PROPOSED OMEGA ELECTRICAL SUBSTATION

ENVIRONMENTAL IMPACT ASSESSMENT
EIA/12/12/20/636

DRAFT SCOPING REPORT

MARCH 2005

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APPENDICES

FIGURES

TABLES

PHOTOGRAPHS

LIST OF ACRONYMS

APM Committee	Archaeology, Palaeontology and Meteorites Committee
BEL Committee	Built Environment Landscape Committee
BCA	Blaauwberg Conservation Area
BSDF	Blaauwberg Spatial Development Plan
DEA&DP	Western Cape Deptartment of Environmental Affairs & Development Planning
DEAT	Department of Environmental Affairs and Tourism
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
EMP	Environmental Management Plan
IAP's	Interested and Affected Parties
NEMA	National Environmental Management Act
MW	Megawatt
PPP	Public Participation Process
RoD	Record of Decision

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The proposed Omega substation forms part of a strengthening programme to supply the anticipated increasing demand for electricity in the western and southern cape. Eskom planners forecasted the need to upgrade the transmission capacity to the Western Cape in 1986. It was then decided that this would necessitate the extension of the national 765kV transmission grid to the region and the addition of a new 765kV substation. The project would ensure a strong 765kV power injection into the Cape Peninsula to maintain reliability and security of supply for the whole of the Western and Southern Cape and result in a reduced risk to the Cape during regular nuclear refuelling at Koeberg power station. The Omega substation will be approximately 5km from Koeberg on a farm owned by Eskom called "Oliphantskop". The substation will act as a switching station for the existing transmission lines in the area, and as the termination point of the 765kV line from Mpumalanga. This property was specifically acquired after a previous EIA conducted by Ninham Shand Consulting Engineers in 1996. Five sites were assessed with the most preferred site located on the Groot Oliphantskop Farm (Site S4-NE/Alternative Site A). Rezoning for the purpose of constructing a substation was obtained, (this has subsequently lapsed). A total of 50ha will be required to build the actual substation, which will be an open-air structure, with a larger area included in the perimeter fence. The existing 400kV transmission lines currently running through the farm need to turn into and then leave the substation.

The DEAT-approved process for the Environmental Impact Assessment process has been completed and this report contains a summary of the process followed and its findings. Interested and affected parties including surrounding landowners, various national, provincial and local authority departments and non-governmental organisations were contacted during the consultative process. Specialist assessments were conducted pertaining to the ecological, visual, avi-faunal and cultural heritage elements of the study area. The main issues that were identified relate to the aesthetic/visual considerations i.e. sense of place and scenic routes associated within the rural context of the proposed substation, potential loss of avifaunal habitat, health and safety concerns (EMFs and associated radiation); cultural and heritage considerations (in particular the historical Oliphantskop Homestead and associated outbuildings and Old Mamre Road); and construction phase impacts within the study area, (such as security).

The three alternative sites proposed in this study are located on the farm Oliphantskop. These sites are described and assessed in Chapter 8 of the Scoping Report. All three alternative sites were evaluated to determine the most environmentally favourable and technically suited location for the proposed Omega substation. A discussion of the sites in the original study was also considered. Based on this report it is recommended that Alternative Site A be selected for the location of the Omega Substation.

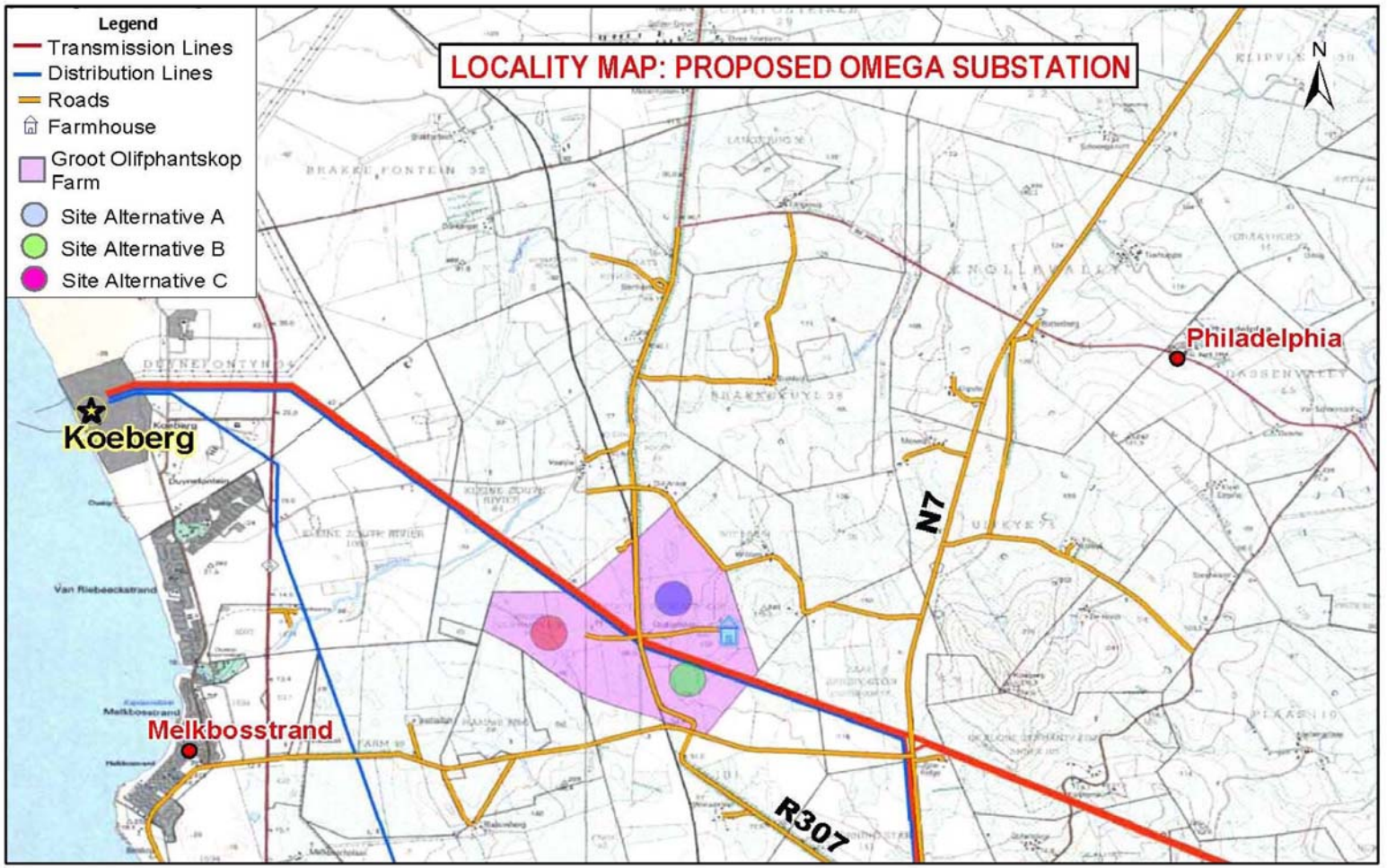


FIGURE 1 LOCALITY MAP : PROPOSED OMEGA SUBSTATION

CHAPTER 1 THE EIA PROCESS FOLLOWED FOR THE PROJECT

1.1 BACKGROUND TO THE PROJECT

Eskom planners forecasted the need to upgrade their transmission capacity to the Western Cape in 1986. It was then determined that this would require the extension of the national 765kV transmission grid to the region and the addition of a new 765kV substation. The new substation was to be called Omega and would need to be located in proximity to the convergence of the existing 4 X 400kV transmission line servitudes from Koeberg, Muldersvlei and Acacia Park. Consequently, Eskom planners in 1996 commissioned preliminary studies for the determination of suitable sites for the Omega Substation. It was envisaged that this would strengthen the electrical infrastructure required for the anticipated increased demand for electricity in the Western and Southern Cape. Ninham Shand Consulting Engineers were appointed as consultants to investigate possible sites for the location of the Omega Substation. Tim Turner and Associates, a firm of Town Planners was appointed to assist Ninham Shand with planning-related issues. The selected site would need to be rezoned from a 'Rural Use Zone' to a 'General Industrial Zone (Electrical substation)' in terms of the provisions of the Land Use Planning Ordinance No.15 of 1985. Eskom identified a number of sites east of Melkbosstrand between the Old Mamre Road and the N7. Five of the most suitable sites were assessed further in the environmental impact assessment.[1]The preferred site was located on the Groot Oliphantskop farm referred to as Site S4-NE, which corresponds to Alternative Site A referred to in this report. Eskom then negotiated to purchase this farm for the anticipated future construction of the proposed Omega Substation. The site at Groot Oliphantskop (Portion 81 of the Cape farm) had been approved for rezoning by the Cape Metropolitan Council during May 1997 (letter dated 26th May 1997). This has however, since lapsed, as the application is only valid for up to a period of 2 years. The Groot Oliphantskop Farm is depicted in Figure 1. In line with current environmental legislation, Eskom Transmission appointed Eyethu Engineers cc as the Independent Environmental Consultant in June 2004 to undertake the Environmental Impact Assessment for the proposed Omega Substation.

1.2 TERMS OF REFERENCE

The current EIA study has focussed on the consideration of suitable sites within the boundaries of the Groot Oliphantskop Farm, which was identified as the most suitable site in the previous EIA undertaken by Ninham Shand.

The rezoning application for Groot Oliphantskop Farm will be commissioned by Eskom to a town planning consultancy and does not form part of the scope of this report. A RoD from the National Department of Environmental Affairs and Tourism is a pre-requisite for re-zoning applications in this context.

[1] The previous EIA was not required by South African law at the time, but was a "best practice" exercise carried out by Eskom in conjunction with the rezoning application. The Environmental Conservation Act now requires that an EIA be conducted before a project such as this can go ahead.

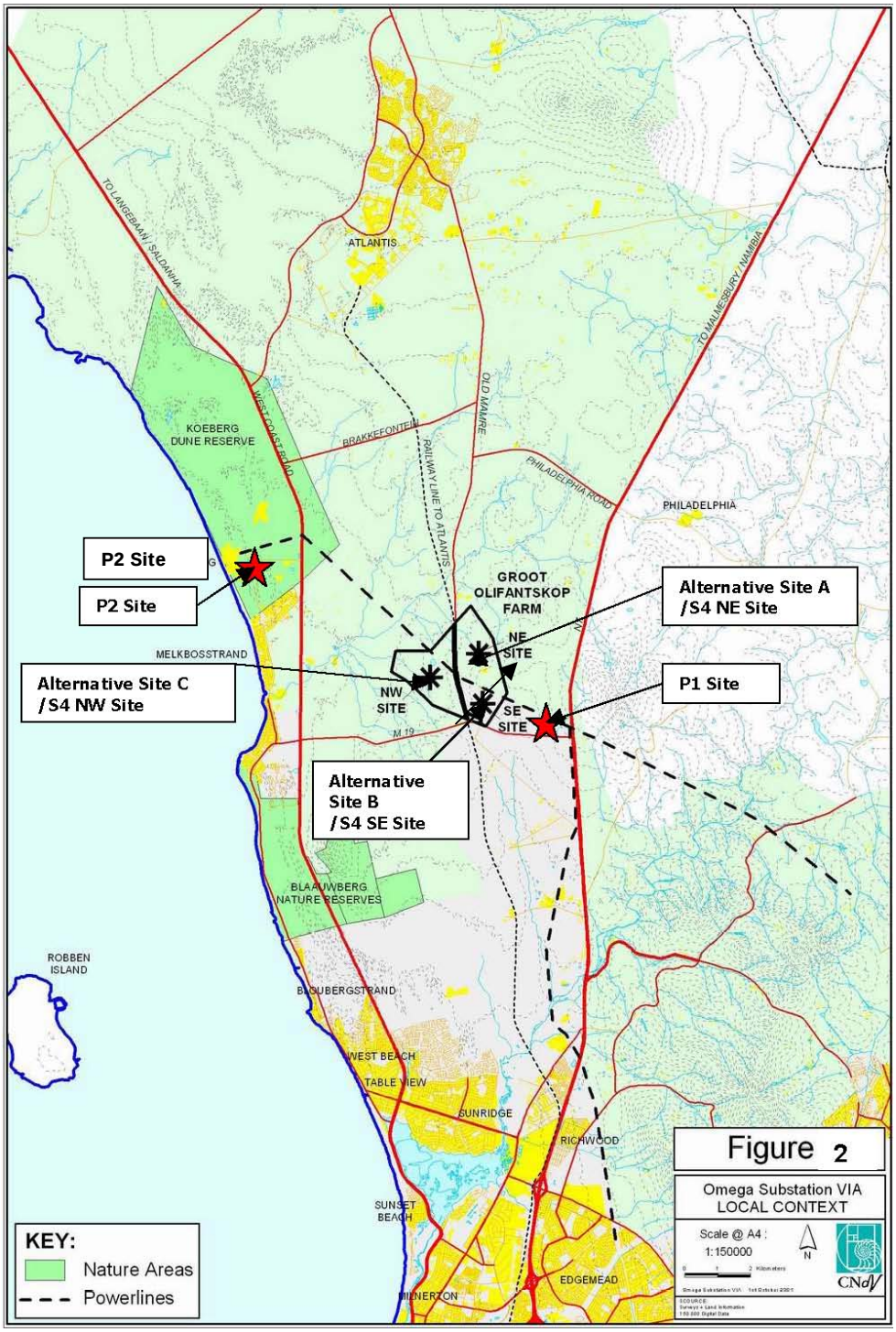


FIGURE 1: THE LOCALITY PLAN

<u>Note:</u> **S4 NW, P2, S4 NE & P1 Refer to alternative sites considered in Ninham Shand EIA (1996)**

1.3 THE EIA PROCESS FOLLOWED

In terms of Regulation 1182 promulgated in terms of section 21 of the Environmental Conservation Act (73 of 1989), the "construction of facilities for commercial electricity generation and supply" was defined as a listed activity (item 1(a) of Schedule 1). Listed activities require compliance with Regulation 1183 promulgated in terms of sections 26 and 28 of the abovementioned Act, in terms of which an environmental impact assessment (EIA) study must be undertaken for the proposed activity prior to it taking place.

This section provides a background to the EIA process for the Omega Substation project and places this report in the project's current context. Eyethu Engineers cc were appointed by Eskom Transmission to undertake the necessary environmental investigations in order to obtain a Record of Decision (RoD) from the National Department of Environmental Affairs and Tourism (DEAT) on whether the project may proceed or not. The EIA process is carried out according to an Integrated Environmental Management (IEM) procedure, as advocated by the Department of Environmental Affairs and Tourism (1992) and the Regulations promulgated under the Environment Conservation Act 73 of 1989. Although National DEAT is the decision-making authority for the project, their decision requires input from the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP). All the correspondence between the consultant and National DEAT throughout the scoping process is thus copied to DEA&DP. This report is the Draft Scoping Report, and forms part of the greater EIA process, as illustrated in Figure 2 below. As per the pre-application consultation with DEAT, this study will terminate after the scoping phase and will not proceed into the Environmental Impact Report phase (unless significant issues are raised requiring further investigation).

The EIA process is intended to provide information on the affected area, identify alternatives at an early stage, facilitate consultation with the neighbouring landowners, key stakeholders and specialists, and to address the concerns of Interested and Affected Parties (IAPs). This report aims to collect and address all issues raised during the scoping process, and to provide sufficient information for National DEAT to assess the project and reach a decision. Based on the review of the Scoping Report, National DEAT will either state that the project may not proceed, or that it may proceed with conditions. A record of decision will then be issues and all I&APs will be informed of the decision.

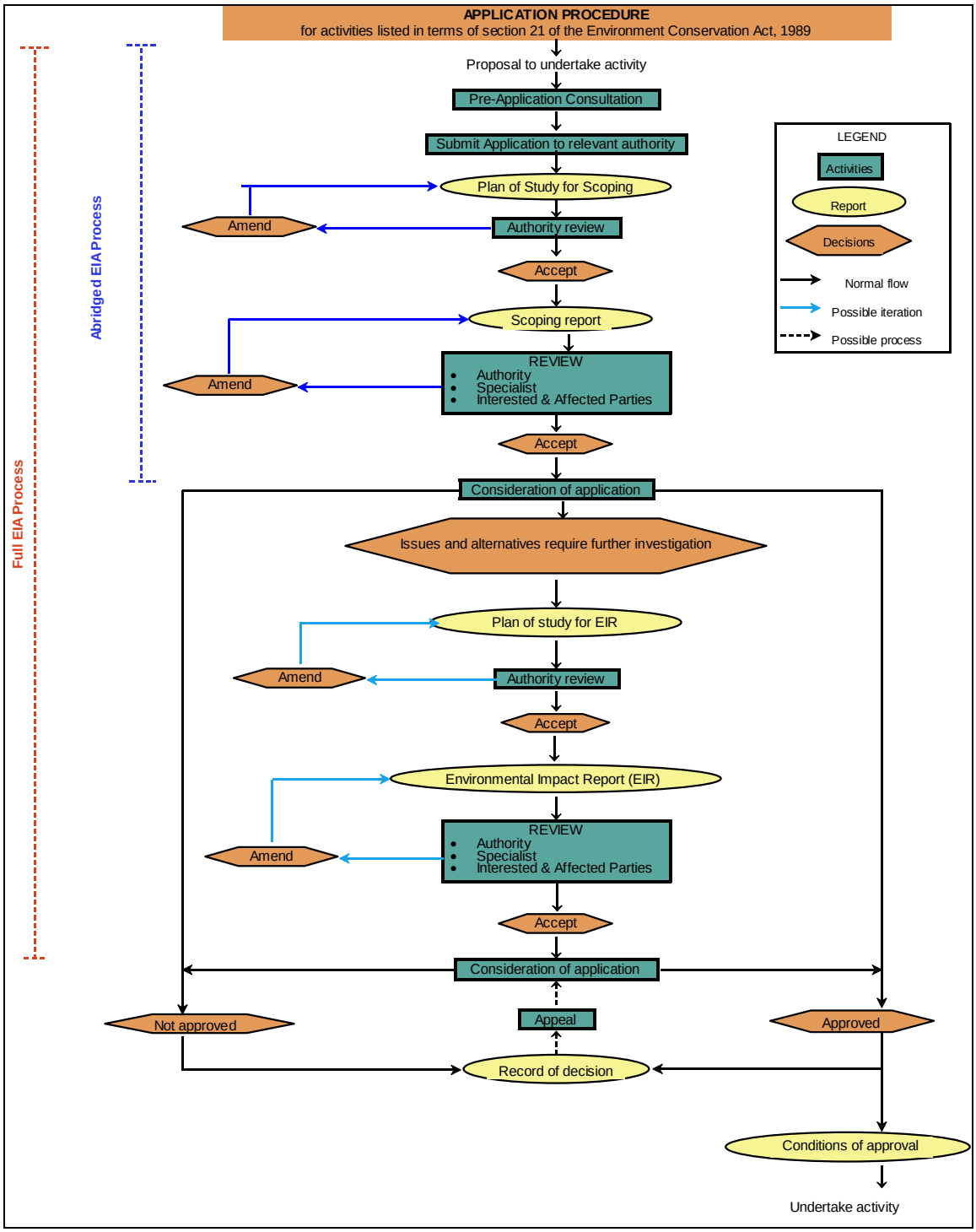


FIGURE 2: THE EIA PROCESS – NOTE: THE EIA PROCESS FOLLOWED IN THIS STUDY WILL BE THE ABRIDGED EIA PROCESS

1.4 APPROACH TO THE STUDY

The various phases of the study and desired outcomes thereof are tabulated below for ease of reference.

TABLE 1: APPROACH TO THE STUDY

Phase	Main Action	Description
Phase 1	Need and justification	Establish the need for the project. Establish project alternatives. Identify study area.
Phase 2	Scoping study	Consultation with authorities. Identify and contact IAPs. Collect background data. Identify gaps in background data. Identify problem areas. Evaluate alternatives and determine which are viable (technically and environmentally).
Phase 3	Specialist Studies	Gathering of area-specific information identified during the scoping phase. Evaluate Alternatives. Evaluate potential impacts. Propose Mitigation measures (if any). Recommendation of preferred alternative.
Phase 4	Environmental Scoping Report	Draft Environmental Scoping Report. **(Current)**
Phase 5	Review	Independent IAP review of Scoping Report. Comments received and analysed, Final Scoping Report.
Phase 6	Environmental Scoping Report	Final Scoping Report.
Phase 7	Decision	Final Environmental Scoping Report submitted to DEAT for approval. Decision on the project made by DEAT. Decision made public.

1.5 SCOPING

Scoping can be defined as an exercise involving the preliminary identification of the environmental issues surrounding a project that require assessment. The first step of the scoping study was to establish the need and justification for the project and to identify project alternatives within the study area. Phase two involved the identification of IAP's, the gathering of background information and the determination of technically and environmentally viable alternatives. The main issues pertaining to the project were identified. Phase three involved the specialist investigations and the proposed mitigatory measures. Thus issues were identified using professional judgement, experience of similar projects, knowledge of the study area, a review of available literature, public consultation, specialist input and consultation with relevant government and local authorities.

The fourth phase constitutes the compilation of the Environmental Scoping Report, in which the potential impacts are evaluated using valued ecosystem components within the study area. Suggested mitigatory measures to counter various predicted impacts are proposed at this stage. Impacts are assessed in terms of their significance and duration with outputs in the form of a matrix.

The Draft Scoping Report is currently available for public review. All interested and affected parties (IAP's) are invited to comment on this Draft Scoping Report. These comments will be included in the Final Scoping Report that will be submitted to Department of Environmental Affairs and

Tourism (DEAT) and the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) for review, consideration and approval. A decision on the project will then be made by national DEAT.

1.5.1 Authority Consultation

Scoping meetings were held with the following authorities:

- Mr Vincent Matabane, Department of Environmental Affairs and Tourism (National) in Pretoria in June 2004; and
- Western Cape Department of Environmental Affairs and Development Planning in Cape Town in July 2004.

1.5.2 Specialist Input

The following specialists were consulted concerning the project:

- Mr. Chris van Rooyen, Endangered Wildlife Trust, Avifauna Unit, Avifaunal specialist
- Mr. Tim Hart, UCT Dept of Archaeology, Archaeologist
- Mr. Nick Helme, Nick Helme Botanical Surveyors, Botanist
- Ms Tanya de Villiers, Chittenden Nicks de Villiers, Visual Impact Assessment

The aims of authority and specialist consultation at this stage were to discuss and define the following:

- the need for the project;
- alternatives;
- any constraints which may be identified by Authorities;
- scope of work for the study;
- study approach and methodology with respect to data collection, data evaluation and public participation;
- identification of additional interested parties;
- the main environmental issues which require detailed study;
- relevant data;
- verification of map data;
- identification of “no go” areas.

1.5.3 Site Visit

The study area was visited by the project team during a project briefing trip on the 4th June 2004.

1.5.4 Information Gathering

Information gathering was carried out through:

- Correspondence with specialists and Eskom personnel
- Literature reviews
- Previous environmental assessment report by Ninham Shand (1996)
- Review of planning policy for the study area

- Geographic Information System (GIS) analysis including 1:50 000 topographical maps and 1:250 000 geological series maps
- Red Data Flora information
- Vegetation Maps of SA (Mucina & Rutherford)
- Archival Databases for the Western Cape
- Interaction with NGOs and individuals
- Interaction with Authorities
- The Blaauwberg Spatial Development Plan
- The Rural Management Framework for the City of Cape Town.

1.6 PUBLIC PARTICIPATION

This scoping phase included public consultation to assist in identification of issues and alternatives in more detail. The public participation process is explained further in Chapter 4.

CHAPTER 2 THE LEGAL POSITION

2.1 INTRODUCTION

A project involving the construction of a new substation requires a vigorous review of applicable legislation, policy guidelines and administrative procedures.

This chapter reviews legislation pertaining to environment conservation, pollution prevention, use and conservation of resources, protection of the socio-cultural heritage, etc.

2.2 PERTINENT ENVIRONMENTAL LEGISLATION

The pertinent environment laws that are applicable to the study area have been identified and are presented in Table 2.

TABLE 2: PERTINENT ENVIRONMENTAL LEGISLATION APPLICABLE TO THE PROJECT

NAME OF ACT OR ORDINANCE	AREA OF APPLICATION	CONTROLLING AUTHORITY
Advertising on Roads and Ribbon Development (Act No 21 of 1940)	Prohibition of leaving refuse, and erection and construction of structures near certain roads	Department of Transport
Agricultural Pests Act (Act no 36 of 1983)	Control to prevent agricultural pests, including the importation of exotic plants and animals	Department of Agriculture
Atmospheric Pollution Prevention Act (Act no 45 of 1965)	Control of all forms of air pollution, e.g. smoke, dust and vehicle emissions	Delegated through regulations to Local authorities, Department of Environmental Affairs and Tourism
Conservation of Agricultural Resources Act (Act no 43 of 1983)	Control of the utilisation and protection of wetlands, soil conservation and related matters, control and prevention of veld fires, control of weeds and invader plants, the control of water pollution from farming practices	Department of Agriculture
Environment Conservation Act (Act no 73 of 1989) and Regulations under the act	Matters relating to conservation, littering, combating of noise, etc.	Department of Environmental Affairs and Tourism
Eskom Act of 1987	Matters relating to Eskom	Eskom
Fencing Act (Act no 31 of 1963)	Prohibition of damage to a property owner's gates and fences	Department of Agriculture
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act no 36 of 1947)	Control of aspects concerning the importation, manufacture, registration, sale, storage and use of pesticides and herbicides	Department of Agriculture
Forest Act (Act no 122 of 1984)	Control of veld, forest and mountain fires and the protection of biota and ecosystems	Department of Environmental Affairs and Tourism
Hazardous Substances Act (Act no 15 of 1973)	Control of substances capable of causing injury, ill-health or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature	Department of Health

NAME OF ACT OR ORDINANCE	AREA OF APPLICATION	CONTROLLING AUTHORITY
Health Act (Act no 63 pf 1977)	Control of the provision of sewerage and sanitary facilities and the pollution of surface and ground water, which may endanger human health	Most powers delegated to local authorities Department of Health
Land Survey Act Act no 8 of 1997)	Cadastral surveys and associated activities	Department of Regional and Land Affairs
National Monuments Act (Act no 28 of 1969)	Controls for and protection of natural and historical monuments, relics and antiques	Department of National Education
National Roads Act (Act no 54 of 1971)	Disposal of waste near national roads	Department of Transport
Occupational Health and Safety Act (Act no 85 of 1993)	Controls the exposure of employees and the public to dangerous and toxic substances or activities	Department of Manpower
Physical Planning Act (Act no 125 of 1991)	Regional and urban structural plans (Sections 23-27)	Department of Regional Planning and Land Affairs
Regional Services Council Act (Act no 109 of 1985)	Enabling regional services councils to control environmental matters within their areas of jurisdiction	Regional Services Councils
South African Transport Services Act (Act no 65 of 1981)	Control on all environmental matters of SA Transport Services properties	Department of Transport
Water Act (Act no 36 of 1998)	Control of the conservation and use of water for domestic and industrial purposes; treatment and disposal of waste and waste water and pollution of surface and ground water	Department of Water Affairs and Forestry
National Environmental Management Act no 107 of 1998	Control of Environmental Management	Department of Environment Affairs and Tourism
National Heritage Resources Act no 25 of 1999	Control of heritage resources	South African Heritage Resources Agency

Of importance are also all provincial and municipal by-laws and regulations that are not listed here. Some of the acts may have changed or are in the process of change. However, once construction starts, current legislation and all amendments will apply.

2.3 SPECIFIC RELEVANT ENVIRONMENTAL LEGISLATION

2.3.1 Environmental Conservation Act No 73 of 1989 (ECA)

The ECA created the mechanism for the implementation of compulsory EIA's by way of ministerial regulation. Section 21 empowered the minister to promulgate regulations identifying activities, which may have a detrimental effect on the environment. Section 22 prohibits the undertaking of activities identified under regulations promulgated under Section 21 except by virtue of a written authorisation issued by the Minister, or delegated competent authority.

Section 26 is again enabling, allowing the Minister to promulgate regulations regarding information to be submitted to the Minister to enable an informed decision to be taken in terms of Section 21.

The Minister promulgated regulations in terms of Section 21 and Section 26 in Government Gazette No 18261 in September of 1997. Regulation 1182 set out a list of activities which may have a substantial detrimental effect on the environment – including "1(a) The construction or upgrading

of facilities for commercial electricity generation and supply". It should be noted that this legislation was not in place at the time that the first EIA was carried out (in 1996). That EIA was thus a "best practice" exercise linked to the rezoning and a formal Record of Decision (RoD) was thus never given.

Regulation 1183 set out the application procedure for approval to carry out a listed activity. The procedure is represented in graphically in Chapter 1, Figure 2.

In terms of Section 1.1(a) of Regulation 1182 promulgated under Section 21 of ECA, Eskom is legally obliged to undertake an EIA for this project in the format prescribed under Regulation 1183 promulgated under Section 26 of ECA.

2.3.2 National Environmental Management Act No. 107 of 1998 (NEMA)

In essence NEMA repealed ECA in total. Section 50(2) however, provides that Sections 21, 22 and 26 of ECA and regulations promulgated under these Sections shall have force and effect until regulations under Section 24 of NEMA are promulgated. To date no regulations have been promulgated under Section 24 of NEMA, hence ECA and NEMA operate side by side. NEMA focuses primarily on co-operative governance, public participation and sustainable development.

Section 2 of the act sets out a series of principles which serve as guidelines "by reference to which any organ of state must exercise any function when taking any decision in terms of this act or any statutory provision concerning the protection of the environment." These principles include:

- The development must be sustainable.
- Pollution must be avoided or minimised and remedied.
- Negative impacts must be minimised and positives enhanced.
- Waste must be avoided or minimised, revised or recycled.

Section 2(4)(vii) effectively writes into law the "precautionary principle", whereby a risk-averse and cautious approach is applied to the decision-making process.

Section 28 imposes a duty of care to avoid environmental damage or pollution, and where it is not possible to avoid this by taking reasonable steps, then imposes an obligation to remediate any environmental damage that may occur as a result of the activity.

2.4 THE REGULATORY FRAMEWORK

2.4.1 The Electricity Act No. 41 of 1987 (& Electricity Amendment Acts of 1994 &1995)

This Act governs the control of generation and supply of electricity in South Africa and the existence and functions of the Electricity Control Regulator (NER).

Section 3 of the Act sets out the objectives of the Regulator, which are to exercise control over the electricity supply industry so as to ensure order in the generation and supply of electricity, and to perform all functions assigned to it under the Act. "Supply" is defined as the provision or distribution of electricity or both.

Sect 4 sets out the functions of the regulator, which are *inter alia*, the regulator may:

(a) issue licences for the generation, provision and, within the area determined by it, distribution of electricity.

(b) determine the prices at and conditions on which electricity may be supplied by a licensee.

The Board of the NER consists of a chairperson and eight part-time members, all of whom are knowledgeable and experienced in broader electricity supply issues. Board members are appointed by the Minister of Minerals and Energy Affairs and are funded predominantly from licence fees levied on the licence in respect of electricity generated or supplied.

Sect 6 stipulates that no person shall generate or supply electricity except under the authority of a licence.

Sect 10 sets out duties of licensees which includes *inter alia* that the licence must supply electricity to every applicant within his licence area, who is in a position to make satisfactory arrangements for payment thereof should the licence unduly delay or refuse to supply the applicant may appeal to the regulator, who will decide whether the licensee shall supply the applicant and the conditions for such supply.

Sect 12 gives the regulator power to give a defaulting licensee 30 days, or such longer period as may be required, to meet his obligations. Failure to comply may result in a criminal conviction, the taking of possession of the undertaking of the licensee or the withdrawal of his licence.

At present Eskom and over 400 distributors, mainly municipal electricity departments supply electricity to end customers. Eskom is the largest single distributor in the country in terms of sales for final consumption and number of customers. The municipal distributors are under direct control of elected local councils. All electricity distributors are subject to regulation by the NER.

This current electricity distribution industry is fragmented and a restructure and consolidation process has commenced whereby 187 Regional Electricity Distributors (RED's) and Eskom will be responsible for distribution.

2.4.2 The Eskom Conversion Act No. 13 of 2001

The objective of the Eskom Conversion Act is to convert Eskom into a public company having a share capital in terms of the companies Act, and to provide for matters connected therewith, such as powers and duties of Eskom.

Sect 2A stipulates that the ownership of Eskom's equity shall rest in the State.

Sect 3 sets out the objectives of Eskom which is "to provide the system by which the electricity needs of the consumer may be satisfied in the most cost-effective manner, subject to resource constraints and the nations interest".

2.4.3 The Eskom Act 40 of 1987 as amended by the Eskom Amendment Act 51 of 1991

Sect 3 of the Act sets out the objectives of Eskom, being *inter alia* the provision of a system by which electricity needs of the consumer may be satisfied in the most cost effective manner, subject to resource constraints and the national interest.

The Electricity Council exercises control over the performance of Eskom's functions and the exercise of its powers and duties. (Sect 4 (1)). The management of the affairs of Eskom are conducted by the Management Board (Sect 4(4)), the members of which are appointed by the Electricity Council.

Sect 11 authorises Eskom to generate or supply or to generate and supply electricity within the Republic of South Africa subject to the right of local authorities and holders of licences under the provisions of the Electricity Act, 1987.

Sect 12 sets out the functions, powers and duties of Eskom, which include *inter alia*:

1(a) the power to investigate, establish, acquire. maintain, co-ordinate, amalgamate and carry on undertakings to provide an efficient and cost effective supply of electricity to any body or person in the republic.

1(aa) to enter into any contract or perform any act …. As will in the opinion of the Electricity Council contribute towards the attainment of Eskom's objectives.

2.4.4 The White Paper on the Energy Policy of the Republic of South Africa (December 1998)

White Papers are policy documents and hence lack the legal force of legislation. They are however indicative of the government's plans and future policies and often result in the tabling of legislation to achieve the policies and goals set out therein. In 1998 the government published its White Paper on the Energy Sector of South Africa.

Energy sector policy objectives identified include increasing access to affordable energy services, improving energy governance, stimulating economic development (including the encouragement of cost-effective energy prices which include quantifiable externalities), managing energy-related environmental and health impacts and securing and supply through diversity. There is a recognition that there needs to be a balance between energy prices and sustainable environmental standards.

The White Paper recognises that electricity industry is effectively a state monopoly, which is tightly regulated by government policies and regulators and commits the Government to encourage competition within energy markets, particularly in the generation sector, with the introduction of Independent Power Producers (IPP).

2.5 SUMMARY

To summarise: Eskom has a number of legal obligations arising out of various pieces of legislation, which are currently applicable, the key aspects being:-

(a) An obligation to supply electricity to every person applying for electricity who is in a position to pay for it, in the most effective manner, subject resource constraints and the national interest.

(b) An obligation to undertake an EIA for activities that fall within the scope of Regulation 1182 promulgated in terms of ECA and / or the National Resources Heritage Act.

(c) Various obligations to prevent environmental damage by taking all reasonable steps to prevent it (NEMA, National Water Act and others).

CHAPTER 3 THE NEED FOR THE OMEGA SUBSTATION

3.1 INTRODUCTION

South Africa has an energy-intensive economy, partly the result of substantial coal deposits resulting in the low price of generated electricity. Eskom has undertaken to reduce the real price of electricity for industry so that South African producers and manufacturers can remain competitive on world markets, create jobs and generate wealth. In addition to this the ongoing electrification of housing is placing pressure on Eskom's existing power generating and transmission capacity.

Electricity cannot be stored. It is therefore necessary to generate and deliver power over long distances the instant that it is needed. In South Africa, thousands of kilometres of high voltage transmission lines transmit power, mainly from the power stations located at the Mpumalanga coal fields to major substations where the voltage is reduced for distribution via distribution lines to industry, businesses, homes and farms all over the country. The Omega substation is proposed to integrate the new 765kV line into the current network.

Most towns and cities purchases electricity in bulk from Eskom and sell it to households, industrialists and other end users within their areas of jurisdiction, while Eskom also sells electricity directly to end users in some parts of South Africa. The network is illustrated in Figure 3 below.

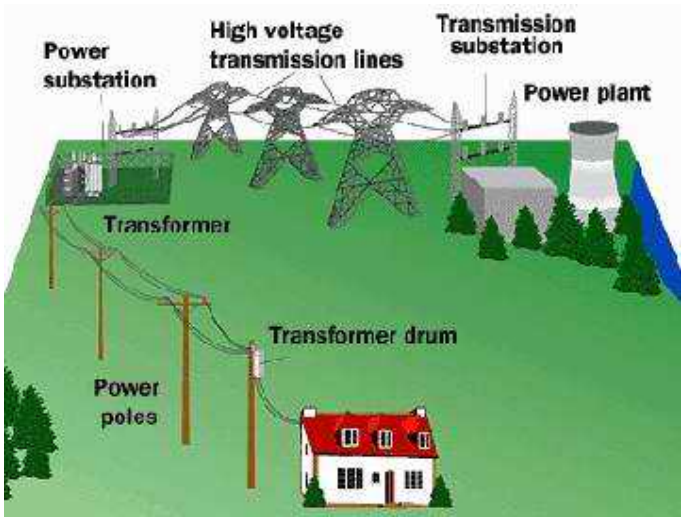


FIGURE 3 OVERVIEW OF THE ELECTRICITY NETWORK

If Eskom is to honour its commitment to meet the increasing needs of end users, it has to establish and expand its infrastructure of powerlines and substations on an ongoing basis. Due to load growth as well as shortages at peak times in the Cape Peninsula area, it has become necessary to reinforce the existing electrical infrastructure.

3.2 SUPPLY AND DEMAND

The electricity demand in the Western Cape region is supplied partly by local generation capacity and partly from the Mpumalanga generation pool by way of long distance transmission lines. Local

generation capacity in the Cape comes in the form of Koeberg Power Station (2x900MW) and the Palmiet pumped storage (2x200MW at peak times only). During an outage (or fault) of one unit at Koeberg the generation capacity is reduced to a value of 900MW, and local generating capacity to 1300MW (1 x 900 MW from Koeberg and 2x 200MW from Palmiet).

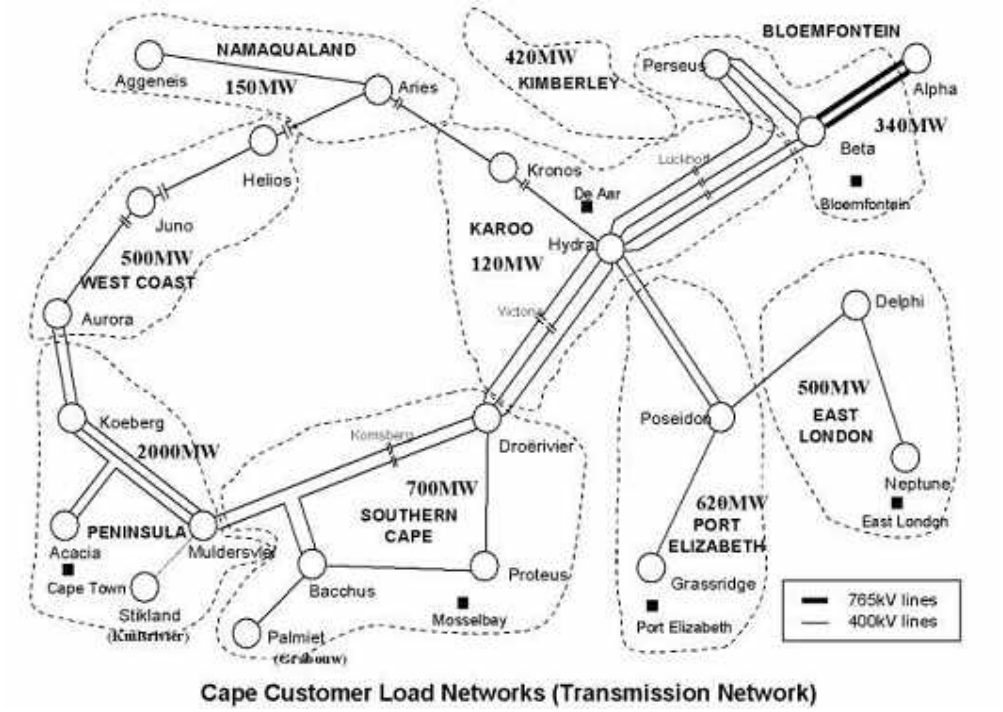


FIGURE 4 CAPE CUSTOMER LOAD NETWORKS

Figure 4 indicates the demands in the Western Cape region and customer load networks supplied from the Cape Corridor Transmission Network (Alpha-Beta-Hydra- Droërivier- Muldersvlei). The most recent figures indicate that peak demands in the Western Cape region exceed 3500MW. Part of this can be supplied from local generation capacity, however the shortfall has to be supplied via the Cape corridor. The supply network to the Western Cape via the Cape Corridor is under strain and will be unable to supply the electricity demand in the Western Cape in the near future.

3.3 THE CAPE STRENGTHENING PROJECT

Eskom identified the weakness in the supply infrastructure along the Cape Corridor some time ago and embarked on the Cape Strengthening Project, which entails a number of measures, being:

(a) The construction of a 765kV transmission line, which has the capacity of approximately 3 x 400kV transmission lines, from Beta near Bloemfontein all the way to Cape Town. This entails construction of new transmission line infrastructure from Hydra to Gamma to Omega Substation. Both Gamma and Omega are proposed new Substations (See Figure 5).

(b) A 400kV transmission line is to be constructed between Palmiet and Stikland Substation. This will link the generating capacity of the Palmiet storage scheme directly to the Muldersvlei Substation improving security and reliability of supply (See Figure 4).

(c) Capacitor banks are to be constructed at Proteus and Bacchus Substations, which will boost power on the Droërivier-Proteus-Bacchus-Muldersvlei transmission line. This measure will allow additional power to be carried on the line should a fault occur elsewhere on the network, again improving security and reliability of supply (See Figure 4).

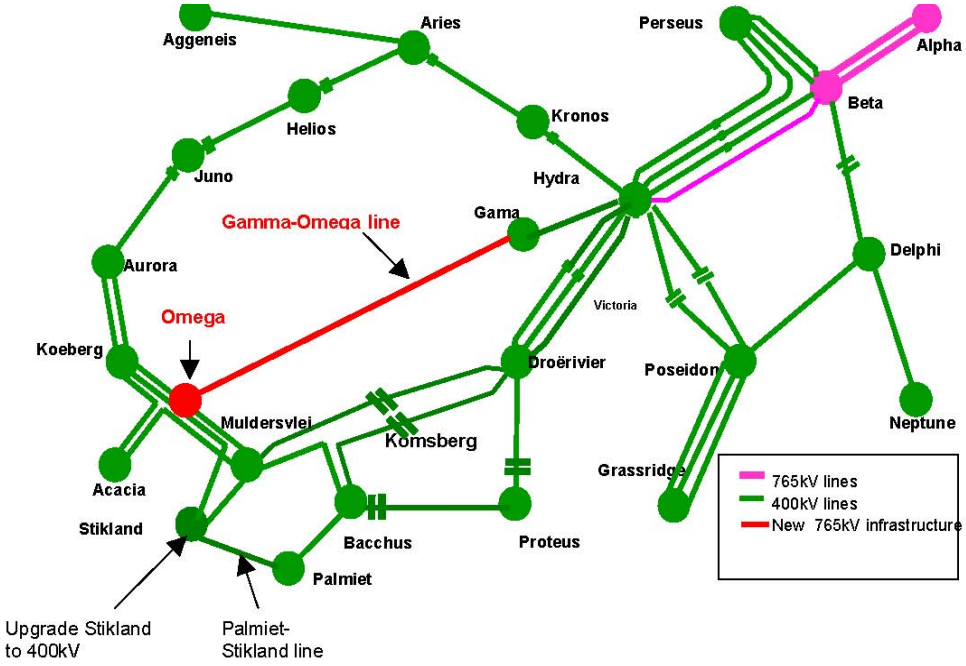


FIGURE 5: GRAPHICAL REPRESENTATION OF THE VARIOUS MEASURES COMPRISING THE CAPE STRENGTHENING PROJECT.

3.4 CONCLUSION

The Western Cape regions demand for electricity will exceed the current infrastructure's capacity to supply it in the foreseeable future. The security of supply to the Western Cape is stretched during certain circumstances (refuelling at Koeberg or transmission line outages). The following needs have been identified:

(a) To increase the transmission line capacity, hence capacity to supply power to the Western Cape.

(b) To improve security and reliability of supply by improvements to the existing infrastructure in the Western Cape.

Eskom's planners have determined that the best way to satisfy (a) above is by the construction of a 765kV transmission line to Cape Town as described above. The existing bulk electricity supply infrastructure (transmission lines and substations) in the Western Cape area cannot handle 765kV

power and hence a new substation is required in Cape Town to “Step-down” the power to a level that it can be distributed to perform a “switching” function i.e. to allow power to be moved between different transmission lines as circumstances dictate.

CHAPTER 4 DESCRIPTION OF PUBLIC PARTICIPATION PROCESS

4.1 INTRODUCTION

Public participation is central to the scoping process, and assists in the gathering of local knowledge, identification of impacts (both positive and negative), and the need to identify viable alternatives that should be considered.

The public participation component of this study was discussed with national DEAT at a pre-application meeting in Pretoria. As a public participation process had been carried out in 1996 as part of the original study, a limited public participation process was agreed to due for the current EIA. (Groot Oliphantskop had been purchased by Eskom after the original study with the intention of constructing the substation on one of the three alternative sites located on the property at a future date). It was envisioned that the current Public Participation Process would entail the updating of the IAP database, investigate any land ownership / occupation changes proximate to the site, and bring IAPs up to speed with the revised status of the project. However, the level of public participation for the study was revisited after initial consultation with the surrounding landowners showed that a need for a more extensive participation process was called for.

The first step of the scoping study was to identify the main issues surrounding the proposed development. The previous study by Ninham Shand (1996) provided information and insight into the potential impacts that are associated with the proposed substation. This was referred to throughout the scoping process as most of the issues are still relevant.

4.1.1 Database of Interested and Affected Parties (IAP's)

A database of interested and affected parties was compiled from the following sources:

- Interested and Affected Parties (IAP) lists from the previous study;
- Communication with Government Authorities;
- Communication with Local Authorities;
- The project team's own experience and visits to the area.

The IAP database is included in Appendix A.

4.1.2 Background Information Document

A Background Information Document (BID) was compiled in English and Afrikaans and was emailed, posted or faxed directly to all IAP's on the database. Copies of the English and Afrikaans BIDs are included in Appendix B. A comment sheet to which comments could be addressed was included with the BID. (Please note that the proposed size of the substation platform has been revised from 150ha as was originally stated in the BID, to 50ha). The total area for rezoning will be larger than the 50ha required for the substation, in order that the perimeter fence is included in the rezoned area.

4.1.3 Newspaper Advertisements

Newspaper advertisements giving notification of the process were placed in English in the local newspaper *The Table Talk* on the 2nd September and in Afrikaans in the regional newspaper *Die Burger* on the 30th August 2004. A further advertisement was placed in *The Cape Times* on 23rd September 2004 in both English and Afrikaans notifying IAP's of the proposed activity and public meeting. Copies of these advertisements are included in Appendix C.

4.1.4 Public Meeting

A public meeting to which all IAP's were invited was held on the 7th of October 2004 at 3pm at the Melkbosstrand Country Club. The meeting was from 3pm to 4pm. A powerpoint presentation was given showing an overview of the environmental assessment process in relation to the proposed development. Thereafter the project team, including representatives from Eyethu Engineers and Eskom Transmission were available to answer questions and to provide technical input to members of the public until 6pm. An attendance register from the public meeting is included in Appendix D.

4.1.5 One-on-One meetings with Affected Landowners

Farms adjacent to Groot Oliphantskop were visited on the 3rd of September 2004 in order to share information about the project and obtain feedback from tenants / landowners in the area.

4.2 Current Status of the Study

Issues raised during scoping were tabled in an issues report (Appendix E). Copies of all written correspondence received from IAP's is available from Eyethu Engineers on request.

All issues identified during scoping, as well as an assessment of impacts and suggested mitigation measures are contained in Chapter 7 of this report.

This report constitutes the Draft Scoping Report and will be distributed to authorities and IAP's for comment. Comments will then be collated and included in the Final Scoping Report.

CHAPTER 5 DESCRIPTION OF RECEIVING ENVIRONMENT AND EVALUATION OF ALTERNATIVE SITES

The information contained in this section provides a broad overview of the environmental context within which the proposed substation would be built, if approved. Should any gaps be identified that make decision-making difficult, components of the affected area may need to be examined in more detail.

5.1 SOCIO-ECONOMIC CHARACTERISTICS OF THE STUDY AREA

5.1.1 Land Use and Surrounding Residential Communities

The surrounding area of the farm Groot Oliphantskop is rural in character and comprises mostly wheat and pasture farmlands.

5.1.2 Planning Policies

Current planning policies and plans were reviewed to determine the context within which land use changes and development proposals need to be assessed. These include:

- The Draft Rural Management Framework for the City of Cape Town (2001) – Volume 1: Findings and Recommendations, which pertains to the management of the rural areas situated on the urban edge of Cape Town Metropolitan area.

- The Blaauwberg Spatial Development Plan (BSDP) - Final Draft (2002) – City of Cape Town – CMC and Blaauwberg Administrations: Spatial Planning. Various areas for future potential development, have been identified that need to be considered in the context of this report and are discussed later in this chapter.

5.1.2.1 The Draft Rural Management Framework

The Draft Rural Management Framework has established principles on which the management of identified rural areas should be based and presents a Rural Spatial Framework that compliments the BSDF and provided guidelines for the management of the rural environment.

According to the Draft Rural Management Framework (2001) a rural spatial framework proposes rural development areas, which include the need for the following land uses peripheral to the urban edge, which can accommodate space extensive uses and support facilities. These land uses include:

- agri-associated " nuisance industries" for example mushroom cultivation, battery farming, piggeries etc;
- land reform; emerging rural-based tourism for example enviro-tourism and adventure tourism and agricultural ventures such as cottage industry;
- metropolitan and sub-regional infrastructure for example sewage treatment works and landfill sites;
- rural living for example smallholdings;

- rural-based accommodation and facilities to support rural ventures such as enviro-tourism and environmental conservation attractions such as biosphere and nature reserves."

The study area falls within the Blaauwberg Rural Development Area, which comprises an area extending east-west between the N7 and R27, and north-south between Atlantis / Klein Dassenberg smallholding area and the proposed Blaauwberg Conservation Area. Proposed broad utilisation according to the Draft Rural Management Framework for the City of Cape Town, includes the following in the central sector north of the M19 route:

- "Retain as agricultural, including the Kleine Zoute Rivier smallholding area, with the location of environmentally friendly space extensive metropolitan facilities (a possible wind farm, and the proposed Omega Substation are mentioned)."
- Promote "value adding" activities (e.g. farm-stays, agrotourism, equestrian centres) on existing agricultural units outside the 5km Koeberg restriction zone.
- Environmental upgrading of Sout River and the introduction of agricultural set-backs and the establishment of an ecological corridor."

It is noted that the proposed Omega Substation has been included in planning policy for this area since the previous study and rezoning application was undertaken in 1996.

Similarly, the Rural Spatial Framework of the Draft Rural Management Framework (2001) proposes Gateway precincts. These are identified as " major city access routes (e.g. N7, N1 and N2) that traverse the rural area, the type, uniqueness and condition of the rural landscape informs both the character of such gateways and the benefits to be derived from such gateways." Two of these precincts fall within the study area: "N7: City and Swartland gateway and the R27: City and West Coast gateway". Thus this framework proposes the need for management guidelines to prevent these rural gateway areas from being lost "subject to ribbon development, non-conforming uses and ad-hoc sub-division." Development of this nature " threatens the integrity of the Urban Edge and impacts negatively on the distinguishing natural features (e.g. indigenous vegetation, topography), dramatic vistas and the man-made environment (e.g. agriculture, cultural heritage), all of which comprise the rural landscape." Thus the siting of the Omega Substation needs to assess visual intrusion within the rural landscape and associated scenic gateway routes to ensure that the alternative site selected possess the least visual impact on the rural landscape.

In the context of this study various scenic routes are located within the study area, N7, M19, R27 (West Coast Road), while the R304 (Old Mamre Road) and its 27 km Eucalyptus avenue passes through Groot Oliphantskop farm. This is considered to be 'conservation worthy' by the National Monuments Council as a scenic route. It is situated north of the urban edge of Cape Town (Ninham Shand, 1996).

5.1.2.2. The Blaauwberg Spatial Development Framework

Further policy relating to scenic routes within the study area relates to the Blaauwberg Spatial Development Plan (2002). The Scenic Drive Network Study, which forms part of this plan has identified scenic drives within the Blaauwberg study area, namely: "the N7 from Contermanskloof, northwards up to the City of Cape Town boundary; Marine Drive, R27; Otto du Plessis Drive; the

R304 Mamre Road (South), from the N7 Morningstar turnoff to Atlantis and the R304 Mamre Road (North) from Atlantis to the City of Cape Town boundary". Specific mention is made of the Melkbosstrand Road (M19) and Old Mamre Road, which are lined with trees and have significant cultural and historical value. This study has laid down policies and guidelines that aid the Blaauwberg Municipality in ensuring that their scenic drives are not lost due to undue or insensitive development. Thus the site selected should be the most favourable from a scenic drive route perspective.

According to the Blaauwberg Spatial Development Framework land use planning adjacent to the proposed Blaauwberg Conservation Area (BCA) needs to be considered in order to account for compatible surrounding land uses. The study area is located north east of the proposed Blaauwberg Conservation Area and north of the Diep River, which is in the process of being proclaimed a conservation area, and the Rietvlei PNE. The proposed BCA consists of two zones a primary conservation zone and a conservation interface (buffer) zone. This area is considered conservation worthy and may be included into the Cape West Coast Biosphere Reserve Southern Core designation (subject to agreement by private landowners and agreement by UNESCO). The primary conservation zone extends from the coast inland to beyond the eastern foothills of Blaauwberg Hill. This zone includes areas of botanical archaeological, historical and cultural important sites. The surrounding landscape to the north, east and south of the buffer area is integral to the larger conservation framework (BSDP, 2002).

The study area is situated inside (alternative site B) and just outside (alternative site A and C) of the current Urban Edge. According to the Blaauwberg Spatial Development Plan the sustainability of the Urban Edge is dependent on how effectively the areas inside and outside the edge are managed. It is envisaged that the remainder of the urban edge on the eastern side of the Blaauwberg study area, will serve to preserve valuable agricultural land and rural practices. The northern urban edge corresponds with the southern boundary of the Primary Conservation Area of the Proposed BCA and the proposed Blaauwberg East-West Arterial. Activities along the proposed arterial must respect the quality of the conservation area and should be suitably landscaped (BSDP, 2002).

5.1.3 Transport Networks and Associated Infrastructure

Both road and rail infrastructure is present in the study area. The railway line to Atlantis is a dedicated goods line and passes through Groot Oliphantskop farm. The Blaauwberg Spatial Development Plan (2002) proposes the upgrading of this line into a passenger line in the long term as a primary public transport facility. This is to accommodate the planned population growth in the area and the development northwards.

The West Coast Road (R27) is situated to the west of the study area and serves as a main route linking the region to Atlantis in the north and greater Cape Town in the south. The N7 is situated to the east of the study area and provides access to Malmesbury and beyond to Cape Town. The Melkbosstrand Road (M19) runs east/west between Melkbosstrand and the N7, just south of the Groot Oliphantskop Farm. From the M19, running due north through the farm is the gum tree-lined Old Mamre Road. Approximately 13 kilometres north of this point this road passes through Atlantis before going through Mamre and on to Darling. The Atlantis railway line lies immediately to

the west of the Old Mamre Road. It passes through Groot Oliphantskop farm before turning more to the west just north of the farm. East of the farm, at a distance of approximately 2.5 kilometres, the N7 between Cape Town and Malmesbury runs in a north south direction. This road is heavily used for cargo haulage and tourism to the Northern Cape and Nambia (Chittenden Nicks de Villiers, 2004). The main transport routes are shown in Figure 1.

According to the Blaauwberg Spatial Development Plan (2002), there are a number of existing road proposals for the Blaauwberg area. These are namely:

The construction of the M12, a proposed north-south arterial to the east of the study area that will link the N7 Freeway at an interchange adjacent to the Du Noon. The M12 will be aligned between the N7 Freeway and the Atlantis railway line and will pass directly through the proposed Site A. The construction of the Omega Substation and M12 expressway are incompatible at present and Eskom are in discussion with the City Of Cape Town in this regard. Eskom has however not been approached with regard to the possible routing of the M12 through their property.

- The extension of the Parklands main Road eastwards to link up with Sandown Road extension and run in a northerly direction adjacent to the Atlantis railway line, up to the point (north of the M19) where it will link up with the existing Mamre Road, which will serve as a northern extension of the M12.This proposed extension is situated further south of the study area and will not affect the proposed substation directly. However, it will affect the northern extension of the M12.

- The southern section of the existing Old Mamre Road is proposed to be realigned to link up with the M12, thus forming a direct connection with Atlantis. This realignment is planned to the north of the study area and will not affect the proposed substation.

5.1.4 Description of Site A: Overview

This site is situated north east of the junction of the Transmission and Distribution lines and the Old Mamre Road, and is north of the current Urban Edge. This portion of the farm is northwest facing and Oliphantskop is located to the east of the site while the Old Mamre Road is to the west. An adjacent farm lies to the north, and to the south is the lower part of Groot Oliphantskop. The historically and culturally significant landmark Groot Oliphantskop Homestead is located close to this site. Surrounding farmland is under oat cultivation and includes a small seasonal drainage line that runs northwest and empties into a culvert that crosses the R307.

5.1.5 Description of Site B: Overview

This site is situated south east of the junction of the Transmission and Distribution lines and the Old Mamre Road, and is situated within the current Urban Edge. This portion of the farm is predominantly south facing and is bounded by the Old Mamre Road to the west, the M19 to the south; Oliphantskop lies to the north and adjacent farmlands to the east. This site is consists of fallow land and is currently pasturelands. There is seasonal wetland, which is used by Blue Cranes as a roosting and breeding area.

5.1.6 Description of Site C: Overview

This site is situated northwest of the junction of the Transmission and Distribution lines and the Old Mamre Road, and is situated outside the current Urban Edge. This portion of the farm is predominantly southwest facing. The existing powerlines from Koeberg power station cross the farm just north of this site and the Old Mamre Road lies to the east across some adjacent farmland. The M19 lies to the south across some farmland and the west is also bounded by an adjacent farm. This site consists of fallow land and has a seasonal wetland present, which is used by Blue Cranes as a roosting and breeding area.

5.1.4 Archaeological and Cultural Resources

An archaeological assessment of the three alternative sites was conducted by Mr Tim Hart and Mr Jayson Orton of the Department of Archaeology, University of Cape Town during June 2004. Please refer to Appendix F.

At least seven heritage sites are located on the farm, with six being deemed to be the more important sites and those that might be most significantly impacted by the proposed development, as shown in Figure 6. A small stone artefact A1 and a second well A3 were found within or at very close proximity to Alternative A and a pre-historic quarry site C1 and occupation site C2 were found respectively within and just outside of Alternative C. A small farm graveyard A4 was found at the north-eastern corner of Alternative B. The five historical farm buildings A2 constitute the most significant heritage resource on the property and are located directly between Alternatives A and B. It is important to note that the cultural and historical landscape of the area is also considered a heritage resource. The three alternative sites are discussed briefly below:

5.1.4.1 Alternative Site A: Cultural Heritage

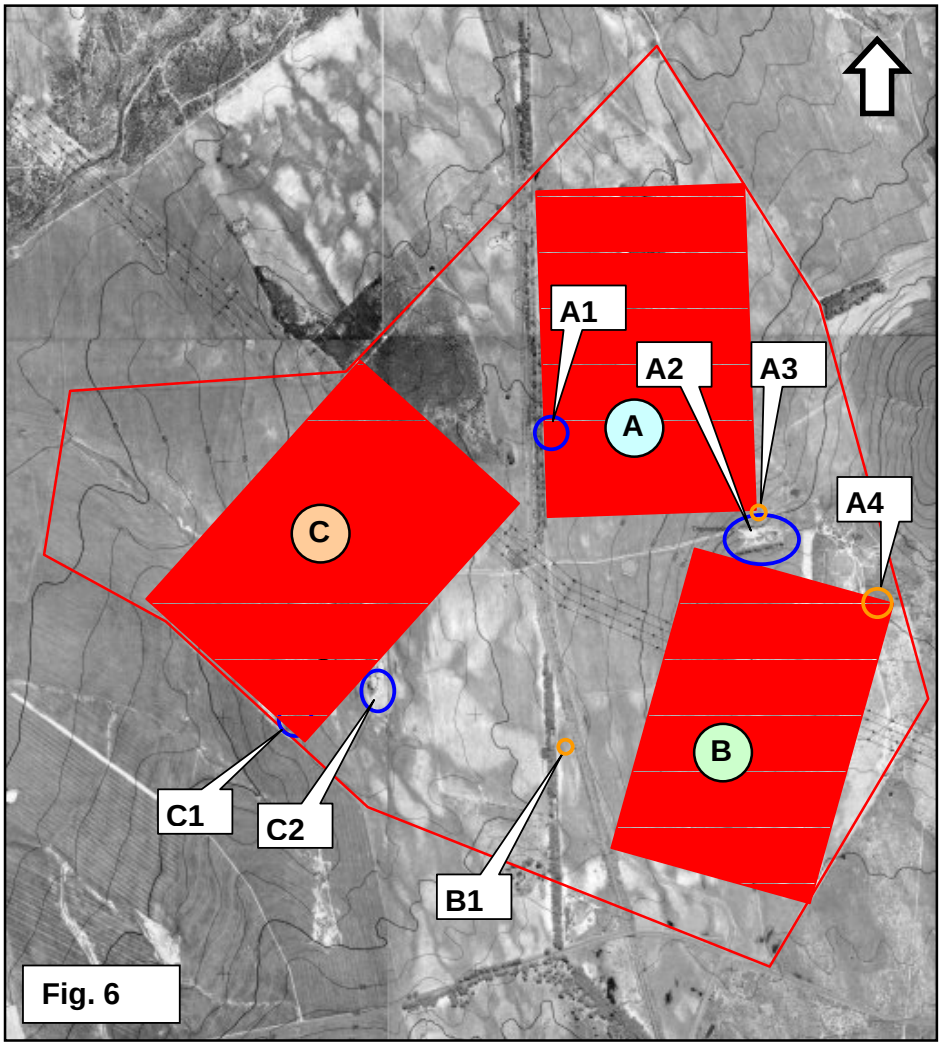
Of the four heritage sites located on Site A, zone A2 was considered the most significant from a cultural heritage perspective. This site comprises the farmhouse and surrounding outbuildings, which according to Hart and Orton (2004) is undoubtedly the most significant and sensitive site on the farm and thus needs to be given careful consideration during the formulation of a heritage management plan for the farm.

According to Hart and Orton (2004) the farmhouse is a significant structure protected by section 34 of the National Heritage Resources Act and is rendered additionally interesting by the fact that its historical layering is intact and it has not been “restored”. It is probably very old by South African standards and could be provisionally assigned grade 3a or even grade 2 status.[2] The building is certainly worthy of conservation (Hart and Orton, 2004). Please refer to 7b. The farm itself is over 200 years old and continues to function commercially to this day. Similarly, the outbuildings are protected by section 34 of the National Resources Heritage Act as applied by Heritage Western

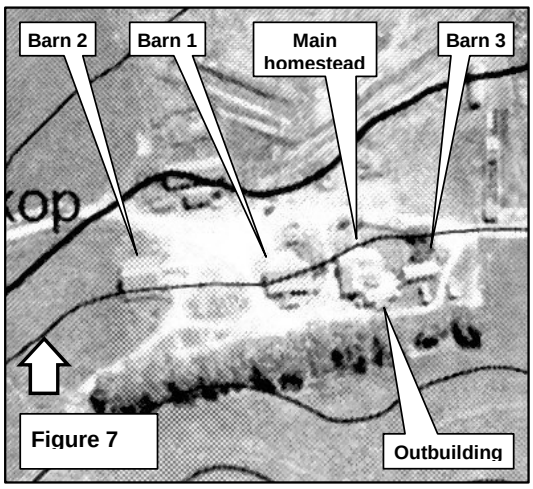
[2] Heritage Western Cape is considering a grading system of archaeological sites to indicate their importance. The system is still in the process of being formalised, but provisional gradings using this system are provided as a guideline. Grade 2 refers to sites of provincial significance, while Grade 3 sites are of local significance. A subdivision within Grade 3 indicates significant sites worthy of conservation (3a) and sites that are not particularly valuable from a historical or archaeological point of view.

Cape. A permit must be applied for and issued for their alteration or destruction (Hart and Orton, 2004).

A4 is located north-east of alternative site B. This consists of a small farm graveyard. This site should be left in tact since any graves older than 50 years that occur within a demarcated graveyard are protected by Section 36 of the National Heritage Resources Act. Thus if alternative B is selected the full procedure as stipulated by the South African Heritage Resources Agency should be followed for the exhumation and relocation of the remains (Hart & Orton, 2004).



3318CB Melkbosstrand & 3318DA Philadelphia (Mapping information supplied by - Chief Directorate: Surveys and Mapping. Website: w3sli.wcape.gov.za) Source Hart and Orton, 2004



FIGURES 6 & 7: ORTHOPHOTOS SHOWING ARCHAEOLOGICAL SITES

5.1.4.2 Alternative Site B: Cultural Heritage

One archaeological finding namely a stone lined well (B1) was made on this site, and it was not considered culturally significant or conservation-worthy.

5.1.4.3 Alternative Site C: Cultural Heritage

According to Hart and Orton (2004), both sites located on Alternative Site C were considered significant from a cultural heritage perspective. Site C1 is located within the footprint of the substation, and is an outright "no-go" area. Although, C2 will not be directly impacted by the development, it would highly likely receive significant indirect impacts during and/or after construction of the substation if a proper management plan is not implemented.

Site C1 is located on a small hill capped with a layer of silicrete from which Stone Age people have obtained raw material for the manufacture of stone artefacts. A vast quantity of flakes, blades, cores and other débitage items were present lying on and around the hill, signifying frequent use of the outcrop as a stone source.

Site C2 is located east of C1 and consists of a sandy deflation containing a scatter of stone artefacts. These seem to be a mixture of Middle Stone Age and Late Stone Age artefacts. Among the latter are three fragments of cobbles, each of which had been used as both a hammerstone and an upper grindstone, and one larger cobble that had been used as a lower grindstone and anvil. With the current deflation of the site, it is thought that its integrity has been substantially altered by souvenir hunters, with many artefacts probably having been removed over the years. As such, the site could provisionally be graded 3b (Hart & Orton, 2004).

5.1.4.4 Summary of the Cultural Heritage Scoping

Alternative B is the preferred site from a cultural heritage perspective.

5.2 BIOPHYSICAL CHARACTERISTICS OF THE STUDY AREA

5.2.1 Location, Topography and Local Hydrology

5.2.1.1 Location and Topography

According to Chittenden Nicks de Villiers (2004) the farm Groot Oliphantskop and its surrounding terrain is one of gentle sloping hills and open plains devoted primarily to wheat farming. There are a few hills that stand out above the rest. Koeberg, to the east of the farm and the N7 highway rises to 376 metres and is the tallest of these. Oliphantskop is on the farm itself and lies immediately adjacent to two of the possible sites for the substation. It rises to 240 metres (Chittenden Nicks de Villiers, 2004).

From Oliphantskop the land slopes gently towards the sea in the west with Koeberg Nuclear power station being to the northwest, Duinefontein and van Riebeeckstrand to the west, and the rest of Melkbosstrand and Atlantic Beach Golf Estate to the southwest. The sea is approximately 8 kilometres from the farm at its closest point (Chittenden Nicks de Villiers, 2004).

As the land nears the sea the terrain becomes more sandy until it is given over to sand dunes, the Koeberg Nature Reserve to the north of the Koeberg power station being a dune reserve (Chittenden Nicks de Villiers, 2004).

To the south of the site there is a wheat farming area, however Cape Town is spreading in this direction and the area up to the M19 just south of the farm is planned for housing development in the long term (Chittenden Nicks de Villiers, 2004).

Crossing the landscape and the farm from northwest to southeast are the existing power lines from Koeberg to Muldersvlei and Acacia Park. A characteristic of the landscape is the presence of several stands of mature trees, mostly pines or gum trees, which stand out above the wheat fields and line some of the roads (Chittenden Nicks de Villiers, 2004).

5.2.1.2 Local Hydrology

There are no major rivers in the area but the land contains several water courses, most of which are perennial. The Salt River runs to the north of the farm and enters the sea at Melkbosstrand and the Diep River is found further to the south and enters the Rietvlei system. According to Van Rooyen (2004) there are two seasonal wetlands located at alternative site B and C. A seasonal drainage line is found on alternative Site A (Helme, 2004).

The farm is divided into two watersheds – with the bulk of the land sloping gently from the homestead towards the Sout Rivier in a northeasterly direction. There are three clearly defined natural watercourses draining from this farm to the Sout Rivier, two from area C and one from area A. Area B drains to the south. The watercourses from the farm, which drain north to the Sout Rivier all pass through a bordering farm located between Groot Oliphantskop and the Sout Rivier. Please refer to Appendix G.

The watercourse from area A drains under the Old Mamre Road and railway line on route to the Sout Rivier. This drainage structure will be a critical point in terms of stormwater discharge.

The eastern boundary of Groot Oliphantskop forms a watershed between this property and the neighbouring Witdraai Farm and it is therefore unlikely that stormwater run-off will be directed onto the neighbouring farm.

A desktop hydrological assessment was conducted to compare the alternative sites and evaluate their capacity to regulate stormwater runoff. Please refer to Appendix G. A development of this size will substantially alter the characteristics of the stormwater runoff and the alteration of existing stormwater flow patterns. The development of this site for a substation will require certain activities including large scale modifications to existing land levels to create flat terraces for heavy electrical equipment and removal of vegetation from the site. Substation yards are not hardened by the construction of an impermeable surface (such as asphalt or concrete) but are gravelled for aesthetics and erosion control. Both of these activities will affect the stormwater run-off characteristics of the land as follows:

- Engineered flat ground results in more point specific discharge points, this tends to concentrate flow and increase its erosive potential;

- Terracing will result in changes to the existing water discharge pathways.

- The absence of vegetation will result in higher stormwater run-off as vegetation slows the flow of surface water run-off allowing it to infiltrate into the ground. The less vegetation on a site the higher the run-off coefficient will become i.e. a higher percentage of water will “run-off” the site rather than infiltrating into the ground.

- Higher run-off coefficients mean that watercourses and man-made drainage structures have to carry more water – this can result in hydraulic capacity problems and flooding.

Site B was not evaluated, as the topography is far steeper than the Alternative A and C, which would result in excessive earthworks volumes and therefore does not appear viable.

Neither site A nor C were found to be preferred from a hydrological point of view. However, Site C has a substantial defined watercourse and hence substantial land remodelling would need to be done which would be more detrimental to the ecology of the site. Site C drains to a stormwater culvert from a neighbouring farm to the south (Blaauwberg), which would have to be accommodated by way of a stormwater culvert or canalisation of some sort. Site C does however drain to a stormwater control structure, which takes the watercourse under the Old Mamre Road and railway line. This will limit the acceptable flow that can be allowed from a development on Site C. The head of the catchment of site A is within the Groot Oliphantskop farm and hence there would not need to be any specific accommodation of flows from a neighbouring landowner. Neither site A nor Site C is a “no-go area” from a hydrological perspective.

Mitigatory measures recommended include:

- The need to reduce run-off from the site, such as avoiding point source discharge points.
- Encouraging slower path velocities by grassing stormwater channels rather than having concrete lined drains to increase infiltration.
- The use of vegetation rather than “hard” surfaces – grassing should be used wherever possible.
- The need to construct a detention facility to ensure that peak flow leaving the site after the development has been completed, does not exceed the peak flows prior to development. This should be designed by an appointed Engineer.
- Further measures include the careful planning of earthworks to ensure that there are no inter-catchment disturbances i.e. transfer of flow from one catchment to another due to the amendment of natural ground levels.
- Similarly, erosion protection and grit traps should be constructed during construction to prevent erosion of sands and subsequent silting of downstream watercourses.
- The design should incorporate the use of several different terraces on differing levels as opposed to one large terrace.

5.2.2 Soils and Geology

The geology map (Theron, 1990) indicates that the primary soils in the area are acid sands of the Springfontyn formation, with significant patches of Tygerberg formation shales, and a small patch of silicrete. The shales are overlain by the sands, and have contributed to the loamy sands, which make agriculture possible. According to Environmental Potential Atlas, 2001, the geology consists mainly of shales and limestone overlain with Aeolian sand deposits. A variety of sandy soil types occur across the area. Geotechnological characteristics indicate that subsurface rock underlies the site.

A survey of the geotechnical characteristics of the three site options was previously conducted in 1996 by Eskom's Geotechnical Services division by MJ Mountain and Partners. This was a preliminary survey, intended to ascertain the geotechnical suitability of each site, and the implications of excavating a 600m x 500m platform (terms of reference for the previous scope) for the substation, (this size has since been reduced significantly). An estimated cost of excavating the substation platform was determined for each site. The costing is a standard cut and fill rate, which includes a degree of compaction but does not make provision for excavating through bedrock. Further geotechnical investigations will be required to determine the full implications for the construction of the Omega substation at one of the three sites. Site-specific geotechnological descriptions are contained below:

5.2.2.1 Alternative site A: Soils and Geology

This site has a relief of about 20m with a concave slope facing slightly north west. A shallow topsoil covers weathered Malmesbury shales. It is anticipated that the bedrock is sufficiently weathered to be excavated using heavy earthmoving equipment. Further geophysical investigations are required to determine the optimal placing of the substation so as to minimise the earthworks (Ninham Shand, 1996).

5.2.2.2 Alternative site B: Soils and Geology

The relief of this site is about 25m with a slightly undulating slope to the west. The geology is similar to that of alternative site A, with the exception that there is more extensive hard rock requiring a larger amount of earthworks (Ninham Shand, 1996).

5.2.2.3 Alternative site C: Soils and Geology

This site has a relief difference of about 20m with an undulating slope toward the southwest and low sand dunes in places. The surface material of aeolian sands is generally a metre deep. The exact distribution of the bedrock geology has not been established. The site is likely to require a large amount of earthworks to create a level platform (Ninham Shand, 1996).

5.2.3 Climate

The area experiences a moderate Mediterranean climate in common with the rest of the South Western Cape. Rainfall is predominantly in winter and approximates 380 mm per annum. Temperatures are mild due to the moderating influence of the sea. Warm summers and cool

winters prevail. Strong south to south-easterly winds predominate in the summer months. During conditions when a south Atlantic high pressure system prevails off Cape Point. These southerly winds accelerate over the Cape Flats and can result in high wind speeds in the study area. The winter is dominated by cyclonic low pressure systems (cold fronts) with winds blowing from the north and north west. The wind strength and duration is generally less than in summer (Ninham Shand, 1996). The mean annual temperature range for Cape Town, which is proximate to the study area, is 11 – 22°C with an annual mean annual rainfall of 515mm (www.weathersa.co.za/climat/Climstats/Cape%20Town%20Stats.html).

The distance to which the coastal climatic influence extends inland has specific relevance for the location of substation because of the association between coastal conditions and corrosion. This was investigated in the previous study by Ninham Shand (1996). This has specific relevance for the tubular-insulation option, as it is particularly susceptible to corrosion by coastal contamination. The design options for the substation are discussed further in section 8.2. A meteorologist, Dr Mark Jury, was appointed at the time to assess the coastal climatic influences operating on the site identified near to Koeberg and the current alternative site A on Groot Oliphantskop Farm. He concluded that based on salt deposition tests undertaken at Koeberg weather Station, Alternative site A would experience about one-third or 29% of the salt exposure experienced at the site near Koeberg. Direct onshore winds occur about 7% of the time within the sectors WNW to WSW. Another 13.4% of winds come from more oblique sectors of NNW, NW, SW and SSW. The site near Koeberg (investigated as part of the previous EIA), was likely to experience a similar degree of exposure to both direct and oblique wind sectors. This means that salt deposition is likely to occur before alternative site A is reached and therefore will not pose a threat to corrosion of substation structures (Ninham Shand, 1996).

According to the Ninham Shand Report (1996) the Koeberg Weather Station completed a preliminary study for Eskom on the ingression of salt air inland in 1988. The outcome of this study indicated that a site close to Koeberg, which is approximately 2.5 km from the coast is not a viable option as salt build-up will be greater than alternative site A, which is situated approximately 5.5km inland.

5.2.4 Vegetation

The farm Oliphantskop is situated in the Swartland, which is situated in the Fynbos biome (Van Rooyen, 2004). Within this area wheat cultivation is the predominant form of dry-land cultivation (36%), followed by old lands (i.e. lands left after the last harvest and not cultivated for several seasons – 24%). Pastures make up about 8% of the land use. Since 1988, there has been a diversification of farming in the region with many farmers switching from a wheat/wheat system to a wheat/pasture system. This was also the case with the farm Groot Oliphantskop, which comprises a total area of 600 hectares. The farm is primarily used for wheat cultivation and milk production. The vegetation on the farm consists mainly of pastures, wheat lands, a few strips of indigenous vegetation and a few pockets of exotic trees (Australian *Eucalptus* and *Acacia* species). The farm also contains two seasonal wetland areas, which is quite rare for the Swartland.

A botanical study was undertaken in June 2004 by botanical specialist Mr Nick Helme during, which the vegetation in all three alternative sites was surveyed. Please refer to Appendix H. According to

the survey all three sites have been totally transformed by intensive agriculture, and presently there is no significant natural vegetation in any of the areas. No rare or endemic species were recorded in these areas, and none is likely. All three sites have been previously disturbed areas and support virtually no natural vegetation. Thus possessing very low local and regional conservation value.

The three alternative sites are discussed briefly below.

5.2.4.1 Alternative Site A: Vegetation

This entire area is currently under intensive oat cultivation. However, the only notable feature that may fall within the site is a small seasonal drainage line that runs northwest and empties into a culvert that crosses under the R307. Please refer to photograph 1. The vegetation west of the main road is still fairly intact, and the wetland nature of the site is indicated by the extensive *Juncus kraussii* (steekriet). The only plants noted in the drainage line in the study area are weedy annuals such as *Senecio burchelii* and *Oxalis pes-caprae* (geel suuring), and this area could in theory be rehabilitated (Helme, 2004).

According to Helme (2004), two areas occurring in Alternative A that need to be conserved include: a 1ha patch just west of the railway opposite the entrance to the farmhouse and a 10ha patch south-southeast of the farmhouse.

PHOTOGRAPH 1 ALTERNATIVE A, OAT FIELDS, LOOKING TOWARDS THE FARMHOUSE AND SHOWING THE SMALL SEASONAL DRAINAGE LINE ON THE FAR RIGHT.

5.2.4.2 Alternative Site B: Vegetation

Alternative B is a fallow land that was once ploughed, and is currently being used for cattle grazing. Please refer to photograph 2. The dominant plants are weedy annuals such as *Cotula turbinata*, *Arctotheca calendula*, alien annual grasses, *Cynodon dactylon* (kweek grass), and the toxic succulent *Conicosia pugioniformis*. A small portion of the site near the road could be described as a seasonal wetland, but there is no significant natural vegetation here as it falls within

the ploughed lands, with essentially the same plant species composition as recorded in Alternative Site A (Helme, 2004).

PHOTOGRAPH 2: FALLOW LANDS IN ALTERNATIVE B, POWERLINES IN THE BACKGROUND

5.2.4.3 Alternative Site C: Vegetation

Alternative C is an existing field under oat cultivation, with no remaining natural vegetation. Please refer to photograph 3. About 200m southwest of the proposed site is a drainage line wetland that is highly degraded as a result of partial ploughing of its edges, intense grazing, and eutrophication by leaching of fertiliser and herbicide runoff. There is no evidence of any significant natural vegetation in this drainage line, and it has low botanical conservation value (Helme, 2004).

5.2.4.4 Summary of the Botanical Scoping

The three alternative sites support virtually no natural vegetation of any significance. The local and regional conservation value is very low. No preferred alternative was therefore recommended by the specialist as direct impact of developing any of the three alternative sites would be negligible from a botanical perspective.

PHOTOGRAPH 3: VIEW OF CULTIVATED LANDS OF ALTERNATIVE C, TOWARDS KOEBERG POWER STATION

5.2.5 Avifauna

An avifaunal assessment was undertaken in June 2004 by specialist Mr Chris van Rooyen, during which the habitat within the three alternative sites was examined. Please refer to Appendix I. According to van Rooyen (2004), the study area contains a variety of avifaunal habitats namely: indigenous vegetation, wheat/pasturelands, wetlands, exotic trees/vegetation and man-made infrastructure. These habitats are briefly discussed below:

According to Van Rooyen very few patches of undisturbed indigenous vegetation remain on the farm, and most of this is infested with exotic species. The indigenous pockets are so small and fragmented that they cannot be considered important refuges for birds. Please refer to photograph 4.

PHOTOGRAPH 4 REMNANT PATCH OF INDIGENOUS VEGETATION

The diversity of birds, especially large terrestrial species are generally low in the wheat/pastureland habitat. This is found in Alternative A and C. However, large numbers of certain species, for example Spurwinged Geese and Helmeted Guineafowl are known to occur in this habitat in large numbers. This habitat is of particular importance for the Blue Crane, which is the process of establishing itself in the Swartland. It would seem that the switch from a wheat/wheat system to a wheat/pasture system has favoured the species. Cranes use agricultural landscapes extensively (fallow, pasture, stubble, crops, bare lands) which provide the birds with a choice of habitats for foraging and nesting as the seasons change. The future of the species has become intimately linked to the farmer and his lands. The farm provides ample habitat for cranes as the majority of the farm consists of lands and pastures. Mr. Stoffberg, who has farmed the property since 1962, reported regular occurrence of Blue Cranes on the farm, both breeding and roosting, as well as one collision mortality of this species on the existing 400kV lines that cross the farm (Van Rooyen, 2004).

Further species identified that can utilize this habitat (and are therefore likely to occur on the farm) are the Steppe Buzzard, White Stork and Secretary birds; nocturnal predators such as the Spotted Eagle Owl and Barn Owl.

The most important aspect of the farm habitat from an avifaunal perspective is the two seasonal wetlands. These are found on alternative sites B and C. Wetlands are crucial for Blue Cranes that use them as roosts. According to Mr. Stoffberg, flocks of up to 50 Blue Cranes roost on the two wetlands in winter and in summer the wetlands are used by several pairs of Blue Cranes for breeding. Other species will also use the wetlands extensively, particularly Spurwinged Geese and various species of waterfowl. The wetlands are likely to attract Blackheaded Heron as well (Van Rooyen, 2004).

Further species such as the White Pelican, which breed on Dassen Island commute from the breeding island to feed at wetlands primarily between the Cape Flats and the Berg River. The farm lies close to the direct north-south flight path from the breeding site and the main feeding sites on the Cape Flats (Rietvlei, Strandfontein, Zeekoeivlei, Muldersvlei). Flamingos migrate at night, and flight altitudes may drop, especially when they encounter a strong headwind (Van Rooyen, 2004).

5.2.5.1 Summary of Avifaunal Scoping

Alternative A is the preferred site from an avifaunal perspective.

5.2.6 Visual Landscape

A visual impact assessment was conducted by Chittenden Nicks de Villiers in October 2004 to determine the visual impacts associated with the positioning of the substation on each alternative site. Please refer to Appendix J.

There are no specific tourist-based activities in the area immediately surrounding the site but the N7 highway carries tourists to Namibia and the Northern Cape, and the R27 Coastal Road carries tourist traffic to Langebaan and the fishing hamlets beyond Saldanha Bay at certain times of the year. The peak tourist season for these roads is during the spring Namakwaland Flower season. Thus there may be significant views of the substation from these and the other surrounding roads. The sites are also readily visible from the Atlantis railway line. Scenic routes were identified that need to be considered when determining the location site. These routes are the N7 highway, Old Mamre Road, M304, M 19 and the Coastal Road (R27). Views from the Atlantis railway were also considered. Views from the surrounding farmlands need to be determined on a farm-by-farm basis. The views of Table Mountain when approaching Cape Town along the N7 are considered important from a tourism perspective with any interruption of these views being considered in a negative light. The Old Mamre Road is of historical significance because of the lines of gum trees on either side that create a very specific atmosphere (Chittenden Nicks de Villiers, 2004).

The three alternative sites are discussed briefly from a visual impact assessment below.

5.2.6.1 Alternative Site A: Visual Impact

This portion of the farm is northwest facing and ranges in height between approximately 80 and 120m above mean sea level. Oliphantskop is to the east of the proposed site, and the Old Mamre

Road to the west. An adjacent farm lies to the north, and to the south is the lower part of Groot Oliphantskop. Please refer to Figure 8.

The alternative site A (Northeast site), being higher than the alternative site C (Northwest site) has the potential to be seen over a larger area, but the possibilities for mitigation on this site seem to be better than on the other two sites. The old Groot Oliphantskop farmhouse will, however be seriously impacted by development on this site.

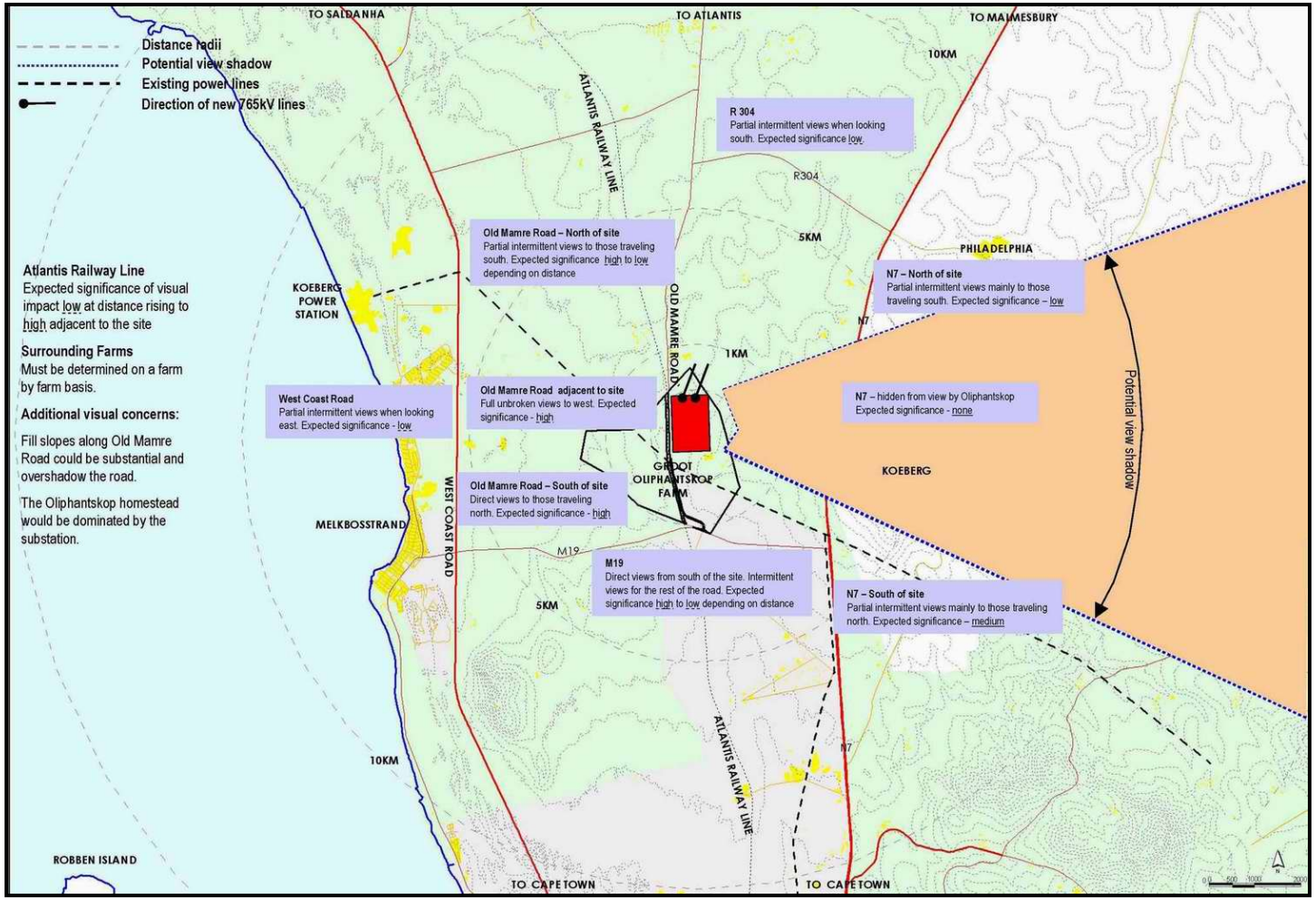


FIGURE 8: VISIBILITY ANALYSIS FOR ALTERNATIVE SITE A

5.2.6.2 Alternative Site B : Visual Impact

This portion of the farm is predominantly south facing and ranges in height between 95 and 130 metres above mean sea level. The site is bounded by the Old Mamre road to the West, the M19 to the south, Oliphantskop lies to the north, and adjacent farmlands to the east. Please refer to figure 9.

According to Chittenden Nicks de Villiers the most unsuitable site for the substation from a visual perspective will be the Alternative Site B (Southeast site). This is because of its proximity to the N7 and M19 and the fact that a section of Oliphantskop would need to be excavated to make place for the platform. It also rises higher than the other two sites and the 765kV lines may have to cross over the top of Oliphantskop to reach the substation causing a visual impact that would be difficult to mitigate.

5.2.6.3 Alternative Site C: Visual Impact

This portion of the farm is predominantly southwest facing and ranges in height between 40 and 80 metres above mean sea level. The existing power lines from Koeberg power station cross the farm just north of the proposed site and the Old Mamre Road lies to the east across some adjacent farmland. The M19 lies to the south across some farmland and the west is also bound by an adjacent farm. Please refer to figure 10.

According to Chittenden Nicks de Villiers (2004), the alternative site C (northwest site) may have the least visual impact in terms of the area from which the substation will be visible, but the need to create a servitude for the 765kV lines across the old Mamre Road will mean the removal of part of the historic tree lines along the road, and the existing watercourses that cross this section of the farm would be seriously impacted. The 765kV lines would need to cross the northeast site to reach the substation and so many of the visual impacts related to the use of the northeast site would be encountered in addition to the impacts that are specific to the northwest site.

A detailed visual analysis will have to be undertaken once the final form and location of the substation has been decided so as to determine the nature and positioning of the various mitigation elements and development a long term visual mitigation strategy.

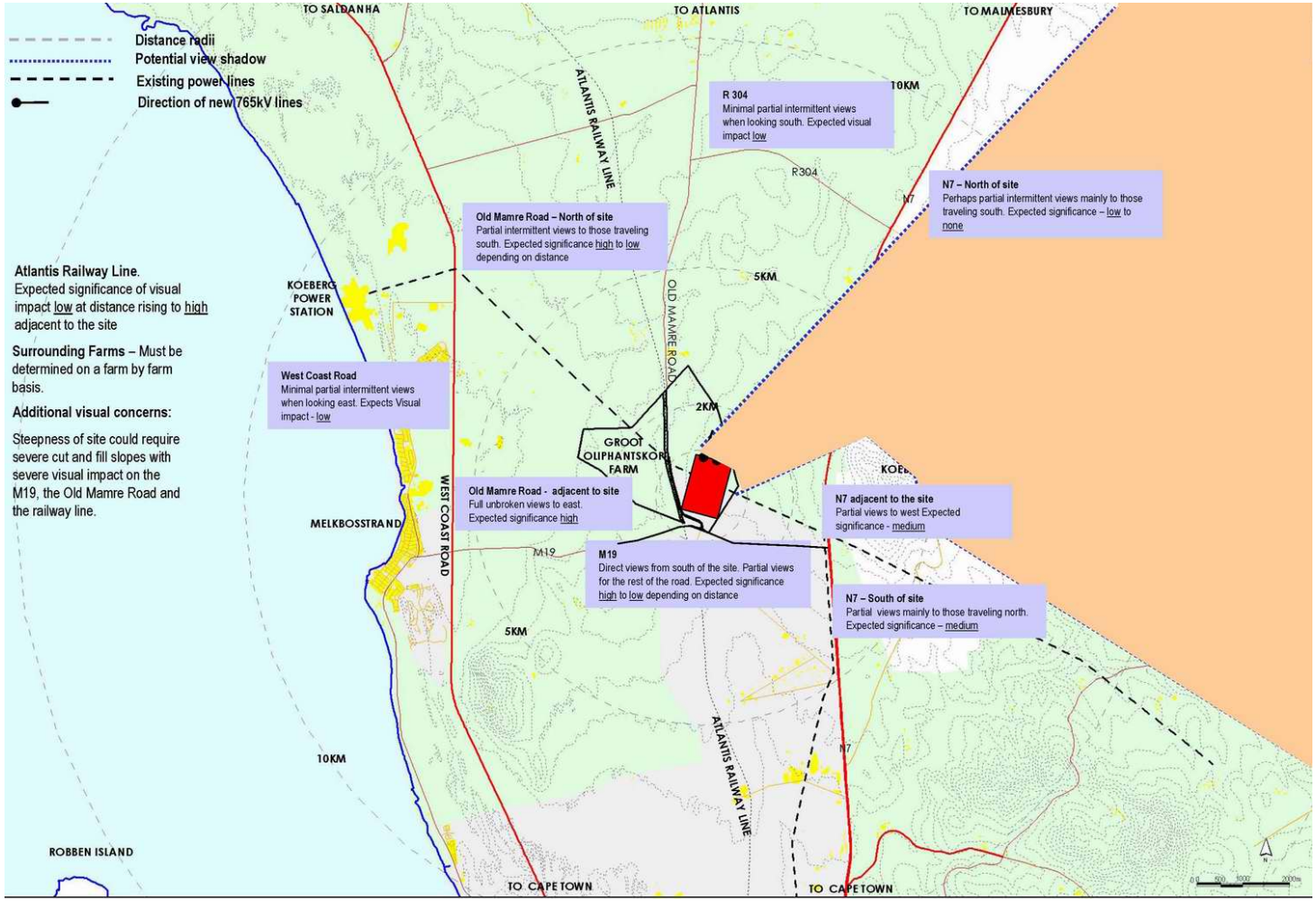


FIGURE 9: VISIBILITY ANALYSIS FOR ALTERNATIVE SITE B

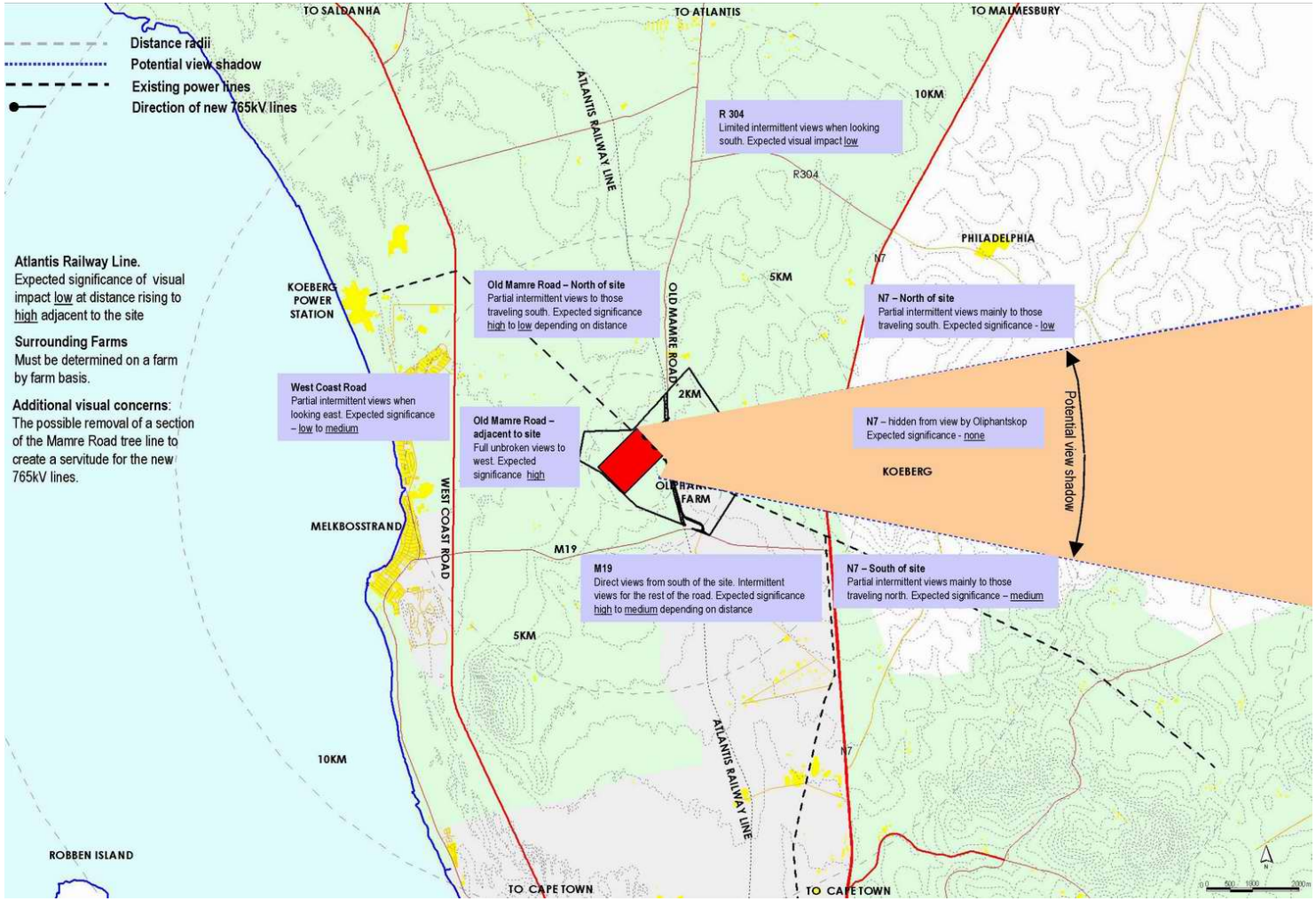


FIGURE 10: VISIBILITY ANALYSIS FOR ALTERNATIVE SITE C

5.2.6.4 Visibility from the Atlantis Railway Line

As with the Old Mamre Road, the railway line will run directly alongside each of the three sites for approximately one kilometre. Views from both north and south of the sites are also possible.

Views from the south of alternative site A will be limited and made partial by Oliphantskop, as will views from the north for Alternative Site A.

Views from both the north and south will be open to the Alternative site C / south west.

Views of both Alternative site A and the alternative site B may be partially mitigated by the existing tree lines, but very little mitigation exists for the south west site Alternative site C (Chittenden Nicks de Villiers, 2004).

5.2.6.5 Visibility from Surrounding Farms

It is inevitable that some of the surrounding farmsteads will have views that will be impacted on by the substation. Once planning is at an advanced stage this will need to be determined on a farm by farm basis.

5.2.6.6 Visibility from Nature Conservation Areas

Two nature conservation areas, the Koeberg Nature Reserve and the Blouberg Nature Reserve, fall within the potential viewshed of the proposed substation.

All views from the Blouberg Nature reserve are expected to be blocked by Blouberg, which stands directly between the site and the nature reserve. No visual impact on the reserve is therefore expected

Koeberg Nature Reserve lies along the coast to the north of the Koeberg power station. There may be partial views of the proposed substation from higher lying areas within the reserve but these views will be from a distance in excess of eight kilometres and are not expected to impact significantly on the experience of the reserve.

5.2.6.7 Summary of Visual Scoping

Alternative site A is the preferred site from a visual impact perspective.

CHAPTER 6 DESCRIPTION OF PROJECT

6.1 DESCRIPTION OF SUBSTATION

The proposed substation is located close to Koeberg in the Western Cape to serve the load centre of Cape Town and the wider Western and Southern Cape areas. The substation will act as a switching station for the existing transmission lines in the area, and as the termination point of the 765kV line from Mpumalanga. A site layout is attached in Appendix K. The fact that the substation will need to act as a switching station for several existing powerlines means that it needs to be situated near the convergence of these lines.

6.1.1 Type of Structure

The choice of substation design types is discussed in detail in Chapter 8. Although an indoor, gas-insulated substation (GIS) was proposed in the original study in 1996, changes in technology and the country's economic climate over the last 9 years have led to a reassessment of the substation design. A low level outdoor station with a tubular bus bar arrangement (see photograph 5 below) is now proposed. The design of the substation lends itself to creating a number of separate terraces at different levels as may be required by the topography of the area. The platform can be divided up into several different levels as follows:

- A 400kV Yard, Control building and access road (1st terrace)
- Road and transformer/reactor plinth (2nd terrace)
- 765kV Yard north (3rd terrace)
- 2 X 765kV Busbar Sections (4th terrace)
- 765kV Yard south (5th terrace)

In addition to the different terrace levels, each terrace can be sloped at 1:100 to allow for storm-water run-off.

As the Koeberg, Acacia Park and Muldersvlei lines already exist in the area, the final siting of the substation will entail the realignment of these lines so that they all converge on the substation.

PHOTOGRAPH 5: EXAMPLE OF TUBULAR ALUMINIUM CONDUCTOR ARRANGEMENT

6.1.2 Dimensions

A total of 50 hectares will be required to construct the substation. It has been decided by Eskom planners that the 50 hectares will be sufficient for future needs and no extension to this layout is envisioned at this stage. The majority of the substation structures are made up of tubular aluminium conductors that are 25metres in height, with the earth wires overhead being strung 35 metres above the ground. The powerlines entering and leaving the substation will be approximately 35-50m high (depending on different voltages). Four 400kV transmission lines currently run through the farm from Koeberg in the northwest and will be turned into and then directed out of the substation in the direction of Muldersvlei and Acacia Park substations to the southeast. One 765kV transmission line is to be constructed and will enter the substation from the northeast (it will not leave the substation as its power will be stepped down for distribution via the 400kV network). The substation's main perimeter fence would be 2m in height.

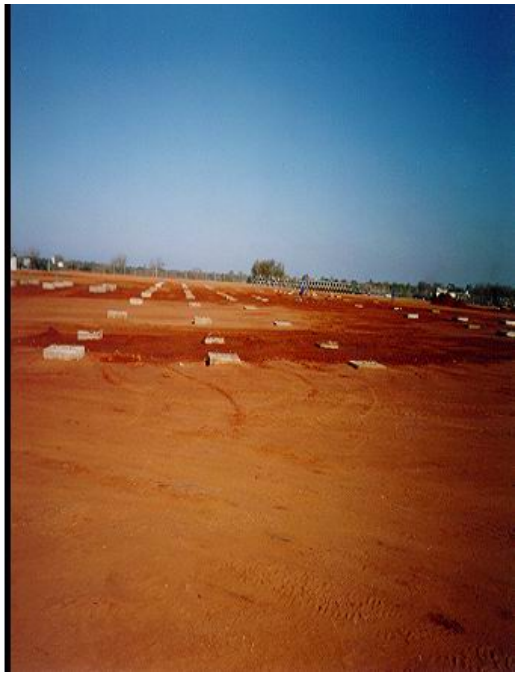
The greater area of the 50ha platforms will be taken up by the bus bar structures, which will be up to a maximum of 27m in height, and other equipment and buildings that will be approximately 13m in height. These structures include a number of transformers and fire safety walls. There will be a control building and radio tower at the substation as per layout drawings.

6.2 CONSTRUCTION PHASE

The construction phase for the substation will take up to three years and will include the construction of access roads to the substation, which will remain once construction is finished as part of the substation's permanent infrastructure. The various stages of the construction

phase are shown in the following photographs. The construction phase will entail the following:

- Construction of the access roads to the substation
- Removal of all vegetation within substation footprint
- Terracing and levelling of the site
- Installation of foundations for infrastructure such as transformers, control building and radio tower
- Construction of bunds and oil holding dams (for emergency holding of transformer oil in the event of a spill) and fire safety walls
- Compaction and filling with gravel of the areas between the foundations
- Creation of formal drainage and stormwater control measures
- Delivery and installation of transformers, towers, busbars and associated infrastructure
- Construction of control rooms and administrative infrastructure
- Redirecting of existing 400kV lines to enter and leave the new substation
- Connection of the new infrastructure to the existing 400kV network
- Construction of perimeter fencing and lighting



PHOTOGRAPHS 6 AND 7: TRANSFORMER FOUNDATIONS


PHOTOGRAPHS 8 AND 9: TRANSFORMER INSTALLATION


PHOTOGRAPHS 10 AND 11: STORMWATER AND EROSION CONTROL


PHOTOGRAPHS 12 AND 13: ERECTION OF STEELWORK

PHOTOGRAPH 14: 765/400 KV TRANSFORMER

PHOTOGRAPH 15: SURGE ARRESTOR AND EARTH SWITCH MOUNTED ON TOP OF STAINLESS STEEL FIRE BARRIER, 765/400 KV TRANSFORMERS BEHIND IT AND BUSBAR STEELWORK IN THE BACKGROUND.

6.3 Environmental Management During Construction

Eskom has internal policies for managing the construction of its electrical infrastructure. These include constant monitoring of the site and construction process and an immediate

response to problems. In addition, management of the construction phase will be bound by requirements prescribed by a project-specific Environmental Management Plan (EMP). This will only be drawn up once a RoD has been given, and is based on Eskom's Generic EMP for construction activities, which is included as Appendix L.

6.4 SITE STAFF

It is estimated that approximately 300 workers will be employed for the project but will not be on site at one given time. Different teams will be one site at different times of the construction. The civil construction work is of a specialised nature therefore most of the workforce is brought in as specially trained workers. Local labour may be used for tasks such as vegetation clearing and fence installation. It is the recommendation of this report that staff do not stay on site as problems relating to a construction camp have been raised repeatedly by IAPs proximate to the site.

6.5 SECURITY

The substation is considered a high security area and thus will be totally enclosed with an electric fence. Mast – type lighting will illuminate sections of the site at night although there will be no upward projection of light on the site. There will be downlighting on approximately six or seven masts. Should there be a breach in the perimeter fence, security lights will come on at that section of the fence, but will not be permanently on. It is unlikely that the substation will be manned, but will have a number of staff present from time to time performing routine maintenance and administrative activities.

CHAPTER 7 - OMEGA SUBSTATION IDENTIFICATION OF POTENTIAL ISSUES

The purpose of this chapter is to indicate that the issues raised during the scoping process have been adequately captured and understood. In addition it serves to explain how these issues affect the process of evaluating the alternative sites. Responses to the potential issues raised can be found in the Issues Report in Appendix E.

7.1 POTENTIAL ISSUES RELATING TO VISUAL IMPACT

Of all issues identified during the scoping process, aesthetic considerations have been of most concern since the proposed substation will have an impact on the rural landscape and the "sense of place" of the area. One of the concerns raised by IAP's is that the rural character of the area will be destroyed. This will result in the loss of aesthetic value as scenic routes pass in the proximity of the area. Further issues that were raised included:

- The light pollution resulting from the substation's security lighting at night.
- The need to screen or "beautify" the substation.
- Concern regarding the potential visual impact on the Blaauwberg Conservation Area (BCA), which is located just south of Oliphantskop farm. The issue of the proposed substation having a possible negative impact on the aesthetics and sense of place of the area, especially as viewed from Blaauwberg Hill, was also raised.
- The need to consider the viewsheds from conservation areas in the study area.
- The need for alternatives to be considered in less visible areas.
- The need to define and quantify the visual impact on the neighbouring properties.

In addition to the possible impacts raised by Interested and Affected Parties, the visual specialist highlighted the following potential visual issues:

- The possible visual impacts of the presence of large machinery and a construction camp during the construction period.
- The possible visual impacts of dust created during construction.
- The possible visual impacts of cut-and-fill slopes needed to create the building platform.
- The potential destruction of existing vegetation, (trees) for both the substation and the realignment of the existing power lines. (This is especially true for the creation of a servitude for the 765kV line across the Old Mamre Road should the alternative site C be chosen.)
- The visual influence of the power lines converging on the substation, especially the new 765kV lines.
- The visual effect of the structures themselves.
- The fencing around the site and other security measures.
- The entrance and maintenance road/roads.
- The visual effect on the changing of the watercourses, (especially for the alternative site C)
- The visual effect of the treatment of the remainder of the farm external to the chosen site.

- The effect of security and other lighting on the nocturnal landscape.
- The effect on the views from the surrounding farmsteads.
- The potential visual impact on the conservation areas along the coast.

It is important that potential mitigation measures be taken into account during the design phase so that adequate planning can be done for their implementation, and that any potential financial implications can be evaluated early in the design process. Generic mitigation measures were suggested that were not exhaustive in scope but still need to be detailed once sufficient design data is available. These include:

- Placing the structures in such a manner as to maximise the buffer zone between the structures and the roads / railway line.
- The retention of as much existing vegetation as possible, specifically the existing mature trees in the area.
- The use of stepping in the building platform to minimise cut-and-fill areas and the lowering of the structures into the site as much as possible.
- The sculpting of the cut and fill slopes to create a visually more natural building platform.
- The re-establishment of natural looking and functioning alternative watercourses where existing water courses will be interrupted.
- The establishment of indigenous Fynbos on the cut-and-fill slopes.
- The establishment of indigenous Fynbos within the buffer zone inside the fences and on all potential open spaces between the components of the substation. This is subject to the necessary technical and safety considerations.
- The re-establishment of either Fynbos or some agricultural activity around the substation depending on the proposed land use. i.e. the land must not just be allowed to lie fallow and become a breeding ground for invasive species.
- The establishment of climbing plants on sections of the perimeter fencing. This is subject to safety and security considerations. Such planting should be done with specific viewpoints in mind and be used to break the monolithic nature or soften the visual impact of the development from those specific viewpoints. These viewpoints will have to be identified once construction has begun and the exact nature of the visual impacts are established.
- The establishment of tree lines in strategic places both on the property and along ridgelines on adjacent properties. Once again these tree lines should be implemented with specific views in mind. i.e. many partial views from specific places along the N7 and other roads could be mitigated in this way and larger views of the substation could be broken up using this method. This would of course, require negotiations with the adjoining landowners but if views from their own properties could be mitigated in this way, it should not be hard to demonstrate the validity of this technique.
- The planting of tree lines around the perimeter is not indicated because the height of the structures, will not be shielded by trees at close range, and because straight lines of trees along the perimeter will only serve to emphasize the unnatural shape of the substation.

- The rehabilitation and extension of the tree lines along the Old Mamre Road and the M19 could also be used as mitigation from various viewpoints.
- Steel components within the substation should not be painted but be galvanised and allowed to oxidise naturally over time. The grey produced in this process will be visually unobtrusive.
- Those parts of the substation that require the protection of paint should be painted in colours chosen from a palette that is matched to the natural colours found in the surrounding landscape.
- All lighting, especially perimeter security lighting must be shielded to minimise light spillage and pollution. No direct light sources must be seen from outside the site.
- Signage should be simple and unobtrusive and not seen anywhere against the skyline.
- A concerted effort should be made to reduce the height and scale of the structures, if at all possible.

The previous study by Ninham Shand (1996) reiterates the visual intrusion of the substation on the rural landscape and on the setting of potential tourist attractions and scenic routes such as the Old Homestead and Old Mamre Road, N7 and N27. The rural landscape was noted as possessing a low visual absorption capacity due to its relative flatness, low vegetation height and limited variety in visual patterns. There were some instances in which critical views relating to scenic tourist routes and landowner properties were obstructed. Mitigatory measures suggested included the excavation to lower the substation in relation to the backdrop, design of buildings using appropriate colour and texture and the use of tree planting.

7.2 POTENTIAL ISSUES RELATING TO AGRICULTURE

Potential issues surrounding agriculture raised by IAPs include:

- The sale of the remainder of Groot Oliphantskop Farm after the substation is built.
- Concerns raised by farmers included the need for the drafting of a stormwater management plan to manage the additional runoff from the substation, which could potentially affect their land and farming activities.
- The need to determine existing plans for any potential water pipeline in the area.
- The need to define and quantify the physical threat that a substation would have on surrounding properties in terms of creating veld fires.
- The need to quantify the potential surface and groundwater pollution from the substation on surrounding properties.
- The possible impact of EMFs from the overhead lines entering the substation on a dairy located proximate to the site.

7.3 POTENTIAL ISSUES RELATING TO CULTURAL HERITAGE RESOURCES

The issue of the important archaeological sites on sections of Groot Oliphantskop were raised by IAP's. Potential issues raised by the cultural heritage specialist relate to sensitive cultural heritage resources. The Groot Oliphantskop Homestead and outbuildings and the eucalyptus –lined Old Mamre Road are both considered local landmarks. The archaeologist has identified the following issues pertaining to each alternative site within the study area. Please refer to Appendix F.

Direct impacts likely to occur relate to Alternative A and Alternative site C. The main impact pertains to the cultural integrity and historical landscape, which would be severely reduced and could limit the long-term heritage potential of the Groot Oliphantskop buildings. The primary concern raised is that the historic structures might lose their current functional status as residence and working farm buildings and either become neglected due to their abandonment or be subjected to other inappropriate future use. Similarly, any future tourism potential these structures have as a heritage site, will be sacrificed. The impacts on the cultural landscape would be somewhat less at Alternative C, while Alternative B would have the least impact.

According to the specialist, the prehistoric quarry site C1, should be granted full protection as this falls within the development footprint for Alternative Site C. The occupation site C2 would be indirectly affected during construction activities. Similarly, site A4 needs to be kept intact as this is protected by legislation as it is a cemetery.

These issues were compared with the previous study by Ninham Shand (1996). They reconfirm that the homestead complex is conservation worthy on the basis that it has sufficient remnants of its original construction to make it a good example of early twentieth century rural architecture, and the physical presence of both the substation and the transmission lines will impact negatively on its setting. They also identified two important stone age sites including a Bushman burial site and a stone age quarry on the southern portion of site C. The stone age quarry site falls within the footprint for Alternative Site C, whereas the bushman's burial site does not.

This report emphasized the potential disturbance during the construction of the substation as a result of uncontrolled souvenir hunting and/or vandalism, and construction activities such as vehicle movement, dumping of fill etc and the need for mitigation in the form of a management plan.

The location of the substation on Site C would result in additional transmission lines crossing the Old Mamre Rd, which will require the felling of eucalyptus trees within the transmission line servitude. As the servitude for two 765kV lines is about 240m wide, a substantial number of trees would need to be felled (Ninham Shand, 1996).

Heritage Western Cape (Archaeology, Palaeontology and Meteorites Committee) have reviewed the specialist archaeology report. It is recommended that Alternative B be preferred for the location of the substation. A Conservation Management Plan (CMP) should

be drawn up to deal with the direct and indirect impacts that heritage resources (archaeological sites, human grave, historical buildings and the cultural landscape) would sustain during the implementation of the construction of the substation and the use of the property thereafter. Please refer to Appendix F.

Heritage Western Cape (Built Environment Landscape Committee) endorses the recommendations made by the specialist report and request that "Alternative A be avoided and that Alternative C, or preferably Alternative B be selected for placement of the substation". Please refer to Appendix F.

7.4 POTENTIAL ISSUES RELATING TO ECOLOGY

Concerns raised by IAP's include:

- The need for the conservation of blue cranes (which are listed as endangered in the IUCN Red Data Book) within the study area and the impact any activities will have to reduce their habitat, create a disturbance and increase their stress level. Avian studies need to include the potential impact of the proposed development on their flight paths, breeding success and long-term viability of the population.
- The need to consider the possible impacts on the neighbouring BCA were also raised.
- The need to quantify potential surface and ground water pollution from the substation and its influence on surrounding farmland.
- The need for a hydrological assessment to determine increased surface water run-off from the proposed substation platform and associated modification of run-off patterns.

Various ecological issues were identified during the scoping process by the botanical and avifaunal specialists. Potential impacts include: the loss of habitat (in particular, wetlands on alternative sites B and C), the risk of collision and disturbance due to construction activities and the loss of sensitive conservation-worthy vegetation namely: Cape Flats Sand Fynbos (on the Springfontyn formation sands) and Swartland Shale Renosterveld (on the Tygerberg formation clays).

According to the botanical specialist the direct impact of developing these sites would be negligible. Please refer to Appendix H. The indirect impacts include the positioning of new powerlines and access roads; however, any impacts on remaining natural pockets/fragments of natural vegetation can be avoided by careful planning. Two areas in Alternative site A were noted that need to be conserved – a 1ha patch just west of the railway opposite the entrance to the main farmhouse and a 10ha patch south-southeast of the farmhouse. It was suggested that a comprehensive alien clearing strategy be implemented in areas of the farm that still support natural vegetation and that cattle should be restricted from using these natural areas for grazing. This strategy should be according to DWAF-approved methodology – no heavy machinery should be allowed in these natural areas.

The previous study by Ninham Shand (1996) noted that of the three sites at the time, alternative site C had remnants of indigenous vegetation. The indigenous vegetation of the

area was considered to be ecologically important, both because relatively little lowland fynbos remained and because the site falls within in a unique floral unit which differs from similar vegetation types to the south.

The bird specialist has identified the following issues pertaining to each alternative site within the study area. Please refer to Appendix I. Alternative C contains a seasonal wetland that is an important avifaunal habitat in the area, which would be destroyed or indirectly impacted through the alteration of the drainage line that feeds the wetland. The construction of roads to accommodate heavy construction equipment could also damage the wetland. Thus these impacts could detrimentally affect waterbirds and cranes currently using this habitat for roosting and breeding. Alternative B also contains a small wetland, which will similarly be affected should this site be chosen. Since these wetlands are relatively rare in the Swartland, this potentially could have serious implications for the local population of waterbirds and cranes. Alternative A will affect pastures and wheatlands, and although this habitat is also widely used by cranes, it occurs in abundance in the Swartland and therefore should not be a significant loss from an avifaunal perspective.

Construction activities at all three sites will also disturb birds in the vicinity, with the most significant impacts at alternative C, followed by alternative B, due to the presence of breeding cranes. This impact is likely to continue on a lesser scale during the operational phase, due to vehicle and other traffic around the Substation.

The potential of collisions with the transmission lines will always be present, regardless of which alternative is chosen. The birds of special concern most likely to be affected are Blue Cranes, White Pelicans, White Storks and (possibly) Flamingos. In the case of the White Pelicans, White Storks, flamingos (and the Blue Crane in winter), flocking behaviour could result in several individuals being killed in one incident. Raptors chasing prey might also collide the lines.

The previous study by Ninham Shand (1996) noted that a small population of Blue Crane bred on Groot Oliphantskop Farm near Site C and to a lesser degree near B. The Blue Cranes on and around the farm formed a substantial proportion of the population in the Swartland area at this time. For this reason, the construction of the substation is likely to have a negative impact of a moderate magnitude for Site C and a low for Site B.

Although the incidence of fatal bird collisions with transmission lines was reported to be low in the study area at the time, the construction of new transmission lines to Omega could potentially increase the frequency. Alternative C was ranked as having a magnitude of moderate impact and the other sites are ranked as low impact.

As discussed above, the most sensitive areas on the farm were the two wetlands, particularly the one at alternative C. Due to the presence of several waterbird species, and most importantly breeding and flocking Blue Cranes, alternative C should be regarded as a “No Go” area.

Mitigation of these impacts using dynamic devices such as bird flappers for the marking of powerlines is recommended by the specialist for the marking of powerlines. It is therefore recommended that the Endangered Wildlife Trust be consulted before a final decision is taken on the type of device to be used in this instance, as new products might be available by the time the line is constructed.

The previous study by Ninham Shand (1996) identified Site C as the only site that included a wetland habitat, however, there was little likelihood of the substation being built on the wetland, as the foundation requirements would preclude this. Further issues identified on Site A related to the dissection of a seasonal drainage furrow, which flowed into the Upper tributaries of the Salt River. They suggested that this drainage furrow could be relocated to channel runoff away from the substation complex.

The following comments and concerns were raised by Cape Nature Conservation:

- Comments given relate to the specialist botanical and avifaunal reports and not to further specialist components of the Omega Substation.
- Cape Nature supports all conclusions and recommendations made by the specialist botanist and ornithologist.
- They strongly advise that recommendations made in these reports be implemented by Eskom should this application be approved.
- The natural remnants and wetland sites (that can be rehabilitated) on this property are of high conservation value, as both the Cape Flats Sand Fynbos and the Swartland Renosterveld are considered critically endangered ecosystems).
- Eskom is required to take reasonable measures to minimise damage from occurring, continuing or recurring on their land. Please refer to Appendix L.

7.5 POTENTIAL ISSUES RELATING TO IMPACT OF CONSTRUCTION ON THE SOCIAL ENVIRONMENT

Various issues were raised by the IAP's with regard to the impact of construction on the social environment. These included:

- Safety and security concerns related to the presence of migrants labourers during the construction of the substation.
- The generation of dust and the transportation thereof to neighbouring properties by wind.
- The housing of workers on site.
- The numbers of workers on site.
- The limited use of local labour
- Noise pollution during construction.
- Access during construction and operation with respect to roads and their capacity to support heavy machinery and equipment (Each transformer weighs approximately 500 tonnes). Access roads to farm need to be tarred.
- Traffic impacts associated with construction activities.
- Damage due to infrastructure and responsibility for costs incurred.

- The need for fencing of the site before construction activities begin.
- Concern with regards impact of heavy vehicles such as construction trucks on the road network and costs incurred for the maintenance of the affected roads, which need to be determined for duration of construction period. Further comments were received expressing concern on the access to any proposed alternative sites from the Main Road 215 and the suggestion that the effects on the road infrastructure be factored into a compensation agreement for damages and the future maintenance of the road to Eskom was made.
- The effect of EMF's on people and livestock on adjacent farms.

In the previous study by Ninham Shand (1996) the issue of an increase in traffic of construction vehicles was viewed as potentially significant in view of the extensive excavation required to create a level platform for the substation. Routes likely to be impacted are the M19, R27 and Old Mamre Road as well as intersections on the N7 and M19, and the M19 and Old Mamre Road.

All the sites require the construction of a high standard access road to facilitate the transportation of the transformers to the substation. The cost of the access road varies according to how far the substation is located from the nearest existing surfaced road. Site C is the most costly site to access as it may require the construction of a road bridge over the Atlantis railway, assuming that access will be from the Old Mamre Road. The cost of excavating a level platform to house the substation is significant because of the substantial size of the substation.

Further potential construction phase impacts pertain to the watercourses and wetlands in the form of increased sediment and other pollutants washing into the watercourses and wetlands. This potential sedimentation of the watercourses and wetlands downstream of the sites C and A during the construction phase could be mitigated to a large extent by completing the excavation work before the rainy season and by stabilising and re-vegetating the disturbed areas (Ninham Shand, 1996).

7.6 POTENTIAL ISSUES RELATING TO IMPACT OF MAINTENANCE ON THE SOCIAL ENVIRONMENT

Various issues were raised by the IAP's with regard to the impact of the operation and maintenance of the substation on the social environment. These included:

- The impact of electromagnetic fields (EMF's) and radiation on people's health and livestock. Please refer to Appendix M.
- What precautions are taken with regard to sabotage action.
- What precautions need to be taken with regards the risk of veld fires.
- The need for a buffer zone around the substation and associated risks to wildlife.
- Need to define and quantify potential property value reduction due to close proximity to substation.

In the previous study by Ninham Shand (1996), possible health impacts associated with the substation were assessed by Drs RI Erlich and I.London, of the Occupational and Environmental Health Research Unit, at the University of Cape Town. They identified two health considerations that are associated with the substation, the possibility of a transformer fire/explosion and exposure to electromagnetic fields (EMF). The potential risk is determined by the likelihood of residential populations settling in close proximity to the substation and transmission lines.

A transformer failure of one or more of the transformers could result in a fire and spillage of the purified mineral oil used for insulation and coolant. According to Eskom, the probability of a failure is low, but even in a worst-case scenario, the health effects of a transformer failure would not affect people beyond the perimeter fence. In the case of a fire, the products of combustion would be released to the surrounding environment. These would be mainly carbon soot, carbon monoxide and carbon dioxide and the impact on the surrounding population would be low (Ninham Shand, 1996).

In this reportedly unlikely event of a transformer failure of one of the transformers, the purified mineral oil, which is used as a coolant would be released. If it is not burnt as a result of the failure, there is a possibility (low) that this oil could get into the drainage furrows crossing A and the wetland near C and spread downstream into the Salt River systems. Such an impact is likely to have short duration (Ninham Shand, 1996).

To mitigate against oil contamination of streams and wetlands as a result of an accident during the operational phase of the substation, the substation complex will have bunded detention ponds to contain an oil spill. This is Eskom practice for substations.

Distance from source is a critical factor in determining the strength of the EMF. Eskom prescribes guidelines for the separation of residential areas from transmission lines and substations. These guidelines are based on calculations of EMF strength for each situation and comply with the standards of the International Radiation Protection association (IRPA) (Ninham Shand, 1996).

Although, various studies have suggested that residential exposure to EMF is associated with an increase in cancer, the scientific evidence is not conclusive. Given the considerable dispute about the accuracy of exposure characterisation, and the variation in electrical current strengths and distances of the subject communities from transmission lines, it is not possible to make definitive statements about the associated health risks. However, the risks of cancer and other physiological disturbances associated with continuous residence in proximity to transmission lines carrying high AC current are probably small, if any. There is nevertheless, a growing public awareness of some of the uncertainty surrounding EMF. This may increasingly result in the public perceiving transmission lines and substations as a health risk (Ninham Shand, 1996).

According to Ninham Shand (1996) as the strength of EMF decreases rapidly with distance from electrical installations, vertical and horizontal special separation from electrical

installations is the primary mitigation measure. The height of transmission line pylons plays a key role in reducing the strength of EMF at ground level. The height of a 400kV pylon and the 765kV pylon to be used at Omega is 36m and 44m respectively which results in a ground level reading, which is within the IRPA standards. Other measures, which are required to mitigate potential health risks associated with the substation include:

- Compliance with IRPA guidelines, or any new standards, and
- Ensuring that EMF readings for the substation and transmission lines are a matter of public record.

Standard setback distances between residential development, substations and transmission lines are:

- 40m from the 765kV transmission lines,
- 27,5m from the 400kV transmission lines, and
- The perimeter fence is the setback line for substations.

Although the perimeter fence provides an adequate setback between the substation and residential development, it would be feasible to set back the residential development even further to make provision for landscaping to screen the substation and at the same time to appease any subjective public concerns about living close to a substation. These setbacks should result in a reduction of a potential negative impact from a moderate magnitude to a low (Ninham Shand, 1996).

7.7 POTENTIAL ISSUES RELATING TO EMPLOYMENT AND SOCIO-ECONOMIC STATUS

Issues raised by IAP's related to employment expressed concern with regards to numbers of workers to be employed and the use of local labour. It is envisaged that approximately 300 workers will be employed by the project but they will not be on site at any one given time. The civil engineering work is specialised and different teams will be brought in at different phases of the construction. The above groundwork is highly specialised and the contractor is likely to bring his own staff to complete most of the activities.

The previous study by Ninham Shand (1996) identified the following issues in relation to employment.

Local employment opportunities would be created for certain of the construction phase projects such as the bulk earthworks, perimeter fencing and the landscaping tree planting to screen the site could be contracted to local companies. These projects, although of short duration, are labour-intensive and could benefit the local communities through increased employment opportunities. Once operational, the substation will have a small permanent staff of two to three, which will also be of low significance in terms of local job creation.

7.8 STRATEGIC PLANNING ISSUES OUTSIDE OF THE EIA PROCESS

According to the Blaauwberg Development Plan the area zoned to the south of Alternative site B is zoned for residential use and as rural areas. This area designated for rural land use is found adjacent to the proposed Blaauwberg Conservation Area. The area south of Alternative site A is zoned for both residential and industrial use. A 20-year Urban Edge line is also envisaged that would constitute the extension of the existing urban Edge further outwards between the N7 and Old Mamre Road. Alternative site A, B and C are currently zoned for rural/agricultural use.

Comments were received from the City of Cape Town Directorate; Transport, Roads and Stormwater. The need to take cognisance of the existing and proposed roads was raised. The need to ensure that adequate vertical clearance to all overhead structures and power lines be provided. Concern was expressed with regards Alternative Site A as this has been identified as carrying a future high-order arterial road/expressway to be aligned on the north-east section of the site and then to join further north with the Old Mamre Road. This road is envisaged to form part of the proposed metropolitan network as contained in the approved interim metropolitan transport plan for Cape Town. The need to give careful consideration to the placement of pylons was raised as inappropriate site location of a pylon could jeopardize route selection alignment options, (especially since such options would be somewhat constrained by topographical features such as hills and watercourses). The Old Mamre Road is also identified as a scenic route established in terms of the approved Scenic Drive Network Plan. It is important from both a cultural perspective as this was the original access route to the Mamre, Missionary Village. Similarly, from a visual perspective it has significance due to its unique avenue of trees. The need to retain this tree-lined route due to its marketability for its scenic value as a tourist route. Removal of these Eucalyptus trees, apart from the negative visual impact would also disrupt the road pavement layers. Thus a further concern relates to the need to address the impact that construction activities and the transport of heavy abnormal loads would have on the Old Mamre Road since it is currently in a poor condition.

Comments were received from the Department of Transport and Public Works (Transport Branch). Concern was expressed with regards the impact of the construction vehicles used during construction of the substation, on the access of any of the proposed alternative sites from Main Road 215, especially as the construction of the substation will be phased over a number of years. A further concern was raised of the impact of the additional construction traffic on the road network within the area. In this regard a compensation agreement for damages and future maintenance of the road between Eskom and the Roads Department needs to be negotiated. The approved 765kV powerline (with a 80m wide servitude) from the north that would also be crossing a number of provincial roads to enable it to end at the substation was a further concern raised. It was suggested that future implications of this powerline connecting to the substation site should be considered during the scoping and planning stages of the site identification.

Comments were received from the Department of Planning and Environment: City of Cape Town (Blaauwberg). The need to provide full details of the site layout, access arrangements

and building footprints as well as building elevations was raised in order for the Council to assess the scale and impact of the substation development. The need for rezoning of the site and the necessary planning processes required in addition to the EIA. The recognition of the City of Cape Town as a key stakeholder in the EIA process and the need to take cognisance the Council's time frames for decision-making and the need to provide adequate time for comment in this regard were mentioned.

Comments were received from the Waste Water Department of the City of Cape Town, as large portions of the proposed sites "A" and "C" are currently used for the disposal of wastewater sludge by land application as per agreement with the current tenant. They expressed concern of the potential loss of these sites as they are closest to the sludge source and therefore transport costs are minimised. Only a small northern portion of site B has been used for this purpose. It is not the intention to use the southern portion nor the adjacent triangular portion of land for sludge to land application due to its proximity to the Morningstar small holdings. Thus from a sludge disposal aspect of wastewater treatment, alternative Site B is preferred. Further comments received were related to a separate EIA for the capacity extension and upgrade of the Melkbosstrand Waste Water Treatment Works (WWTW) or a new WWTW on an alternative site. One such site is situated to the northwest of the Groot Oliphantskop Farm near to alternative site C.

The previous study by Ninham Shand (1996) identified the following issues in relation to planning issues at the time. Site B located within the proposed urban edge, on the interface of two abutting future land uses namely: low intensity urban development (probably housing) and conservation –related use. Although there are examples of substations within residential areas, they are not generally considered to be compatible uses. Nor would the substation be compatible with the conservation-related use, which in this case is intended to protect visual integrity of the ridge of hills between the sea and Koeberg Koppie. The area comprising Alternative Site A and C is zoned for future agricultural land use. Locating the substation on either site would be inconsistent with the proposed future use of the area. However, this would be of low significance as the agricultural potential of the area is generally regarded as low. Sites C and A are north of the activity corridor proposed in the BSRP but, in the future, there may be pressure to extend this activity corridor northwards. However, this scenario cannot be pursued while the existing Population Exclusion zones are in place around Koeberg.

7.9 ISSUES RELATING TO THE EIA PROCESS

Various issues related to the EIA process, were raised by IAP's regarding the proposed substation. These included:

- Concern over the fact that separate EIA's for the 765 kV line and the Omega Substation were undertaken, as opposed to an all-encompassing EIA.
- An update on the progress on 765kV Record of decision was requested.
- The appearance of differences between the Ninham Shand EIA and this EIA were questioned, (for example the size of site has increased and whether workers may reside on-site during the project differs from what was originally stated).

- Request to include liaison with surrounding residents in order that local knowledge is incorporated in the report.
- Concern that more alternatives are needed in a different locality to Groot Oliphantskop farm.
- Explanation requested for identification of site termination point and why Koeberg, (which already has substantial negative impacts associated with it), was not deemed suitable
- Need for alternative electricity-saving measures and a focus on energy demand management.
- Need for a more comprehensive public participation as this was considered lacking at time of meeting.

The following comment was raised by Cape Nature Conservation:

- Acknowledgement of alternative sites that have been presented within Groot Oliphantskop Farm, but alternative sites should also be considered within the landscape to ensure that the most appropriate area is selected for the substation. Request motivation for Groot Oliphantskop Farm as general location for the substation.

7.10 CONSTRUCTION MANAGEMENT AND TECHNICAL ISSUES

Various issues related to construction management were raised by IAP's regarding the proposed substation. These included:

- The length of construction and the likely date for construction commencement.
- The need for an EMP to be put in place.
- The appointment of an independent ECO for monitoring environmental purposes.
- The need for an environmental management system to ensure on-going auditing of the site.
- Deviation from design originally proposed/envisaged namely; the use of GIS (Gas Insulated System substation) to a now larger, open-air structure.
- The costs implications/differences for the use of Gas Insulated Substation and an open-air equivalent structure.
- The preferred site.
- The size of the proposed site.
- The survey of the site.
- Runoff problems associated with site A and impact on animals as it is adjacent to the location of a dairy.

7.11 POTENTIAL ISSUES RELATING TO STORMWATER MANAGEMENT

IAP's raised the concern of stormwater management as a development of this size will substantially alter the characteristics of the stormwater runoff and the alteration of existing stormwater flow patterns. Neither site A nor Site C is a "no-go area" from a hydrological perspective. However, Site B was considered a "no-go area".

7.12 GENERAL ISSUES

Various general issues were raised by IAP's:

- What is the link between proposed Wind Farm on farm Oliphantskop and the Substation. It could be construed that this substation has been approved that the approval of a wind farm could conceivably be easier to push through
- The need and justification of the proposed substation site has been questioned.

CHAPTER 8 PROJECT ALTERNATIVES AND ASSESSMENT

8.1 INTRODUCTION

One of the functions of the environmental scoping process is to describe and evaluate the alternatives to the project, as stipulated by the current environmental legislation.

Alternatives to the proposed Omega Substation include:

- Alternative sites for the proposed substation (As discussed in Chapter 5).
- Alternative designs for proposed substation and associated infrastructure
- Strategic Alternatives including the "do nothing" option and demand side management.

Alternative sites have been discussed in detail in Chapter 5.

8.2 ALTERNATIVE DESIGNS

8.1.2 Gas Insulated Substation (GIS)

A gas insulated substation entails the switchgear being housed in a building. The transformers and shunt reactors are however located outdoors, so too some of the 765kV equipment such as surge arresters, line traps and capacitor voltage transformers as shown in photograph 16 below. A (GIS) indoor structure was proposed in the previous EIA in 1996, due to the concerns of salt corrosion on the structure. However, this design has been reconsidered as it is far more costly than an open-air structure. In addition there have been technological innovations since 1996 whereby corrosion can be managed on an open-air structure. The open-air structure is however significantly larger than the GIS.

PHOTOGRAPH 16: GAS INSULATED SWITCHGEAR WITH OUTDOOR TELECOMMUNICATIONS TERMINAL EQUIPMENT

8.1.3 Outdoor Overhead (Strung Flexible Conductor Busbars)

This design philosophy requires the installation of 3 different levels of densely packed flexible multi-conductor bundles. The large number of high-rise steelwork structures necessary to support the conductors produces an installation with a high average height, making it more visually intrusive than other options. The tubular busbars are approximately 27metres high with this design. Although the cheapest of the three different arrangements, it is highly unfavourable in terms of aesthetics.

PHOTOGRAPH 17: EXAMPLE OF OVERHEAD STRUNG FLEXIBLE CONDUCTOR BUSBARS STRUCTURE

8.1.4 Outdoor Overhead (Supported Tubular Conductor Busbars)

This outdoor structure also requires tall structures to accommodate the line terminations and for overhead shielding earth-wires, but there are far fewer tall structures as in the Strung Flexible design. The tubular conductor busbar option dramatically reduces the number of high-rise steelwork structures and therefore average height of high-rise steelwork. The tubular busbars are approximately 25metres high with this design.

A photograph of this type of structure is shown in section 6.1.1 of this report, (Photograph 5).

8.1.5 Design Comparison and Conclusions

Type of Design	Height of Busbars	Conductor attachment points	Area required	Is terracing possible?	Cost *X*=1(normalised cost)
GIS	25m	30m (power conductors) 35m (earth wire)	*X*/2	Yes	3.8 - 4.3
Outdoor Tubular	25 m	30m (power conductors) 35m (earth wire)	*X*	Yes	1.2
Outdoor Flexible Strung	27 m	40m (power conductors) 48m (earth wire)	*X*	Yes	1

The open air supported tubular conductor design for the Omega substation is regarded as the most cost effective and environmentally and technically acceptable for a project of this extent. The design criterion that is critical for a project of this size relates to the orientation of the substation within the landscape. This will be dependant on the final RoD as to the site selected.

8.3 STRATEGIC ALTERNATIVES

Strategic alternatives to the proposed Omega Substation include the “do nothing” option, and demand-side management.

8.3.1 The “Do Nothing” Option

The Department of Environmental Affairs and Tourism states that the “do nothing” or “no-go” option should be considered in cases where the proposed development could have negative impacts. For this project, the no-development option would mean not constructing the Omega Substation. The implications of this would be no additional security of supply of electricity to the Western Cape Grid. Although many of the potential impacts are classed as medium to high (a more detailed description of these follows), they also have good potential for mitigation (with the exception of the impact on cultural heritage at Alternative site A, and the impact on the rural ‘sense of place’. One of the findings of this report is that the “no go” option would not be the most viable option in this instance, as the greater public benefits to society in terms of strengthened electricity supply and security of supply for the Western Cape region outweigh potential and mitigable impacts.

8.3.2 Demand-side Management

Demand Side Management (DSM) is a function carried out by the electricity supply utility aimed at encouraging a reduction in the amount of electricity used at peak times. This is achieved by influencing customer usage to improve efficiency and reduce overall demand. These efforts are intended to produce a flat load duration curve to ensure the

most efficient use of installed network capacity. By reducing peak demand and shifting load from high load to low load periods, reductions in capital expenditure (for network capacity expansion) and operating costs can be achieved. One of the basic tools is the price differentiation (such as time-of-use tariffs) between peak demand time and low demand time. This option is practiced to a certain extent, but is currently not considered feasible for managing the level of growth forecast for the Western Grid region.

CHAPTER 9 IMPACT ASSESSMENT AND SUGGESTED MITIGATION

This chapter assesses the potential impacts of the proposed Omega substation on the biophysical and socio-economic environments of the three identified sites and suggests possible mitigatory measures that could be applied to minimise negative impacts and enhance positive impacts.

9.1 ASSESSMENT OF ALTERNATIVE SITES

Please refer to Tables 4a, 4b and 4c for assessment of alternative sites during the construction and operational phases for the proposed substation.

In addition to the issues / concerns raised during the public participation process (Please refer to Chapter 7), various potential impacts have been identified. These impacts were assessed in terms of specific criteria commonly used in the IEM procedure guidelines of the DEAT (1992) (Table 3). The potential for the mitigation of impacts is included in this table.

Table 3 gives a summary of the criteria used for the assessment of the issues of concern identified during the scoping study.

TABLE 3: SUMMARY OF CRITERIA USED FOR THE ASSESSMENT OF THE IMPACTS

	CRITERIA	DESCRIPTION OF ELEMENTS THAT ARE CENTRAL TO EACH ISSUE.
	Status	Positive, negative or neutral.
ASSESSMENT	Extent and Spatial Scale	**High.** Widespread. Far beyond site boundary. Regional / National / International scale.
		Medium. Beyond site boundary. Local area.
		Low. Within site boundary.
	Intensity or Severity	**High.** Disturbance of pristine areas that have important conservation value. Destruction of rare or endangered species.
		Medium. Disturbance of areas that have potential conservation value or are of use as a resource. Complete change in species occurrence or variety.
		Low. Disturbance in degraded areas that have little conservation value. Minor change in species occurrence or variety.
	Duration	**High (long term).** Permanent. Beyond decommissioning. Long term (more than 15 years).
		Medium (medium term). Reversible over time. Lifespan of project. Medium term (5-15 years).
		Low (short term). Quickly reversible. Less than the project lifespan. Short term (0-5 years).

	CRITERIA	DESCRIPTION OF ELEMENTS THAT ARE CENTRAL TO EACH ISSUE.
	Status	Positive, negative or neutral.
	Mitigatory Potential	**High.** High potential to mitigate negative impacts to the level of insignificant effects.
		Medium. Potential to mitigate negative impacts. However, the implementation of mitigation measures may still not prevent some negative impacts.
		Low. Little or no mechanism to mitigate negative impacts.
	Acceptability	**High (Unacceptable).** Abandon project in part or in its entirety.
		Medium. With regulatory controls. With project proponent's commitments.
		Low (Acceptable). No risk to public health.
	Degree of Certainty	**Definite.** More than 90% sure of a particular fact or of the likelihood of an impact occurring.
		Probable. Over 70% sure of a particular fact or the likelihood of an impact occurring.
		Possible. Only over 40% sure of a particular fact or of the likelihood of an impact occurring.
		Unsure. Less than 40% sure of a particular fact or the likelihood of an impact occurring.
	Magnitude and Significance	**High.** Of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time consuming or a combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. In the case of beneficial impacts, the impact is of a substantial order within the bounds of impacts that could occur.
		Medium. Impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and fairly easily possible. Social, cultural and economic activities of communities are changed, but can be continued (albeit in a different form). Modification of the project design or alternative action may be required. In the case of beneficial impacts, other means of achieving this benefit are about equal in time, cost and effort.
		Low. Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural and economic activities of communities can continue unchanged. In the case of beneficial impacts, alternative means of achieving this benefit are likely to be easier, cheaper, more effective and less time-consuming.
		No impact. Zero impact.

9.2 IMPACT ANALYSIS

The following pages contain a tabulated assessment of impacts for the proposed substation for each Alternative Site:

- during the construction phase and
- during the operating phase.

TABLE 4A IMPACT ANALYSIS : ALTERNATIVE SITE A: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptability of impact**	**Certainty of Impact**
VEGETATION	7.4	Disturbance to pockets of sensitive conservation worthy indigenous Fynbos vegetation i.e. 1ha pocket located west of the railway opposite the entrance to the farmhouse and a 10ha patch south south-east of the farmhouse.	These pockets are considered "No-Go" areas. Therefore they require protection from construction activities.	Low	Low	Low	High	Med	Med	Pro
		Encroachment of alien vegetation on exposed land cleared for platform.	Ensure that alien vegetation programme is included in project – specific EMP.	Low	Low	Med	Low	High	Med	Pro
AVIFAUNA	7.4	Disturbance due to construction activities.	To be addressed in the project-specific EMP.	Low	Low	Med	Med	Med	Med	Def
		Loss of habitat for roosting and breeding.	Habitat abundant in the Swartland.	Low	Low	Low	High	Med	Med	Def
		Increase in bird collisions due to presence of substation and associated transmission lines.	Implement mitigatory measures such as the use of bird flappers as per avifaunal specialist report. EWT should be consulted in this regard.	Med	Low	Med	High	Med	Med	Def
WETLANDS AND WATERCOURSES	7.2 & 7.4	Loss of seasonal drainage line.	Consult a wetland specialist to ascertain conservation measures necessary for conservation of this drainage line.	Low	Low	Med	High	High	Med	Def
		Sedimentation and contamination of seasonal drainage line and groundwater.	Construction of on-site retention ponds by Engineer to ensure all runoff is contained/localised for removal of possible contaminated sediment by registered waste contractors.	Med	Low	Med	Low	High	Med	Pro
		Increase in run-off on local hydrology.	Implement mitigatory measures as per hydrological report.	Med	Med	Med	High	Med	Med	Def

TABLE 4A IMPACT ANALYSIS : ALTERNATIVE SITE A: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptability of impact**	**Certainty of Impact**
VISUAL/ AESTHETICS	7.1	Impact of critical, gateway views and scenic routes.	As per visual specialist mitigatory measures.	High	Med	Med	High	Low	Med	Def
		Impact on existing rural character and "sense of place".	As per visual specialist mitigatory measures.	High	Med	Med	High	Low	Med	Def
		Light pollution associated with the substation nocturnal security lighting.	As per visual specialist mitigatory measures.	Med	Low	Med	High	Med	Med	Def
		Potential destruction of existing trees along the scenic " Old Mamre" Road.	As per visual specialist mitigatory measures. Ensure designs protect integrity of trees.	Med	Med	High	High	Med	Med	Pro
CONSTRUCTION PHASE IMPACTS	7.5	Stormwater management	As per hydrological report mitigatory measures.	Med	Low	Med	High	Med	Med	Def
		Generation of dust and noise.	As per project-specific EMP.	Med	Low	Med	Med	Med	Med	Def
		Compensation for damage to road due to heavy vehicles along rural roads.	Compensation as per Eskom agreement and Municipal agreement.	Med	Med	Med	Low	Med	Med	Def
		On-site residence of labour.	As per consultation with Eskom.	Med	Med	Med	Low	Med	Med	Pro
ARCHAEOLOGY, HERITAGE AND CULTURE	7.3	Potential erosion of the cultural integrity of the historical landscape if Groot Oliphantskop Homestead and associated outbuildings lose their functional status.	As per archaeological specialist mitigatory measures and Heritage Management Plan.	Med	Low	High	High	Med	Med	Pro
		Potential defacement and vandalism of the Groot Oliphantskop Homestead and outbuildings (A1) during the construction activities.	This site has been identified as a "no-go" area by the archaeological specialist due to its high archaeological value.	Med	Low	High	Low	Med	Med	Pro

TABLE 4A IMPACT ANALYSIS : ALTERNATIVE SITE A: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptability of impact**	**Certainty of Impact**
		The protection of the cemetery site (A4).	This site has been identified as a "no-go" area by the archaeological specialist due to its high archaeological value.	High	Low	Med	High	Low	Med	Def
HEALTH AND SAFETY	7.6	Health risks associated with the proximity of people and livestock to the substation and associated EMF's & radiation.	As per Eskom setback requirements that comply with IRPA specification. Consider relocating nearby Dairy.	Low	Low	Med	High	Med	Med	Low
		Veld fire risk due to substation.	As per Eskom Safety standards for substations.	Low	Low	Med	High	High	Med	Low
		Risk associated with sabotage action.	As per Eskom Safety standards for substations.	Low	Low	Med	High	High	Med	Low
		Risk due to potential for explosion at the substation.	As per Eskom Safety standards for substations.	Low	Low	Med	High	High	Med	Low
STRATEGIC /PLANNING ISSUES OUTSIDE EIA PROCESS	7.8	Impact on current planning proposals i.e. proposal for extension of road network.	Consultation with Cape Town City Municipal Planners.	Med	Med	Med	High	Med	Med	Pro
		Impact on existing land use.	Consultation with Cape Town City Municipal Planners.	Med	Med	Med	High	Med	Med	Pro
SOCIO-ECONOMIC	7.7	Employment opportunities generated during construction phase. (Positive)	Limited to specialised labour due to technical nature of construction.	Low	Low	Low	Low	Low	Low	Def
		Sale of remainder of agricultural land. (Positive)	To be negotiated by Eskom.	Low	Low	Med	Low	High	Low	Def

TABLE 4A IMPACT ANALYSIS : ALTERNATIVE SITE A: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptability of impact**	**Certainty of Impact**
		Property reduction in property prices of surrounding landowners due to presence of substation.	To be investigated by a property evaluator.	Med	Med	Med	High	Med	Med	Pos
ENERGY SUPPLY	Chp 3	Impact on the electricity supply grid for the southern and Western Cape Region. (Positive)	As per Need and justification of the proposed project.	High	High	High	High	Low	Low	Def

TABLE 4B IMPACT ANALYSIS: ALTERNATIVE SITE B: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptab-ility of impact**	**Certainty of Impact**
VEGETATION	7.4	Fallow land used for cattle grazing.	No significant natural vegetation was considered present by the botanist.	Low	Low	Low	High	NA	Low	Def
		Encroachment of alien vegetation on exposed land cleared for platform.	Ensure that alien vegetation programme is included in project – specific EMP.	Low	Low	Med	Low	High	Med	Pro
AVIFAUNA	7.4	Disturbance due to construction activities.	To be addressed in the project-specific EMP.	Low	Low	Med	Med	Med	Med	Def
		Loss of wetland habitat for roosting and breeding for resident crane population.	This wetland is considered a "No-Go" area by ornithologist.	Med	Low	High	High	Low	Med	Def
		Increase in bird collisions due to presence of substation and associated transmission lines.	Implement mitigatory measures such as the use of bird flappers as per avifaunal specialist report. EWT should be consulted in this regard.	Med	Low	Med	High	Med	Med	Def
WETLANDS AND WATERCOURSES	7.2 & 7.4	Loss of seasonal wetland.	This wetland is considered a "No-Go" area by ornithologist.	Med	Low	High	High	Low	Med	Def
		Sedimentation and contamination of wetland and groundwater.	Construction of on-site retention ponds by Engineer to ensure all runoff is contained/localised for removal of possible contaminated sediment by registered waste contractors.	Med	Low	Med	Low	High	Med	Pro
		Increase in run-off on local hydrology.	Implement mitigatory measures as per hydrological report.	Med	Med	Med	High	Med	Med	Def
VISUAL/ AESTHETICS	7.1	Impact of critical, gateway views and scenic routes.	As per visual specialist mitigatory measures.	High	Med	Med	High	Low	Med	Def

TABLE 4B IMPACT ANALYSIS: ALTERNATIVE SITE B: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptab-ility of impact**	**Certainty of Impact**
		Impact on existing rural character and "sense of place".	As per visual specialist mitigatory measures.	High	Med	Med	High	Low	Med	Def
		Light pollution associated with the substation nocturnal security lighting.	As per visual specialist mitigatory measures.	Med	Low	Med	High	Med	Med	Def
		Potential destruction of existing trees along the scenic " Old Mamre" Road.	As per visual specialist mitigatory measures. Ensure designs protect integrity of trees.	Med	Med	High	High	Med	Med	Pro
CONSTRUCTION PHASE IMPACTS	7.5	Stormwater management	As per hydrological report mitigatory measures.	Med	Low	Med	High	Med	Med	Def
		Generation of dust and noise.	As per project-specific EMP.	Med	Low	Med	Med	Med	Med	Def
		Compensation for damage to road due to heavy vehicles along rural roads.	Compensation as per Eskom agreement and Municipal agreement.	Med	Med	Med	Low	Med	Med	Def
		On-site residence of labour.	As per consultation with Eskom.	Med	Med	Med	Low	Med	Med	Pro
ARCHAEOLOGY, HERITAGE AND CULTURE	7.3	A stone lined well (B1) was identified on this site.	This was not considered archaeologically conservation worthy.	Low	Low	Low	High	Med	Med	Def
HEALTH AND SAFETY	7.6	Health risks associated with the proximity of people and livestock to the substation and associated EMF's & radiation.	As per Eskom setback requirements that comply with IRPA specification.	Low	Low	Med	High	Med	Med	Low
		Veld fire risk due to substation.	As per Eskom Safety standards for substations.	Low	Low	Med	High	High	Med	Low
		Risk associated with sabotage action.	As per Eskom Safety standards for substations.	Low	Low	Med	High	High	Med	Low
		Risk due to potential for explosion at the substation.	As per Eskom Safety standards for substations.	Low	Low	Med	High	High	Med	Low

TABLE 4B IMPACT ANALYSIS: ALTERNATIVE SITE B: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptab-ility of impact**	**Certainty of Impact**
STRATEGIC /PLANNING ISSUES OUTSIDE EIA PROCESS	7.8	Impact on current planning proposals i.e. proposal for extension of road network.	Consultation with Cape Town City Municipal Planners.	Med	Med	Med	High	Med	Med	Pro
		Impact on existing land use.	Consultation with Cape Town City Municipal Planners.	Med	Med	Med	High	Med	Med	Pro
SOCIO-ECONOMIC	7.7	Employment opportunities generated during construction phase. (Positive)	Limited to specialised labour due to technical nature of construction.	Low	Low	Low	Low	Low	Low	Def
		Sale of remainder of agricultural land. (Positive)	To be negotiated by Eskom.	Low	Low	Med	Low	High	Low	Def
		Property reduction in property prices of surrounding landowners due to presence of substation.	To be investigated by a property evaluator.	Med	Med	Med	High	Med	Med	Pos
ENERGY SUPPLY	Chp 3	Impact on the electricity supply grid for the southern and Western Cape Region. (Positive)	As per Need and justification of the proposed project.	High	High	High	High	Low	Low	Def

TABLE 4C IMPACT ANALYSIS: ALTERNATIVE SITE C: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptab-ility of impact**	**Certainty of Impact**
VEGETATION	7.4	Field under oat cultivation.	No significant natural vegetation was considered present by the botanist.	Low	Low	Low	High	NA	Low	Def
		Encroachment of alien vegetation on exposed land cleared for platform.	Ensure that alien vegetation programme is included in project – specific EMP.	Low	Low	Med	Low	High	Med	Pro
AVIFAUNA	7.4	Disturbance due to construction activities.	To be addressed in the project-specific EMP.	Low	Low	Med	Med	Med	Med	Def
		Loss of wetland habitat for roosting and breeding for resident crane population.	This wetland is considered a "No-Go" area by ornithologist.	Med	Low	High	High	Low	Med	Def
		Increase in bird collisions due to presence of substation and associated transmission lines.	Implement mitigatory measures such as the use of bird flappers as per avifaunal specialist report. EWT should be consulted in this regard.	Med	Low	Med	High	Med	Med	Def
WETLANDS AND WATERCOURSES	7.2 & 7.4	Loss of seasonal wetland.	This wetland is considered a "No-Go" area by ornithologist.	Med	Low	High	High	Low	Med	Def
		Sedimentation and contamination of seasonal drainage line and groundwater.	Construction of on-site retention ponds by Engineer to ensure all runoff is contained/localised for removal of possible contaminated sediment by registered waste contractors.	Med	Low	Med	Low	High	Med	Pro
		Increase in run-off on local hydrology.	Implement mitigatory measures as per hydrological report.	Med	Med	Med	High	Med	Med	Def

TABLE 4C IMPACT ANALYSIS: ALTERNATIVE SITE C: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptab-ility of impact**	**Certainty of Impact**
VISUAL/ AESTHETICS	7.1	Impact of critical, gateway views and scenic routes.	As per visual specialist mitigatory measures.	High	Med	Med	High	Low	Med	Def
		Impact on existing rural character and "sense of place".	As per visual specialist mitigatory measures.	High	Med	Med	High	Low	Med	Def
		Light pollution associated with the substation nocturnal security lighting.	As per visual specialist mitigatory measures.	Med	Low	Med	High	Med	Med	Def
		Potential destruction of existing trees along the scenic " Old Mamre" Road.	As per visual specialist mitigatory measures. Ensure designs protecting integrity of trees.	Med	Med	High	High	Med	Med	Pro
CONSTRUCTION PHASE IMPACTS	7.5	Stormwater management	As per hydrological report mitigatory measures.	Med	Low	Med	High	Med	Med	Def
		Generation of dust and noise.	As per project-specific EMP.	Med	Low	Med	Med	Med	Med	Def
		Compensation for damage to road due to heavy vehicles along rural roads.	Compensation as per Eskom agreement and Municipal agreement.	Med	Med	Med	Low	Med	Med	Def
		On-site residence of labour.	As per consultation with Eskom.	Med	Med	Med	Low	Med	Med	Pro
ARCHAEOLOGY, HERITAGE AND CULTURE	7.3	Potential erosion of the cultural integrity of the historical landscape if the occupation site (C2) is disturbed.	As per archaeological specialist mitigatory measures and Heritage Management Plan.	Med	Low	High	High	Med	Med	Pro
		The protection of the prehistoric quarry site (C1).	This site has been identified as a "no-go" area by the archaeological specialist due to its high archaeological value.	High	Low	Med	High	Low	Med	Def

TABLE 4C IMPACT ANALYSIS: ALTERNATIVE SITE C: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptab-ility of impact**	**Certainty of Impact**
HEALTH AND SAFETY	7.6	Health risks associated with the proximity of people and livestock to the substation and associated EMF's & radiation.	As per Eskom setback requirements that comply with IRPA specification.	Low	Low	Med	High	Med	Med	Low
		Veld fire risk due to substation.	As per Eskom Safety standards for substations.	Low	Low	Med	High	High	Med	Low
		Risk associated with sabotage action.	As per Eskom Safety standards for substations.	Low	Low	Med	High	High	Med	Low
		Risk due to potential for explosion at the substation.	As per Eskom Safety standards for substations.	Low	Low	Med	High	High	Med	Low
STRATEGIC /PLANNING ISSUES OUTSIDE EIA PROCESS	7.8	Impact on current planning proposals i.e. proposal for extension of road network.	Consultation with Cape Town City Municipal Planners.	Med	Med	Med	High	Med	Med	Pro
		Impact on existing land use.	Consultation with Cape Town City Municipal Planners.	Med	Med	Med	High	Med	Med	Pro
SOCIO-ECONOMIC	7.7	Employment opportunities generated during construction phase. (Positive)	Limited to specialised labour due to technical nature of construction.	Low	Low	Low	Low	Low	Low	Def
		Sale of remainder of agricultural land. (Positive)	To be negotiated by Eskom.	Low	Low	Med	Low	High	Low	Def

TABLE 4C IMPACT ANALYSIS: ALTERNATIVE SITE C: IMPACT SUMMARY CONSTRUCTION AND OPERATIONAL PHASES										
Category of Impact	**Report Ref**	**Impact Statement**	**Management Action**	**Magnitude and significanc**	**Spatial scale of impact**	**Intensity / severity of impact**	**Duration of impact**	**Mitigatory potential**	**Acceptab-ility of impact**	**Certainty of Impact**
		Property reduction in property prices of surrounding landowners due to presence of substation.	To be investigated by a property evaluator.	Med	Med	Med	High	Med	Med	Pos
ENERGY SUPPLY	Chp 3	Impact on the electricity supply grid for the Southern and Western Cape Region. (Positive)	As per Need and justification of the proposed project.	High	High	High	High	Low	Low	Def

CHAPTER 10 CONCLUSIONS

The brief of this EIA was to undertake a scoping level study into the construction of a proposed 765kV – 400kV substation to be located at the termination point of the Gamma Omega 765kV Transmission line. The brief was to consider only viable potential sites on the Groot Oliphantskop Farm, as this site was identified as the optimum site following an Environmental Impact Assessment undertaken by Ninham Shand in 1996. Reasons for choosing Groot Oliphantskop as the study area include:

a) The farm is owned by Eskom.
b) All powerlines that are required to connect to the proposed Omega substation pass through the farm already, hence the associated impacts of turning in and out powerlines is reduced.
c) The long term planning for the area has always favoured this end-point for the 765kV line and servitudes over adjacent farms have been acquired based on this planning.
d) Surrounding farmers are aware of the plans for this farm. They have agreed to servitudes on their farms for this purpose and did not object to the original rezoning of the site.

The conclusion is that despite some objection to this location, it remains the most environmentally suitable within the least potentially negative socio-economic impacts.

During the study the following potential impacts were identified:
The visual / aesthetic impacts for all sites are expected to be significant as scenic routes are found within the study area and the historical Old Mamre Road passes through the Groot Oliphantskop Farm. Thus visual intrusion of the landscape due to the “man-made” nature of the substation in a rural area will affect the tranquil sense of place. This visual impact needs to be mitigated using the necessary design criteria as recommended in the specialist report.

Cultural historical significant sites within the study area include the Groot Oliphantskop Homestead and associated out buildings (A2) and cemetery (A4) at Alternative site A and a pre-historic quarry (C1) and occupational site (C2) at alternative site C. The pre-historic quarry (C1) and cemetery (A4) fall within the development footprints on alternative sites C and A respectively. The Homestead and associated buildings site A2 and C2 fall outside the development footprints. However, a heritage conservation management plan needs to be drawn up to protect these structures from potential vandalism and defacement during the construction phase. The Homestead however, will lose its value as a tourist site due to the close proximity to the proposed substation. However, this Homestead and associated outbuildings will need to be sold with the remainder of the Eskom land. It is recommended that both the prehistoric quarry site and occupational site and Groot Oliphantskop Homestead and associated buildings be afforded protection in the sale agreements. The cemetery site is protected according to Section 36 of the Heritage Resources Act of 1999.

Sensitive ecological pockets of indigenous vegetation were identified in Alternative Site A, although not occurring in the development footprint. These will need to be conserved. Similarly, sensitive avifaunal wetland habitats were identified in Alternative sites B and C. These habitats are used by the resident Blue Crane population in the area and are in need of

conservation to ensure the survival of this species. A seasonal drainage line wetland was also identified in alternative A. The recommendations of this report and the relevant botanical and avifaunal specialist reports need to be followed to ensure that ecological impacts are kept to a minimum. The compilation and implementation of a project-specific Environmental Management Plan for the construction process will further ensure this. The increase in bird collisions is also a potential impact and this would require the installation of anti – collision devices on surrounding transmission lines. Mitigatory measures have been recommended to minimise these impacts.

Potential design impacts include the increase in surface water runoff associated with the substation's platforms that may potentially modify the hydrological regime of the surrounding seasonal wetlands (Alternative site B and C) and seasonal drainage line found in alternative sites A. A further impact relates to the nocturnal light pollution associated with the substation and its impact on the surrounding farmlands. These impacts have mitigatory measures that have been recommended by the specialists.

Potential impacts associated with the construction phase relate to the impact of the proposed on-site resident labour force, the generation of dust and noise pollution, the encroachment of alien vegetation, the potential introduction of sediment and other pollutants into surface and groundwater systems, stormwater management and the potential increase in the heavy vehicular traffic on the local road network within the surrounding area. These impacts need to be addressed in the project-specific EMP and environmental monitoring/auditing by an appointed qualified Environmental Control Officer needs to be on going to ensure that mitigatory measures are implemented.

Potential impacts associated with the operational phase relate to the perceived health risks associated with EMFs and associated radiation, which would be emitted from a substation of this size. Standard setback distances are prescribed between residential areas and the substation and transmission lines, which are based on calculations of EMF strength for each situation and comply with the standards of International Radiation Protection Association (IRPA). Eskom has offered to finance the relocation of the existing dairy buildings on the farm to an area that is situated further from the proposed alternative site A. The is based on "The Precautionary Principle" since current scientific information remains inconclusive with regards to potential health impacts on human and animal health. Further risks that were identified included the risk posed by the substation with regards to the potential generation of veld fires, potential sabotage action and potential accidental transformer explosions. The probability of such risks occurring are low since there are security and safety monitoring systems in place to prevent the occurrence of such accidental events. Further issues raised included the impacts on the surrounding property prices due to the presence of a substation of this nature and the question of the sale of the remainder of the Groot Oliphantskop farm. Clarification from Eskom has been requested in these matters. Social impacts are expected to be marginal as the project is not expected to have an effect on local employment, and the accommodation of site staff is to be strictly governed by the EMP and be monitored on an on-going basis.

Based on the specialist studies undertaken on the site the following conclusions can be drawn:

(a) Site C is a “No-Go” site from an archaeological and ecological perspective.

(b) Site A is the best option from a topographic perspective and will require less bulk earthworks and hence landscape alteration than Site B. Site A conflicts with the Cape Municipality Council’s planned future M12 road expressway, although the planning for this is at an early stage. The development of Site A will have a significant effect on the original Homestead and substantially reduce its heritage value.

(c) Site B is not large enough for the proposed footprint of the substation, without having to purchase a portion of the adjoining farm and re-aligning the Old Mamre Road. The site is also steeper and would result in substantially greater earthworks and landscape alteration.

All sites will be visually obtrusive and although mitigation measures may soften the impact, it will be substantial and significant in the region.

Considering all factors, Site A is the preferred Alternative for the proposed Omega Substation.

CHAPTER 11 RECOMMENDATIONS

The immediately affected landowners around the Groot Oliphantskop Farm have been engaged with since 1996 regarding the Gamma-Omega Transmission line and Omega Substation and did not object to the previous re-zoning of this site for the substation. It must however be said that substantial changes have been proposed during this study, such as the changes in the size of the substation footprint and consequential impacts on farm boundaries, nearby dairies, stormwater run-off, visual intrusion and archaeologically important areas. These issues have given rise to concerns arousing nearby landowners and various other organizations. In light of this we recommend:

a) That proposed site A on Groot Oliphantskop be rezoned for general industrial purposes to facilitate the construction of the Omega Substation.

b) That authority be granted by the DEAT for the construction of the substation with the following conditions:

   i) The design of the substation incorporates terraced platforms, which cascade in harmony as far as possible with the existing topography. Grassed earthwork berms and vegetation should be incorporated into the design to "hide" or minimise the visual impact from the Old Mamre Road. This will also minimise spoil material and the need to transport it from the site.

   ii) Visual and botanical specialists should be consulted with regard to the use of screening plants / trees to minimise the visual impact of the substation.

   iii) The site must be designed with stormwater attenuation and management such that the peak stormwater leaving the developed site is no greater than the current run-off.

   iv) The development of the site should be phased to minimise unnecessary land clearance and associated erosion, dust generation and visual impacts.

   v) A detailed Environmental Management Plan (EMP) must be drawn up to minimise construction-related impacts. This must include all mitigation measures proposed by the specialists, specifically:

      - A detailed site plan that includes: proposed haulage routes; silt retention measures; dust suppression measures; stormwater control measures; site establishment; materials volume and handling procedures.
      - A detailed heritage resources management plan showing how the sites of heritage value will be protected during construction and shielded from detrimental construction activities as well as long term shielding from visual impacts during the operational phase.

vi) It is recommended that off site accommodation be found for construction workers. (It was indicated by IAPs during the scoping process that this would be preferred).

vii) A Health and Safety plan must be drawn up for the construction phase in terms of the Construction Regulations promulgated under the Occupational Health and Safety Act. It is recommended that this be incorporated into the EMP.

viii) An independent Environmental Control Officer (ECO) must be assigned to monitor that the conditions of the RoD and EMP are complied with on site for the duration of the construction period.

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