom EIA Environmental Authorizations within vicinity of Koeberg Power Station excluding high voltage line projects

Project	Current, Past or Future	Approx. loss of un-transformed indigenous vegetation	Fynbos Type	Comments
Koeberg Admin and Training Centre Campus	Past	8 ha	Atlantis Dune Fynbos	EA did not require any biodiversity off-set however stewardship agreement is required
Ankerlig power station conversion and integration	Past	17.5 ha	Cape Flats Dune Strandveld	EA requires a biodiversity off set of 225 ha. Off-set not yet implemented due to project on hold
Weskusfleur Substation	Current	Alt 1: None Alt 4: 27 ha	Alt 1: Previously Transformed Alt 4: Atlantis Dune Fynbos	Biodiversity off set (if required) subject to EIA process
Nuclear-1	Current	265 ha	Some Cape Flats Dune Strandveld, some unlisted	Biodiversity off set (if required) subject to EIA process
Koeberg Transient	Future Proposed	None	Previously Transformed	Biodiversity off set (if required) subject to EIA

Interim Nuclear Used Fuel Storage Facility			Cape Seashore Fynbos	process
Koeberg Thermal Power Uprate	Future Proposed	None	N/A	No biodiversity off-set required
Koeberg portable equipment store and water storage tank	Future Proposed	None	Previously Transformed	Biodiversity off set (if required) subject to EIA process
Koeberg Insulator Pollution Test Station	Future Proposed	None	Previously Transformed	Biodiversity off set (if required) subject to EIA process
Koeberg Visitor's Centre	Future Proposed	None	Previously Transformed	Biodiversity off set (if required) subject to EIA process

The nature and extent of these impacts will be assessed in the EIA phase of the project.

8.3.6 Fauna

Potential faunal impacts include:

Nature:

- Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna during the construction phase.
- Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present.
- Some mammals and reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present.
- In the longer term impacts on fauna are likely to be relatively low provided that effective mitigation can be applied.

Extent: The extent of the impact would be largely restricted to the local area.

Potential Significance: Disturbance during the construction is likely to be high as a result of disturbance, noise and human presence. However, during the operational phase impacts are likely to be of relatively low significance, especially for the transformed alternatives. As with vegetation, the significance of the development on fauna would depend to a large degree on the final location of the substation and associated infrastructure.

Loss of Landscape Connectivity and Ecological Function

Nature:

- The presence of the substation within areas of natural vegetation would disrupt landscape connectivity and would pose an obstacle for the movement of many fauna.
- Subterranean species such as the local endemic Bloubergstrand Dwarf Burrowing Skink would be most vulnerable.

Extent: The extent of this impact would depend on the final preferred Alternative and would be of regional significance in the worst case scenario.

Potential Significance: The significance of this impact would depend on the final preferred Alternative, but for *Alternatives 3* and *4* and AIS *Alternatives 1* and *2*, the significance would be high given the likely importance of these areas for faunal movement and landscape connectivity.

8.3.7 Biodiversity Comparative Assessment

Each Alternative and substation type option are preliminary compared within a table in terms of the sensitivity of each Alternative for each element of the terrestrial biodiversity. At this stage, a broad subjective assessment is used to categorise each alternative as low, medium, high or very high sensitivity for a particular biodiversity element.

Table 8.4: Summary assessment of the likely sensitivity of each Alternative for each element of biodiversity, based on the preliminary ecological data available for each site.

Alternative		Flora	Ecological Function	Mammals	Reptiles	Amphibians	Avifauna
Alt 1	**AIS**	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	GIS	Low	Low	Low	Low	Low	Low
Alt 2	**AIS**	High	High	High	High	High	High
	GIS	Low	Low	Low	Low	Low	Low
Alt 3	**AIS**	Very High	Very High	High	Very High	Moderate	High
	GIS	High	High	Moderate	High	Moderate	Moderate
Alt 4	**AIS**	High	High	Moderate	High	Moderate	Moderate
	GIS	High	High	Low	High	Low	Low
Alt 5	**AIS**	Low	Low	Low	Low	Low	Low

The results of the comparative assessment are to some extent dependent on the power lines associated with each option and not only the location of the substation. Currently the management of the vegetation beneath the power lines is detrimental to biodiversity, and should the policy at Eskom change and the vegetation beneath the power lines is allowed to persist without continued clearing and disturbance as is currently the case, then the ranking would be based more exclusively on the location of the substation itself.

However, at this point, only the status quo can be safely assumed and under such a scenario, *Alternative 5* is likely to be preferable option in terms of overall ecological impact, followed by *Alternative 4 GIS* although not technically viable and *Alternative 2 GIS*. *Alternatives 1, 2* and *3* for AIS are likely to be the least preferred alternatives as they would result in the greatest loss of currently intact habitat and would have the greatest ecological impact. The no-go alternative would maintain the status quo and would obviously not have a direct impact on biodiversity. However, under the current situation some areas such as the area to the east of the R27 is becoming heavily invaded by woody aliens and would impact the biodiversity value of this sensitive area.

8.3.8 Surface Water

The primary drainage paths is located a distance from the sites except for a small tributary of the Sout River which run through the western corner of the proposed *Alternative 5* north of the Sterrekus Substation. The area of all the proposed alternatives consists mainly of minor drainage paths over a flat sandy terrain. Impacts as a result of flooding linked to watercourses are therefore absent. Although flooding below the Sterrekus Substation (*Alternative 5*) which is located in the proximity of a tributary of the Salt River has taken place. This impact is linked to storm-water management and adequate storm water measures.

A large area will be cleared for construction activities and flat surfaces will be created for heavy electrical equipment. These activities will affect the storm water runoff characteristics of the land. The flat surfaces will result in more point specific discharge points which in turn concentrate flow and increase the erosion potential. The absence of vegetation and the associated reduced infiltration result in a higher runoff coefficient (higher percentage of water runoff from the site). Watercourses and man-made drainage structures will carry more water which may result into flooding.

The following potentially negative impacts on the surface water associated with the **construction phase** have been identified:

- Clearance of the site to prepare for construction;
- Storage of hazardous chemical substances;
- Storage of fuel and oil;
- Cement and concrete batching;
- Transportation of material to site and the storage of material on site; and
- Dust as a result of construction activities.

The abovementioned impacts associated with the construction phase are generic and can be adequately managed through the implementation of a construction Environmental Management Plan.

The following potentially negative impacts on the surface water associated with the **operational phase** have been identified:

- Blocked surface water management systems as result of build-up of dust and silt;
- The cut of the supply of surface water to wetlands as a result of the diversion of site storm water into storm-water infrastructure.

8.4 Identification of Potential Social Impacts

8.4.1 Visual

Based on the status, extent and duration of the change to the existing landscape, a preliminary visual impact magnitude was defined in order to rank the five sites in terms of risk to landscape degradation (**Table 8.5**).

The preliminary visual impacts in terms of the different alternatives identified:

- The low risk sites were *Alternative 5* and *Alternative 2* GIS due to their close proximity to the Sterrekus substation and Koeberg power station, which already generate high levels of visual contrast.
- The impact of *Alternative 4* was rated medium for the site and high for the transmission line. The site is degraded by close proximity to the transmission line corridors and is covered by alien vegetation. The site is flat without much visual appeal but is in closer proximity to the R27 and isolated farmsteads in the area. The Alternative 4 transmission line crosses over four dwellings and the change in landscape will be strongly experienced as the receptors would have to undergo relocation.
- The impact of *Alternative 1* GIS was rated medium. Although mostly on transformed land, the northern extent does intrude into a high sensitivity dune field area.
- *Alternatives 3* (AIS and GIS) were rated moderate to high as they are located on significant vegetation, are strong associated with the gateway to the Koeberg complex which is currently of interest and defined by natural vegetation surrounding the developed areas, and would be in clear view of the R27 and Duinefontein receptors who have higher sensitivity to landscape change.
- *Alternative 1* and *2* AIS were rated high risk to landscape character. *Alternative 1* AIS intrudes significantly into the northern dune fields which have been identified by the Nuclear 1 EIA as having high environmental significance.
- *Alternative 2* AIS is located within a high exposure area to the Duinefontein residential area where the current buffer zone from the power station has become a key aspect of the local sense of place. Landscape change in this area will be strongly felt and resisted.

Table 8.5: Visual Impact Summary Table

Project component	Status	Extent	Duration	Magnitude
Alternative 1 GIS	-ve direct	Site	Permanent	Medium
Alternative 1 AIS	-ve direct	Regional	Permanent	High
Alternative 2 GIS	-ve indirect	Site	Permanent	Low
Alternative 2 AIS	-ve indirect	Regional	Permanent	High
Alternative 3 GIS	-ve direct	Site	Permanent	Medium - High
Alternative 3 AIS	-ve indirect	Regional	Permanent	Medium - High
Alternative 4 AIS	-ve indirect	Regional	Permanent	Medium
Alternative 4 TX	-ve direct	Site	Permanent	High
Alternative 5	-ve indirect	Regional	Permanent	Low - Medium

8.4.2 Heritage

Heritage scoping has indicated that the proposed construction of the Weskusfleur substation will not impact on any significant surface archaeological heritage, in site *Alternatives 1-5*. The following potential heritage impacts have been identified:

- The desk top study has shown, however, that most of the significant archaeological and palaeontological heritage is deeply buried and will only be exposed during the construction phase of the project. This applies particularly to *Alternatives 1* and *2*.
- Some archaeological heritage (mainly ESA artefacts) might be exposed or uncovered in *Alternatives 3, 4* and *5*, but these are expected to be thinly and unevenly distributed over the proposed development sites and will be of little scientific value.
- Unmarked human burials may be exposed or uncovered during bulk earthworks and excavations.
- Exposure of heritage resources (in *Alternatives 1 & 2*) may result in extensive and lengthy mitigation, possibly delaying construction of the proposed substation by several years. These are potential risks that will need to be taken into account when deciding on the preferred site alternative.
- Construction of the new Weskusfleur substation will however, also provide a unique and rare opportunity to sample, record (their context), collect and rescue material, where deep excavations penetrate or intersect these archaeological and fossil-bearing deposits

- No old buildings, structures or features of historical significance were encountered during scoping, and impacts on significant colonial period heritage resources are unlikely to occur.
- The cultural landscape is not a significant heritage indicator. The existing nuclear/industrial complex at KNPS and Groot Oliphantskop has already compromised the rural agricultural landscape character of the receiving environment. Brakkefontein No. 32/1 does, however, still retain a rural agricultural `sense of place'.

8.4.3 Social

The key social issues that would need to be assessed during the SIA can be divided into:

- Perceptions and fears associated with the proposed power line; and
- Local, site-specific issues (during construction and operation phases).

The local site-specific issues can in turn be divided into construction and operational related issues.

- **Perceptions and Fears**

Social impacts are unique in that the mere introduction of information into the public domain can result in social impacts that manifest themselves in the form of perceptions, fears and expectations. In the case of the proposed Weskusfleur substation, the introduction of information in the form of maps and diagrams indicating the potential alternative alignments is likely to have resulted in social impacts, specifically for the land owners whose properties may potentially be affected.

The extent and nature of these fears are likely to be linked to concerns related to the visual and sense of place impacts associated with large, substations and high voltage transmission lines as well as fuelling existing issues and concerns that landowners have regarding the existing infrastructure in the study area.

These impacts could in turn have negative implications for property values, investments in tourism initiatives and the public's perception of Eskom and their contractors in general etc. The SIA will seek to identify and assess the potential extent and severity of these fears and perceptions as part of the assessment process.

- **Local, Site-specific Issues**

The potential impacts during the **construction phase** include:

- Presence of construction workers and the potential risks to personal safety, specifically for farmers, increase in stock theft, trespassing, poaching and fires;
- Potential for interaction between construction workers and farm workers may result in social impacts, such as relationship conflicts, prostitution, un-planned pregnancies, spread of sexually transmitted diseases, alcohol and drug abuse etc;

- Damage to natural vegetation and grazing due to construction related activities;
- Damage to access and farm roads due to heavy vehicular traffic associated with construction activities;
- Impact on farm infrastructure (fences, gates etc) due to construction related activities;
- Impact on tourism related activities due to construction related activities;
- The impact of the compensation process on farming activities. Concern is that delays in payment of compensation for land takes can impact negatively on farming activities and result in uncertainty regarding future investments in infrastructure etc.
- Creation of local employment and business opportunities; and
- Creation of opportunities for skills development and training for members from local communities.

The potential impacts during the **operational phase** include:

- The impact of the proposed alignments on the visual character of the area and sense of place. These impacts will be felt at both a local, individual landowner level, and also at a larger, landscape level that affects visitors to the area. The nature and extent of the visual and sense of place impacts will be related to the nature of the terrain affected by the substation and transmission lines, the number of people affected, and the existing activities and sense of place of the area;
- The impact of the proposed substation on farming activities and land use potential;
- The potential impact associated with the perceived electromagnetic fields on farming activities and worker health and safety;
- The potential increased fire risks associated with the proposed substation and the implications for farming and other land use related activities, such as tourism and conservation;
- The impact on current and future tourism and conservation related activities and potential. This will be closely linked to the visual and sense of place impacts associated with the proposed substation;
- Impact on property values. Although the SIA will not be in a position to quantify the potential impact on property values, the establishment of substation is likely to have a negative impact on property values for certain landowners;
- The potential impacts associated with maintenance and repair work on farming and other land use related activities, such as tourism and conservation;
- The impact on the servitudes on fire management programmes and the implications for farmers and other land uses, such as tourism and conservation. In many instances the natural vegetation under power lines cannot be burnt on a regular basis due the potential damage to the power lines. Also the presence of the power lines impacts upon the fire fighting options that can be used to combat fires;
- The potential cumulative impacts on the social environment associated with the proposed substation;
- The broader social benefits for South Africa associated with an improved, more stable energy supply network;
- Creation of local employment and business opportunities associated with the maintenance and up-keep of the substation; and

- Creation of opportunities for skills development and training for members from local communities associated with maintenance and up-keep of the transmission lines.

Decommissioning:

Depending on the final alternative selected (**Chapter 4**) the decommissioning of some of the existing Koeberg GIS substation infrastructure and lines is also proposed as part of some of the alternatives. Important aspects for consideration for decommissioning:

- Assessing soil conditions;
- Ensuring the site is reclaimed to the pre-disturbance land capability and is compatible with current adjacent land use.

The scope of the decommissioning will determine which impacts may be expected during decommissioning. The current Koeberg Substation is within the security fence of the Koeberg Nuclear Power station site and will most likely not be fully rehabilitated to its natural state and therefore will the impacts of decommissioning be only localised.

The above mentioned impacts will be investigated in more detail during the EIA phase of the project.