

**ESKOM TRANSMISSION  
PROPOSED GAMMA SUB-STATION  
EIA: 12/12/20/873**

**DRAFT SCOPING REPORT**

# **ESKOM TRANSMISSION**

## **Proposed Gamma Sub-Station EIA: 12/12/20/873**

### **Draft Scoping Report**

Report prepared for:

Eskom Transmission  
PO Box 1091  
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0001

Report prepared by:

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## PURPOSE OF THE DRAFT SCOPING REPORT

Eskom Transmission is currently undertaking an Environmental Impact Assessment to investigate the proposed construction and operation of the Gamma Sub-Station near Victoria West, Northern Cape Province of South Africa. The Environmental Impact Assessment, including its associated Public Participation Programme, is being undertaken by ACER (Africa) Environmental Management Consultants in terms of the National Environmental Management Act, 1998 (Act No. 108 of 1998) (as amended), in particular, the EIA Regulations GN R385, GN R386 and GN R387.

An Environmental Impact Assessment must show the authorities and the proponent what the consequences of their decisions to choose particular alternatives will be in environmental, economic and social terms. An extremely important phase of an Environmental Impact Assessment is Scoping. This is the phase during which issues and concerns are identified in order to focus the assessment and to provide a framework within which the assessment is to be undertaken. This includes studies by technical specialists on specific subjects identified during Scoping.

In accordance with the Regulations of the National Environmental Management Act, Interested and Affected Parties (members of the public, the development proponent, technical specialists and the authorities) must have **the opportunity to raise issues during Scoping and to verify that these issues must be captured, understood, interpreted and contextualised.** Interested and Affected Parties may also comment in writing on the contents of the report. These comments must be submitted to the authorities as part of the project documentation.

To this end, the Draft Scoping Report will be available for comment from 14 – 27 February 2007. After the public comment period, a Final Scoping Report will be submitted to the lead environmental authority, the Department of Environmental Affairs and Tourism who, in close collaboration with their Provincial counterparts, will consider the scope to be covered by the Specialist Studies and decide whether the EIA process should proceed or not.

**YOUR COMMENTS PLEASE**

**Please submit your comments to**

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**The due date for comments on the Draft Scoping Report is 27 February 2007**

## DRAFT SCOPING REPORT DISTRIBUTION

This Draft Scoping Report will be distributed to key stakeholders and was also left in the following public places in the project area from 14 – 27 February 2007.

Area	Venue and Street
Victoria West	Victoria West Public Library, Kerk Street
Victoria West	Schietkuil Guest House, N1.
Murraysburg	Murraysburg Public Library, 37 Beaufort Street

The following methods of public review of the Draft Scoping Report are available:

- Completing the comment sheet enclosed with the report.
- Additional written submissions.
- Comment by email, fax or telephone.

[Please note that all comments received will be considered and, where appropriate, will be included in the report. However, in terms of the requirements of section 58 of Regulation R 386, only written comments received from registered I&APs, will form part of the package of project documentation that will be submitted to the authorities for their consideration and action].

## SUMMARY

### BACKGROUND

Eskom's transmission network, supplying electricity to the greater Eastern and Western Cape areas, is running short of capacity. Eskom is planning to strengthen its transmission network by constructing a 765 kV transmission line backbone through the centre of the country, linking its main generating facilities in Mpumalanga, with demand centres in the Western and Eastern Cape. In order to transmit electricity over long distances, Eskom requires sub-stations. The location of the proposed Gamma Sub-station is indicated by an optimal distance between the Perseus (Dealesville) and Omega (Koeberg) Sub-stations, being approximately equidistant. It also serves as an off-take for the proposed 765 kV transmission lines to the Grassridge Sub-station near Port Elizabeth. Environmental authorisation was issued in 2005 for the proposed Gamma Sub-station to be located on the farm Uit Vlugt Fontein near Victoria West, Northern Cape. However, recent planning has indicated that the proposed Gamma Sub-station would be more ideally located about 10 km to the east of the original site (on the farm Uit Vlugt Fontein No. 233 with a small encroachment onto the farm Schietkuil No. 3).

Eskom Transmission (proponent) has appointed ACER (Africa) Environmental Management Consultants as the Environmental Assessment Practitioner to undertake the independent Environmental Impact Assessment for the proposed Gamma Sub-station. The Environmental Impact Assessment is being undertaken in accordance with the National Environmental Management Act, 1998 (Act No. 108 of 1998) (as amended) and its associated EIA Regulations published in July 2006. The competent authority for this project is the national Department of Environmental Affairs and Tourism, with its provincial counterparts, viz. the Northern Cape Department of Tourism, Environment and Conservation and the Western Cape Department of Economic Affairs and Development Planning.

The Environmental Impact Assessment is currently in the Scoping phase, and this Draft Scoping Report is one of several information documents that will be produced. All registered Interested & Affected Parties will be provided with access to this Draft Scoping Report and given time to respond and comment. Following the period of public review, the report will be updated and a Final Scoping Report will be submitted to the environmental authorities for consideration. Thereafter, DEAT will indicate whether or not the Environmental Impact Assessment can proceed to the Impact Assessment Phase.

### DESCRIPTION OF THE PROJECT

A sub-station's function is to transform voltages from high to low or the reverse, using transformers and other heavy-duty electrical switchgear. In addition to these functions, the proposed Gamma Sub-station will house equipment used to correct or neutralise inductive reactance, or voltage rise, and enable Eskom to safely tap off power from the 765 kV backbone and distribute it to other areas. The Gamma Sub-station will eventually accommodate five incoming and five outgoing lines, together with the associated switching, protection and control equipment, line termination structures, high-voltage switchgear, reactors, low voltage switchgear, transformers, reactors, busbars, surge protection controls and metering. The proposed Gamma Sub-station will cover an area of 1,290 m x 465 m (approximately 60 ha) and a small corridor (approximately 400 m x 2,000 m, an area of 80 ha) will be used for an access road to the R63. There will also be turn-in lines to connect the existing 400 kV transmission lines to the sub-station, with these turn-in lines having their own servitude requirements. The whole complex will be surrounded by a substantial security fence.

The first construction activity will be to clear the site of vegetation and to level off and terrace the ground surface. After this will follow the concrete and building construction for foundations for the supporting steelwork, transformers and switchgear, storm water drainage pipes, slabs, bund walls, the control room, small buildings and storage areas that are needed, and the construction of a tarred access road and a telecommunication (microwave lattice) mast. Various hazardous substances will be temporarily stored on-site during construction.

During construction, there should not be more than 80 people present on site at any one time, of which some will be housed on site in temporary accommodation. The construction of a sub-station is a specialised undertaking requiring skilled people and, by implication, job opportunities for local people will be limited to unskilled jobs, on site and in construction camps. Apart from direct employment, local people and businesses will benefit through the supply of goods and services to the appointed contractors. No people will be housed on site on a permanent basis during the operational life of the sub-station. However, there will be ongoing monitoring and control of operations as well as planned and other maintenance work done on an *ad hoc* basis.

A project-specific Environmental Management Plan will be compiled for the project and this document will detail the specific controls, which must be in place for the duration of the construction phase. An Environmental Control Officer who acts as an intermediary between individual landowners, Eskom and the contractors, will monitor compliance with the Environmental Management Plan.

In order to meet the expected electricity demand, the proposed Gamma Sub-station must be operational by 2009. Therefore, construction must commence in the latter half of 2007. This Environmental Impact Assessment is being managed with a target date for the issuing of a Record of Decision by DEAT in mid-July 2007.

For the proposed Gamma Sub-station, there are three alternatives under consideration:

- ❑ The proposed site on the farm Uit Vlucht Fontein 265, bordering on the farm Schietkuil 3.
- ❑ An alternative site on the farm Uit Vlucht Fontein 265, for which a positive Record of Decision was issued by DEAT (as explained, Eskom has decided to move the location of the sub-station).
- ❑ The “no go” or no-development alternative.

It is the professional opinion of the environmental assessment team that the no-development option is unrealistic and, therefore, it is submitted that this alternative should be discarded from further consideration in this EIA. Also, the site that has received a positive Record of Decision is taken as a *fait accompli* and, therefore, only the proposed new site is considered in this Environmental Impact Assessment.

## **PURPOSE AND NEED FOR THE PROJECT**

Eskom is planning to substantially bolster the main power supply to the southern provinces with additional 765 kV transmission lines that will be constructed alongside the existing 400 kV lines. On long EHV transmission lines, sub-stations are needed every 400 to 450 km to house equipment. Eskom wants to place the proposed Gamma Sub-station next to three existing 400 kV transmission lines so that reactive voltage correction apparatus for the 400 kV and 765 kV lines can then be housed within one structure. Further, if the proposed Gamma Sub-station is built in proximity to the existing 400 kV lines it can also be used to boost the electrical power feed in the 400 kV lines. Gamma will be built with transformers to step down the voltage from 765 kV to 400 kV and this additional power can then be fed into the 400 kV lines for onward transmission.

The main purpose of building the Gamma Sub-station is to safely house the engineering and technical equipment that is necessary for the operation of long distance EHV power lines. The need for such a facility arises out of the physics of long distance power transmission, where compensation for capacitive voltage generation on power lines has to be provided to avoid uncontrolled voltage rise especially on lightly loaded lines.

### **BROAD LEGAL PERSPECTIVE AND ASSESSMENT FRAMEWORK**

For a development such as the proposed Gamma Sub-station, there are a host of legal requirements (National, Provincial and Local Government spheres) to which the development proponent must adhere.

Listed below is some of the *key* legislation that is applicable to this project:

- Constitution of the Republic of South Africa (Act No. 108 of 1996) as amended by the Constitution of the Republic of South Africa, Amendment Act (Act No. 35 of 1997).
- National Environmental Management Act (Act No. 107 of 1998).
- Environment Conservation Act (Act No. 73 of 1989).
- Electricity Act (Act No 41 of 1987).
- Eskom Conversion Act (Act No 13 of 2001).
- Eskom Act (Act No 40 of 1987) as amended by the Eskom Amendment Act (Act No 51 of 1991).
- White Paper on the Energy Policy of the Republic of South Africa (December 1998).
- National Water Act (Act No. 36 of 1998).
- National Heritage Resources Act (Act No 25 of 1999).
- Conservation of Agricultural Resources Act (Act No 43 of 1983).
- Public Finances Management Act (Act No 1 of 1999) as amended by Act No 29 of 1999.

The concept of sustainability underpinning this assessment considers three inter-related dimensions of the environment, viz. the social, economic and biophysical dimensions. For an option or project to be sustainable, it needs to demonstrate economic growth, social acceptability and soundness, and ecological integrity within a framework of good governance. In the case of the proposed Gamma Sub-station, the economic and social dimensions of the environment are the primary drivers. Therefore, within the assessment, particular focus and care will need to be placed on the biophysical dimension.

### **DESCRIPTION OF THE RECEIVING ENVIRONMENT**

The area affected by the project is divided into a number of District and Local Municipalities:

- The affected district municipality in the Northern Cape is the Pixley KaSeme District Municipality (DC 07). The affected local municipal area is the Ubuntu Local Municipality (NC 071).
- The affected district municipality in the Western Cape is the Central Karoo District Municipality (DC 05). The affected local municipal area is the WCDMA 05.

The general area is sparsely populated and much of the area is semi-desert with vast expanses of open land and concentrated small settlements. Approximately half of the population lives in the Beaufort West area, i.e. most of the population is urbanised. The Central Karoo District Municipality has been declared as a Presidential Node by President Mbeki during 2001 due to the high levels of poverty. Settlements in the study area are generally linked by an adequate road network. The R61 and N1 are the main roads in the study area, which are supported by a network of minor roads, some black-topped but mostly gravel.



Interior climatic conditions in the Karoo vary considerably with a diverse, natural and physical environment. The climate in the region is warm all year round, with hot summers and winters that frequently have frost. The site is located in a generally flat area adjacent to a range of low hills and koppies. The site slopes gently to the south-west and storm water drains towards a watercourse about 1 km away. Key topographical features in the study area include the Murraysburg Mountains (Ondersneeuberg Mountains) and the Kamdeboo Mountains. The underlying geology of the site is sandstones and shales derived from the Beaufort Group of the Karoo Supergroup. These rocks give rise to weak and structureless clayey and sandy soils (red duplex soils, shallow soils with some lime and rocky areas).

Typical Karoo landscapes comprise grasslands and densely vegetated rivers and valleys. The vegetation is sparse, dry and, once damaged, does not regenerate easily. The presence of fragile soils means that there is much erosion and slippage. The vegetation in the area supports a high diversity of bird species, many of which are endemic to South Africa, although not to the particular region. There are some fauna species on the site including several small mammals such as mice, reptiles such as lizards and snakes, as well as many insect species.

Much of the study area is considered to be managed for purposes of conservation. Similarly, many private landowners/farmers are entering into the eco-tourism sector on a regional scale. The wilderness landscapes of much of the study area are sensitive and critical to preserve for the conservation of the whole region.

The proposed development site occurs in an area where few or no professional cultural heritage surveys of archaeological sites or research projects have been undertaken. Only a few sites are known in the wider vicinity of the proposed site.

## **SCOPING AND PUBLIC PARTICIPATION**

The Environmental Impact Assessment is currently in the Scoping Phase where issues for further investigation are identified so that they can be considered for inclusion in the Specialist Studies that will be done during the next phase, viz. the Impact Assessment Phase.

The technical process comprised the following activities:

- Information gathering.
- Assessment and collation of information.
- Evaluation and prioritisation of issues and impacts.

The public participation process has been designed to satisfy the requirements laid down in legislation and the NEMA Regulations. The key objective of public participation during Scoping is to assist to define the scope of the technical studies to be undertaken during the Impact Assessment through the following key activities:

- Notification of the application.
- Registration of Interested & Affected Parties.
- Project announcement.
- Obtaining and dealing with comments from Interested & Affected Parties.
- Focus Group and/or Public Meetings.
- Issues and Response Report, with acknowledgements.
- Draft Scoping Report.

All registered Interested & Affected Parties will be advised of the availability of the Draft Scoping Report and will be provided with an opportunity to review and comment on this report. The Final Scoping Report will be updated with any additional issues raised by Interested & Affected Parties, and will contain any new information that may have been generated as a result of the public review process. It will be submitted to the Authorities, with a request that the assessment process can proceed to the next phase, viz. the Impact Assessment.

### **ENVIRONMENTAL ISSUES, IMPACTS AND SPECIALIST STUDIES**

Issues raised during Scoping reflect the concerns and values of a range of different people, groups and organisations, including the public at large, special interest groups, private individuals, various authorities, Eskom and the EIA Team. Through the integration of discipline-specific perspectives (positive and negative aspects), the key issues identified during Scoping have been formulated as five main questions:

- What are the potential impacts during the construction of the proposed Gamma Sub-station? This includes aspects such as water (storm water management, water supply and sanitation), geology (soils and geotechnical), air pollution, the influx of construction workers and security concerns, and cultural heritage resources.
- What are the potential impacts during the operation of the proposed Gamma Sub-station? This includes aspects such as the presence of high intensity electro-magnetic fields from EHV equipment, aesthetics, land-use and economic activities, and emergency situations.
- What are the potential impacts of the proposed Gamma Sub-station on flora and fauna (including avi-fauna)?
- What positive or negative economic effects can be expected to the social and socio-economic environments?
- What cumulative effects will the sub-station contribute, seen in association with impacts arising from other activities in the region?

For purposes of Scoping, issues and associated potential impacts are described but with no assessment of significance (this will be done during the Impact Assessment, once discipline-specific specialist studies have been completed).

### **PLAN OF STUDY FOR IMPACT ASSESSMENT**

The Plan of Study for the Impact Assessment has been compiled and conforms to the requirements of the National Environmental Management Act (No 107 of 1998) (as amended) and the EIA Regulations. The main activities during this phase will be to:

- Undertake focused scientific studies to assess the issues of concern.
- Maintain ongoing communication and participation with stakeholders.
- Integrate the findings into a defensible Environmental Impact Report, inclusive of mitigation measures to ameliorate the effects of negative impacts and optimise positive ones.
- Prepare an Environmental Management Plan.

Through an integrated approach, a number of Specialist Studies will be undertaken to consider direct, secondary and cumulative impacts wherever possible. The proposed Specialist Studies include:

- Faunal and Avi-Faunal Assessments.
- Wetlands assessment.
- Vegetation assessment.
- Geotechnical assessment.

- Land use assessment.
- Visual and aesthetics assessment.
- Social and socio-economic assessment.
- Heritage impact assessment.

The outcomes of Specialist Studies commissioned as part of the proposed Gamma-Grassridge 765 kV Transmission Lines (x 2) EIA (notably the EMF and Compensation Studies) will also be used to inform the issues arising for the proposed Gamma Sub-Station EIA.

The results will be used by the EIA Team when doing the integrated assessment of the proposed sub-station development. The outcomes of integration and assessment will be documented in an Environmental Impact Report, which will be released in the public domain for comment at the appropriate time. Furthermore, based on the findings of the Impact Assessment, a comprehensive Environmental Management Plan will be prepared.

The following activities will be undertaken for the public participation process of the Impact Assessment Phase:

- Interested & Affected Parties will receive two personalised letters advising them of progress and the opportunity to comment on reports (Environmental Impact Report, Environmental Management Plan and Specialist Reports).
- Interested & Affected Parties will be advised of the availability of the various reports (for public review).
- Compilation of an Issues and Response Report.
- Focus Group Meeting.
- Interested & Affected Parties will be advised of the issue of the Record of Decision by DEAT.

### **CONCLUDING REMARKS**

The EIA Team is of the opinion that Eskom Transmission has followed due environmental process during the undertaking of this Scoping process and associated public participation programme. The analysis of key issues during Scoping has shown that there are no negative impacts that can be classified as fatal flaws. However, a number of issues that may lead to the identification of some significant environmental impacts, have been highlighted for further investigation in order to assess their significance and to determine the kinds of mitigation measures required for their management and minimisation.

The EIA Team is of the opinion that the Impact Assessment Phase, as described, should be undertaken in order to better understand the key issues and associated potential impacts.

## OPSOMMING

### AGTERGROND

Eskom se transmissienetwerk wat elektrisiteit aan die Oos- en Wes-Kaap voorsien, se kapasiteit skiet te kort. Eskom beplan die versterking van die transmissienetwerk deur die konstruksie van 'n 765 kV transmissielyn deur die middel van die land en daardeur die hoof kragopwekkings fasiliteite in Mpumalanga, met die aanvraag in die Wes- en Oos-Kaap te verbind. Ten einde elektrisiteit oor lang afstande te kan stuur, benodig Eskom substasies. Die ligging van die voorgestelde Gamma Substasie is 'n optimale afstand tussen die Perseus- (Dealesville) en Omega (Koeberg) Substasies en is omtrent ewe ver van elkeen af. Dit dien ook as 'n aftakpunt vir die voorgestelde 765 kV transmissielyn na die Grassridge Substasie naby Port Elizabeth. Omgewingsmagtiging vir die voorgestelde Gamma Substasie op die plaas Uit Vlucht Fontein naby Victoria-Wes in die Noord-Kaap is in 2005 toegestaan. Onlangse beplanning het egter getoon dat dit meer ideaal sal wees indien die voorgestelde Gamma Substasie omtrent 10 km oos van die oorspronklike terrein (op die plaas Uit Vlucht Fontein No. 233 met 'n klein oorvleueling op die plaas Schietkuil No. 3) verskuif word.

Eskom Transmissie (die proponent) het ACER (Africa) Environmental Management Consultants as Omgewingsimpakpraktisyn aangestel om die onafhanklike Omgewingsimpakstudie vir die voorgestelde Gamma Substasie te onderneem. Die Omgewingsimpakstudie word in ooreenstemming met die Nasionale Omgewingsbestuurswet (Wet Nr. 108 van 1998) (soos gewysig) en die gepaardgaande OIS Regulasies wat in Julie 2006 gepubliseer is, onderneem. Die bevoegde owerheid vir hierdie projek is die Nasionale Departement van Omgewingsake en Toerisme, tesame met hul provinsiale eweknieë, die Noord-Kaapse Departement van Toerisme, Omgewing en Bewaring en die Wes-Kaapse Departement van Ekonomiesesake en Ontwikkelingsbeplanning.

Die Omgewingsimpakstudie is tans in die Omvangsbepalingsfase en hierdie Konsep Omvangsbepalingverslag is een van vele inligtingsdokumente wat saamgestel sal word. Alle geregistreerde Belanghebbende en Geïnteresseerde Partye sal toegang tot die Konsep Omvangsbepalingsverslag hê en sal tyd gegun word om daarop kommentaar te lewer. Na afloop van die publieke oorsig tydperk sal die verslag op datum gebring word en die Finale Omvangsbepalingverslag sal by die owerhede vir oorweging ingedien word. Daarna sal DEAT aandui of die Omgewingsimpakstudie met die Omgewingsimpakfase kan voortgaan, al dan nie.

### BESKRYWING VAN DIE PROJEK

'n Substasie se funksie is om spanning van hoog na laag, of andersom, om te skakel deur die gebruik van transformators en ander swaardiens skakeltoerusting. Daarbenewens sal die voorgestelde Gamma Substasie toerusting huisves wat gebruik word om induktiewe reaktansie te kompenseer of te neutraliseer en Eskom in staat te stel om op 'n veilige wyse krag van die 765 kV ruggraat af te tak en na ander areas te versprei. Die Gamma Substasie sal uiteindelik vyf inkomende en vyf uitgaande lyne akkommodeer te same met skakel-, beskermings- en kontroletoerusting, lyn-einde strukture, hoogspannings skakeltoerusting, reaktors, lae-spanning skakeltoerusting, geleierstange, golwingsbeskerming en kontroles. Die voorgestelde Gamma Substasie sal 'n area van ongeveer 1,290 m x 465 m (ongeveer 60 ha) beslaan en 'n klein korridor (ongeveer 400 m x 2,000 m, 'n area van 80 ha) sal vir 'n toegangspad tot die R63 gebruik word. Die hele kompleks sal deur 'n stewige veiligheidsheining omring word.

Die eerste konstruksie aktiwiteit is die onbossing en gelyk maak van die areas waar die swaar elektriese transformators en ander skakeltoerusting sal staan. Hierna volg die betonwerk en die bou van fondasies vir die ondersteunende staalwerk, transformators en ander skakeltoerusting, stormwater dreinerings, keermure, kontrolekamer, klein geboue en stoorruimtes, asook die konstruksie van die toegangspad en telekommunikasiemas (mikrogolf latwerk). Verskeie gevaarlike stowwe sal tydelik gedurende konstruksie op die terrein gestoor word.

Gedurende konstruksie sal daar nie meer as 80 mense op enige spesifieke tydperk, sommige in tydelike akkomodasie, op die terrein wees nie. Die konstruksie van 'n substasie is 'n gespesialiseerde onderneming wat geskoolde mense vereis en dus sal werkseleenthede vir plaaslike mense tot ongeskoolde arbeid op die terrein en in die konstruksiekampe wees. Behalwe vir direkte werkseleenthede, sal plaaslike mense en besighede voordeel trek uit die voorsiening van goedere en dienste aan die aangestelde kontrakteurs. Niemand sal gedurende die bedryf van die substasie op 'n permanente basis op die terrein gehuisves word nie. Daar sal egter wel voortdurende operasionele monitering en kontrole wees, sowel as beplande onderhoudswerk, as en wanneer dit nodig is.

'n Projek spesifieke Omgewingsbestuursplan sal vir die projek opgestel word. Hierdie dokument sal besonderhede aangaande spesifieke kontroles uiteensit wat gedurende die konstruksiefase in plek moet wees. 'n Omgewingskontrole-amptenaar, wat as tussenganger tussen Eskom en grondeienaars sal optree, sal die nakoming van die Omgewingsbestuursplan monitor.

Ten einde in die verwagte behoefte na elektrisiteit te voorsien, moet die voorgestelde Gamma Substasie teen 2009 in bedryf wees. Konstruksie moet dus teen die laaste helfte van 2007 'n aanvang neem. Hierdie Omgewingsimpakstudie word tans bestuur met die oog op 'n teiken datum vir uitreiking van 'n Rekord van Besluit deur DEAT teen die middel van 2007.

Daar word drie alternatiewe vir die voorgestelde Gamma Substasie oorweeg:

- Die voorgestelde terrein op die plaas Uit Vlucht Fontein No. 265, aangrensend aan die plaas Schietkuil No. 3.
- 'n Alternatiewe terrein op die plaas Uit Vlucht Fontein No. 265, waarvoor 'n positiewe Rekord van Besluit reeds deur DEAT uitgereik is (soos vroeër verduidelik het Eskom besluit om die ligging van die substasie te verskuif).
- Die "no go" of "geen-ontwikkeling" alternatief.

Dit is die professionele opinie van die omgewingsimpakspan dat die geen-ontwikkeling opsie onrealisties is en dus sal hierdie opsie nie verder in die proses oorweeg word nie. Daarbenewens het die terrein reeds 'n positiewe Rekord van Besluit ontvang en is dus 'n uitgemakte saak en daarom sal slegs die nuwe terrein in die Omgewingsimpakstudie oorweeg word.

## **DOEL VAN EN BEHOEFTE AAN DIE PROJEK**

Eskom beplan om die krag voorsiening aan die suidelike provinsies aansienlik te versterk deur middel van die konstruksie van addisionele 765 kV transmissielyn langs bestaande 400 kV lyne. Oor lang EHV transmissielyn word substasies elke 400 tot 450 km benodig om toerusting te huisves. Eskom wil die voorgestelde Gamma Substasie langsaan die drie bestaande 400 kV transmissielyn plaas ten einde die reaktiewe spanning regstellings-apparaat vir 400 kV en 765 kV lyne in dieselfde struktuur te huisves. Daar word verder voorgestel dat die Gamma Substasie in die nabyheid van die bestaande 400 kV lyne gebou word sodat dit gebruik kan word om die krag vloei in die 400 kV lyne te versterk. Gamma sal gebou word met transformators wat spanning vanaf 765 kV na 400 kV kan verlaag en addisionele krag kan dus in die 400 kV lyne gevoer word vir verdere transmissie.

Die hoofdoel met die bou van die Gamma Substasie is om die ingeneurs- en tegniese toerusting wat benodig word vir die bedryf van lang afstand EHV kraglyne, veilig te huisves. Die behoefte vir so fasiliteit spruit uit die fisika van lang afstand krag transmissie, waar daar vir die kompensasië vir kapasitiewe spanningsgenerasie voorsiening gemaak moet word ten einde ongekontroleerde spanningsverhoging, veral op ligbelaaide lyne, te verhoed.

### **WETLIKE PERSPEKTIEF EN ASSESSERINGSRAAMWERK**

Vir 'n ontwikkeling soos die voorgestelde Gamma-Grassridge 765 kV Transmissie Kraglyne is daar 'n menigte wetlike vereistes (Nasionale-, Provinsiale en Plaaslikeregering Sektore) waaraan die ontwikkelingsproponent moet voldoen. Sleutel wetgewing en beleid sluit in:

- Grondwet van die Republiek van Suid-Afrika (Wet 108 van 1996) soos gewysig deur die Grondwet van die Republiek van Suid-Afrika Wysigingswet (Wet 35 van 1997).
- Wet op Nasionale Omgewingsbestuur (Wet 107 van 1998).
- Wet op Omgewingsbewaring (Wet 73 van 1989).
- Elektrisiteitswet (Wet 41 van 1987).
- Eskom Omskakelingswet (Wet 13 van 2001).
- Eskom Wet (Wet 40 van 1987) soos gewysig deur die Eskom Wysigingswet (Wet 51 van 1991).
- Witskrif op Energie Beleid van die Republiek van Suid-Afrika (Desember 1998).
- Nasionale Waterwet (Wet 36 van 1998).
- Nasionale Erfeniswet (Wet 25 van 1999).
- Wet op die Bewaring van Landbouhulpbronne (Wet 43 van 1983).
- Wet op die Bestuur van Openbare Finansies (Wet 1 van 1999) soos gewysig deur Wet 29 van 1999.

Die konsep van volhoubaarheid vorm die grondslag van hierdie studie en neem drie onderlinge dimensies van die omgewing in ag, naamlik die sosiale, ekonomiese en natuurlike dimensies. Vir 'n opsie of projek om volhoubaar te wees moet ekonomiese groei, sosiale aanvaarbaarheid en ekologiese integriteit binne 'n raamwerk van gesonde bestuur, demonstree word. In die geval van die voorgestelde Gamma Substasie is die ekonomiese en sosiale dimensies die hoof dryfvere. Daar sal dus binne die studie spesifieke fokus en sorg op die natuurlike dimensie geplaas en aan die dag gelê moet word.

### **BESKRYWING VAN DIE OMGEWING**

Die betrokke area is in 'n aantal Distriks- en Plaaslike Munisipaliteite verdeel:

- Die geaffekteerde Distriks Munisipaliteit in die Noord-Kaap is die Pixley KaSeme Distriks Munisipaliteit (DC 07). Die geaffekteerde Plaaslike Munisipaliteit is die Ubuntu Plaaslike Munisipaliteit (NC 071).
- Die geaffekteerde Distriks Munisipaliteit in die Wes-Kaap is die Sentrale Karoo Distriks Munisipaliteit (DC 05). Die geaffekteerde Plaaslike Munisipaliteit is die WCDMA 05.

Die area is yl bevolk en die grootste gedeelte daarvan is oop ruimtes met gekonsentreerde klein nedersettings. Ongeveer die helfte van die bevolking is in die Beaufort Wes area woonagtig, d.w.s. die meerderheid van die bevolking is verstedelik. Die Sentrale Karoo Distriks Munisipaliteit is gedurende 2001 as 'n Presidensiële Node deur President Mbeki verklaar weens die hoë vlakke van armoede. Nedersettings word oor die algemeen deur 'n voldoende padnetwerk verbind. Die R61 en die N1 is die hoofpaaie in die studie area en word deur 'n netwerk van kleiner paaie, sommige geteer, maar meestal grond, verbind.

Interne klimaatstoestande in die Karoo verskil aansienlik en die natuurlike omgewing is divers. Die klimaat in die streek is heel jaar warm, met baie warm somers en gereelde ryp in die winter. Die terrein is op 'n algemene plat area langs 'n reeks lae berge en koppies geleë. Die terrein is effens skuins in die suidweste en stormwater dreineer in die rigting van 'n stroombed omtrent 1 km ver. Sleutel topografiese kenmerke van studie area sluit die Murraysburg Berge (Ondersneeberg Berge) en die Kamdeboo Berge in. Die onderliggende geologie van die terrein is sandsteen en skalie van die Beaufortgroep van die Karoo Supergroep. Hierdie rots onderlê swak, struktuurlose kleierige en sanderige grond (rooi duplex grond, vlak grond met kalk klipperige areas).

Tipiese Karoo landskap beslaan grasland en dig begroeide riviere en valleie. Die plantegroei is yl en droog en as dit beskadig word herstel dit nie maklik nie. Die teenwoordigheid van bros grondtipes beteken dat daar heelwat erosie en gly is. Die plantegroei in die area onderhou 'n diversiteit van voëlspesies, waarvan heelwat endemies aan Suid-Afrika is, hoewel nie tot die spesifieke streek nie. Daar is sekere fauna spesies op die terrein wat heelparty klein soogdiere soos muise, reptiele soos akkedisse en slange, asook insekspesies insluit.

Die grootste gedeelte van die studie area word vir bewarings doeleindes bestuur. Soortgelyk is heelparty grondeienaars/boere in die proses om die eko-toerisme sektor op 'n streeksvlak te betree. Die wildernes landskap van die grootste deel van die studie area is sensitief en die bewaring daarvan is krities vir die bewaring van die hele streek.

Die voorgestelde ontwikkelingsterrein is in 'n area geleë waar min of geen professionele argeologiese opnames van argeologiese terreine of navorsingsprojekte onderneem is nie. Slegs 'n paar terreine in die omgewing van die voorgetstelde terrein is bekend.

#### **OMVANGSBEPALING EN PUBLIEKE DEELNAME**

Die Omgewingsimpakstudie is tans in die Omvangsbepalingsfase waartydens kwessies identifiseer word sodat dit vir insluiting in die Spesialisstudies, wat tydens die volgende fase, naamlik die Impakbepalingsfase gedoen sal word, oorweeg kan word vir verdere ondersoek.

Die tegniese proses bestaan uit die volgende aktiwiteite:

- Inligting insameling.
- Bestudering en sortering van inligting.
- Evaluering en prioritisering van kwessies en impakte.

Die publieke deelname proses is ontwerp om aan die vereistes wat in wetgewing en die NEMA Regulasies neergelê is, te voldoen. Die hoofdoelwit van publieke deelname gedurende Omvangsbepaling is om die omvang van die tegniese studies wat gedurende Impakbepaling onderneem word, te bepaal deur middel van die volgende:

- Kennisgewing van die aansoek.
- Registrasie van Belanghebbende en Geïnteresseerde Partye.
- Projek aankondiging.
- Inwin en hantering van kommentaar van Belanghebbende en Geïnteresseerde Partye.
- Fokusgroep- en/of Publiekevergaderings.
- Kommentaar- en Terugvoerverslag, met erkennings.
- Konsep Omvangsbepalingsverslag.

Alle geregistreerde Belanghebbende en Geïnteresseerde Partye sal van die beskikbaarheid van die Konsep Omvangsbepalingsverslag in kennis gestel word en die geleentheid gegun word tot oorsig van die kommentaar op die verslag. Die Finale Omvangsbepalingsverslag sal op datum gebring word met enige kwessies wat deur Belanghebbende en Geïnteresseerde Partye gelug is en sal enige nuwe inligting wat deur die publieke oorsig proses aan die lig gebring is, insluit. Dit sal aan die owerhede voorgelê word te same met 'n versoek om met die volgende fase, naamlik Impakbepaling, voort te gaan.

### **OMGEWINGSKWESSIES, -IMPAKTE EN SPESIALISSTUDIES**

Kwessies wat gedurende Omvangsbepaling gelug word gee die waardes en belange van 'n reeks verskillende mense, organisasies, die breë publiek, spesiale belange groepe, privaat individue, verskeie owerhede, Eskom en die OIS-span, weer. Deur die integrasie van dissipline spesifieke perspektiewe (positiewe sowel as negatiewe aspekte), is sleutel kwessies identifiseer gedurende Omvangsbepaling en as in die vorm van vyf hoof vrae geformuleer:

- Wat is die potensiële impak van die voorgestelde Gamma Substasie tydens konstruksie? Dit sluit aspekte soos water (stormwaterbestuur, watervoorsieinig en sanitasie), geologie (grond en geotegnies), lugbesoedeling, die instroming van konstruksie werkers en sekuriteits kwessies, asook kultuurerfenishulpbronne, in.
- Wat is die potensiële impak gedurende die bedryf van die voorgestelde Gamma Substasie? Dit sluit aspekte soos die teenwoordigheid van hoë intensiteit elektromagnetiesevelde van EHV toerusting, die estetiese, grondgebruik en ekonomiese aktiwiteite, asook noodsituasies, in.
- Wat is die potensiële impak van die voorgestelde Gamma Substasie op flora en fauna (voëllewe ingesluit)?
- Watter positiewe of negatiewe ekonomiese effek op die sosiale en sosio-ekonomiese omgewing kan verwag word?
- Watter kumulatiewe effek sal die substasie, teen die agtergrond van die impak van ander aktiwiteite in die streek, bydra?

Vir die doeleinde van Omvangsbepaling word kwessies en gepaardgaande impakte omskryf, maar geen bepaling van gewigtigheid word gedoen nie (dit sal gedurende die Impakbepaling gedoen word, ná die afhandeling van spesialisstudies).

### **STUDIEPLAN VIR IMPAKBEPALING**

Die Studieplan vir die Impakbepaling is voltooi en konformeer met die vereistes van die Nasionale Omgewingsbestuurswet (Nr 107 van 1998) (soos gewysig) en die OIS Regulasies. Die hoofaktiwiteite gedurende hierdie fase sal die volgende wees:

- Onderneem gefokusde wetenskaplike studies ten einde die kwessies te ondersoek.
- Handhaaf aaneenlopende kommunikasie en deelname met rolspelers.
- Integreer die bevindinge in 'n houdbare Omgewingsimpakverslag wat versagtings maatreëls, waardeur negatiewe impakte versag en positiewe impakte versterk kan word, insluit.
- Berei 'n Omgewingsbestuursplan voor.

Deur middel van die geïntegreerde benadering sal 'n aantal Spesialisstudies onderneem word om direkte, sekondêre en kumulatiewe impakte, waar moontlik, te ondersoek. Die voorgestelde Spesialisstudies sluit in:

- Diere- en Voëllewestudies.
- Vleilanstudie.
- Plantegroei studie.
- Geotegniesestudie.



- Grondgebruikstudie.
- Visuele- en Estetiesestudie.
- Sosiale en sosio-ekonomiesestudie.
- Erfenisstudie.

Die bevindinge van die Spesialisstudies wat as deel van die Gamma-Grassridge 765 kV Transmissielyn (x 2) OIS (meer spesifiek die EMF- en Kompensasiestudies) sal ook gebruik word of kwessies wat uit die Gamma Substasie OIS voortspruit, toe te lug.

Die bevindinge sal deur die OIS-span gebruik word gedurende die geïntegreerde studie vir die voorgestelde substasie ontwikkeling. Die resultate van die integrasie sal in 'n Omgewingsimpakverslag opgeteken word en sal op die gepaste tyd aan die publiek beskikbaar gestel word vir kommentaar. Daarbenewens sal 'n omvattende Omgewingsbestuursplan voorberei word.

Die volgende aktiwiteite sal onder die publieke deelname proses, as deel van die Impakbepalingsfase, onderneem word:

- Belanghebbende en Geïnteresseerde Partye sal twee persoonlike briewe ontvang waarin hulle van vordering en die geleentheid om kommentaar op die verslae te lewer, verwittig word. (Omgewingsimpakverslag, Omgewingsbestuursplan en Spesialisstudies).
- Belanghebbende en Geïnteresseerde Partye sal ook van die beskikbaarheid van die verskeie verslae (vir publieke kommentaar) verwittig word.
- Samestelling van 'n Kommentaar- en Terugvoerverslag.
- 'n Fokusgroepvergadering.
- Belanghebbende en Geïnteresseerde Partye sal van die uitreiking van die Rekord van Besluit verwittig word.

## **SLOTOPMERKINGS**

Dit is die OIS-span se opinie dat Eskom Transmissie 'n behoorlike omgewingsproses, tydens Omvangsbepaling en die publieke deelname program, gevolg het. Die analise van die sleutel kwessies gedurende Omvangsbepaling het getoon dat daar nie negatiewe kwessies is wat as onherstelbare leemtes geklassifiseer kan word nie. Nietemin, is 'n aantal gewigtige omgewingsimpakte identifiseer wat verdere studie vereis ten einde hul gewigtigheid te bepaal en versagtingsmaatreëls vir die bestuur daarvan voor te stel.

Dit is die opinie van OIS-span dat die Impakbepalingsfase soos hier beskryf, onderneem moet word ten einde sleutel kwessies en gepaardgaande impakte beter te verstaan.

## TABLE OF CONTENTS

PURPOSE OF THE DRAFT SCOPING REPORT .....	II
YOUR COMMENTS PLEASE .....	III
DRAFT SCOPING REPORT DISTRIBUTION .....	IV
SUMMARY .....	V
OPSOMMING .....	XI
TABLE OF CONTENTS .....	XVII
LIST OF FIGURES .....	XXI
LIST OF TABLES .....	XXI
ACRONYMS .....	XXII
PROPONENT .....	XXIII
INDEPENDENT ENVIRONMENTAL ASSESSMENT PRACTITIONER .....	XXIII
REGULATORY REQUIREMENTS CHECKLISTS .....	XXIV
1. INTRODUCTION .....	1
1.1 Background .....	1
1.1.1 Eskom's 765 kV national backbone .....	4
1.2 Environmental authorisation process .....	6
1.3 Draft Scoping Report .....	8
2. DESCRIPTION OF THE PROJECT .....	9
2.1 Background .....	9
2.2 Project description .....	10
2.2.1 Main sub-station switchgear .....	13
2.2.1.1 Transformers .....	13
2.2.1.2 Reactors .....	13
2.2.1.3 Busbars .....	16
2.2.1.4 Power out .....	16
2.2.1.5 Buildings .....	16
2.2.2 The site .....	16
2.2.3 Construction of the sub-station .....	17
2.2.4 Construction and maintenance of access roads .....	18
2.2.5 Temporary storage of hazardous substances .....	18
2.2.6 Telecommunication masts .....	19
2.2.7 Use of services and resources during construction .....	19
2.2.7.1 Water .....	19
2.2.7.2 Sewerage .....	19
2.2.7.3 Roads .....	19
2.2.7.4 Storm water .....	19
2.2.7.5 Solid waste disposal .....	19
2.2.7.6 Electricity .....	20

---

2.3	Economics and job creation .....	20
2.4	Environmental Management Plan .....	20
2.5	Operations and maintenance .....	20
2.6	Decommissioning .....	20
2.7	Project timeframes .....	21
2.8	Alternatives .....	21
3.	PURPOSE AND NEED FOR THE PROJECT .....	23
4.	BROAD LEGAL PERSPECTIVE AND ASSESSMENT FRAMEWORK .....	24
4.1	Legislative considerations .....	24
4.1.1	<i>Constitution of the Republic of South Africa (Act No. 108 of 1996) as amended by the Constitution of the Republic of South Africa, Amendment Act (Act No. 35 of 1997)</i> .....	24
4.1.2	<i>National Environmental Management Act (Act No. 107 of 1998)</i> .....	25
4.1.3	<i>Environment Conservation Act (Act No. 73 of 1989)</i> .....	26
4.1.4	<i>Legislation and policy applicable to Eskom</i> .....	26
4.1.4.1	<i>Electricity Act (Act No 41 of 1987)</i> .....	26
4.1.4.2	<i>Eskom Conversion Act (Act No 13 of 2001)</i> .....	26
4.1.4.3	<i>Eskom Act (Act No 40 of 1987) as amended by the Eskom Amendment Act (Act No 51 of 1991)</i> .....	26
4.1.4.4	<i>White Paper on the Energy Policy of the Republic of South Africa (December 1998)</i> .....	27
4.1.5	<i>National Water Act (Act No. 36 of 1998)</i> .....	27
4.1.6	<i>National Heritage Resources Act (Act No 25 of 1999)</i> .....	27
4.1.7	<i>Conservation of Agricultural Resources Act (Act No 43 of 1983)</i> .....	28
4.1.8	<i>Public Finances Management Act (Act No 1 of 1999) as amended by Act No 29 of 1999</i> .....	28
4.1.9	<i>Other National, Provincial and Local legislation of potential relevance</i> .....	28
4.2	Assessment framework .....	29
5.	DESCRIPTION OF THE RECEIVING ENVIRONMENT .....	31
5.1	Introduction .....	31
5.2	Description of the social environment .....	31
5.2.1	<i>The study area</i> .....	31
5.2.1.1	<i>Northern Cape: Pixley ke Seme District Municipality</i> .....	31
5.2.1.2	<i>Western Cape: Central Karoo District Municipality</i> .....	31
5.2.2	<i>Access to electricity</i> .....	32
5.2.3	<i>Land-use and settlement</i> .....	32
5.2.4	<i>Transport</i> .....	32
5.2.5	<i>Tourism</i> .....	33
5.3	Description of the biophysical environment .....	33
5.3.1	<i>Climate</i> .....	33
5.3.2	<i>Air quality</i> .....	33
5.3.3	<i>Topography</i> .....	33
5.3.4	<i>Drainage</i> .....	34
5.3.5	<i>Geology and soils</i> .....	34
5.3.6	<i>Flora</i> .....	34
5.3.7	<i>Fauna and avi-fauna</i> .....	35
5.3.8	<i>Visual and aesthetics</i> .....	35
5.4	Cultural and heritage resources .....	36

---

6.	SCOPING AND PUBLIC PARTICIPATION PROCESSES .....	38
6.1	Scoping .....	38
6.1.1	<i>Technical scoping</i> .....	38
6.1.1.1	Information gathering .....	39
6.1.1.2	Assessment and collation of information .....	39
6.1.1.3	Evaluation and prioritisation of issues and impacts .....	39
6.2	Public participation .....	40
6.2.1	<i>Notification of the application</i> .....	40
6.2.2	<i>Registration of I&amp;APs</i> .....	41
6.2.3	<i>Project announcement</i> .....	41
6.2.4	<i>Obtaining and dealing with comments from I&amp;APs</i> .....	41
6.2.5	<i>Focus Group and Public Meetings</i> .....	42
6.2.6	<i>Issues Report and Acknowledgements</i> .....	42
6.2.7	<i>Draft Scoping Report</i> .....	42
6.2.8	<i>Public participation after completion of the Draft Scoping Report</i> .....	43
6.2.9	<i>Final Scoping Report</i> .....	44
6.3	Public participation during the Impact Assessment .....	44
7.	ENVIRONMENTAL ISSUES, IMPACTS AND SPECIALIST STUDIES .....	45
7.1	Issues and concerns .....	45
7.2	What are the potential impacts during the construction of the proposed Gamma Sub-station? .....	46
7.2.1	<i>Water use</i> .....	46
7.2.2	<i>Geology, soils and geotechnical</i> .....	46
7.2.3	<i>Air pollution</i> .....	47
7.2.4	<i>Influx of construction workers and security</i> .....	47
7.2.5	<i>Cultural heritage resources</i> .....	47
7.3	What are the potential impacts during the operation of the proposed Gamma Sub-station? .....	48
7.3.1	<i>Electromagnetic fields</i> .....	48
7.3.2	<i>Aesthetics and land-use impacts</i> .....	48
7.3.3	<i>Emergency situations</i> .....	49
7.4	What are the potential impacts of the proposed Gamma Sub-station on flora and fauna? .....	49
7.4.1	<i>Flora</i> .....	49
7.4.2	<i>Fauna and avi-fauna</i> .....	50
7.5	What positive or negative economic effects can be expected to the social and socio-economic environment? .....	50
7.6	What cumulative effects will the sub-station contribute seen in association with impacts arising from other activities in the region? .....	51
8.	PLAN OF STUDY FOR IMPACT ASSESSMENT .....	52
8.1	Proposed technical process .....	52
8.1.1	<i>Specialist studies</i> .....	53
8.1.1.1	Faunal and avi-faunal assessments .....	53
8.1.1.2	Vegetation assessment .....	54
8.1.1.3	Wetlands assessment .....	54
8.1.1.4	Geotechnical assessment .....	55
8.1.1.5	Land-use assessment .....	55

8.1.1.6 Visual and aesthetics assessment.....	56
8.1.1.7 Social and socio-economic assessment.....	56
8.1.1.8 Heritage impact assessment .....	56
8.1.1.9 Other information.....	57
8.1.2 <i>Integration and impact description</i> .....	57
8.2 Public participation during the Impact Assessment .....	60
8.3 Programme .....	61
9. CONCLUDING REMARKS.....	64
10. REFERENCES.....	65
APPENDIX 1 .....	66
APPENDIX 2 .....	67
APPENDIX 3 .....	68
APPENDIX 4 .....	69

## LIST OF FIGURES

Figure 1	Map showing the 765 kV backbone that is planned by Eskom Transmission .....	2
Figure 2	Map showing the new location of the proposed Gamma Sub-station, with turn-in lines.....	3
Figure 3	South Africa's power network .....	5
Figure 4	The four principal phases of an Environmental Impact Assessment.....	7
Figure 5	Schematic diagram of the proposed Gamma Sub-station layout .....	11
Figure 6	Hydra Sub-station that is typical of Eskom Sub-stations in South Africa .....	12
Figure 7	Transformer and bund wall.....	14
Figure 8	Oil holding dam .....	15
Figure 9	Inter-related dimensions of the environment contributing to the achievement of sustainability.....	30
Figure 10	Programme for the environmental authorisation process for the proposed Gamma Sub- station .....	62

## LIST OF TABLES

Table 1	Scheduled activities in terms of which Eskom is seeking environmental authorisation for the proposed Gamma Sub-station.....	7
Table 2	Sectors of society represented by I&APs on the direct mailing list .....	42
Table 3	Details of focus group meetings held during scoping .....	43
Table 4	List of public places in the project area where the Draft Scoping Report will be placed for public review .....	43
Table 5	Assessment conventions that will be applied for the impact assessment .....	58
Table 6	Key activities and anticipated time frames.....	61

## ACRONYMS

ABE	Affirmative Business Enterprise
ACER	ACER (Africa) Environmental Management Consultants
DEAT	Department of Environmental Affairs and Tourism (National)
DEADP	Department of Environmental Affairs, Development and Planning (Western Cape)
DSR	Draft Scoping Report
DTEC	Department of Tourism, Environment and Conservation (Northern Cape)
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act
ECO	Environmental Control Officer
EHV	Extra High Voltage
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
ELF	Extremely Low Frequency
EMF	Electro-Magnetic Field
EMP	Environmental Management Plan
FSR	Final Scoping Report
I&AP	Interested and Affected Party
NEMA	National Environmental Management Act
NER	National Electricity Regulator
PCB	Polychlorinated Biphenyl
ROD	Record of Decision
SAHRA	South African Heritage Resources Agency
SME	Small and Medium Enterprise

## PROPONENT

Eskom Transmission, a Division of Eskom Holdings Limited, is the project proponent who has commissioned this EIA. Contact details are as follows:

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**REGULATORY REQUIREMENTS CHECKLISTS**

<b>Gamma Sub-station EIA</b>		
	<b>Contents of a Scoping Report (Chapter 3, Part 3, Section 29)</b>	<b>Covered in Draft Scoping Report</b>
1	Info necessary for proper understanding of nature of issues identified during scoping and must include:	
a	details and expertise of the EAP who prepared the report and carried out the scoping process	Draft Scoping Report, Page xiii
b	description of the proposed activity and of any feasible and reasonable alternatives that have been identified	Draft Scoping Report, Chapter 2, Page 9
c	description of the property on which the activity is to be undertaken and the location of the activity on the property	Draft Scoping Report, Chapter 2, Page 9
d	description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity	Draft Scoping Report, Chapter 5, Page 31
e	identification of all legislation and guidelines that have been considered in the preparation of the scoping report	Draft Scoping Report, Chapter 4, Page 24
f	description of all environmental issues and potential impacts, including cumulative impacts, that have been identified	Draft Scoping Report, Chapter 7, Page 45
g	information on the methodology that will be adopted in assessing the potential impacts, including any specialist studies or specialised processes that will be undertaken	Draft Scoping Report, Chapter 8, Page 52
h	details of the public participation process conducted in terms of regulation 28(a) (28(a) = 56 detailed in next spreadsheet)	Draft Scoping Report, Chapter 6, Page 38
i	plan of study for impact assessment which sets out the proposed approach to the EIA, which includes (i) a description of tasks of the IA (including specialist studies) and the manner in which such tasks will be undertaken, (ii) an indication of the stages at which the authority will be consulted, (iii) a description of the method of assessing the issues/alternatives, (iv) particulars of the PPP	Draft Scoping Report, Chapter 8, Page 52
j	a scoping report must take into account any guidelines applicable to the kind of activity which is the subject of the application	Undertaken

<b>Gamma Sub-station EIA</b>		
<b>Public Participation Process (Chapter 6, Sections 56 - 59)</b>		<b>Undertaken during Scoping</b>
56.2	The PPP must take into account any guidelines applicable to the PPP and give notice to all I&APs by:	
a	fixing a notice board at a place conspicuous to the public at the (i) site and (ii) alternative sites	No (see motivation in Draft Scoping Report, Page 41)
b	giving written notice to (i) owners and occupiers of land adjacent to the site or alternative sites (ii) owners or occupiers of land within 100 metres of the site or alternative sites (iii) municipal ward councillor of the site or alternative sites (iv) municipality (v) organ of state having jurisdiction	Draft Scoping Report, Appendix 2, Page 67
c	placing an advertisement in (i) one local newspaper or (ii) official gazette that is published for the purpose of providing public notice	Draft Scoping Report, Appendix 2, Page 67
d	placing an advertisement in at least one provincial newspaper or national newspaper (if activity impacts extend beyond boundaries of metro or local municipality)	Draft Scoping Report, Appendix 2, Page 67
3	A notice, notice board or advertisement referred to above must:	
a	give details of application which is subject to PPP	Draft Scoping Report, Appendix 2, Page 67
b	state (i) application has been or is to be submitted to authority in terms of these Regs (ii) whether basic assessment or scoping being applied (iii) nature and location of activity (iv) where further info can be obtained (v) manner in which and person to whom representations can be made	Draft Scoping Report, Appendix 2, Page 67
4	A notice board must be (a) 60 cm by 42 cm (b) display the required info in lettering and format determined by authority	No (see motivation in Draft Scoping Report, Page 41)
5	If application is for linear or ocean activity, compliance with (2) is inappropriate and must be agreed with authority	n/a
6	Person conducting PPP must ensure that (a) info is made available to I&APs (b) participation by I&APs is facilitated to provide all with a reasonable opportunity to comment	Draft Scoping Report, Appendix 2, Page 67
57.1	EAP must open and maintain register with details of:	
1	persons who have submitted written comment or attended meetings	Draft Scoping Report, Appendix 3, Page 68
b	persons who have requested names to be added	Draft Scoping Report, Appendix 3, Page 68
c	all organs of state which have jurisdiction	Draft Scoping Report, Appendix 3, Page 68
2	EAP must give access of register to any person who requests	Available
58.1	A registered I&AP is entitled to comment in writing on all written submissions made to authority and raise issues, provided that:	
a	comments submitted within (i) timeframes that have been approved or set by authority (ii) extension of a timeframe agreed to	Undertaken during Scoping
b	copy of comments submitted directly to authority is served to applicant or EAP	Undertaken during Scoping
c	I&AP discloses direct business, financial, personal or other interest in approval/refusal of application	Undertaken during Scoping
2	Before EAP submits report, the EAP must give registered I&APs access to and an opportunity to comment in writing	To be undertaken (see Draft Scoping Report), Pages ii, iii and iv.
3	Reports include (a) BAR (b) BAR amended and resubmitted (c) SR (d) SR amended and resubmitted (e) specialist reports (f) EIRs (g) EMPs	n/a
4	Written comment must accompany the report when submitted to authority	Undertaken during Scoping
5	A registered I&AP may comment on final reports submitted by reviewer where report contains substantive information not previously made available	n/a
59	EAP must ensure that comments of I&APs are recorded in reports submitted to authority; provided that comments may be attached to the report w/o recording in report itself	Draft Scoping Report, Appendix 3, Page 68

## 1. INTRODUCTION

### 1.1 Background

Eskom's transmission network, supplying electricity to the greater Eastern and Western Cape areas, is running short of capacity to supply the natural load growth, and presents a reliability constraint by 2009 (or immediately if power supply problems are encountered as has recently been experienced country wide). To counter this situation and to meet projected future electricity demand, Eskom is planning to strengthen its transmission network by constructing a 765 kV transmission line backbone through the centre of the country, linking its main generating facilities in Mpumalanga, with demand centres in the Western and Eastern Cape. This involves constructing new 765 kV transmission lines from Standerton, in Mpumalanga, to Cape Town, in the Western Cape, with branch lines to Port Elizabeth, in the Eastern Cape. The approximate length of the total line is 1,300 km (Figure 1).

The location of the proposed Gamma Sub-station is indicated by an optimal distance between the Perseus (Dealesville) and Omega (Koeberg) Sub-stations, being approximately equidistant. It also serves as an off-take for the proposed 765 kV transmission lines to the Grassridge Sub-station near Port Elizabeth. To tap off electricity in this way a sub-station must be built for this purpose. The extra high voltages (EHV) involved, require the use of large, purpose made switchgear that has to be securely housed in a specially designed sub-station.

The sub-station in question has been given the name Gamma and it is proposed to locate it on the farms Uit Vlucht Fontein No. 233 and Schietkuil No 3 in the Pixley ka Seme and Central Karoo District Municipalities (Figure 2). It will eventually cover an area of at least  $1.5 \times 1.15 \text{ km}^2$  (172 ha). The sub-station will eventually have five incoming EHV power lines and five 765 kV feeder power lines going out. In addition, power from the 765 kV incoming lines will also be used to boost the supplies in the existing 400 kV lines.

Environmental authorisation was issued in 2005 for the proposed Gamma Sub-station to be located on the farm Uit Vlucht Fontein near Victoria West, Northern Cape. However, recent planning has indicated that the proposed Gamma Sub-station would be more ideally located about 10 km to the east of the original site. It will now lie mainly on the farm Uit Vlucht Fontein No. 233 with a small encroachment (approximately 22 m) onto the farm Schietkuil No. 3.

On long EHV transmission lines, sub-stations are needed every 400 to 450 km. Sub-stations house equipment that compensates for and neutralises inductive reactance, or the rise in the voltages along the line due to capacitance effects (Ferranti Effect). In this regard, Eskom wants to place the sub-station next to its three existing 400 kV transmission lines. Reactive voltage correction apparatus for the 400 kV and 765 kV lines can then be housed within one structure. Also, if the Gamma sub-station is built in proximity to the 400 kV lines it can also be used to boost the electrical power feed in the 400 kV lines. To this end, the proposed Gamma Sub-station will be built with transformers to step down the voltage from 765 kV to 400 kV. This additional power can then be fed into the 400 kV lines for onward transmission. Furthermore, placing all the transmission lines closer together and building the proposed Gamma Sub-station at its new position makes great economic sense (saving Eskom substantial capital in terms of transmission line construction costs, (R 2.5 million/km)).

**Figure 1** Map showing the 765 kV backbone that is planned by Eskom Transmission

**Figure 2** Map showing the new location of the proposed Gamma Sub-station, with turn-in lines

Consistent with environmental best practice and environmental legislation, Eskom Transmission (proponent) appointed ACER (Africa) Environmental Management Consultants (ACER) as the Environmental Assessment Practitioner (EAP) to undertake the independent Environmental Impact Assessment (EIA) for the proposed Gamma Sub-station. It should be noted that this EIA deals with the complete Gamma Sub-station, although the construction of individual components will be phased, as indicated by the growth in electricity demand over the next few years.

### **1.1.1 Eskom's 765 kV national backbone**

Over many years, Eskom has built up a national and regional electricity supply grid that connects the centres of power generation to consumers, and to whom electricity can flow on an uninterrupted basis (Figure 3). The network of interconnections between power producers and consumers ensures that power can flow even if one link is disabled.

However, all electrical equipment and facilities have a finite commercial life. In the case of power stations and transmission lines, this is assumed to be about 40 years. Therefore, ongoing planned and emergency maintenance, and replacement strategies, have to be applied to achieve reliability and continuity of supply. The combination of ageing equipment and increasing demand, is increasing the risk that Eskom will be unable to assure bulk electricity supplies to consumers on a national scale without some form of load shedding or outages at certain times.

Quantifying and managing these risks is an integral part of Eskom's Integrated Risk Management Strategy and Process. Indeed, large power grids, like the South African one, need close monitoring and technical design audits, analyses and other technical inputs to be carried out on a regular basis. In this regard, Eskom carries out annual audits to international standards, with inputs from international power transmission experts, in order to assess and quantify the maximum reliable capacity of each transmission line. This involves factors such as system safety design and stability considerations, as well as the physical or thermal limits of the transmission lines.

All Eskom's recent audits indicate the need for expansion of the transmission network to attain a higher security of supply. This needs to be achieved through the implementation of a 765 kV backbone through the centre of the country. The position of sub-stations on this backbone, as well as the distance between sub-stations, is determined by the peculiarities of electricity transmission at extra high voltage. In order to comply with the known and laid down safety limits, sub-stations must be about 400 km apart with an absolute maximum distance of 450 km. This is because on long transmission lines the voltage increases along the line because of capacitance in the line (Ferranti Effect). Compensation is done at the sub-station where reactors are installed to neutralize inductive reactance in the long transmission lines. If the voltage is allowed to become too high it will burn out equipment.

An added dilemma is the increasing reliance that is placed on the Hydra Sub-station at De Aar. This is a major sub-station and a potentially vulnerable point in the network that is in danger of becoming overloaded or unnecessarily stressed. Therefore, it has become necessary to plan, design and implement the 765 kV transmission backbone in a manner that avoids additional reliance on the Hydra Sub-station and, indeed, in a manner that reduces this reliance by providing alternative sub-stations and transmission line routes (particularly in the central parts of the country).

**Figure 3 South Africa's power network**

## 1.2 Environmental authorisation process

In terms of the National Environmental Management Act, 1998 (Act No. 108 of 1998) (as amended) (NEMA) and its EIA Regulations published in July 2006, it is necessary to undertake environmental investigations as an integral part of project planning in order to obtain environmental authorisation for a proposed activity deemed to potentially negatively affect the environment. The construction and operation of a sub-station like Gamma, is identified as an activity which may not commence without environmental authorisation from the relevant competent authority and requires assessment and communication of potential environmental impacts of activities based on the procedure as described in Sections 27 to 36 of the Regulation R 385 of April 2006. In this regard, Eskom is applying for environmental authorisation for listed activities detailed in Table 1.

Further, in accordance with the principles and practice of Integrated Environmental Management to which Eskom subscribes, it is best business practice to understand the environmental consequences of a development. In terms of NEMA and the EIA Regulations, certain listed activities require environmental authorisation before they can proceed. Application for authorisation of the proposed Gamma Sub-station site was submitted to Environmental Authorities in November 2006. The process of environmental assessment that will be followed is shown in Figure 4.

The national Department of Environmental Affairs and Tourism (DEAT) is the competent authority<sup>1</sup> for this project, and accordingly, is responsible for decision-making on whether or not to authorise the proposed development. However, it is important to note that DEAT works in close collaboration with its provincial counterparts, viz. the Northern Cape Department of Tourism, Environment and Conservation and the Western Cape Department of Economic Affairs and Development Planning.

The EIA for the proposed Gamma Sub-station is being undertaken in four main phases (Figure 4):

- Scoping.
- Impact Assessment.
- Environmental Impact Report (integrated report of findings).
- Decision-making.

Importantly, these four main phases are underpinned and supported by other sub-phases, for example, pre-application site visit and consultation with the environmental authorities, the preparation and submission of an application for authorisation to undertake listed activities. In addition, there are other activities that will occur further into the process, viz. the preparation of a Plan of Study for Impact Assessment, the preparation of an Environmental Management Plan (EMP) and the issuing of a Record of Decision by the environmental authorities.

The EIA for the proposed Gamma Sub-station is currently in the Scoping Phase. This is the first phase of the EIA during which issues are identified for investigation, assessment and resolution during the next phase. During the Impact Assessment phase, an EMP will be prepared. The purpose of the EMP is to provide a structured framework for managing the causes of environmental impacts. To do this, it uses the information and findings contained in the Environmental Impact Report (EIR) as a basis.

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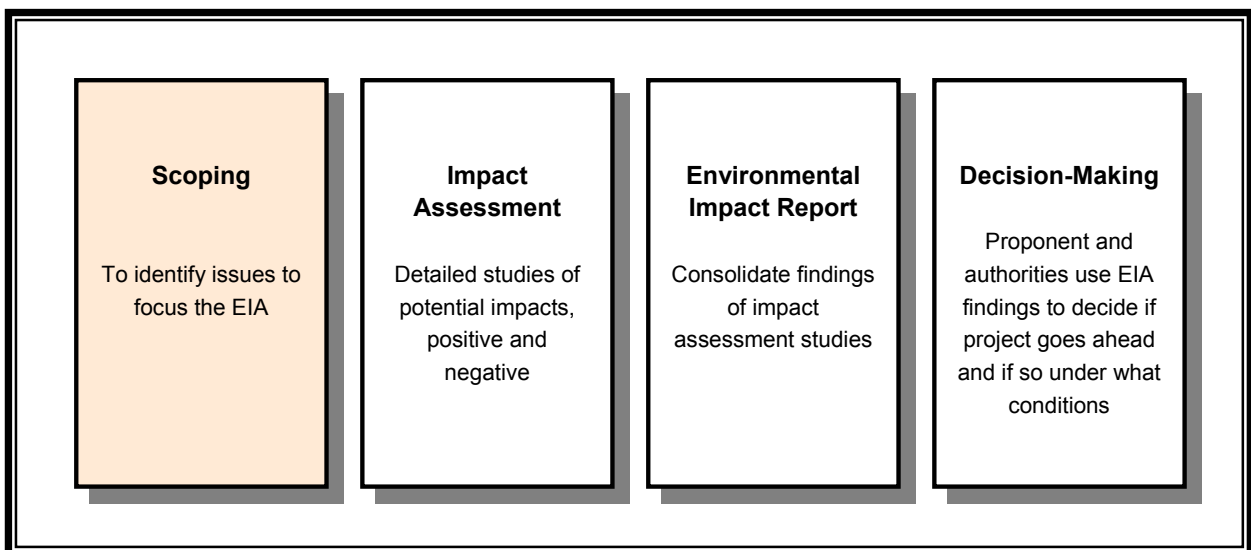
<sup>1</sup> DEAT is the competent authority when the applicant is a parastatal or when more than one province is involved. In this case, the proposed Gamma Sub-station is located in the Northern and Western Cape Provinces.



**Table 1 Scheduled activities in terms of which Eskom is seeking environmental authorisation for the proposed Gamma Sub-station**

<b>Activity</b>	<b>Schedule Number</b>	<b>Schedule Description</b>
Transmission of electricity	R 387, No. 1(l) 21 April 2006	The construction of facilities or infrastructure, including associated structures or infrastructure for the transmission of above ground electricity with a capacity of 120 kilovolts or more.
Construction of masts	R 386, No. 14 21 April 2006	The construction of masts of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission.
Construction of roads	R 386, No. 15 21 April 2006	The construction of a road that is wider than 4 meters or that has a reserve wider than 6 meters, excluding roads that fall within the ambit of another listed activity or which are access roads less than 30 metres long.
Above-ground storage of hazardous substances	R 387, No. 1(c) 21 April 2006	The construction of facilities or infrastructure, including associated structures or infrastructure for the above-ground storage of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of 1,000 cubic metres or more at any one location or site including the storage of one or more dangerous goods, in a tank farm.
Development activity	R 387, No. 2 21 April 2006	Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.

**Figure 4 The four principal phases of an Environmental Impact Assessment**



Activities to date and proposed future actions are detailed in Section 6.

**This report fulfils the function of the Draft Scoping Report, the findings of which will be reviewed by the public and the authorities.**

### 1.3 Draft Scoping Report

This Draft Scoping Report (DSR) is one of several information documents that will be produced during the EIA for the proposed Gamma Sub-station. The information that has to be supplied in a Scoping Report is clearly spelled out in Section 29 of Regulation 285. To meet these requirements, the Scoping Report for the proposed Gamma Sub-station has been structured in the following manner:

- ❑ A detailed description of the proposed project, including a discussion of the feasible and reasonable alternatives that have been identified.
- ❑ An understanding of the purpose and need for the proposed project.
- ❑ A broad perspective of the legal environment within which the project will take place that includes the legal framework that governs the assessment.
- ❑ A description of the receiving environment.
- ❑ A description of the important elements of the public participation process required by the Regulations.
- ❑ A description of environmental issues and potential impacts (including issues and concerns identified during the scoping process).
- ❑ Presentation of the overarching scope of specialist studies to be commissioned during the Impact Assessment.
- ❑ A plan of study for EIA and a description of the assessment process that will be used.

The Scoping Report also contains appendices that present the following information:

- ❑ The application submitted to DEAT for environmental authorisation.
- ❑ Public participation documentation.

ACER compiled the Scoping Report, and also coordinated those sections that contain selected inputs by discipline-specific specialists.

The Scoping Report will first be issued in draft form. All registered I&APs will be provided with direct access to the DSR and given a reasonable time to respond and comment. The document will also be peer reviewed. Following the period of public review, the DSR will be updated and the Final Scoping Report will be submitted to the environmental authorities. DEAT, in collaboration with the two provincial authorities, will consider the Final Scoping Report, where after they will indicate whether or not the EIA can proceed to the Impact Assessment Phase.

## 2. DESCRIPTION OF THE PROJECT

### 2.1 Background

Eskom is an enterprise responsible for the generation, transmission and distribution of virtually all bulk power supplies throughout South Africa. The Holding Company's only shareholder is the State and it is regulated under licences granted by the National Electricity Regulator (NER) in terms of Electricity Acts. The national transmission network currently supplies electricity to the Eastern and Western Cape areas from power stations situated on the coal fields of Mpumalanga. Eskom is planning to construct additional 765 kV transmission lines alongside the existing 400 kV lines that supply power to these provinces. The 400 kV lines currently run to the east of Victoria West, close to where the N1 crosses the R63. The new lines will bring additional electrical capacity to meet demand for electrical power that is urgently needed in the Eastern and Western Cape.

The location of the proposed Gamma Sub-station is indicated by an optimal distance between the Perseus (Dealesville) and Omega (Koeberg) Sub-stations, being approximately equidistant. It also serves as an off-take for the proposed 765 kV transmission lines to the Grassridge Sub-station near Port Elizabeth. To tap off electricity in this way a sub-station must be built for this purpose. The extra high voltages involved, require the use of large, purpose made switchgear that has to be securely housed in a specially designed sub-station.

Although planning and design work for the Gamma Sub-station was completed some time ago (with a positive Record of Decision (ROD) from DEAT), the sub-station was never constructed. In the interim, Eskom Transmission decided to move the site of the Gamma Sub-station to a different position, located 10 km to the east of the original site. It will now lie mainly on the farm Uit Vlucht Fontein No. 233 with a small encroachment (approximately 22 m) onto the farm Schietkuil No. 3. Besides being used as a point to split the power transmission to the Eastern Cape, there are other important reasons for the change in location, viz. EHV transmission lines traversing great distances require sub-stations every 400 to 450 km. Sub-stations house equipment which compensates for and neutralises inductive reactance, or the rise in the voltages along the line due to capacitance effects (Ferranti Effect). Also, Eskom would prefer to place the sub-station right next to its three existing 400 kV transmission lines as reactive voltage correction apparatus for the 400 kV and 765 kV lines can then be housed within one structure. Further, if the proposed Gamma Sub-station is built in close proximity to the existing 400 kV lines it can also be used to boost the electrical power feed in the 400 kV lines. To this end, the proposed Gamma Sub-station will be built with transformers to step down the voltage from 765 kV to 400 kV and this additional power can then be fed into the 400 kV lines for onward transmission.

The new location of the proposed Gamma Sub-station is a site on the farms Uit Vlucht Fontein No. 233 and Schietkuil No 3 in the Pixley ka Seme and Central Karoo District Municipalities. It will cover an area of at least  $1.5 \times 1.15 \text{ km}^2$  (172 ha) and is designed to have five incoming EHV power lines and five out-going feeder power lines. Eskom would like to commence construction of the sub-station in the latter half of 2007.

## 2.2 Project description

A sub-station is an important element of an electricity generation, transmission and distribution system. Its function is normally to transform voltages from high to low or the reverse, using transformers and other heavy-duty electrical switchgear. In the case of Gamma it has two other important additional functions. The sub-station will house the equipment that will be used to correct or neutralise inductive reactance, or voltage rise induced in the power lines from capacitance effects. It will also enable Eskom to safely tap off power from the 765 kV backbone and distribute it to other geographical areas, for example, the Eastern Cape. When electrical power is tapped off in this way, it cannot be done by simply splitting the lines. Great care must be taken due to the EHV equipment that is used. The electrical feed to the different destinations is fed into common distribution conductors called busbars. From these busbars, electricity is then fed onto dedicated transmission lines running to specific geographic areas where the power is needed. Any of the lines in question can also be isolated in the high voltage yard.

The proposed Gamma Sub-station will eventually accommodate five incoming and five outgoing lines, together with the associated switching, protection and control equipment. This is shown schematically in Figure 5 (with Figure 6 showing the Hydra Sub-station that is typical of Eskom sub-stations in South Africa). Additional power lines will come in from the Perseus Sub-station near Dealesville and new lines will go out to the Omega (Koeberg) and Grassridge (Port Elizabeth) Sub-stations. Circuit breakers will be installed to interrupt any short-circuits or overload currents that may occur on the network. There will also be line termination structures, high-voltage switchgear, reactors, low voltage switchgear, and surge protection controls and metering. Finally, the whole complex will be surrounded by a substantial security fence, which will be properly earthed to protect people from high voltages that may occur during a fault in the transmission system.

By having a sub-station in a transmission network, it is possible for Eskom to de-energise a transmission line or other electrical switchgear for maintenance or for new construction or installation. In this way Eskom is able to maintain reliability of supply as maintenance work is being performed while still keeping the whole system running. More importantly, faults may develop in transmission lines or in the associated switchgear. Examples of this are when a line is hit by lightning and develops an arc or, in extreme cases, a tower may be blown down by high wind. The advantage of the sub-station is that it is then possible to isolate the faulted portion of the system in the shortest possible time. If left unattended, faults cause equipment damage and also destabilise the whole system. A transmission line left in a faulted condition will eventually burn down and, similarly, a transformer left in a faulted condition will eventually blow up. At these times there is a heavy drain of power on the system and it becomes unstable. By disconnecting the faulted components quickly at the sub-stations, such problems can be safely and effectively dealt with.

The proposed Gamma Sub-station will cover a relatively large area. Eskom is planning to purchase an area that is approximately 1,136 m by 1,540 m (approximately 172 ha) on which the facility will be built. In addition, a small corridor (approximately 400 m x 2,000 m, an area of 80 ha) will be used for an access road to the R63. When finally completed, the sub-station itself will cover about 1,290 m x 465 m (approximately 60 ha) (when measured in terms of the outer perimeter lines of the terraces and security fence). There will also be turn-in lines from the existing 400 kV lines to the sub-station. These turn-in lines will require their own servitudes.

**Figure 5 Schematic diagram of the proposed Gamma Sub-station layout**

**Figure 6** Hydra Sub-station that is typical of Eskom Sub-stations in South Africa

### **2.2.1 Main sub-station switchgear**

Power is brought to the sub-station on 765 kV transmission lines that end on a large steel structure called a terminal tower. The centre line of the tower is 43 m from the security fence surrounding the sub-station. Power is then transferred into the main electrical switchgear inside the sub-station perimeter.

#### **2.2.1.1 Transformers**

Eskom is planning to install two EHV transformers at the Gamma Sub-station. Their main purpose will be to boost the electrical power feed in the existing 400 kV lines that run past the site. The voltage will be stepped down from 765 kV to 400 kV, and this additional power can then be fed into the 400 kV lines for onward transmission. The windings of such large transformers are immersed in transformer oil. It is a highly refined mineral oil that is stable at high temperatures and has excellent electrical insulating properties. Its functions are to insulate, suppress corona and arcing, and to serve as a coolant. Also, because it provides part of the electrical insulation between internal live parts, it must remain stable at high temperatures over an extended period.

Formerly, polychlorinated biphenyl (PCB) was used as it was not a fire hazard in indoor power transformers and it is highly stable. However, PCB by-products are unstable and toxic, and also accumulate in the environment. These products are, therefore, no longer permitted and will not be used at the proposed Gamma Sub-station.

Great care is taken in the construction and operation of sub-stations and transformers, in particular, to ensure that there is no uncontrolled release of transformer oil into the environment. Transformer plinths are surrounded by bund walls and potential spillages are drained into sumps (Figures 7 and 8).

One transformer will be commissioned during the first phase of operation of the sub-station. A second will be added when demand for power increases and the sub-station is expanded.

#### **2.2.1.2 Reactors**

Each transmission line coming into and going out of Gamma Sub-station will be provided with a dedicated reactor. These items of equipment are essential for the efficient operation of long, EHV power transmission lines. The reactor compensates the voltage generation on power lines to avoid uncontrolled voltage rise, especially on lightly loaded lines. Reactors are normally disconnected at periods of heavy load and are brought into the line at periods of low load.

Eventually, the Gamma Sub-station will have a total of 10 reactor units; five on the incoming and five on the outgoing transmission lines. Two reactors will be installed initially and the others will be brought into operation as the sub-station expands with increasing power demands from the areas to which the power is provided.

**Figure 7 Transformer and bund wall**



**Figure 8 Oil holding dam**

### **2.2.1.3 Busbars**

Once past the switching components, the lines of a given voltage in the sub-station all tie in to a common bus. This consists of a number of heavy metal busbars, usually made of aluminium. In most cases there are three parallel busbars, since electrical power is distributed via three-phase. Sub-stations that require additional reliability often have a double bus or even a double ring of busbars, in which the bus system is actually duplicated. Each feeder as well as each outgoing line has a connection to each separate busbar. This is a safety measure that is required mainly for reliability so that in the case of a failure it would not cause a substantial part of the system to be brought down.

Higher voltages require greater thickness or cross section of busbar metal, which has to be supported by columns, trusses and a lattice work of steel members. The busbars are supported high above the ground and then safely carry and distribute the 765 kV voltages to the different lines. The number of lines and amount of power that has to be fed in and distributed at Gamma, will require a substantial amount of supporting steelwork. In order to reduce the gross weight of supporting steelwork and the weight of the busbars themselves, the intention is to use hollow tubular sections for the busbar components. This will help reduce the overall height of the steelwork and electrical switchgear, which will be approximately 25 m.

### **2.2.1.4 Power out**

Power out of the sub-station is fed into the 765 kV outgoing transmission lines, that start from large steel terminal towers about 43 m outside the perimeter fence. There will initially be two feeds going out which will be increased to a total of five, as the capacity of the sub-station is increased to cater for the increasing demand for power from the areas being supplied.

The Gamma sub-station makes provision for six 400 kV feeder lines going out that can feed into the existing 400 kV power grid. Three of these feeds will be commissioned during the initial construction phase of the work. Three will be added later as the demand for power increases and the feed to the 400 kV grid has to be increased proportionately.

### **2.2.1.5 Buildings**

When operational, the sub-station is not manned on a 24-hour basis. Extensive buildings and service facilities are, therefore, not needed. The main facilities to be provided include a small office, workshop areas and storage space, external storage areas and a control room to house the high voltage monitoring and control instrumentation and equipment. The sub-station will also be equipped with Eskom's own internal micro-wave telecommunications facilities.

## **2.2.2 The site**

The Gamma site lies mainly on the farm Uit Vlucht Fontein No. 233 but does also slightly overspill onto Schietkuil No. 3 (approximately 22 m), in the Victoria West District of the Northern Cape. An area of land approximately 1.54 km x 1.136 km (172 ha) has been demarcated for the sub-station. It lies at an altitude of about 1,200 m and the whole area will be protected by a substantial security fence.

The site is typical of what is classified as Central Upper Karoo (Acocks Veld Type 27) or Upper Nama Karoo (Veld Type 50, Low and Rebelo, 1996). The vegetation on the stony plains of such areas is made up commonly of Kapokbush *Eriocephalus ericoides*, Silverkaroo *Plinthus karooicus* and Perdekaroo *Rosenia humilis*, amongst others. After good rains grasses, such as Tassel Bristlegrass *Aristida congesta* and Lehmann's Lovegrass *Eragrostis lehmanniana*, may dominate.

The underlying geology of the site is sandstones and shales derived from the Beaufort Group of the Karoo Supergroup. These rocks give rise to weak and structureless clay and sandy soils. The whole system is intruded by numerous dolerite dykes and sills. Soil cover is thin and the soils are sensitive to water and wind erosion.

The climate in the region is warm all year round, with hot summers and winters that frequently have frost. The annual rainfall is low and varies between 200-250 mm per annum. Rainfall is mostly in summer with a greater proportion occurring mainly late in the season. The atmospheric evaporative demand is high and exceeds 2,300 mm per annum.

### **2.2.3 Construction of the sub-station**

The first construction activity will be to clear the site of vegetation and to level off and terrace the ground surface for those areas where the heavy electrical transformers and other switchgear will stand. After this will follow the concrete and building construction for foundations for the supporting steelwork, transformers and other switchgear, storm water drainage pipes, slabs, bund walls, the control room, small buildings and storage areas that are needed.

All open areas between the transformer plinths and other switchgear foundations will be covered with about a 150 mm layer of 25 mm crushed stone. Before laying the crushed stone, the ground surface is intensively treated to strict specification with insecticide and herbicide to prevent insect activity and the growth of weeds and other plants in the high voltage yard.

The steelwork will then be erected. The transformers, circuit breakers, reactors and other high voltage equipment will be delivered to site, erected and then commissioned. As indicated previously, the sub-station will be built in phases. As the demand for power increases, so the number of incoming and outgoing lines with their electrical switchgear will be increased.

Eskom has decades of experience in the construction and operational use of high voltage equipment such as the proposed Gamma Sub-station. All equipment, commissioning and operational procedures and protocols are subject to strict specifications, which Eskom has had in place for many years. Construction is anticipated to begin in the latter half of 2007, and it is estimated that it will continue for approximately three years thereafter, before the sub-station is finally commissioned. During construction, which is when the civil works are being carried out (foundations, storm water drainage, buildings, etc), there should not be more than 80 people present on the site at any one time. Depending on the level and nature of construction activity taking place, there will be varying numbers of people housed on site in temporary accommodation.

No people will be housed on site on a permanent basis during the operational life of the sub-station. However, there will be ongoing monitoring and control of operations as well as planned and other maintenance work done on an *ad hoc* basis.

#### **2.2.4 Construction and maintenance of access roads**

The Gamma Sub-station will be served by a tarred access road to the R63 and internal gravelled traffic areas for access to the EHV equipment. The flow of traffic to the site during the construction period will be relatively light and, during operations, there will be virtually no traffic. The access road will be constructed to a Type 6 gravel road that comprises the following:

- ❑ Construction of 6 m wide, tarred access roads (totalling a length of approximately 1.8 km).
- ❑ Drainage is to be provided in the form of meadow drains (flat terrain) and “v” drains (steeper terrain). Some new culverts may be required.
- ❑ Fencing will be erected where required.
- ❑ Gravel will be obtained from the nearest existing borrow pit of suitable material.

Particular attention will be paid to storm water and the management thereof, with erosion protection measures being put in place where indicated by the terrain (geology, soils and topography) and climate (in particular, rainfall and high rainfall events in short periods of time). Furthermore, any access roads will be aligned and constructed within the provisions and specifications of the private landowners. This is considered important for three primary reasons:

- ❑ The access road should fulfil multipurpose functions serving the needs of Eskom and the landowners.
- ❑ Landowners are acutely aware of sensitivities on their land and should be in an excellent position to inform Eskom of optimum alignments.
- ❑ During and post construction, Eskom will be responsible for the maintenance of the access road.

The specifications for the access road will be contained within the EMP that will be prepared for construction and which will become legally binding on Eskom and contractually binding on Eskom-appointed contractors (with special care being taken with river/stream crossings, where potential environmental impacts are greatest, with due consideration for licenses that must be obtained from the Department of Water Affairs and Forestry).

#### **2.2.5 Temporary storage of hazardous substances**

The hazardous substances referred to comprise fuels, oils and lubricants that will be stored and dispensed at the construction camp. Specifications for the storage and dispensing of fuels, oils and lubricants include the following:

- ❑ Specifically designated areas.
- ❑ All storage of fuels, oils and lubricants shall be stored above ground and under cover.
- ❑ All designated areas will be bunded.
- ❑ Each designated area will be equipped with adequate fire protection equipment appropriate for the nature of the fuels, oils and lubricants that are stored and dispensed.
- ❑ All areas shall be properly signed in all applicable languages.
- ❑ All employees must be properly trained in the storage and dispensing of specific fuels, oils and lubricants.
- ❑ A specific procedure for emergency situations, including accidental spills, must be formulated and must be available on site at all times.

Specifications will be contained within an EMP that will be prepared for construction and which will become legally binding on Eskom and contractually binding on Eskom-appointed contractors.

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### **2.2.6 Telecommunication masts**

A telecommunication mast will be required at the Gamma Sub-station. The mast will be a microwave lattice mast, between 30 and 50 m high and will form an integral part of the sub-station.

### **2.2.7 Use of services and resources during construction**

#### **2.2.7.1 Water**

Water will be required for potable use and in the construction of the foundations for the sub-station. The water will be sourced from a borehole on site.

#### **2.2.7.2 Sewerage**

A negligible sewerage flow is anticipated for the duration of the construction period. On site treatment will be undertaken through the use of chemical toilets and septic tank facilities. The supplier will service the toilets periodically.

#### **2.2.7.3 Roads**

Existing roads will be utilised as far as possible during the construction and operational periods. The use of roads on private property is subject to the provisions of an EMP that will be prepared for the project (with individual landowner specifications being determined during discussions with landowners during the negotiation process). The Gamma Sub-station will be served by a gravel access road to the R63 and internal gravelled traffic areas for access to the EHV equipment. The flow of traffic to the site during the construction period will be relatively light and during operations there will be virtually no traffic.

#### **2.2.7.4 Storm water**

Soil on site is clayey and sandy (derived from sandstone and shale parent rock in the Karoo geological system) and sensitive to water and wind erosion. Although the mean annual rainfall is relatively low, the area does experience short, sharp or intensive thunderstorm type precipitation. Great care has to be taken in making sure that storm water drainage is carefully designed on all roads as well as the runoff from the sub-station terraces. Storm water will have to be diverted into the veld at low energy levels to make sure that significant erosion problems are avoided in and around the site.

Storm water will be managed according to the Eskom Guidelines for Erosion Control and Vegetation Management as well as the provisions of the EMP.

#### **2.2.7.5 Solid waste disposal**

All solid waste will be collected at a central location at the construction site and will be stored temporarily until removal to an appropriately permitted landfill site.

#### 2.2.7.6 Electricity

Diesel generators will be utilised for the provision of electricity.

### 2.3 Economics and job creation

The proposed Gamma Sub-station will cost approximately R 500 million to construct.

At the busiest time of the construction work, which is when the civil works are being carried out (foundations, storm water drainage, buildings, etc), there should not be more than 80 people present on the site at any one time. Depending on the level and nature of construction activity taking place, there will be varying numbers of people housed on site in temporary accommodation. Employment will be effected either directly with the main contractor or through sub-contractors, which will include Small and Medium Enterprises (SMEs) and Affirmative Business Enterprises (ABEs).

It is important to note that the construction of a sub-station is a specialised undertaking requiring skilled people. It is probable that the appointed contractors will bring in skilled staff from other areas. By implication, job opportunities for local people will be limited to unskilled jobs, on site and in construction camps. Apart from direct employment, local people and businesses will benefit through the supply of goods and services to the appointed contractors.

### 2.4 Environmental Management Plan

A project-specific EMP will be compiled for the project and this document will detail the specific controls, which must be in place for the duration of the construction phase. An Environmental Control Officer (ECO) who acts as an intermediary between individual landowners, Eskom and the contractors, will monitor compliance with the EMP.

### 2.5 Operations and maintenance

During operations, Eskom requires access to the sub-station for maintenance activities. This will require traversing private property. Maintenance activities are specialised and are, therefore, carried out by Eskom employees.

During the operational life of the sub-station, there will be no people housed on site on a permanent basis.

### 2.6 Decommissioning

The following are assumed:

- ❑ The physical removal of the sub-station infrastructure would entail the reversal of the construction process.
- ❑ A rehabilitation programme would need to be agreed upon with the landowners before being implemented.
- ❑ The disposal of materials from the decommissioned sub-station would be at an approved waste disposal facility. Alternatively, recycling opportunities could be investigated and implemented.

All of the afore-mentioned would be subject to a separate Environmental Impact Assessment and environmental authorisation at the appropriate time.

## 2.7 Project timeframes

In order to meet the expected electricity demand, the proposed Gamma Sub-station must be operational by 2009<sup>2</sup>. Therefore, construction must commence in the latter half of 2007. This EIA is being managed with a target date for the issuing of a Record of Decision by DEAT in mid-July 2007.

## 2.8 Alternatives

The identification and examination of alternatives is fundamental to environmental assessment. It provides decision-makers with information that enables them to properly consider optimal solutions to development proposals. Alternatives illustrate and contrast the environmental implications and consequences of different options available to achieve the same end. In this way, both the proponent and the authorities who must consider granting the authorisation, are put in a position where all involved are able to make informed choices or decisions.

For the proposed Gamma Sub-station, there are three alternatives under consideration:

- ❑ The proposed site on the farm Uit Vlucht Fontein 265, bordering on the farm Schietkuil 3.
- ❑ An alternative site on the farm Uit Vlucht Fontein 265, for which a positive Record of Decision was issued by DEAT (as explained, Eskom has decided to move the location of the sub-station).
- ❑ The “no go” or no-development alternative.

It should be noted that, in this particular case, the existing Gamma site for which environmental authorisation has been obtained remains the default sub-station for Eskom should environmental authorisation not be obtained for the proposed new site.

Similarly, the no-development option simply means that Eskom would do nothing to address the purpose and need for the construction and operation of the sub-station. It would effectively mean that the power supply to large areas of the country would not be made more secure nor bolstered or augmented. It would place the lives of millions of people and expose the economies of large areas to grave risks. New economic developments in the Eastern and Western Provinces would not be possible.

The positive effect would be the local maintenance of a near natural visual landscape in a sparsely populated and economically low-key area. There would be no visual scarring from the sight of large electrical switchgear and supporting steelwork in a semi desert environment, no aesthetic effects and no effect on the biophysical environment at the site.

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<sup>2</sup> This is to meet the current and immediate future demand. Additional construction (in phases) may occur over the next 10-15 years, as indicated by growth in demand for electricity.

It is the professional opinion of the environmental assessment team that the no-development option is unrealistic and, therefore, it is submitted that this alternative should be discarded from further consideration in this EIA.

**Arising from the afore-mentioned, only the new site for the proposed Gamma Sub-station is discussed in any detail in this Draft Scoping Report.**



### 3. PURPOSE AND NEED FOR THE PROJECT

Eskom is responsible for the generation, transmission and distribution of bulk power supplies throughout South Africa. The national transmission network currently supplies electricity to all parts of the country including the Eastern and Western Cape areas, from power stations situated on the coal fields of the Mpumalanga Highveld. Power is fed to Cape Town and Port Elizabeth over long distances through transmission lines that run from south eastern Mpumalanga, through the Free State to the west of Bloemfontein and then down across the eastern tip of the Northern Cape, approximately 40 km to the east of Victoria West.

Eskom is now planning to substantially bolster the main power supply to the southern Provinces with additional 765 kV transmission lines that will be constructed alongside the existing 400 kV lines. However, long transmission lines draw a substantial quantity of charging current. If such a line is open circuited or lightly loaded at the receiving end, the voltage at the receiving end may become greater than voltage at the sending end. This is known as the Ferranti Effect and is due to the voltage drop across the line inductance (due to charging current) being in phase with the sending end voltages. Therefore, both capacitance and inductance are responsible for producing this phenomenon.

On long EHV transmission lines, sub-stations are needed every 400 to 450 km to house equipment, which compensates for and neutralises this inductive reactance. For the proposed Gamma Sub-station, Eskom wants to place the sub-station next to its three existing 400 kV transmission lines. Reactive voltage correction apparatus for the 400 kV and 765 kV lines can then be housed within one structure.

Further, if the Gamma Sub-station is built in proximity to the existing 400 kV lines it can also be used to boost the electrical power feed in the 400 kV lines. To this end, Gamma will be built with transformers to step down the voltage from 765 kV to 400 kV and this additional power can then be fed into the 400 kV lines for onward transmission. Also, by placing both the existing 400 kV and the 765 kV transmission lines close together and bringing them down the same basic route, the voltage correction function that is necessary for all the lines and feeding extra power to the 400 kV line from the 765 kV line can be housed within the confines of the same dedicated facility. If the Gamma Sub-station is built approximately 10 km to the west of where it is now intended to be, it would require a high voltage line to link the different components. By implication, Eskom can save a substantial amount of money by not having to construct possibly up to 60 km of additional power lines (at an estimated R 2.5 million per kilometre).

**The main purpose of building the Gamma Sub-station is to safely house the engineering and technical equipment that is necessary for the operation of long distance EHV power lines.**

**The need for such a facility arises out of the physics of long distance power transmission, where compensation for capacitive voltage generation on power lines has to be provided to avoid uncontrolled voltage rise especially on lightly loaded lines.**

## 4. BROAD LEGAL PERSPECTIVE AND ASSESSMENT FRAMEWORK

### 4.1 Legislative considerations

For a development such as the proposed Gamma Sub-station, there are a host of legal requirements (National, Provincial and Local Government spheres) to which the development proponent must adhere.

The legal environment in which development takes place and in which people and organisations have to function in South Africa has changed fundamentally over the last 12 years and is quite complex. It has altered substantially from the command-and-control type of administrative procedures that were commonly applied before the advent of Constitutional sovereignty in 1994. The situation is now that there is a fundamental requirement for planning and implementation procedures that involve the ongoing integration of environmental values and principles into all decisions and actions that are taken for development purposes.

In particular, the principles of integrated environmental management and assessment are germane to all situations at all times. The Constitutional right that people have to environmental protection as set out in the Bill of Rights in the Constitution (Section 24), has been interpreted in the National Environmental Management Act No 107 of 1998. It is this plus many other laws and sets of regulations (> 300) that govern the manner in which integrated environmental management has to be adhered to by any person or organisation that proposes any form of development. Set out below, at a broad level of detail, is some of the key legislation that is applicable to this project.

#### **4.1.1 Constitution of the Republic of South Africa (Act No. 108 of 1996) as amended by the Constitution of the Republic of South Africa, Amendment Act (Act No. 35 of 1997)**

The Constitution of the Republic of South Africa is the cornerstone of all law in South Africa and, importantly from an environmental perspective, has entrenched an environmental right. Equally important, the Constitution provides for environmental rights and protection at all spheres of government, applied either concurrently (includes environmental matters) or exclusively at one of these spheres. Some of the sections most relevant to the proposed development and EIA process are provided below.

In Section 24 of the Act, contained within the Bill of Rights, which is fundamental to the Constitution of South Africa, it is stated that:

*“Everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.*

The proposed development must not violate any of the environmental rights as they appear in Section 24.

The Constitution also has reference to environmental management and its tools, such as the EIA process. Given that environmental management is founded partly on the principles of public participation, Section 195 of the Act, which covers basic values and principles governing public administration, is also of primary relevance, particularly Sub-section (1) (e) to (g), viz.:

*“(1) Public administration must be governed by the democratic values and principles enshrined in the Constitution, including the following principles: (a). (b). (c). (d). (e). People’s needs must be responded to, and the public must be encouraged to participate in policy-making. (f) Public administration must be accountable. (g) Transparency must be fostered by providing the public with timely, accessible and accurate information. (h). (i)”.*

#### **4.1.2 National Environmental Management Act (Act No. 107 of 1998)**

The National Environmental Management Act is South Africa’s overarching environmental legislation. NEMA has as its primary objective, to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state and to provide for matters connected therewith.

NEMA provides for the right to an environment that is not harmful to the health and well-being of South African citizens; equitable access to natural resources; sustainable development; environmental protection and the formulation of environmental management frameworks. These principles and provisions in Chapter 5 (Integrated Environmental Management) govern the way in which environmental management should be practised. Provision is also made for the making of various Regulations in order to carry out the purposes and the provisions of NEMA.

Thus, NEMA upholds people’s environmental rights as espoused in the Constitution and provides more detail as to how the environment should be protected and utilised. These provisions are relevant to the proposed development and its responsibility towards the environment. NEMA also gives general instructions on how environmental management should be implemented. Specific procedures for EIAs were recently promulgated (3 July 2006) under NEMA. The Regulations governing EIAs and identified activities include:

- ❑ Government Notice R 385. Regulations promulgated in terms of Chapter 5 of NEMA for the purpose of regulating procedures and criteria as contemplated in Chapter 5 of NEMA for the submission, processing, consideration and decision of applications for environmental authorisation of activities and associated matters.
- ❑ Government Notice R 386. Schedule of activities which may not commence without environmental authorisation in terms of sections 22 to 26 of the EIA regulations, 2006 (smaller scale activities).
- ❑ Government Notice R 387. Schedule of activities which may not commence without environmental authorisation in terms of sections 27 to 36 of the EIA regulations, 2006 (activities likely to have significant impacts).

The EIA Regulations cover three primary aspects. Firstly, they describe and classify activities, which potentially have a deleterious effect on the environment and for which environmental authorisation is required. Secondly, they prescribe the procedure to be followed when seeking environmental authorisation for a proposed activity (this is the process being followed for the proposed development). Thirdly, they designate the competent authority that may issue environmental authorisation (in this case, DEAT, in collaboration with their provincial counterparts).

#### **4.1.3 Environment Conservation Act (Act No. 73 of 1989)**

The primary objective of the Environment Conservation Act (ECA) is to provide for the effective protection and controlled utilisation of the environment. Following the enactment of NEMA, a number of the powers of the Act have either been repealed or may be repealed or assigned to provinces. The sections that remain include the definitions, protected natural environments, waste-management and regulations on noise, vibration and shock.

#### **4.1.4 Legislation and policy applicable to Eskom**

##### **4.1.4.1 Electricity Act (Act No 41 of 1987)**

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

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. Section 4 sets out the functions of the Regulator that include: (a) the Regulator issues licenses for the generation, provision and distribution of electricity (b) the Regulator determines the prices at and conditions on which electricity may be supplied by a licensee.

At present, Eskom and over 400 distributors (mainly municipal electricity departments) supply electricity to end customers. Eskom is the largest distributor in the country in terms of sales for final consumption and number of customers.

The current electricity distribution industry is fragmented and a restructuring and consolidation process has commenced whereby six Regional Electricity Distributors and Eskom will be responsible for distribution of electricity in South Africa

##### **4.1.4.2 Eskom Conversion Act (Act No 13 of 2001)**

The objective of this 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. Section 2A stipulates that the ownership of Eskom's equity shall rest in the State. Section 3 sets out the objective 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 nation's interest".

##### **4.1.4.3 Eskom Act (Act No 40 of 1987) as amended by the Eskom Amendment Act (Act No 51 of 1991)**

Section 3 of the Act sets out the objective of Eskom, being the provision of a system by which the electricity needs of the consumer may be satisfied in the most cost effective manner, subject to resource constraints and the national interest. The National Energy Regulator of South Africa exercises control over the performance of Eskom's functions and the exercise of its powers and duties. Section 11 authorises Eskom to generate or supply electricity within South Africa subject to the right of local authorities and holders of licences under the provisions of the Electricity Act (Act No 41 of 1987). Section 12 sets out the functions, powers and duties of Eskom.

#### **4.1.4.4 White Paper on the Energy Policy of the Republic of South Africa (December 1998)**

White Papers are policy documents and lack the legal force of legislation. However, they are indicative of the Government's plans and often result in the tabling of legislation.

The energy sector policy objectives identified increasing access to affordable energy services, improving energy governance, stimulating economic development, managing energy-related environmental and health impacts and securing supply through diversity. There is the recognition that there needs to be a balance between energy prices and sustainable environmental standards. The White Paper recognises that the 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 with the introduction of Independent Power Producers.

#### **4.1.5 National Water Act (Act No. 36 of 1998)**

The purpose of the National Water Act is to ensure that the water resources within South Africa are appropriately protected, used, developed, conserved and controlled. This includes meeting the basic human needs of both present and future generations; equitable access; redressing the result of past racial and gender discrimination; promoting the efficient, sustainable and beneficial use of water in the public interest; facilitating social and economic development; providing for growing demand for water use; protecting aquatic and associated ecosystems and their biological diversity; reducing and preventing pollution and degradation of water resources; and managing floods and droughts.

The Act deals with the development of strategies to facilitate the proper management of water resources, provides for the protection of the water resource, for the regulation of the use of water, for financial provision, catchment management agencies, water user associations and other matters.

Chapter 3, Part 4 of the Act deals with pollution prevention and, in particular, a situation where pollution of a water resource occurs or might occur as a result of activities on land. The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources.

Chapter 4 of the Act deals with the regulation of the use of water and the requirements for controlled activities, general authorisations and licences. In general, a water use must be licensed unless it is listed in Schedule 1 of the Act, is an existing lawful water use, is permissible under a general authorisation or if a responsible authority waives the need for a license.

Eskom Transmission will take responsibility for applying for the relevant licenses and registrations.

#### **4.1.6 National Heritage Resources Act (Act No 25 of 1999)**

The National Heritage Resources Act aims to promote an integrated system for the identification, assessment and management of the heritage resources of South Africa. Furthermore, it established the South African Heritage Resources Agency (SAHRA) to implement the Act.

The Act describes a process to be complied with by developers with respect to the identification, assessment and management of cultural heritage resources that may be affected by a development. Provision is made for the alignment with other evaluation processes undertaken in terms of NEMA or the integrated environmental management guidelines issued by the Department of Environmental Affairs and Tourism, or the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), or any other legislation.

#### **4.1.7 Conservation of Agricultural Resources Act (Act No 43 of 1983)**

The present legal mechanism dealing with soil conservation and the control of alien invasive species (weeds) is contained in the Conservation of Agricultural Resources Act. The object of the Act is *“To provide for control over the utilisation of the natural agricultural resources in the Republic in order to promote the conservation of soil, the water resources, the vegetation and the combating of weeds and invader plants, and the matters connected therewith”*. Soil erosion is a natural process, which, without disturbance, would balance itself with the formation of new soil. Any development that destroys the natural protective canopy of vegetation, speeds up the process of soil erosion. Regulations applicable to the proposed project include:

- ❑ Section 2 (2) (a) - the provisions of this Act relating to weeds and invader plants shall also apply to land that is situated in an urban area.
- ❑ Section 6 (2) (e) - the utilisation and protection of vleis, marshes, water sponges, watercourses and water resources<sup>3</sup>.
- ❑ Section 6 (2) (l) - the control of weeds and invader plants.

#### **4.1.8 Public Finances Management Act (Act No 1 of 1999) as amended by Act No 29 of 1999**

The object of this Act is to secure transparency, accountability and sound management of the revenue, expenditure, assets and liabilities of the institutions to which this Act applies, namely departments, public entities, constitutional institutions and Parliament.

In terms of the Eskom Conversion Act, Eskom is a public entity and is, thus, bound to the provisions contained within the Public Finances Management Act (as amended).

#### **4.1.9 Other National, Provincial and Local legislation of potential relevance**

These include:

- ❑ Agricultural Pests Act (Act No 36 of 1983).
- ❑ Fencing Act (Act No 31 of 1963).
- ❑ Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No 36 of 1947).
- ❑ Forest Act (Act No 122 of 1984).
- ❑ Hazardous Substances Act (Act No 15 of 1973).
- ❑ Land Survey Act (Act No 9 of 1921).
- ❑ Minerals and Petroleum Resources Development Act (Act No 28 of 2002).
- ❑ Municipal Structures Act (Act No 117 of 1998).
- ❑ National Environmental Management: Air Quality Act (Act No 39 of 2004).

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<sup>3</sup> Empirical evidence suggests that wetlands are inadequately protected in South Africa. The loss of wetlands is of international concern (in the last century more than 50% of wetlands have disappeared worldwide), hence, the Ramsar Convention, to which South Africa is a signatory.

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- ❑ National Forests Act (Act No 84 of 1998).
- ❑ National Veld and Forest Fire Act (Act No 101 of 1998).
- ❑ Occupational Health and Safety Act (Act No 85 of 1993).

Although not discussed under this macro legislative framework, the proponent must also take cognisance of Provincial and Local Government Acts, Ordinances and By-laws, which may be applicable to the proposed development.

#### 4.2 Assessment framework

The concept of sustainability underpinning this assessment considers three inter-related dimensions of the environment, viz. the social, economic and biophysical dimensions (Figure 9). For an option or project to be sustainable, it needs to demonstrate economic growth, social acceptability and soundness, and ecological integrity within a framework of good governance.

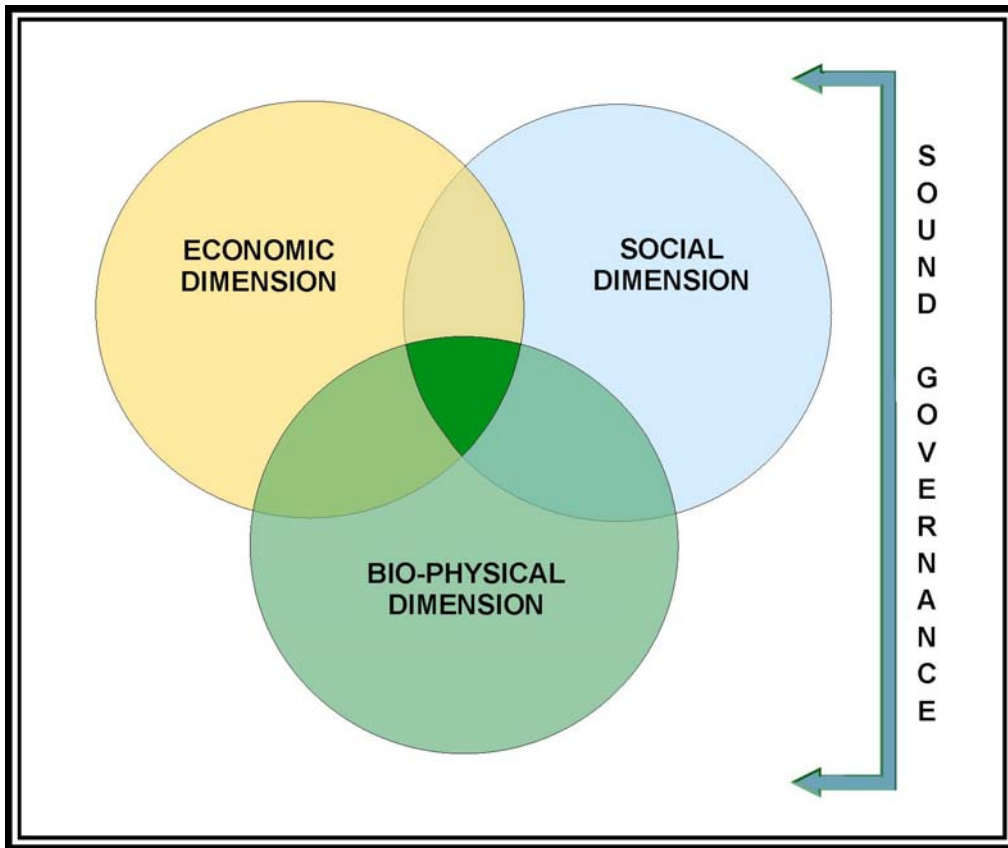
All three dimensions of the environment, and the interactions between them, contribute to achieving sustainability and, therefore, each dimension, singly, and as it interacts with the other two dimensions, needs to be taken into account when assessing a proposed option or project, taking due cognisance that the three dimensions are seldom in perfect balance, with optimised solutions often being dictated by local circumstances.

In terms of sustainability and the assessment framework, key principles include:

- ❑ Development must not irretrievably degrade the natural, built, social, economic and governance resources on which it is based.
- ❑ Current actions should not cause irreversible damage to natural and other resources, as this potentially precludes sustainable options.
- ❑ Where there is uncertainty about the impact of activities on the environment, caution should be exercised in favour of the environment.
- ❑ Land-use and environmental planning need to be integrated.
- ❑ Immediate and long-term actions need to be identified and planned for, so that urgent needs can be met while still progressing towards longer-term sustainable solutions.

In the case of the proposed Gamma Sub-station, the economic and social dimensions of the environment are the primary drivers. Therefore, within the assessment, particular focus and care will need to be placed on the biophysical dimension.

**Figure 9** Inter-related dimensions of the environment contributing to the achievement of sustainability





## 5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

### 5.1 Introduction

This section aims to bring insight into the biophysical and social characteristics of the receiving environment enabling the identification of issues and potential impacts that the project is likely to have on the environment and *vice versa*. For this project, the study area has been defined as the development site and its immediate surrounds, as well as the broader district and local municipal areas.

### 5.2 Description of the social environment

#### 5.2.1 *The study area*

The area affected by the project is divided into a number of District and Local Municipalities, including:

- The affected district municipality in the Northern Cape is the Pixley KaSeme District Municipality (DC 07). The affected local municipal area is the Ubuntu Local Municipality (NC 071).
- The affected district municipality in the Western Cape is the Central Karoo District Municipality (DC 05). The affected local municipal area is the WCDMA 05.

The main towns, which are situated within the study area, are Victoria West and Murraysburg.

The preferred site for the Gamma Sub-station is on the farms Uit Vlucht Fontein No. 233 and Schietkuil No 3 in the Pixley ka Seme and Central Karoo District Municipalities. The former is in the Northern Cape Province and the latter in the Western Cape Province.

##### 5.2.1.1 *Northern Cape: Pixley ke Seme District Municipality*

The Pixley ke Seme District Municipality (DC 7) is situated in the Northern Cape in the south-eastern portion of the Northern Cape Province (arid western interior of the country). It consists of eight local municipalities and the geographical area of the province is 361,830 km<sup>2</sup>.

The general area is sparsely populated and much of the area is semi-desert. The population numbers and densities are particularly low in the dry Karoo area with the majority of the people living in the scattered towns and settlements. The area mainly consists of large game (springbok and wildebeest), sheep and cattle farms. In the Pixley Ka Seme District Municipality 63% of the population is employed.

##### 5.2.1.2 *Western Cape: Central Karoo District Municipality*

The Central Karoo District Municipality (DC 5) is situated in the northern part of the Western Cape Province and covers the municipal areas of Beaufort West, Laingsburg and Prince Albert as well as District Management Area WCDMA 05. The geographical area of the province is 38,853 km<sup>2</sup>.

The general area is sparsely populated (37,000 residents) and much of the area is semi-desert. Approximately half of the population lives in the Beaufort West area, i.e. most of the population is urbanised. The Central Karoo District Municipality has been declared as a Presidential Node by President Mbeki during 2001 due to the high levels of poverty.

### **5.2.2 Access to electricity**

The distribution of electricity in the study area can generally be regarded as reasonable. Disparities exist between areas that are remote and urban areas. Approximately 75% of households in the Pixley Ka Seme District Municipality have electricity in their dwellings. In the Central Karoo District Municipality, approximately 77% of households use electricity directly from Eskom or distributed by the municipality.

### **5.2.3 Land-use and settlement**

The study area comprises vast expanses of open land with concentrated small settlements. The population density is low. Major land-uses in the study area include:

- Commercial agriculture.
- Live stock farming (dairy, beef, sheep, ostriches, etc.).
- Game farming.
- Peri-urban development (including homesteads, shops and limited subsistence agriculture).
- Rural homesteads.
- Eco-tourism and conservation. Many local landowners practise conservation and maintain conservancies.
- Transportation.

Historical, racially-based, land-ownership patterns persist in the study area and the rural areas are characterised by privately, mainly white-owned commercial family farms. Land claims do exist but are not prevalent. In many towns, the pattern of racially inequitable land distribution persists and the pattern of residential segregation continues, with standards of housing and municipal services considerably higher in “white” areas, although most municipalities are actively addressing the provision of basic services to poorly serviced residential areas. Many areas are facing a shortage of vacant, planned or developed residential land and there is the need for land for communal grazing, small-scale farming and non-residential uses.

### **5.2.4 Transport**

Settlements in the study area are generally linked by an adequate road network that is currently under pressure due to inadequate maintenance related to funding constraints. The importance of the road network has increased, benefiting the settlements located on the main routes. Settlements along major road routes have the advantage that tourist movement benefits their economies (Urban-Econ, 2006). The R61 and N1 are the main roads in the study area. They are supported by a network of minor roads, some black-topped but mostly gravel.

### **5.2.5 Tourism**

The area lacks significant features and is located in a part of the country that is fairly inaccessible because of its distance from the main centres of attraction. Nevertheless, it is serviced by a good national road. Surveys show that it is the area that attracts the least number of foreign tourists that visit South Africa (Urban-Econ, 2006).

Nevertheless tourism in and around Victoria West is developing, albeit at a slow pace. Several bed-and-breakfast establishments, guesthouses and hunting lodges have been established in and around Victoria West. The Apollo Film Festival, which is an annual event, is now becoming well known and does draw numbers of tourists to Victoria West every year.

## **5.3 Description of the biophysical environment**

### **5.3.1 Climate**

Interior climatic conditions in the Karoo vary considerably with a diverse, natural and physical environment. The climate in the region of the proposed Gamma Sub-station is warm all year round, with hot summers and winters that frequently have frost. The Gamma sub-station site may be considered to be dry-cold, with an annual rainfall that is low, varying between 200-250 mm per annum. Rainfall is in summer with a greater proportion of rain falling late in the season. The atmospheric evaporative demand is high and exceeds 2,300 mm per annum. The general areas of the Pixley ke Seme and Central Karoo District Municipalities are considered to be dry-cold, with the majority of the area receiving less than 400 mm of rain per year, which confirms its arid status.

### **5.3.2 Air quality**

Reliable data on ambient air pollution in the study area are unavailable but the absence of significant point and non-point sources of pollution suggests that ambient air quality is good. The sparse population of the Central Karoo and Pixley ke Seme District Municipalities suggests that man-made pollution levels are low in these areas.

### **5.3.3 Topography**

Due to the climatic conditions experienced in these parts, it is expected that mechanical weathering rather than chemical weathering will determine the nature of the topography.

The preferred site is located in a generally flat area, a fair distance to the south of a range of low hills and koppies. The site slopes gently to the south-west at a gradient of not more than about 5 or 6%. Storm water from the site will drain towards a watercourse about 1 km away. It only flows intermittently, in times of good rain or in the event of heavy or intense thunderstorms.

The development site is located on relatively flat and sparse terrain. Typical Karoo landscapes comprise grasslands and densely vegetated rivers and valleys. Key topographical features in the study area include the Murraysburg Mountains (Ondersneeuberg Mountains) and the Kamdeboo Mountains.

There are no other water bodies, wetlands, streams or dams on the site or nearby.

### 5.3.4 Drainage

In general, the study area is considered to be semi-arid to arid, with very low rainfall. Thus, the general area does not support many rivers. However, the study area transects some primary catchment(s) and there are a number of quaternary catchment areas within the study area, with important drainage lines. Primary and secondary drainage lines drain the landscape in a south-westerly to north-easterly direction.

### 5.3.5 Geology and soils

The underlying geology of the site is sandstones and shales derived from the Beaufort Group of the Karoo Supergroup. These rocks give rise to weak and structureless clayey and sandy soils. The whole system is intruded by numerous dolerite dykes and sills. Soil cover is thin and the soils are sensitive to water and wind erosion.

The soils that are to be found on the sub-station site and in the immediate surroundings can be divided into three main types:

- ❑ Red duplex soils.
- ❑ Shallow soils with some lime.
- ❑ Rocky areas.

The majority of soils in the area are shallow duplex soils mainly of the Swartland form. They have an abrupt texture and structure increase from topsoil to subsoil. There is little high potential agricultural land anywhere and only isolated pockets of land with moderate potential can be found, mainly in low lying areas.

### 5.3.6 Flora

The Northern Cape and Western Cape Karoo areas consist of typical Karoo vegetation. The vegetation is sparse, dry and, once damaged, does not regenerate easily. The presence of fragile soils means that there is much erosion and slippage.

In the Upper Nama Karoo or Veld Type 50, the vegetation on the stony plains of such areas is made up commonly of Kapokbush *Eriocephalus ericoides*, Silverkaroo *Plinthus karooicus* and Perdekaroo *Rosenia humilis*, amongst others. After good rains, grasses, such as Tassel Bristlegrass *Aristida congesta* and Lehmann's Lovegrass *Eragrostis lehmanniana*, may dominate.

The vegetation is fairly dense and semi arid shrubland occurs in the central upper Karoo plateau at altitudes of between about 1,000 m to 1,700 m above sea level. Vegetation differs somewhat between the large plains that are relatively flat and stony and the hilly areas where more grasses may be found.

On the plains, many species of typical Karoo bushes are found. These include *Eriocephalus ericoides*, *Plinthus karooicus*, *Rosenia humilis*, *Salsola glabrescens*, *Pentzia incana*, *P. globosa*, *P. spinescens*, *P. Felicia muricata*, *Eberlanzia ferox*, *Rhigozum obovatum*, *Aptosimum procumbens* and *Zygophyllum incrasata*. After good rains, many grasses flourish briefly between the shrubs including *Eragrostis lehmanniana*, *E. bicolor*, *Panicum stapfianum*, *Sporobolus acinifolius*, *Arsitida congesta*, *Stipagrostis obtusa* and *S. ciliata*. *Acacia karoo* is widespread, especially along streams and rivers where *Phragmites australis* is common.

In the hills and koppies, more grass species are found. These include *Eragrostis lehmanniana*, *E. bergiana* and *Aristida congesta* subsp. *congesta*, which are the most common. The shrubs and small karoo bushes that are found include *Rhus indulata*, *R. burchelli*, *Rhigozum trichotomum*, *Lycium* spp. and occasionally *Aloe broomii*.

No plant species lists have been compiled for the purpose of this report. This is a task that must be done during the detailed investigation for the EIA. However, judging from what is said in reports of previous work done in the area, it is possible that there may be some rare and endangered species on or near to the site. Cape Nature Conservation indicated that the Bontalwyn, *Aloe grandidentata*, Ghaap, *Hoodia pillansii*, Ghaap, *Hoodia bainsii*, Beeskloutjie/Perdekloutjie, *Lithops saliola* and Sheeps Tongue, *Titanopsis calcarea*, may possibly occur. Therefore, during the Impact Assessment, a check will be done to see if these or any other rare and endangered species occur on the site.

### 5.3.7 Fauna and avi-fauna

There are some fauna species on the site including several small mammals such as mice, reptiles such as lizards and snakes, as well as many insect species. From the initial site visit, no special or sensitive habitats were observed (that would suggest the occurrence of rare or endangered species).

The vegetation in the area supports a high diversity of bird species, many of which are endemic to South Africa, although not to the particular region. The plains vegetation supports many ground dwelling bird species. The trees and taller shrubs of the more wooded areas in the hills and koppies as well as the areas along watercourses would have a different make up of avian diversity.

Sub-stations and the associated infrastructure are known to impact significantly on various bird species, both directly through causing mortality of birds, and indirectly through disturbance of birds and the destruction of habitats.

Of particular importance to this study area is the presence of the Blue Crane, which is globally and nationally vulnerable. Many species are known to potentially interact directly with sub-station infrastructure, for example, by perching, roosting, nesting or colliding with the smaller earth-line. Some species will also be impacted on “indirectly” by the infrastructure through disturbance and habitat destruction. Many Red Data species are vulnerable to collision with the sub-station infrastructure, an impact anticipated to be the most significant on birds as a result of this proposed project.

Main birds found in the study area include Karoo Korhaan, Ludwig's Bustard, Namaqua Sandgrouse, Acacia Pied Barbet, Red-eyed Bulbul, Karoo Scrub Robin, Cape Robin-Chat, Chestnut-Vented Tit-Babbler, Layard's Tit-Babbler, Yellow-Bellied Eremomela, Pale-Winged Starling, Southern (Lesser) Double-Collared, Dusky Sunbird, Redheaded, Karoo Eremomela, Namaqua Warbler (*Prinia*) and Pirit Batis. Raptors include Booted Eagle, Pale Chanting Goshawk, Rock Kestrel, Lesser Kestrel, Verreaux's (Black) Eagle and Martial Eagle (*Polemaetus bellicosus*).

### 5.3.8 Visual and aesthetics

Much of the study area is considered to be managed for purposes of conservation. Similarly, many private landowners/farmers are entering into the eco-tourism sector on a regional scale.

The wilderness landscapes of much of the study area are sensitive and critical to preserve for the conservation of the whole region. The conservation of the sensitive landscapes will promote the entry of private landowners/farmers into the eco-tourism sector on a regional scale. It is, thus, necessary to maintain a near natural visual landscape, with limited aesthetic affects and the continuation of nature-based economic activities such as eco-tourism and hunting.

In this regard, it is an imperative that Eskom be sensitive to the requirements of the local people involved in eco-tourism activities in order to minimise visual impacts. Topographical features influence the environment and these features will need to be utilised and the development site optimised to camouflage the sub-station infrastructure to minimise visual impacts and intrusions.

#### **5.4 Cultural and heritage resources**

SAHRA is the relevant authority in terms of the conservation of cultural heritage resources, including archaeological resources. In terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), SAHRA has a mandate to protect these resources acting as the national heritage management organisation.

Section 38(1) of the National Heritage Resources Act indicates that a Heritage Impact Assessment is required in the case of the following:

- (a) Construction of a road, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length.
- (b) Construction of a bridge or similar structure exceeding 50 m in length.
- (c) Any development, or other activity which will change the character of an area of land, or water:
  - (i) Exceeding 10,000 m<sup>2</sup> in extent.
  - (ii) Involving three or more existing erven or subdivisions thereof.
  - (iii) Involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years.
- (d) The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority.
- (e) The re-zoning of a site exceeding 10,000m<sup>2</sup> in extent.
- (f) Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

The proposed development site of the Gamma Sub-station occurs in an area where few or no professional surveys of archaeological sites or research projects have been undertaken. Only a few sites, mainly reported by the public are known in the wider vicinity of the proposed site. These include isolated scatters of stone tools and a small number of rock painting sites. The latter may be found in the mountains but also against small koppies in the Karoo. Scatters of stone artefacts may be encountered on the plains. Consideration should be given to the importance of sources of water in this arid part of the region and the possibility that archaeological sites, such as freshwater shell middens containing pottery, bone and ostrich eggshell fragments, may be clustered along riverbanks, around pans and flood plains. Some material and features may also be buried, such as human remains and fossil bone in the above-mentioned areas (eThembeni, 2006).

With respect to historical structures in the region, it is anticipated that many of the old farmhouses may exceed the restrictions placed on development, which affects buildings or structures that are more than 60 years old. In other words, all building, or parts thereof, markers, milestones, graves and gravestones or landmarks older than 60 years are protected in terms of the National Heritage Resources Act, and may not be destroyed without a permit. These old buildings, which may relate to the movement of the first Dutch trekboers in the 18<sup>th</sup> and 19<sup>th</sup> centuries, are a valuable record of colonial settlement (eThembeni, 2006).

It can be anticipated that the construction of the proposed sub-station would have a significant, localised effect on cultural sites. Therefore, a cultural heritage assessment will be undertaken of the sub-station site as part of the Impact Assessment. Possible resources and recommended remedial/mitigation/management actions will need to be formulated.

## 6. SCOPING AND PUBLIC PARTICIPATION PROCESSES

### 6.1 Scoping

The EIA is currently in the Scoping Phase. This is the phase during which issues for further investigation are identified so that they can be considered for inclusion in the Specialist Studies that will be done during the next phase of the EIA, viz. the Impact Assessment Phase.

The EIA Team has adopted a robust framework within which environmental aspects arising from or influencing the proposed Gamma Sub-station will be considered. Key elements of the framework are as follows:

- The concept of sustainability, which considers the inter-related dimensions of the environment, viz. the social, economic and biophysical dimensions, underpinned by a system of sound governance.
- Legal/statutory requirements of South Africa (specifically, the National Environmental Management Act (Act No 107 of 1998), the National Heritage Resources Act (Act No 25 of 1999), and the obligations that are associated with ratification of important international treaties, accords and agreements, for example, the United Nations Convention on Biodiversity.

The proposed Gamma Sub-station is subject to the Environmental Regulations of the National Environmental Management Act (Act No 107 of 1998). A standard environmental authorisation process is being followed<sup>4</sup>, comprising:

- Pre-application meeting with the Authorities (National and Provincial).
- Submission of Application to the Authorities.
- Scoping Study and preparation of the Draft Scoping Report (this document).
- Submission of Scoping Report and Plan of Study for EIA to the Authorities.
- Conducting specialist studies.
- Compilation of an Environmental Impact Report and Environmental Management Plan.
- Submission of EIR and EMP to the Authorities.
- Record of Decision from the Authorities.

#### 6.1.1 Technical scoping

During Scoping, the project and studies to be undertaken must be defined in a way that will result in a thorough and scientifically defensible EIR, to ensure that if the proposed project proceeds, it does so in an environmentally sound manner.

The technical process needs to provide scientifically sound information on issues of concern relating to the proposed development, and must also identify all significant issues that need to be addressed by specialist studies during the Impact Assessment.

Issues of concern have to be identified and assessed with regard to the significance of potential impacts. As such, the technical process comprised the following activities.

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<sup>4</sup> See Figure 4 for the four main phases.



#### 6.1.1.1 Information gathering

Information gathering focussed on gaining an understanding of the environmental context and status in order to:

- Identify and assess the significance of environmentally related issues of concern.
- Focus and tailor the scope of work for specialist studies to address each issue of concern identified during Scoping.

The information-gathering phase included input from the project proponent, the technical team, and the public participation programme.

#### 6.1.1.2 Assessment and collation of information

The information obtained was collated and assessed to gain an understanding of the environmental context and status. The collation and assessment of information included the following activities:

- Determining the limits, constraints and provisions applying to information.
- Checking and verifying the integrity and reliability of information.
- Agreeing on terminology and nomenclature.
- Determining shortcomings in information.

#### 6.1.1.3 Evaluation and prioritisation of issues and impacts

The issues and impacts raised during the technical and public participation processes were collated, grouped on the basis of their underlying potential impacts, and evaluated in terms of their significance and need to be further investigated during the Impact Assessment. In conformance with the requirements of NEMA, careful attention was paid to cumulative impacts, and those impacts that may be expressed at a location that is far from where the original activity occurred, or where an impact may only be experienced at some future date.

Once the issues and impacts had been defined and evaluated in terms of the criteria, a process of prioritisation was followed. Prioritisation was based on professional judgment, and also took into account the importance placed on each issue by stakeholders.

The significance of an impact was determined by incorporating various criteria (nature of impact, extent, duration, intensity and probability of occurrence). By addressing issues of uncertainty in the preliminary assessment of impacts, it was anticipated that the major significant impacts would emerge. These significant issues are to be addressed in the Impact Assessment. Impacts that were considered less significant or not significant are to be addressed in commensurately less detail.

An impact is described as “low” where it is considered unlikely to have an influence on the decision, “medium” where it should have an influence on the decision unless it is mitigated, or “high” where it should influence the decision regardless of any possible mitigation.

Issues and potential impacts are described and discussed in Section 7. Section 8 provides information on how these issues and potential impacts will be investigated during the Impact Assessment. Approximate timings of when different activities will occur are also provided.

## 6.2 Public participation

The public participation process for the proposed Gamma Sub-station has been designed to satisfy the requirements laid down in legislation and the NEMA Regulations. Figure 10 provides an overview of the EIA technical and public participation processes, and shows how issues and concerns raised by the public are used to inform the technical investigations of the EIA at various milestones during the process.

This section of the report highlights the key elements of the public participation process to date. Sections 56 to 59 of Regulation R385 are applicable. The important elements relating to the public participation process that are required by the Regulations are the following:

- ❑ The manner in which potential Interested and Affected Parties (I&APs) were notified of the application for authorisation, and that a public participation process was mandatory. This includes notice boards, giving written notice to land owners, letters, information documents and advertisements in the media (Section 56).
- ❑ Opening and maintaining a register, which contains the names and addresses of I&APs. These include all persons who have attended meetings, submitted comments, are organs of State who have some form of jurisdiction in the assessment process, and all those who have requested that they be placed on the register as registered I&APs (Section 57).
- ❑ Registered I&APs are entitled to comment, in writing, on all written submissions made to the competent authority by the applicant or the EAP managing the application, and to bring to the attention of the competent authority any issues, which that party believes may be of significance when the application is considered for authorisation (Section 58).
- ❑ The comments of registered I&APs must be recorded and included in the reports submitted to the competent authority (Section 59).

The objectives of public participation in an EIA are to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

- ❑ During Scoping.
  - Identify issues of concern, and provide suggestions for enhanced benefits and alternatives.
  - Contribute local knowledge and experience.
  - Verify that their issues have been considered.
- ❑ During the Impact Assessment.
  - Verify that their issues have been considered either by the EIA Specialist Studies, or elsewhere.
  - Comment on the findings of the EIA, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones.

The key objective of public participation during Scoping is to assist to define the scope of the technical studies to be undertaken during the Impact Assessment.

### 6.2.1 Notification of the application

An application for environmental authorisation was submitted to DEAT in November 2006. I&APs were notified of the intention to submit an application to DEAT during public meetings held as part of the Gamma-Grassridge 765 kV Transmission Lines EIA, as follows:

- ❑ 15 August 2006: Landowners and the Uitvlug Boerevereniging (Skietkuil Guest Farm).
- ❑ 19 September 2006: Landowners, Uitvlug Boerevereniging and the general public (Skietkuil Guest Farm).

### **6.2.2 Registration of I&APs**

The direct mailing list for this EIA consists of 104 individuals and organisations from both within the project area and beyond its boundaries. Table 2 shows that these I&APs represent a broad spectrum of sectors of society. While consultation has taken place with representatives of different sectors of society, special efforts have been made to obtain the contributions of all people who may be affected directly by the proposed project. These efforts will be on-going for the duration of the entire EIA.

Please note that there is no project notice board on site. This is because the site is remote and a notice board would not be seen by prospective I&APs, and would serve little purpose. Rather, the EIA Team has made substantive efforts to personally identify and notify prospective I&APs (resulting in the 104 individuals and organisations registered on the project data base).

### **6.2.3 Project announcement**

The opportunity to participate in the EIA was announced in August 2006 in two languages (English and Afrikaans) as follows:

- ❑ Telephonic notifications.
- ❑ Discussions during meetings, during which information on the proposed project was provided.
- ❑ Comments sheets were provided to I&APs at all focus group and public meetings.
- ❑ The Project Team (EIA Team and Eskom) and landowners undertook a site visit to the proposed new location of the Gamma Sub-station on 5 December 2006.

### **6.2.4 Obtaining and dealing with comments from I&APs**

The following opportunities were provided during Scoping for I&APs to contribute comments:

- ❑ Completing and returning registration sheets on which space is provided for comments.
- ❑ Providing comment telephonically or by email to the public participation office.
- ❑ A public meeting was held on 5 December 2006 at the farm Schietkuil near Victoria West.
- ❑ Meeting with Eskom Internal Stakeholders (Distribution and Transmission) on 6 November 2006.

During these meetings, I&APs raised both environmental, technical and public participation issues. Those relevant to the project configuration have been carried forward into the EIA.

**Table 2 Sectors of society represented by I&APs on the direct mailing list**

National Government
Provincial Government (Eastern Cape, Western Cape and Northern Cape)
Local Government (District and Local Municipalities)
Agricultural Unions and Farmers' Associations
Water User Associations
Landowners
Tourism Authorities
Conservation Authorities, including Provincial Nature Reserves
Private Game Reserves
Game and Hunting Associations
Environmental Groups
Public Enterprises, Utilities and Agencies
Mining, Industry and Organised Business
Media

#### **6.2.5 Focus Group and Public Meetings**

A considerable effort was made in contacting landowners directly affected and those surrounding the proposed Gamma Sub-station. Landowners who attended meetings assisted the EIA Team with the identification of potentially affected landowners and, where possible, also provided relevant contact details.

Due to the relatively isolated locality of the proposed Gamma Sub-station, focus group meetings were combined with public meetings. Details of these meetings are provided in Table 3.

#### **6.2.6 Issues Report and Acknowledgements**

Issues raised have been captured in an Issues and Response Report, which is appended to this DSR (Appendix 3). This report will be updated to include any additional I&AP contributions that may be received as the EIA process proceeds, and as the findings of the EIA become available.

#### **6.2.7 Draft Scoping Report**

The purpose of the DSR is to enable I&APs to verify that their contributions have been captured, understood and correctly interpreted. At the end of Scoping, the issues identified by the I&APs and by the environmental technical specialists, will be used to define the terms of reference for the specialist studies that will be conducted during the Impact Assessment Phase of the EIA. A period of two weeks is available for public review of the DSR.

**Table 3 Details of focus group meetings held during scoping**

Representation	Date and Venue
Landowners near Gamma Sub-station Uitvlug Boerevereniging	15 August 2006, Skietkuil Guest Farm
Landowners near Gamma Sub-station	19 September 2006, Skietkuil Guest Farm
Landowners near Gamma Sub-station Western Cape Department of Environmental Affairs and Planning	5 December 2006, Skietkuil Guest Farm

**6.2.8 Public participation after completion of the Draft Scoping Report**

Upon completion of the DSR, all registered I&APs will be advised of the availability of the document and will be provided with an opportunity to review and comment on this report. The following are proposed tasks/actions associated with the public review process of the DSR:

- The DSR, with comment sheets, will be made available in the public domain for review and comment before it is finalised and submitted to the Department of Environmental Affairs and Tourism, the Northern Cape Department of Tourism, Environment and Conservation and Western Cape Department of Environmental Affairs, Development and Planning (Table 4).
- A letter (English and Afrikaans) will be sent to all registered I&APs informing them of the report's availability and comment period.
- The DSR will be posted on Eskom's website ([www.eskom.co.za/eia](http://www.eskom.co.za/eia)).
- A meeting will be held with stakeholders (if required and at their request).
- Where required, assistance will be provided to I&APs in order to facilitate understanding of the DSR.
- Comments on the DSR will be included in the Issues and Response Report submitted to the Environmental Authorities with the Final Scoping Report (FSR).
- Compilation of the FSR and submission to the Environmental Authorities.
- Sending out progress feedback letters to stakeholders.

**Table 4 List of public places in the project area where the Draft Scoping Report will be placed for public review**

Area	Venue and Street
Murraysburg	Murraysburg Public Library, 37 Beaufort Street
Near the proposed Gamma Sub-station site	Skietkuil Guest Farm
Victoria West	Victoria West Public Library, 7 Protea Street

### **6.2.9 Final Scoping Report**

The Final Scoping Report will be updated with any additional issues raised by I&APs and will contain any new information that may have been generated as a result of the DSR public review process. It will be submitted to the Authorities, with a request that the EIA can proceed to the next phase, viz. the Impact Assessment.

Once DEAT has approved the Final Scoping Report, the Impact Assessment Phase of the EIA will commence. This will comprise various specialist studies to assess the potential positive and negative impacts of the proposed project, and to recommend appropriate measures to enhance positive impacts and avoid or reduce negative ones. I&APs will be kept informed of progress with these studies.

### **6.3 Public participation during the Impact Assessment**

Public participation during the Impact Assessment Phase will mainly involve a review of the findings of the EIA, presented in the Draft Environmental Impact Report and the various specialist study reports.

I&APs will be advised in good time of the availability of these reports, how to obtain them, and the dates and venues for public and other meetings where the contents of the reports will be presented for comment.

Where possible, public participation activities for this environmental authorisation process will be optimised with those activities forming part of EIA 12/12/20/801 for the proposed Gamma-Grassridge 765 kV Transmission Lines (x 2) (the two processes are being undertaken concurrently, and involve the same I&APs in the area of the proposed sub-station).

## 7. ENVIRONMENTAL ISSUES, IMPACTS AND SPECIALIST STUDIES

### 7.1 Issues and concerns

The key issues identified during Scoping have been formulated as five main questions:

- ❑ What are the potential impacts during the construction of the proposed Gamma Sub-station? This includes aspects such as water (storm water management, water supply and sanitation), geology (soils and geotechnical), air pollution, the influx of construction workers and security concerns, and cultural heritage resources.
- ❑ What are the potential impacts during the operation of the proposed Gamma Sub-station? This includes aspects such as the presence of high intensity electro-magnetic fields from EHV equipment, aesthetics, land-use and economic activities, and emergency situations.
- ❑ What are the potential impacts of the proposed Gamma Sub-station on flora and fauna?
- ❑ What positive or negative economic effects can be expected to the social and socio-economic environments?
- ❑ What cumulative effects will the sub-station contribute, seen in association with impacts arising from other activities in the region?

These issues reflect the concerns and values of a range of different people, groups and organisations, including the public at large, special interest groups, private individuals, various authorities, Eskom and the EIA Team. It is important to note that, for some of the issues and associated potential impacts, it is not a given that potential impacts will actually occur. However, they need to be identified to inform decision-making and to enable the relevant parties to proactively address them should they occur. To investigate and understand the key issues, consideration was given to a range of discipline-specific perspectives, including:

- ❑ Ecological systems (aquatic and terrestrial).
- ❑ Flora and fauna.
- ❑ Avi-fauna.
- ❑ Water resources (including wetlands).
- ❑ Geology and geotechnical.
- ❑ Health, safety and security.
- ❑ Land-use (agriculture and eco-tourism).
- ❑ Visual and aesthetics.
- ❑ Social and socio-economic.
- ❑ Cultural heritage.

Through the integration of discipline-specific perspectives (positive and negative aspects), the key issues are described below. Potential positive and negative impacts are discussed for each phase of the project. The nature of the activity is such that most impacts will be realised during construction. However, some of these impacts may extend into the operational phase albeit at a reduced level of significance.

For purposes of the DSR, issues and associated potential impacts are described but with no assessment of significance (this will be done during the Impact Assessment, once discipline-specific specialist studies have been completed).

## **7.2 What are the potential impacts during the construction of the proposed Gamma Sub-station?**

### **7.2.1 Water use**

The proposed sub-station site lies in what may be termed a fragile environment. The soils are derived from sandstones and shales. Soil cover is thin and the soils are sensitive to water and wind erosion because of their weak structure and the clay and sand content.

Vegetation cover is typical of arid regions where rainfall is sparse (< 300 mm/annum). If the natural state of an environment like this one is greatly disturbed by an intervention such as the construction and operation of a sub-station, the effects on water can be significant. In this case, there are two important considerations relating to water use, viz. storm water management and the use of potable water for human consumption and sanitation.

Storm water management is important in two areas, viz. drainage from the site (the terraces and paved areas of the sub-station) and drainage from access roads. In each case, the problem arises where storm water runoff is concentrated and allowed to run uncontrolled into adjacent areas of veld. The fragile soil and vegetation cover will be unable to withstand this and erosion and destruction of vegetation cover will occur. Therefore, the design of storm water control structures will need to ensure that there is adequate provision to contain and de-energise storm water before it is released into the surrounding environment.

Even though the sub-station will not be manned 24 hours a day when in operation, varying numbers of people will visit it for purposes of monitoring, maintenance and other tasks. During construction, many more people will be on site and ablution facilities will have to be made available for them. The water that is used in these facilities cannot be allowed to run-off uncontrolled into the surrounding environment. Even if the water from sanitation is purified by means of French drains or a soak-away, it is wastewater from an industrial source. It will attract animals and will be a source of moisture in an otherwise arid environment. Therefore, care must be taken to ensure that there will not be any harm to fauna and flora.

In order to address the concerns and matters pertaining to this issue, the following specialist studies will be undertaken:

- Faunal assessment.
- Vegetation assessment.
- Wetlands assessment.
- Geotechnical assessment.

### **7.2.2 Geology, soils and geotechnical**

The soils in the study area are generally susceptible to erosion. The soil stability impacts on the erosion potential, which will affect the environmental management practises to be implemented during the lifecycle of the project. The removal of vegetation during site clearing may expose soils and make them more susceptible to erosion. The geology, residual weathered rock and transported material that may be present will have an effect on the engineering properties of the founding conditions, the foundation system cost, soil erosion potential, dust storms and construction site access under wet conditions.

In order to properly address the concerns and matters pertaining to this issue, a geotechnical assessment will be commissioned.



### **7.2.3 Air pollution**

Air pollution concerns relate mainly to dust. Dust may be a problem, but only during the construction period. In this regard, dust can be controlled by appropriate dust suppression measures.

There is no need for a specific specialist study to address concerns and matters pertaining to dust.

### **7.2.4 Influx of construction workers and security**

The region around the proposed sub-station is sparsely populated. People live on isolated homesteads on farms and in small towns. Perceptions exist that the construction of the sub-station will result in an influx of workers into the region that could affect their physical security. Furthermore, theft of sheep, cattle and game next to highways and national roads could occur, and with construction workers present in the area over a period of three years or more, stock theft may be a problem.

In order to address this concern, the issue needs to be investigated in terms of a specialist study that looks at the question of construction in rural areas and the influence that such construction teams have on personal security and the safety of animals on farms. Therefore, a social and socio-economic assessment will be commissioned.

### **7.2.5 Cultural heritage resources**

Potential impacts on cultural heritage resources relate to isolated scatters of stone tools and possible presence of rock paintings (although the latter are considered unlikely as rock paintings are usually found in mountains and small koppies). Consideration should be given to the importance of sources of water in this arid part of the region and the possibility that archaeological sites, such as freshwater shell middens containing pottery, bone and ostrich eggshell fragments, may be clustered along riverbanks, around pans and flood plains. These sites have been exposed to the elements for thousands of years and are usually in secondary context. Some material and features may also be buried, such as human remains and fossil bone.

In addition, a specialist must ascertain if remains of more recent human habitation (in the form of ruins of farmhouses) exist. In this regard, all buildings, or parts thereof, markers, milestones, graves and gravestones or landmarks older than 60 years are protected and may not be destroyed without a permit.

In order to determine the presence or not of cultural heritage resources on the proposed sub-station site, it will be necessary to undertake a physical inspection of the proposed site to ensure that no *in situ* heritage resources are compromised (and, if so, to determine and execute appropriate mitigation measures). Therefore, a heritage resources assessment will be commissioned.

### **7.3 What are the potential impacts during the operation of the proposed Gamma Sub-station?**

#### **7.3.1 *Electromagnetic fields***

Electromagnetic Fields (EMFs) are produced from EHV electrical equipment. They are also produced by some human activities and also occur naturally, for example, from lightning and the magnetic field of the earth. Extremely Low Frequency (ELF) fields are the type of EMFs that are likely to be generated from the equipment in the proposed sub-station.

An EMF is the electric field generated around conductors through which alternating electric current is flowing. The field is at its maximum closest to the conductor and the intensity drops away from the conductor. Apart from the magnitude of the voltage and current applied to a conductor, the intensity of the EMF depends on the height of the conductors above ground and the spacing between the conductors.

Eskom is guided by exposure guidelines for electric and magnetic fields as given by the International Commission on Non-Ionising Radiation Protection. Furthermore, sub-stations are designed in accordance with standards of the International Radioactive Protection Agency. Added to this, Eskom adopts the precautionary principle in the control and restriction of activities taking place within the sub-station servitude.

Some concerns exist regarding the impact of exposure of humans and animals to EMFs from electrical equipment. In this regard, EMFs are perceived as threats to farm workers and livestock. A number of studies have been undertaken internationally on the biological impact of ELF fields. To date, no conclusive evidence of any health-related impacts has been advanced.

After more than 20 years of research undertaken by Eskom, it has not been conclusively demonstrated that detrimental human and animal health effects exist with the exposure to EMFs. Studies on the effects of EMFs on farm animals have also concluded that they have no influence on the reproduction, meat, milk and egg production or the development of offspring. This has been verified recently by an independent research study commissioned by Eskom and internationally peer reviewed. Therefore, it is the opinion of the EIA Team that, for purposes of the proposed Gamma Sub-station, there is no need for a specific specialist study to be commissioned in order to address the concerns and matters pertaining to EMFs.

#### **7.3.2 *Aesthetics and land-use impacts***

Visual and aesthetic impacts are highly subjective and usually considered most significant when the development is dissimilar to other developments or the general surroundings in which it is sited. This is made worse if the structure is not adequately hidden from view or can be seen from areas of public access such as roads, paths and viewpoints. There is little that can be done to avoid the visual intrusiveness of large elements of electrical infrastructure. However, mitigation measures, to lessen impacts, are available and should be applied, for example, to make sure that the facility is placed in a manner where the visual absorption capacity of the terrain is utilised optimally.

There are concerns that property values will decline as a consequence of the construction of the proposed sub-station, and that it is then forever seen as an eyesore in an otherwise rural or natural environment. Individual private landowners have invested in conservation and associated activities (eco-tourism, hunting and the like). These activities may be negatively affected by the presence of the proposed sub-station, which may adversely affect the commercial viability of such enterprises.

In order to address the concerns and matters pertaining to this issue, the following specialist studies will be undertaken:

- Land-use assessment.
- Visual and aesthetics assessment.

Outcomes will inform the Compensation Study that is being undertaken for EIA: 12/12/20/801 for the proposed Gamma-Grassridge 765 kV Transmission Lines (x 2).

### **7.3.3 Emergency situations**

Although the chances are small, it is possible that emergencies with the electrical equipment may occur at the sub-station, for example, transformers can become overloaded and blow up and switchgear equipment can explode. Each of these kinds of incidents can have knock on effects and can place humans, animals and the natural environment at risk.

An opinion needs to be given concerning emergency situations to assist with the provision of sufficient mitigatory measures to ameliorate the potential impacts. An example would be the construction of sumps and drainage channels to catch and retain the transformer oil in the event of such an emergency, preventing it from running uncontrolled into the veld.

There is no need for a specific specialist study to be commissioned in order to address the concerns and matters pertaining to emergency situations. However, as part of this EIA, Eskom will need to provide input into suitable emergency procedures and mitigatory measures applicable to sub-stations.

## **7.4 What are the potential impacts of the proposed Gamma Sub-station on flora and fauna?**

### **7.4.1 Flora**

Typical Karoo vegetation, which has been flagged as sensitive, is present within the development site. Construction activities for the sub-station and access road, will impact on this vegetation (particular attention should be given to red data species that occur in the area) and it is anticipated that a relatively long period will be required for the recovery of the vegetation. Furthermore, there is the potential for the poaching of sensitive flora due to the area becoming more easily accessible due to construction activities. Also, there is a risk for increased alien vegetation infestation in areas affected by construction activities. This potential impact also holds true for the operation of the sub-station arising from maintenance activities.

Construction camps can also lead to the loss of valuable flora and, therefore, their location needs to be determined with a keen sensitivity to the flora on site. Where applicable, all large trees should be left *in situ* and gravelling should occur in the least sensitive areas.

Electrical infrastructure in the vicinity of natural vegetation may have a negative impact, as it is known that “flash-overs” may be a source of energy sufficient to spark an unplanned fire. This may lead to secondary impacts such as a shortage of grazing for livestock and increased soil erosion. However, fires are considered unlikely in typical Karoo vegetation, and, if they do occur, their likelihood of spreading widely is considered low.

In order to address these concerns, a vegetation assessment will be undertaken.

#### **7.4.2 Fauna and avi-fauna**

The proposed development site probably supports important faunal biodiversity (with particular attention being given to red data species). Irreversible habitat destruction associated with construction activities is the largest source of risk to the faunal communities in the study area.

During operations, the largest effect on faunal habitat is likely to be that of the access roads and general maintenance activities.

Due to their size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but common problems in Southern Africa are bird deaths (through collision with the earth wire on transmission lines). Other problems are electrical faults caused by bird excreta when roosting or nesting on electrical infrastructure and disturbance and habitat destruction during construction and maintenance activities (EWT, 2006).

Collisions are the biggest single threat posed by electrical infrastructure to birds in Southern Africa. Most heavily impacted upon are bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines.

In order to address these concerns, a faunal and an avi-faunal assessment will be undertaken.

#### **7.5 What positive or negative economic effects can be expected to the social and socio-economic environment?**

The following potential social and socio-economic impacts were identified during scoping:

- Potential impacts on existing infrastructure and services.
- Traffic impacts related to increased heavy vehicle traffic.
- Nuisance impacts, for example, dust and noise.
- Employment and commercial opportunities.
- Safety and security impacts, including potential stock theft.
- Health impacts, mainly related to disease transmission, in particular, the spread of HIV/AIDS as a consequence of incoming contracting teams.
- Potential loss of use of land.

Each of the above is a possibility that need to be examined. However, given the remoteness of the site, potential impacts on existing infrastructure and services are likely to be minor, with the appointed contractors mostly providing their own on-site infrastructure and service needs. Similarly, the proposed site is close to the N1 national road, suggesting that traffic impacts related to the import of machinery and equipment will have a localised effect on immediate surrounding landowners. A reasonably significant concern relates to dust (and to a lesser

extent, noise), in particular, at the start of construction when large areas will be cleared of vegetation ahead of civil works. In terms of employment, the construction and commissioning of a sub-station are specialised tasks. There are only a few companies in the country that would be able to carry out these types of contracts. Therefore, during construction there will be limited unskilled employment opportunities for local people, and only on a temporary basis. By implication, benefits are not likely to be significant. In addition to direct employment opportunities during construction, commercial opportunities are anticipated in towns and settlements surrounding the construction site. These will manifest themselves in the goods, supplies and services sectors. In terms of safety and security, the personal safety of surrounding landowners should not be compromised by an incoming workforce. However, livestock theft and poaching are eventualities for which management plans will need to be formulated and implemented. Disease transmission is always a concern when construction camps are envisaged, and is a subject that needs to be examined to reduce opportunities and risks. Lastly, loss of land use is a given as the area required for the proposed sub-station will be wholly transformed. This may also affect neighbouring landowners, resulting in reduced land values, for which adequate compensation will need to be paid.

In order to address these concerns, a social and socio-economic assessment will be undertaken. It should be noted that a comprehensive Compensation Study is being undertaken as part of EIA 12/12/20/801 (the proposed Gamma-Grassridge 765 kV Transmission Lines (x 2), the outcomes of which will be incorporated in this EIA for the proposed Gamma Sub-station (i.e. there will be no separate Compensation Study as part of this Impact Assessment).

#### **7.6 What cumulative effects will the sub-station contribute seen in association with impacts arising from other activities in the region?**

Concerns were raised by I&APs that there may be a cumulative effect from the construction of the proposed sub-station and proposed upgrade of the N1 by the South African National Roads Agency. The cumulative impact from the construction of both the sub-station and N1 should, therefore, be considered.

A cumulative impact is defined as the impact of an activity that may not be significant but may become significant when added to the existing and potential impacts in combination with or in sympathy with the effects from similar or diverse activities or undertakings in the area. To this end, similar or diverse, existing or possible future activities in the vicinity of the sub-station need to be identified.

In order to address these concerns, all the specialist studies commissioned will have as a requirement the identification and consideration of potential cumulative impacts.

## 8. PLAN OF STUDY FOR IMPACT ASSESSMENT

This section presents the proposed Plan of Study for the Impact Assessment of the EIA for the construction and operation of the proposed Gamma Sub-station. In this regard, it must be remembered that the environmental authorisation process that is being followed for the proposed Gamma Sub-station conforms to the requirements of the National Environmental Management Act (No 107 of 1998) (as amended) and the EIA Regulations, viz.

- ❑ Pre-application meeting with the Authorities (National and Provincial).
- ❑ Submission of Application to the Authorities.
- ❑ Scoping Study and preparation of the Draft Scoping Report and Plan of Study for Impact Assessment for comment by I&APs.
- ❑ Submission of Final Scoping Report and Plan of Study for Impact Assessment to the Authorities.
- ❑ Conducting Specialist Studies.
- ❑ Compilation of a Draft Environmental Impact Report and Environmental Management Plan for comment by I&APs.
- ❑ Submission of Final EIR and EMP to the Authorities.
- ❑ Record of Decision from the Authorities.

Assuming a positive ROD authorising the proposed project, Eskom will undertake environmental compliance monitoring for the full duration of construction, reporting to DEAT.

The Scoping Phase for the proposed Gamma Sub-station is nearing completion. This Plan of Study for Impact Assessment outlines the focus and process for the Impact Assessment.

The aim of the Impact Assessment Phase is to investigate the environmental issues and concerns that have been identified during Scoping. The technical and public participation processes will continue to interact at important stages to ensure that both processes build towards a comprehensive investigation of the issues identified.

The main activities during this phase will be to:

- ❑ Undertake focused scientific studies to assess the issues of concern.
- ❑ Maintain ongoing communication and participation with stakeholders.
- ❑ Integrate the findings into a defensible EIR, inclusive of mitigation measures to ameliorate the effects of negative impacts and optimise positive ones.
- ❑ Prepare an Environmental Management Plan.

### 8.1 Proposed technical process

In order to provide scientifically sound information in regard to the various issues raised, a number of Specialist Studies will be undertaken. It is important to note that these Specialists will not work in isolation but will be required to interact and discuss aspects during their investigations. An integrated approach will be adopted to consider direct, secondary and cumulative impacts wherever possible.

In order to address some of the broader key issues, each Specialist will be tasked with assessing the possible impact from the angle of their area of expertise, thereafter, the findings will be integrated by the EIA Team to provide a comprehensive understanding of the issue. Importantly, information on certain project components and activities will be fed into this EIA process from other project team members that do not necessarily form part of the EIA specialist study group.

### **8.1.1 Specialist studies**

The Specialist Studies that the EIA Team believe should be carried out during the Impact Assessment will be undertaken by professionals regarded as specialists in their specific disciplines. Arising from Scoping, and the distillation of issues and associated potential impacts, the need for the following Specialist Studies have been identified:

- Faunal and Avi-Faunal Assessments.
- Wetlands assessment.
- Vegetation assessment.
- Geotechnical assessment.
- Land use assessment.
- Visual and aesthetics assessment.
- Social and socio-economic assessment.
- Heritage impact assessment.

**Where applicable, the Specialist Studies must comply with Specialist Guidelines produced by the Western Cape Department of Environmental Affairs and Development Planning (June 2005).**

The results of the Specialist Studies will be used by the EIA Team when doing the integrated assessment of the proposed sub-station development. The outcomes of integration and assessment will be documented in an Environmental Impact Report, which will be released in the public domain for comment at the appropriate time.

Following the EIR, based on the findings of the EIA, a comprehensive EMP will be prepared. The EMP will outline the mitigation and monitoring measures for avoiding or minimising negative impacts and optimising benefits during project implementation and operation. The EMP provides a critical link between mitigation measures described in the EIR and their actual implementation.

The Specialist Studies that are proposed and **key aspects** of their respective terms of reference are detailed below. The Specialist Reports will comply with Section 33 of GN R385.

#### **8.1.1.1 Faunal and avi-faunal assessments**

The faunal and avi-faunal assessments will cover the following key subjects:

- Description of the current state of fauna and avi-fauna in the study area, outlining important characteristics and components thereof, including species-specific habitats, which may be influenced by the proposed infrastructure or which may influence the proposed infrastructure during construction and operation.
- Identification of Red Data species potentially affected by the proposed sub-station.

- ❑ The identification of potential impacts (positive or negative, including cumulative impacts if relevant) of the proposed development on fauna and avi-fauna during construction and operation.
- ❑ Particular attention must be paid to wetland areas (requiring close interaction with the wetland specialist) and potential impacts.
- ❑ The identification of mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed sub-station).
- ❑ The formulation of a simple system to monitor impacts, and their management, based on key indicators.

#### *8.1.1.2 Vegetation assessment*

The vegetation assessment will cover the following key subjects:

- ❑ Description of the current state of the vegetation in the study area, outlining important characteristics and components thereof, which may be influenced by the proposed infrastructure or which may influence the proposed infrastructure during construction and operation.
- ❑ Identification of Red Data species potentially affected by the proposed sub-station.
- ❑ The identification of potential impacts (positive or negative, including cumulative impacts if relevant) of the proposed development on vegetation during construction and operation.
- ❑ Particular attention must be paid to wetlands (requiring close interaction with the wetland specialist).
- ❑ The identification of mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed sub-station).
- ❑ The provision of clear guidelines to reduce vegetation damage and loss, and to assist with rehabilitation where damage and loss are unavoidable, and to reduce the risk of the spread of alien vegetation.
- ❑ The formulation of a simple system to monitor impacts, and their management, based on key indicators.

#### *8.1.1.3 Wetlands assessment*

The wetlands assessment will cover the following key subjects:

- ❑ Description of the current state of wetlands and key ground water resources (including geo-hydrological aspects) within the study area, outlining important characteristics and components thereof, which may be influenced by the proposed sub-station or which may influence the proposed sub-station during construction and operation. Collaboration with the Geotechnical Specialists will be required.
- ❑ Description of the functionality of wetlands identified within the study area.
- ❑ The identification of potential impacts (positive or negative, including cumulative impacts if relevant) of the proposed sub-station on wetlands during construction and operation. This aspect of the study must identify sensitive and “no go” areas, and should also include an analysis of construction constraints associated with wetlands.
- ❑ The identification of mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed sub-station).



- ❑ The formulation of a simple system to monitor impacts, and their management, based on key indicators.

#### *8.1.1.4 Geotechnical assessment*

The geotechnical assessment will cover the following key subjects:

- ❑ Description of the site topography and drainage in the study area.
- ❑ Description of the site geology and soils in the study area.
- ❑ Description of the groundwater conditions and linkages with surface water resources and soil types and conditions. Collaboration with the Wetlands Specialist will be required.
- ❑ Description of the slope stability, collapse potential, sub-soil seepage and percolation properties.
- ❑ Recommendations on suitable construction materials and from where these can be sourced.
- ❑ Suggestions on the following:
  - Earthworks, including cuts and fills.
  - Drainage.
  - Founding.
  - Piling.
- ❑ An understanding of construction methods opportunities and constraints offered by geotechnical conditions. This is to include the identification of sensitive areas (as well as “no go” areas) and measures to ameliorate construction constraints.

#### *8.1.1.5 Land-use assessment*

The land-use assessment will cover the following key subjects:

- ❑ A description and broad assessment of impacts of land-uses in the study area.
- ❑ The identification of potential impacts (positive and negative, including cumulative impacts if relevant) of the proposed development on land-uses in the study area during the construction and operation of the proposed transmission lines.
- ❑ The identification, quantification and assessment of potential impacts of the sub-station on tourism, eco-tourism and related activities, and agricultural activities (livestock and crops).
- ❑ The identification of areas of conflict with suggestions for remediation. These aspects needs to include suggestions on ways in which the development proponent can achieve the development concept while optimizing natural attributes of the development area, through the avoidance of appealing landscapes and sensitive habitats. In addition, this aspect of the study must consider relationships between current land-uses and offer measures for managing these relationships. Collaboration with the Visual and Aesthetics Specialist will be required.
- ❑ The assessment of future land-use opportunities (and their viability).
- ❑ The identification of mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed sub-station).
- ❑ The formulation of a simple system to monitor impacts, and their management, based on key indicators.

#### *8.1.1.6 Visual and aesthetics assessment*

The visual and aesthetics assessment will cover the following key subjects:

- ❑ Description of the visual landscape of the study area with specific focus on topographical features that offer impact mitigation opportunities and constraints.
- ❑ Description of the area from which the project can be seen (the view shed) as well as the viewing distance.
- ❑ An assessment of the visual absorption capacity of the landscape (i.e. the capacity of the landscape to visually absorb structures and forms placed upon it).
- ❑ The appearance of the sub-station from important or critical viewpoints within established and existing planned land uses/activities. Particular attention must be paid to conservation, tourism, eco-tourism and associated activities, and potential effects on sense of place. Collaboration with the Land-use Specialist will be required.
- ❑ The identification of potential impacts (positive or negative, including cumulative impacts if relevant) of the proposed sub-station on the visual landscape during construction and operation.
- ❑ The identification of mitigation measures for enhancing benefits and avoiding, reducing or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed sub-station).
- ❑ The formulation of a simple system to monitor impacts, and their management, based on key indicators.

#### *8.1.1.7 Social and socio-economic assessment*

The social and socio-economic assessment will cover the following key subjects:

- ❑ Description of the current social and socio-economic environments within the study area, outlining important characteristics and components thereof, which may be influenced by the proposed infrastructure or which may influence the proposed infrastructure during construction and operation.
- ❑ The identification of potential impacts (positive and negative, local and regional, including cumulative impacts if relevant) of the proposed development on the social and socio-economic environments during construction and operation. This aspect of the study must consider potential impacts on existing infrastructure, nuisance impacts, possible traffic effects, the transmission of diseases, in particular, HIV/AIDS, and health and safety impacts (including poaching and stock theft).
- ❑ The identification of mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed sub-station).
- ❑ The formulation of a simple system to monitor impacts, and their management, based on key indicators.

#### *8.1.1.8 Heritage impact assessment*

The heritage impact assessment will cover the following key subjects:

- ❑ The consideration of the impacts on cultural heritage resources arising from the construction and operation of the proposed transmission lines and infrastructure.

- Information will be provided on the following:
  - Results of a survey of the construction footprint and the identification of cultural heritage resources that may be affected by the proposed infrastructure or which may affect the proposed infrastructure during construction and operation.
  - Recommended mitigation measures for enhancing positive impacts and avoiding or minimizing negative impacts and risks (to be implemented during design, construction and operation).
- Formulation of a protocol to be followed by Eskom for the identification, protection or recovery of cultural heritage resources during construction and operation.

#### **8.1.1.9 Other information**

In addition to the above Specialist Studies, the EIA Team will make use of existing information to address subjects such as dust suppression, noise suppression, the effects of EMFs, compensation aspects (from EIA: 12/12/20/801), and designing for and managing emergency situations.

#### **8.1.2 Integration and impact description**

Once the specialist investigations and integration have been undertaken, an Environmental Impact Report will be prepared in accordance with Section 32 of GN R385 to cover the following:

- Details and expertise of the EAP who conducted the EIA and compiled the report.
- A detailed description of the proposed activity.
- A description of the property on which the activity is to be undertaken and the location of the activity on the property.
- A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.
- Details of the public participation process conducted.
- A description of the need and desirability of the proposed activity and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.
- An indication of the methodology used in determining significance of potential environmental impacts. In this case, conventions provided in Table 5 will be used by Specialists when undertaking their discipline-specific assessments. The EIA Team will also use these conventions for purposes of the integrated assessment of potential impacts, and the determination of impact significance.
- A description and comparative assessment of all alternatives identified during the EIA process.
- A summary of the findings and recommendations of any specialist report or report on a specialist process.
- A description of all environmental issues that were identified during the EIA process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures.
- An assessment of each identified potentially significant impact.

**Table 5 Assessment conventions that will be applied for the impact assessment**

<b>Notation</b>	<b>Description</b>
<b>Nature</b>	An impact is either positive or negative. Importantly, even after mitigation, few negative impacts become positive. Most negative impacts will remain as negative impacts. However, after mitigation, the significance should reduce.
<b>Extent</b>	Describes the spatial scale of the impact. Local – limited to the immediate area(s) around the project site. Regional – extends over a larger area that would include a major portion of an area or province. National/International - even wider area that would have national or international implications.
<b>Duration</b>	Provides a prediction of whether the duration of the impact would be: Short-term (0 to 3 years) – or confined to the construction period. Medium-term (3 to 10 years). Long-term (> 10 years). Permanent (beyond the anticipated lifetime of the project).
<b>Intensity</b>	This provides an order of magnitude of whether or not the intensity (magnitude/size/frequency) of the impact would be high, medium, low or negligible (no impact).

Table 5 continued

Notation	Description
<b>Frequency</b>	This provides a description of any repetitive, continuous or time-linked characteristics of the impact(s) as: Continuous (i.e. without interruption). Intermittent (occurring from time to time, without specific periodicity). Periodic (occurring at more or less regular intervals).
<b>Probability</b>	This provides a description of the probability of the impact actually occurring as: Improbable (very low to low likelihood). Probable (distinct possibility). Highly probable (most likely). Definite (the impact would occur regardless of prevention or mitigation measures).
<b>Significance</b>	The significance of the identified impacts on components of the affected environment (and where relevant, with respect to potential legal infringement) were described as: Low, where the impact will not have a significant influence on the environment, and, thus, will not be required to be significantly accommodated in the project design. Medium, where it could have an adverse influence on the environment, which would require modification of the project design or alternative mitigation actions. High, where it could block the project regardless of any possible mitigation.
<b>Confidence</b>	Provides a measure of confidence in the assessment expressed as low, medium or high.

- ❑ A description of any assumptions, uncertainties and gaps in knowledge.
- ❑ An opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.
- ❑ An environmental impact assessment statement.
- ❑ A draft EMP.
- ❑ Copies of any specialist reports and reports on specialised processes.
- ❑ Any specific information that may be required by the competent authority (viz. DEAT).

An EMP will be incorporated into the EIR. The EMP will be prepared in accordance with Section 34 of GN R385 to cover the following:

- ❑ Details and expertise of the person who prepared the EMP.
- ❑ Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in the EIR, including environmental impacts or objectives in respect of planning and design, pre-construction and construction activities, operation or undertaking of the activity, rehabilitation of the environment, and closure (where relevant).
- ❑ A detailed description of the aspects of the activity that are covered by the draft EMP.
- ❑ An identification of the persons who will be responsible for the implementation of the measures.
- ❑ Where appropriate, time periods within which the measures contemplated in the draft EMP must be implemented.
- ❑ Proposed mechanisms for monitoring compliance with the EMP and reporting thereon.

## **8.2 Public participation during the Impact Assessment**

Interested and Affected Parties will continue to be informed of progress with the Specialist Studies and the EIA, and will be requested for their inputs on an ongoing basis up to the submission of the Final EIR for Authority decision. During the Impact Assessment phase, I&APs will receive two personalised letters advising them of progress and the opportunity to comment when reports are available.

All I&APs will be advised in good time of the availability of reports, how to obtain them, and the dates and venues of public and/or other meetings where the contents of the reports will be presented for comment. The availability of reports will be advertised in the appropriate media.

Public participation during the impact assessment phase of the EIA will involve preparing a review of the findings of the EIA, presented in the Draft EIR and the volume of Specialist Study Reports. The findings of the EIA will be consolidated into a Draft EIR. The Issues and Response Report listing all issues raised, together with an indication of how they were considered and/or addressed, will be appended to the Draft EIR. This will allow I&APs to verify that the issues they raised during Scoping have been considered or how they have been addressed.

In addition to continued contact with I&APs, members of the EIA Team will meet with key authorities at local, provincial and national government at necessary times throughout the process to facilitate discussion and understanding.

Once the Authorities have issued a ROD on the proposed development, this will be conveyed to members of the public via advertisements and personalized letters. All I&APs will receive a letter at the end of the EIA notifying them of the ROD and explaining the appeal procedure.

### 8.3 Programme

In order to meet the expected electricity demand, the proposed Gamma Sub-station must be operational by 2009. Therefore, construction must commence in the second half of 2007. This EIA is being managed with a target date for the issuing of a ROD by DEAT in mid-July 2007.

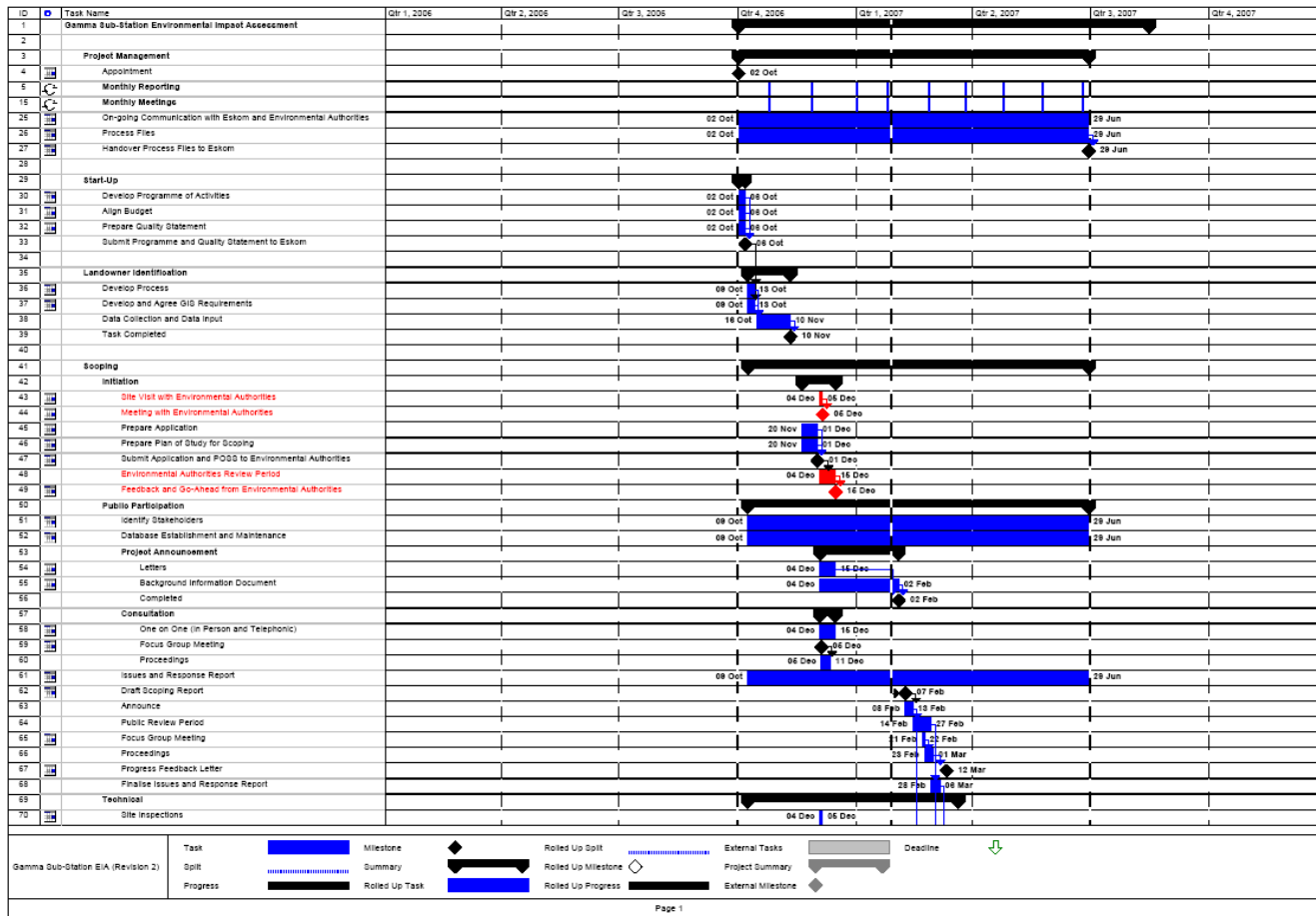
Thus, the current programme aims to undertake the Specialist Studies from February to April 2007. Thereafter, the Draft EIR will be prepared and submitted for public review and comment during May 2007. Three weeks have been allowed for public comments (including provision for one public meeting to discuss the Draft EIR), after which the report will be finalised for submission to the Environmental Authorities.

Key activities and anticipated time frames are shown in Table 6. The full program is provided in Figure 10.

**Table 6 Key activities and anticipated time frames**

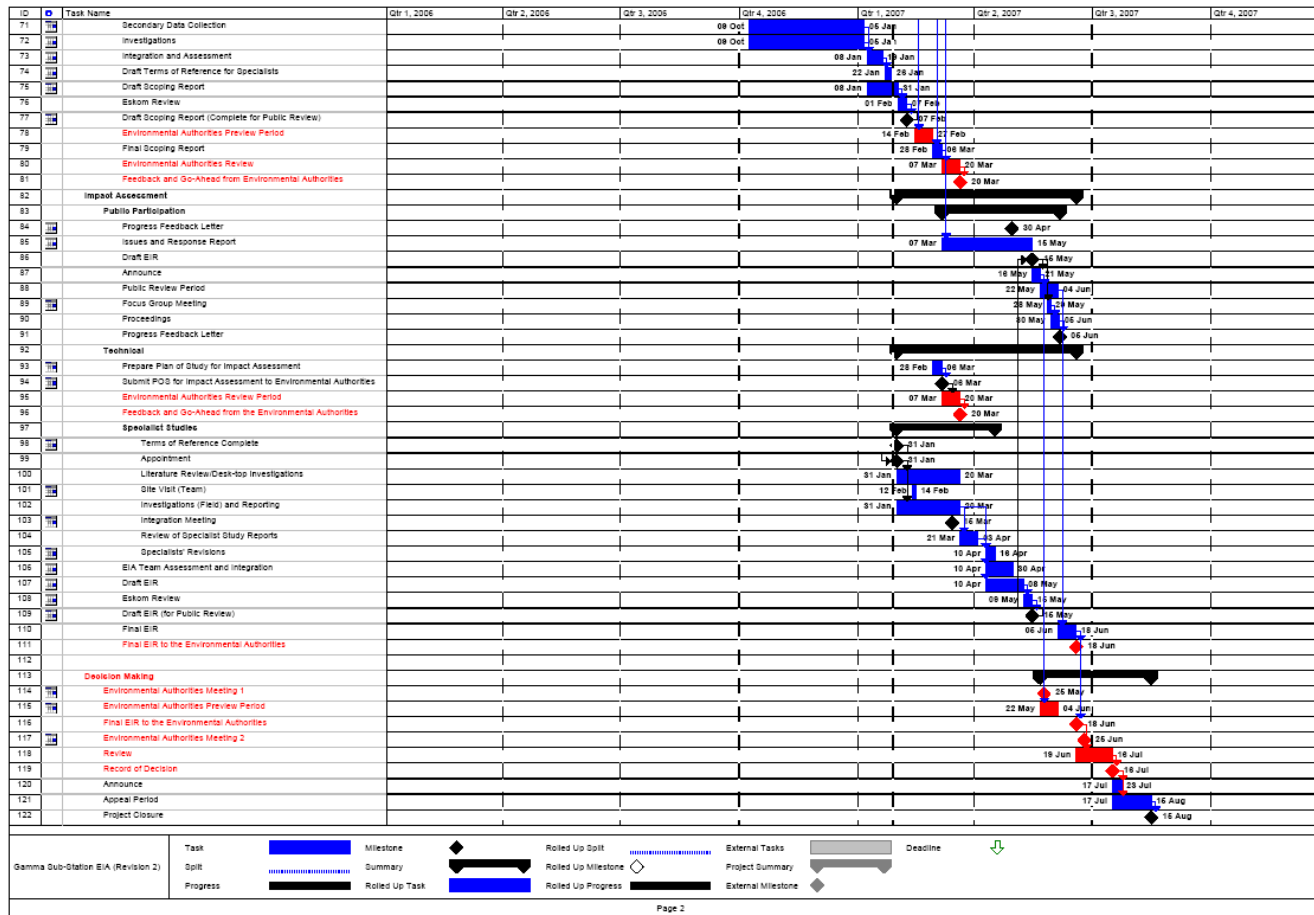
<b>Activity</b>	<b>Anticipated Dates</b>
Submit Final Scoping Report and Plan of Study for the Impact Assessment to the Authorities	6 March 2007
Specialist Study Investigations	31 January 2007 – 16 April 2007
Preparation of Draft Environmental Impact Report	21 March 2007 – 15 May 2007
Submit Draft Environmental Impact Report for Public Review	15 May 2007
Focus Group Meeting for Draft Environmental Impact Report	28/29 May 2007
Submit Final Environmental Impact Report to the Authorities	18 June 2007
Record of Decision	16 July 2007

Figure 10 Programme for the environmental authorisation process for the proposed Gamma Sub-station





ESKOM TRANSMISSION  
PROPOSED GAMMA SUB-STATION



## 9. CONCLUDING REMARKS

The EIA Team is of the opinion that Eskom Transmission has followed due environmental process during the undertaking of this scoping process and associated public participation programme. The analysis of key issues during scoping has shown that there are no negative impacts that can be classified as fatal flaws. However, a number of issues that may lead to the identification of some significant environmental impacts, have been highlighted for further investigation in order to assess their significance and to determine the kinds of mitigation measures required for their management and minimisation.

Following the comment period for the Draft Scoping Report, the issues raised by stakeholders, together with those of technical specialists and the regulatory authorities, will be captured in a Final Scoping Report. The FSR will be used to define the scope of work for the second phase of the EIA, when the potential impacts of the proposed development on the environmental and socio-economic status of the study area will be examined in detail. In this way, the issues of stakeholders will assist to provide a robust framework within which the EIA will be carried out.

The proposed programme for the Impact Assessment Phase takes into account the technical and the public participation processes, and their interaction.

A detailed EMP for construction, incorporating all recommended mitigation measures and conditions contained within the ROD, will be compiled as a separate document. The EMP will cover the construction phase of the project and will include a monitoring programme. The EMP will be submitted to the Environmental Authorities for approval and, once approved, will become legally binding on Eskom Transmission and its contractors.

A separate EMP for the operation of the project will be compiled at a later stage.

## 10. REFERENCES

- Acocks, J.P.H. 1953. Veld Types of South Africa. Memoirs of the Botanical Survey of South Africa 28.
- eThembeni Cultural Heritage. 2006. Overview: Gamma-Grassridge Power Line Heritage Scoping Assessment, Eastern Cape Province.
- EWT. 2006. Gamma Grassridge 765 kV Transmission line. Preliminary summary of avifaunal impacts.
- Low, A.B. and A.G. Rebelo (Editors). 1996. Vegetation of South Africa, Lesotho and Swaziland. Department of Environmental Affairs and Tourism, Pretoria.
- Urban-Econ. 2006. Draft District-Wide Economic Growth and Development Strategy: Cacadu District Municipality.

**APPENDIX 1**  
**APPLICATION**

**APPENDIX 2**  
**PUBLIC PARTICIPATION DOCUMENTATION**

**APPENDIX 3**  
**ISSUES AND RESPONSE REPORT**

**APPENDIX 4**  
**I&AP DATA BASE**