

PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

ENVIRONMENTAL IMPACT ASSESSMENT

ENVIRONMENTAL IMPACT REPORT

DRAFT

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EXECUTIVE SUMMARY

BACKGROUND

This Draft Environmental Impact Report (Draft EIR) addresses the proposed development of the 400 kV Transmission line from the Pegasus Sub-station (near Dundee) to the Umfolozi Sub-station (near Ulundi). The length of this line will be approximately 100 km.

AIMS

The intention of this Draft EIR is to provide Department of Agriculture and Environmental Affairs, KwaZulu-Natal (DAEA) with a comprehensive report of the activities conducted during the EIA Phase, with a particular focus on the Specialist investigations. This report follows on from the submission of the Scoping Report Based to the DAEA, who have approved it and the Plan of Study for the EIA.

The format of this report follows that established in the Scoping Report and the Plan of Study for Scoping and has been structured in a manner that will hopefully facilitate the reviewing process for the Reader. The table of contents clearly indicates the status of the various chapters in this report, i.e. whether the information has remained unchanged, has been revised or is new. Supporting information is provided in the Appendices.



DRAFT EIR REVIEW

Owing to the tight time frames, the Scoping Report and the Draft Environmental Impact Report have been issued within a week. It was agreed with Stakeholders at the Key Stakeholder Workshop in Dundee on 15 November 2001 that the Scoping Report not be submitted for public review, that the Draft Environmental Impact Report be disseminated for public review as this would be of greater interest to them. It should be stated that this support was based on Stakeholder opinion that the process had been both transparent and robust and that there was a high confidence in information presented to them.



IMPACT TABLES AND SPECIALIST REPORTS

This report presents the findings of the specialist studies and integrates the information to assist the decision making process. The reporting is therefore presented at three levels:

- Overview level – presented in the main report for the reader looking for a broad understanding of the study
- Impact tables – presented in Appendix D, provides the reader with more issues specific information and assessment

- Detailed specialist assessment – presented in the specialist reports in Appendices R to W.

OVERVIEW OF STUDY FINDINGS

Based on the detailed studies, and the integration and distillation process undertaken above and in the Impact tables of Appendix B, the overall preference per specialist field has been provided by each specialist. Each are ranked according to most preferred route to least preferred route. In addition to the specialist evaluations, two technical components are included; technical feasibility and construction cost. These two components were requested from Eskom Transmission.

The broad reasoning for the different preferences is summarised as follows:

Ecology	The National Heritage Site, and sensitive woodland areas adjacent to it in the eastern sections along the southern route is the main motivation for dropping options B and D. In the western areas the northern route is more diverse and more sensitive than the southern route which has more agricultural disturbance. Hence option C – the cross-over option – is the most preferred.
Birds	Following the existing lines provides significantly greater mitigation against bird collisions than any other concern. Hence both options A and B rank very highly, though the northern route (option A) gets greater preference as the habitat of this route is more disturbed, and there appears to be more water areas and wetlands along the southern route (which will attract more birds).
Soils	Erosion is a problem throughout the study area, though the northern route appears more sensitive and is more disturbed. Instead the cross-over route (option C) is given to offer the least impact on erosion, and it also avoids the very unstable area just north of Nqutu.
Archaeology	Preference rating pending submission of map of archaeological and historic sites.
Visual	The overriding concern here is the open and more characterful visual quality of the southern route in the eastern sections. Hence options B and D are ranked lowest. Option A gets the highest ranking due to the presence of an existing line along the entire route, though option C is also given a high preference.
Social	The lower population densities along the southern route mean that most of the socially related impacts will be lower along this route. However, option C is still

given a relatively high ranking given that there is not a significant difference between the northern and southern routes in the eastern sections.

Technical feasibility and cost the more complex topography of the northern route will increase the cost of the construction of the line due to construction expenses and the likely greater number of self supporting and strain towers. The southern route offers the simpler and cheaper solution, with option D being preferred due to the long straight section to the Umfolozi sub-station. Nonetheless, option C is still given a fairly high preference rating.

It is suggested from the above that, while there may be different preference for the most preferred route, there is good reason to consider option C (= the cross-over route) as being the option that offers the least impact on the environment as a whole. Further this evaluation is seen to include the technical feasibility and cost factors.

It is important to note that the archaeological considerations are not included in this assessment at this stage. Though the indications are that the overall evaluation will not change, **this assessment is pending the maps of the archaeological investigations that were not available for the release of this document.**



CONCLUDING REMARKS

Despite these concerns, the Study Team is confident that the process has been robust and has been well supported by Key stakeholders. As such, this Draft EIR provides a fair and balanced view of activities undertaken during the study. The process of specialist assessment and integration has been comprehensive and intensive.

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Maps

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PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE

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About this Report

This Draft Environmental Impact Report (draft EIR) is a culmination of the Environmental Impact Assessment (EIA) Phase and is the third in a series of reports that will be issued in this study. For ease of reference, it is intended that the reports follow similar formats and will 'build on' to the information presented in the previous report. The series of reports is expected to include the following:

- *Plan of Study for Scoping (published October 2001)*
- *Scoping Report (published 10 December 2001)*
- ⇒ *Draft Environmental Impact Report*
- *Final Environmental Impact Report (due January 2001)*

Hence, as indicated in the Table of Contents, this report is an update of the Scoping Report.

The report presents a draft of the findings of the specialist studies. It attempts to integrate the findings in a manner that gives the reader an overview of the study such that a conclusion can be drawn on the most environmentally beneficial route. The outcome of the studies are therefore presented at three levels:

- *Overview – in main text of the report*
- *Impact Tables – developed further on the Issues Table presented in the Scoping report, these tables attempt to give a more detailed but integrated overview of the impacts*
- *Specialist study reports.*

For ease of reference, the Table of Contents provides a guide to the status of the various sections relative to the previous report. There are considerable additional inclusions to this report.

Furthermore, to assist in gaining a background understanding to the planning process for a new transmission line, information is provided in Appendix B in the form of information boxes addressing different topics.

1. Introduction

PROCON Environmental Technologies (Pty) Ltd. has been appointed by Eskom Transmission to undertake an Environmental Impact Assessment of the proposed development of a new 400kV Transmission line between the Pegasus and Umfolozi sub-stations (near Dundee and Ulundi respectively) in Kwa-Zulu Natal. The length of the proposed line is approximately 80km and will be an extension of the proposed new 400kV line from Athene (Richards Bay) to Umfolozi. An EIA has already been undertaken for this line and is currently awaiting a Record of Decision.

A significant increase in short-term demand in the greater Richards Bay area has necessitated that Eskom Transmission undertake the design and construction of the new Pegasus-Umfolozi 400kV line under an accelerated programme. This requirement is similarly imposed on the Environmental Impact Assessment (EIA) for the development and a very condensed study programme is currently being followed.

To achieve this programme it has been necessary to carefully review the requirements of the current regulations, and NEMA. The resulting study process has not followed the conventional approach. In particular, the Scoping and EIA phases are set to run in parallel for the first period. Hence, a draft Plan of Study for EIA was submitted as an appendix to the Plan of Study for Scoping.

For the purposes of transparency, the Plan of Study for Scoping was released for public scrutiny and comment at the beginning of November 2001. Prior to this, it was also discussed in detail with the Department of Agriculture and Environmental Affairs, KwaZulu Natal (DAEA) and a consulting legal advisor. The closing date for public comments was the 30th November, and the Scoping Report was issued to the authorities on the 10th December.

The Plan of Study for Scoping (published October 2001) highlighted the intended parallel Scoping and EIA processes in this study, and this was confirmed in the Scoping Report. Hence, this Draft EIR follows closely on the publication of the Scoping Report.

2. Nature and Extent of the Development

The proposed development of a new 400kV Transmission line will extend some 100km from the Pegasus sub-station (28° 14' 56"S, 30° 19' 35"E) near Dundee to the Umfolozi sub-station (28° 12' 52"S, 31° 11' 13"E) just northwest of Ulundi in Kwa-Zulu Natal (Figure 1). In addition to the new line, it will be required to equip the Pegasus sub-station to receive the line. It is understood that the upgrade will be carried out within the existing sub-station high voltage area, where an existing bay will be equipped (see Figure 2). No significant environmental impact is anticipated

as a result of this. At the Umfolozi end, the new line will pass through the Umfolozi sub-station, and will connect directly to the planned 400kV line linking Umfolozi to Athene sub-station near Richards Bay (see Figure 3). As at Pegasus, there is little physical change required at the Umfolozi sub-station, and no significant environmental impact is anticipated. By far the greater impact at each station will be the construction of the new transmission line itself.

There are already two existing 400kV Transmission lines in the area between the Pegasus and Umfolozi sub-stations (see Figure 1). The proposed new line will be of a similar nature, though it is proposed by Eskom Transmission that cross-roped suspension pylons be used as much as possible. They are lighter in steel and therefore both less expensive and less visually intrusive than the self supporting structures that were the common method of transmission line support; eg the northern route in the study area. The existing southern line makes use of the ‘Guide-V’ pylon design, this being an advance on the self supporting structures. However, the cross-roped suspension pylon is the latest design and has been successfully used on 400kV lines in this country. In fact the last few kilometres of the southern line near Umfolozi has this pylon design.

The cross-roped suspension tower has its limitations, however, and bends greater than 3° and steep ground will require that the stronger strain tower and self supporting designs are used. The sketches in Figures 4a to 4c give an indication of the tower types that are likely to be used on the proposed line.

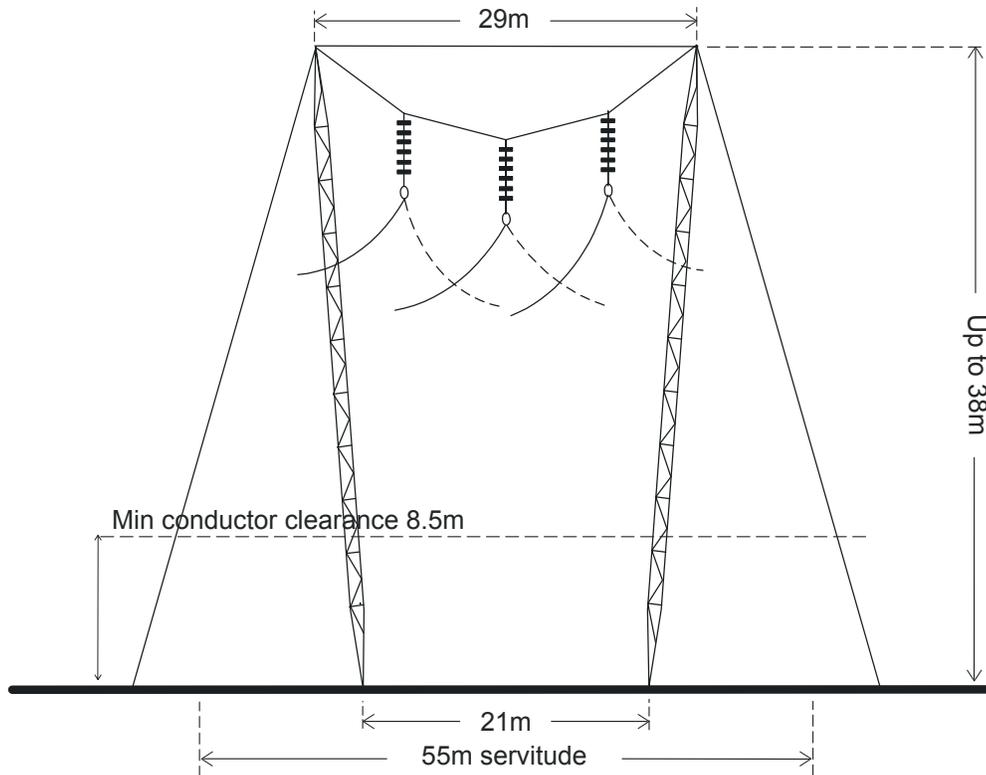


Figure 4a: Cross-roped suspension tower design

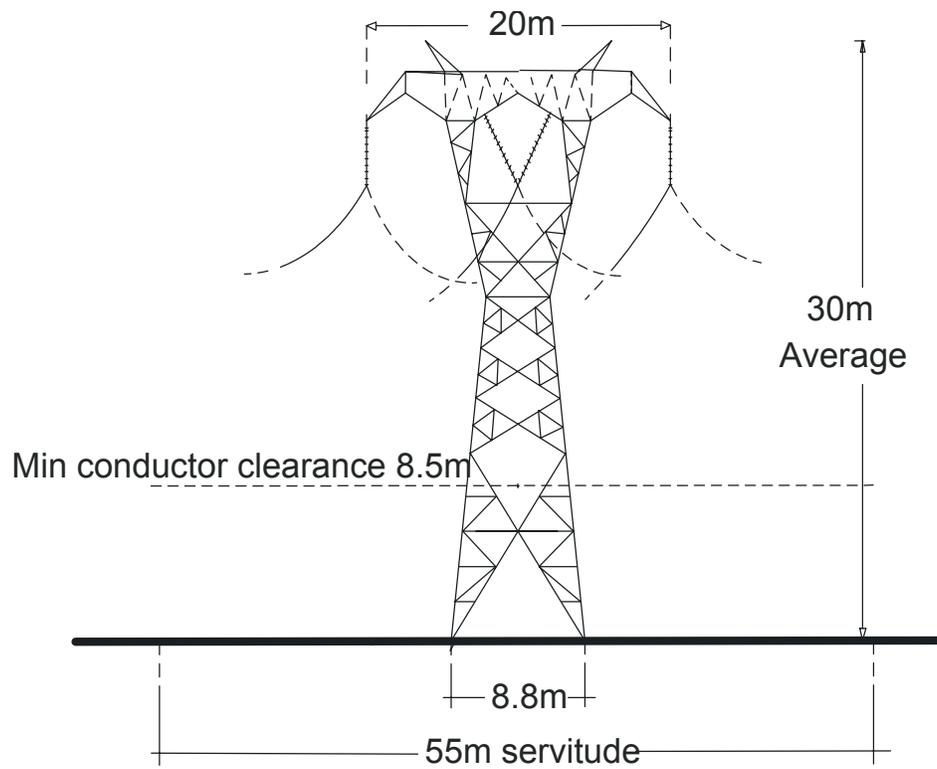


Figure 4b: Self supporting tower design

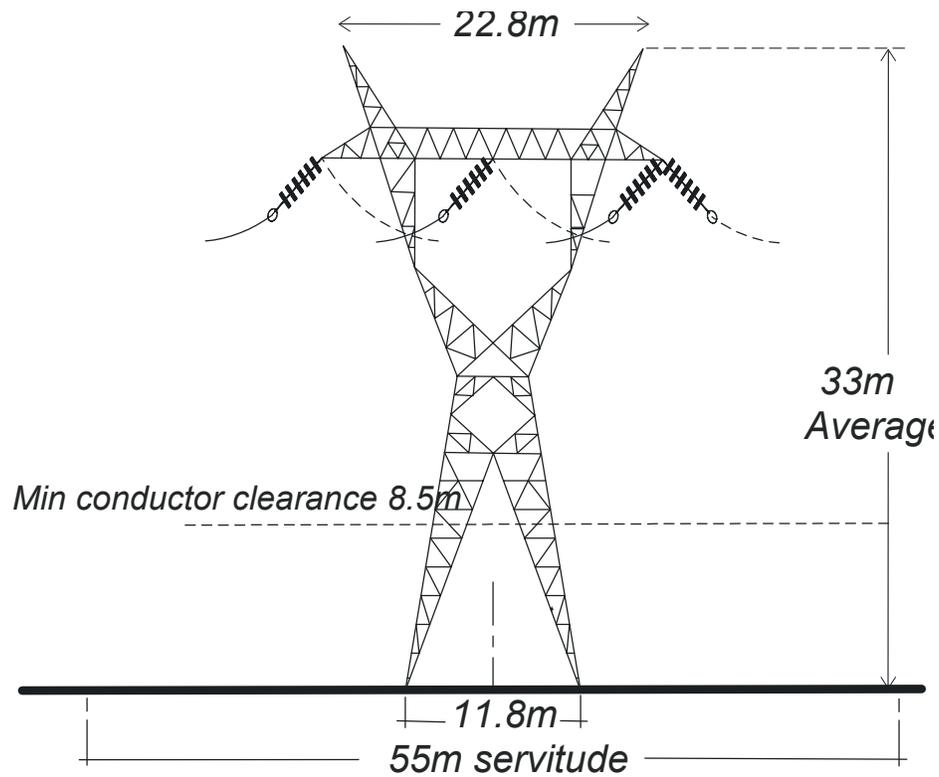


Figure 4c: Strain tower design

The main features of the different tower designs are shown in the sketches. Tower heights vary dependent on terrain and tower spacing such that the minimum clearance requirement is ensured. Typical tower spacing is 450m. The cross-rope suspension tower is more limited in its height range.

The standard servitude width is 55m for 400kV transmission lines. The servitude is required to ensure the safe construction, maintenance and operation of the line, and thereby entitles Eskom Transmission certain rights (eg unrestricted access). Information on servitudes and servitude negotiation is presented in Appendix B.

A vehicle access route is usually established along the entire length of the servitude (typically along the centre line), though environmentally sensitive areas and difficult terrain (eg steep or very rocky areas) may require alternative access methods (eg on foot or by air in exceptional circumstances) the access roads

Servitude Negotiation and the EIA Process

The process of establishing a servitude is independent of the EIA process, and it is important that the aims of the two processes are seen as separate. They share a common cause (the construction and operation of a transmission line) and may share common landowner databases, but they have different aims. Refer to Appendix B for further information.

will be established during the construction phase and are more established by vehicle passage than by grading or blading. Details of the Construction process are presented for information in Appendix B.

3. Project Motivation

The project motivation details both the need for the new 400kV Transmission line and an understanding of the study programme targets in the context of the rapid economic and energy demand growth of the Richards Bay area.

To support this growing demand, Eskom Transmission will need to both improve the reliability of the existing network and ultimately upgrade its capacity. This proposed new 400kV Transmission Line from the Pegasus Sub-station near Dundee to the Umfolozi Sub-station near Ulundi forms part of a phased process of upgrading the National Grid in the region, but with a particular focus on the Richards Bay area. This Environmental Impact Assessment follows one for the Umfolozi-Athene route between Umfolozi and Richards Bay, this EIA having been completed and submitted earlier in 2001.

The planning process is subservient to predictions of future energy demand requirements that are themselves at the mercy of the variability of market forces. The uncertainty of energy growth predictions, coupled with time consuming servitude establishment, and transmission line design and construction programmes, can sometimes lead to considerable pressure on the planning process for the establishment of a new line. Due to recent changes in the energy demand in the Richards Bay area, the proposed development of the Pegasus-Umfolozi 400kV Transmission Line has been brought forward with some urgency.

It sets out the need for the new line in the broader context of the energy demand growth and reliability of supply in the region is discussed below, and identifies a very significant short-term demand that places urgency on the planning, and therefore EIA, process.

3.1 The Need for the Pegasus-Umfolozi 400kV Transmission Line

The main source of electrical energy in South Africa is found in the Mpumalanga coal fields. The relatively low cost of coal has historically made it economic to build large power stations in this area and transmit the power over large distances by the use of Power Lines. The spare capacity available within these power stations means that these stations remain to be one of the main alternatives considered when growing energy demands are to be met anywhere in the country.

Various alternatives have been considered in the evaluation of the need for the proposed Pegasus-Umfolozi line, and include demand management and alternative power generation sources. These will be discussed in more detail in the EIA reports, though the conclusion is that, to meet the anticipated demands within the current planning horizon, the upgrade to the existing

transmission network will provide the most economic and reliable solution. This is set out in more detail below.

The Richards Bay area is characterised by the existence of large industries which take advantage of the nearby deep harbour facilities. The electrical load in this area has reached a level equivalent to the Durban and Pietermaritzburg City loads together and is close to the reliable capacity of the existing network. Under these circumstances there are two reasons to provide additional transmission capacity in the Richards Bay area;

- ▶ to ensure for reliability of supply and
- ▶ to provide for increased energy demand in the future.

3.2 Need for ensured reliability of supply

As the transmission network reaches capacity the operation of the lines become more critical. The network is increasingly operated above its design capacity during peak periods, and two particular concerns arise:

- ▶ Energy losses increase significantly along the transmission lines
- ▶ The voltage drop along the lines increases to a point where it becomes unstable and the line 'goes down' and supply on that transmission line is lost.

When a transmission line 'goes down' it is normally possible to re-route the electricity via other lines in the network. However, when the network is already close to operating at capacity there is greater risk that the entire network will 'go down', cutting supply to the region.

For the same reasons, routine maintenance on the transmission network becomes restricted, resulting in the deterioration of the network over time, and this in turn will also affect performance.

The need for a reliable supply in the Richards Bay area is of particular importance due to its significance as a major industrial centre. Apart from lost production time that can have serious impacts on the sector as a whole, there are significant cost and environmental implications if power dips or power losses occur. For example, power dips affect linear production processed as the timing of machinery operations can be affected, resulting in losses in both material and production time. Additionally, air scrubbers and treatment processes are similarly affected by disruptions in electricity supply, resulting in emissions and discharges of untreated waste. Such incidences occurred recently in the area, and were due to electricity supply disruption.

Eskom Transmission has taken measures to optimise the existing Transmission system so that the construction of new lines and associated infrastructure will occur only when needed.

However, these measures are limited and it is now necessary to provide additional capacity in the network to ensure reliability of supply. It is therefore proposed to provide an additional 400kV Transmission line to the Richards Bay area.

3.3 The need to meet growing energy demands in the Richards Bay area

As indicated above, the Richards Bay area is a significant, and growing, industrial centre of South Africa and has similarly significant energy demands. The predictions on energy demand growth are made and reviewed on a regular basis such that the need for additional transmission lines and associated infrastructure can be planned. Typically, energy demand growth is based on an estimated annual growth rate, currently 2%. However, in industrial centres such as this the introduction of a single plant may introduce a significant step up in energy demands, raising the demand well above the predicted rate of growth in a very short time period.

Eskom Transmission's planned infrastructure developments for the short-term included the proposed 400kV Transmission line from the Umfolozi sub-station to the Athene sub-station at Richards Bay. An EIA has been completed for this line and is currently awaiting environmental authorisation.

However, it has become apparent that, with the anticipated extension of the Hillside Aluminium smelter and current development of the TICOR plant, the energy demand will be significantly higher than planned for the short-term. To meet this demand, and ensure reliability of supply, it is proposed to extend the proposed 400kV Transmission line from Umfolozi to the Pegasus sub-station – the subject of this document.

It is expected that the TICOR plant will require electricity supply in 2002. The planned extension of the Hillside Aluminium smelter in Richards Bay achieved environmental authorisation and is planned to start operation in February 2004.

The construction programme for the Pegasus-Umfolozi 400kV Transmission line and associated upgrade at Pegasus Sub-station would be 12 months. With an additional lead-in time for design and the ordering of equipment from overseas of another 12 months, this brings the programme date for the EIA back to the 1st February 2002. It therefore becomes critical that a Record of Decision is achieved by February 2002.

3.4 EIA's and the Planning Process for Transmission Lines

The EIA process has become an important part of the planning process of a new transmission line. The various information presented in Appendix B provides an overview of the processes involved.

The EIA process forms part of the initial planning stages of the line. Route alternatives are identified, and the number of options are narrowed down as the EIA progresses. Provided no 'No-Go' issues are found in the process the EIA will present the authorities with a preferred route for environmental authorisation.

While there should be reasonable confidence in the feasibility of the preferred route, there may occur events in subsequent elements of the planning process that may require alteration to the route that has received authorisation. These may include:

- Detailed design reveals a technical problem that will require excessive cost to resolve (eg further site investigations show ground conditions to be too unstable).
- During the course of the negotiation process a landowner on the route requests that the line be shifted 2km to the other side of his property.

Provided such requests are not unreasonable, it is fair to investigate local adjustments to the authorised route, and this may occur at a number of points along the route. In this case the Department of Environmental Affairs and Tourism, or their provincial office, will be informed and, if necessary they seek comment from the environmental consultant. Provided the deviations are not outside the original study area, the consultants' assessment of the situation may be straight forward, and the original authorisation may be amended.

If the deviation is far outside the original study area, the environmental consultant may be required to undertake further investigation. The extent of this would need to be judged under the circumstances.

Once the design and negotiation processes are complete the planning process is largely complete.

3.5 Study Area and Route Alternatives

Given the start and end points of a proposed line, the extent of the study area and the selection of routes within the study area should be done with consideration for the biophysical and social environments. Typically, this is an iterative process that gives consideration to such aspects as ecological impact, social impact, visual impact, technical feasibility and cost. Even though these aspects are covered at a preliminary planning level, the iterative process can be a significant element of the EIA study programme. There can be an almost infinite number of routes between any two points.

However, due to the existence of two 400kV transmission lines between the Pegasus and Umfolozi sub-stations, the process of study area and route selection has been simplified. It is

Eskom Transmission's preference to run parallel to one of the existing lines as this will assist the processes of construction, operation and maintenance. Similarly, it is also the consideration of the environmental consulting team that there is greater opportunity for minimising environmental impacts by following one of the existing lines.

The routes and study area were therefore set on this basis at the start of the study, and the outcome of the Scoping Phase has tended to support the view that environmental impacts will be minimised by following the one of the existing lines. The study area, as depicted in Figure 1 extends beyond the existing lines to allow for local diversions where biophysical or social issues dictate. It also indicates that the area between the two lines is included in the EIA study, the consideration here being that it may also be preferable, environmentally, to cross over from one line to the other.

Following the investigations during the Scoping Phase, the route alternatives that have been identified for further study include:

- Option A Parallel to the northern line between the Pegasus and Umfolozi sub-stations
- Option B Parallel to the southern line
- Option C Following the southern line from Pegasus, but crossing to the northern line at a point two-thirds of the way to Umfolozi (this occurs at a narrow point between the two lines)
- Option D Following the southern line, but with a straight line deviation to the south of the line near Umfolozi (approx the last quarter of the route to Umfolozi)

The "Red Flag" Map in Appendix P depicts the different options.

3.6 Strategic Alternatives

No Go Alternative

A primary motivation for both the development and its implementation programme is the need to provide a reliable supply to the industrial node in the Richards Bay area. The existing network is operating close to capacity, meaning that meeting the additional demand anticipated in the short-term cannot be guaranteed on a reliable basis. To this extent the No Go alternative will delay the economic growth of the Richards Bay industrial area, and this in turn will impact on the region as a whole. The implications of such a delay in the short-term is seen to be significant.

Alternative sources of Power

Currently 90% of South Africa's power is generated in the Mpumalanga region, and spare capacity is understood to exist.

Alternative sources of power generation on a scale suitable to meet the energy needs of the larger centres in the country, including Richards Bay, are still in the early stages of testing and development. These include nuclear power generation using the Pebble Bed Modular Reactor technology (currently the focus of an EIA in the Western Cape), and the use of gas resources. The latter is showing greater potential as more resources are identified in Mocambique and Namibia, but the planning horizon for the establishment of a gas fired power station in the Richards Bay area would compromise the short-term need for increasing energy in the area.

Other alternatives such as wind and solar power generation are seen to be too small scale at this stage to be viable alternatives for this area.

Figure 1: Study Area Map

4. EIA Study Programme Motivation

It is therefore the aim of the developer, Eskom Transmission, to achieve a Record of Decision by the 1st February 2002. The motivation for such a condensed programme is drawn from the discussions above, and is summarised as follows:

- 4.1. The significant growth in short-term energy demand foreseen in the greater Richards Bay area requires that the existing Transmission network be upgraded for reliability and additional capacity.
- 4.2. The development of the new Pegasus-Umfolozi 400kV Transmission line is a key element of the upgrade of the transmission network, in conjunction with the proposed Umfolozi-Athene 400kV Transmission line development.
- 4.3. **There is now considerable experience and understanding of the benefits, impacts and mitigation of transmission lines on the environment.** A comprehensive list of Issues could therefore be drawn up at an early stage in the EIA, and the specialist studies could be streamlined. It was therefore seen to be possible to shorten the EIA study process.
- 4.4. Given the above, it is considered that a shortened EIA process will not compromise the requirements of the current regulations and NEMA. The proposed shortened process will be important in ensuring that the necessary reliable supply can be provided to support the foreseen short-term increase in demand due to increased economic activity and development in the Richards Bay area.

It was recognised that the condensed EIA study timeframe needed to be supported by the authorities and the I&APs. However, the proposed EIA process (see separate document) is seen to comply with the regulatory requirements and NEMA, and the process is considered reasonable and the target date achievable. Key Stakeholders and Interested and Affected Parties were given the opportunity to comment on the proposed process. In particular, the Key Stakeholders supported the process at a Key Stakeholder Workshop held in Dundee on 14 November 2001.

5. Study Process

The proposed study process is summarised in the Project Time-Line presented below. It is based on the process set out in the EIA Guideline Document published by the Department of Environment Affairs and Tourism in April 1998. However, due to the very condensed project programme timeframes (Section 3: Project Motivation), it has been necessary to optimise on the main elements of the process.

The Project Time-Line (Table 1) breaks up the main activities into weekly periods. The three principal elements to the process remain:

- ▶ Pre-consultation phase
- ▶ A Scoping Phase (detailing the process followed in the public domain.)
- ▶ An EIA Phase which overlapped with the 'Scoping Phase' in that specialist fieldwork is undertaken in preparation of a draft EIR.

It is by running the Scoping and EIA phases in parallel that allowed the time-line of the study to be shortened.

The following were considered in planning the process.

- i. There is concern regarding the adoption of a 'mini-EIA' Scoping process on a project of this nature. Firstly, there is growing resistance to this shortcut in the EIA process and, from experience, achieving environmental authorisation on the basis of the Scoping phase alone has proved to be a protracted process in many cases. Hence the methodology shown in the time-line still follows the full EIA process, albeit still with modifications.
- ii. In support of the Scoping process, the Plan of Study for Scoping was published for public review. This included a list of environmental issues common to Transmission lines, and assisted I&APs and the authorities in identifying issues applicable to the study area. It was also presented to DAEA (KZN) for comment.
- iii. The public review period for the Plan of Study for Scoping was supplemented with focus group field visits, meetings with farmers associations, and with the AmaKhosi tribal councils possibly affected by the proposed transmission routes. The environmental issues were discussed at each of these meetings. These are further detailed in the Public Participation Programme Chapter.
- iv. This Scoping Report is a culmination of the above process and sets out a list of all issues specific to this development, and will include all those raised during the review period and the various consultation meetings described above. The Scoping Report will be presented to the DAEA only. As the Draft Environment Impact Report will follow the Scoping Report shortly, Key Stakeholders agreed at the Key Stakeholder Workshop

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- that they would prefer to receive only the Draft Environmental Impact Report for comment.
- v. The Scoping Phase has overlapped with the start of the Assessment phase during which the key specialists carried out their detailed investigations. These investigations are identified through past experience on Transmission line developments, were required by Eskom Transmission and the environmental consultants in any event. It is acknowledged, however, that there may be additional study requirements identified during the Scoping phase, and may require that the specialists revisit the study area after Scoping.
 - vi. Following the above, a draft EIR will be prepared. This will list and address issues raised by the public, will present the specialist reports, and will present an assessment of the impacts. This draft EIR will be released in the public domain for comment.
 - vii. The Christmas/December holiday period has a significant impact on the programme, limiting much of the time available for public consultation and liaison with authorities. However, it is intended that there will be feedback meetings with the AmaKhosi and one feedback meeting for the wider public towards the end of the EIR review period.
 - viii. In addition to the public involvement process described very briefly above, the environmental consultant remains open to other opportunities to engage with I&APs in the area. Such opportunities will be kept under review for the duration of the study.

Thus far the process has been acceptable to the authorities and public alike, and is proceeding in accordance with the time-line in Table 1.

Table 1 : Proposed Project Time-Line

Week	Scoping Phase	EIA Phase
12 Oct	Contract award.	
15 Oct	Prepare application consultation Meeting with DAEA-KZN (18 th Oct) – submit draft PoS - agree process Submit Application	
22 Oct	Finalise PoS Scoping and submit to DAEA PoS Scoping to include: ▶ List of key I&AP's ▶ BID ▶ List of generic issues ▶ Draft PoS EIA	Prepare draft PoS EIA
29 Oct	Place adverts Distribute PoS Scoping to key I&AP's, libraries, public locations, etc	Prepare ToR's for specialist studies
5 Nov	Begin public consultation (<i>Focus Group meetings, etc.</i>)	Begin specialist studies
12 Nov	.....continue the above	.....continue the above
19 Nov	.....continue the above	.....continue the above
26 Nov	.....continue the above Deadline for I&AP comments 30 Nov.	.....continue the above
3 Dec	Prepare & Issue Scoping Report to DAEA: ▶ Complete list of issues ▶ I&AP Comment & Response Doc ▶ I&AP meeting notes	Review EIA study needs Finalise PoS EIA , & submit to DAEA Authority review
10 Dec		Undertake additional specialist work if required. Preparation of draft Environmental Impact Report (EIR)
17 Dec		Issue draft EIR to DAEA & I&APs
24 Dec		.....public & authority review
31 Dec		.....public & authority review
7 Jan		.....public & authority review
14 Jan		.....public & authority review Deadline for I&AP comments 17 Jan.
21 Jan		<u>Finalise EIR</u> Issue to DAEA – target date 23 Jan 2002
28 Jan		Consideration of Application
1 Feb		<u>Award of RoD</u>

6. Assumptions and Limitations of the Study

There are several assumptions and limitations on which this study approach has been based. These are detailed below:

6.1 Assumptions

- ▶ All information provided by Eskom Transmission and I&APs to the Study Team was correct and valid at the time it was provided.
- ▶ There would be certain iterations to the public participation programme that would need to be accommodated by Eskom Transmission, the Study Team, the authorities and the I&APs.
- ▶ It is not possible to involve all Interested and Affected Parties themselves. Rather, every effort has been made to involve as many broad base representatives of the stakeholders in the area. An assumption has therefore been made those the representatives with whom there has been communication, are acting on behalf of the parties that they are representing.

6.2 Limitations and concerns

- ▶ Despite an agreement by the Authorities to proceed with the revised approach, the tight time frames within which the EIA has to be conducted could still present some challenges in the public domain in terms of process.
- ▶ The traditional approach to communication within the tribal areas insisted on by the Amakhosi, and respected by the Public Participation Consultant, could present problems from some sectors, (e.g., business) in terms of sufficient consultation, despite every effort being made by the consultant.
- ▶ The negotiation process between Eskom Transmission and certain Landowners commenced prior to the commencement of the Public Participation Programme and Servitude Options have been signed with some landowners on the southern route. This unfortunately has resulted in a reticence on the part of the landowners to participate in the EIA process. The assumption can be made that the landowners who have signed the Servitude Option accept that the line will traverse their properties and that any issues and concerns will be raised as part of the conditions of the servitude agreement, thus ensuring any issues that landowners have not raised directly with the Public Participation team, will be recorded at another level.

7. Public Participation Programme

7.1 Introduction

The objective of this section is to provide an overview of the Public Participation Programme conducted for this EIA. While a complete account of this process is provided in Appendix C1, this section provides a summary of the principles and the methodology. The report on the Public Participation Programme allows the Authorities to assess the process followed in terms of its effectiveness, appropriateness and transparency, and in terms of environmental legislation.

The aim of the Public Participation Programme was to establish efficient communication channels that would allow all Interested and Affected Parties the opportunity to participate meaningfully and timeously in the tight time frames of the adopted process in which the Scoping and EIA run parallel. Considering the nature of the proposed EIA approach, it was considered prudent to appoint an independent Environmental Lawyer to the team to serve as an internal reviewer and to also ensure public accountability. Importantly, the Authorities and Prof Ridl, approved and supported this approach. To ensure due process in the public domain, Prof Ridl has been consulted and has provided written reviews at key junctures in the Scoping phase. These reviews have been included in Appendix G.

7.2 Principles of Public Participation

As the Public Participation Programme is an integral part of Integrated Environmental Management (IEM), the same IEM principles should be applied. These principles, as listed by Department of Environmental Affairs and Tourism (DEA&T) and that are relevant to the public involvement have been adopted in the Public Participation Programme:

- ▶ Meaningful and timeous participation of Interested and Affected Parties.
- ▶ Focus on important issues.
- ▶ Due consideration of alternatives.
- ▶ Accountability for information used for decision-making.
- ▶ Dispute/conflict resolution will be handled as prescribe by relevant legislation.
- ▶ Application of “due process” particularly with regard to public participation in environmental governance as provided for in the Constitution.
- ▶ Inclusivity: the needs, interests and values of Interested and Affected Parties must be considered in the decision-making process.

The condensed time-line placed greater emphasis on integration of the above principles in the proposed approach. It was important that the Study Team recognise the necessity to review the initial methodology contained in the Plan of Study for Scoping. Discussions with Key Stakeholders, Traditional Authorities and Farmers' Associations contributed to a revision of the revised approach detailed in Appendix C1.

7.3 Methodology

In adopting the abovementioned IEM principles, and taking into account the revised strategy, the activities that were developed for the Public Participation Programme are listed below and further discussed in Appendix C1.

As the Public Participation Consultant, Procon Environmental Technologies was both proactive and reactive in its approach and its communication function focused on the following activities:

7.3.1 Meetings

- ▶ Focus Group Discussions
 - Farmers' Associations.
 - Tribal Authorities.
- ▶ Key Stakeholder Workshop
 - Farmers' Associations.
 - Tribal Authorities.
- ▶ Individual discussions with key stakeholders

7.3.2 Services

- ▶ Establish and maintain a Register of Interested and Affected Parties.
- ▶ Distribution of documentation (e.g. the Background Information Document and the Draft EIR).
- ▶ Assistance to stakeholders.

7.3.3 Products

- ▶ Background Information Document
- ▶ Notification material
- ▶ Key Stakeholder Information Package
- ▶ A project Website.
- ▶ The Public Participation Programme Report.
- ▶ Public Accountability Review

7.4 Interested and Affected Parties Consultation

In evaluating the responses and available time frames and based on discussions with the Authorities and Prof Ridl, it was necessary to implement a communication strategy that would provide sufficient opportunity for Interested and Affected Parties (I&APs) to participate meaningfully in the study. Understanding that not all I&APs would show willingness or a capacity to participate, key stakeholders and stakeholder representative groupings were identified and structures set in place to facilitate discussions.

Notwithstanding the above explanation, special attention was given to potentially directly affected landowners, as such, Farmer's Associations representing landowners in the study area were identified and separate meetings were held with the respective chairpersons. There is an overlap between the EIA process and the Eskom Transmission Landowner negotiation process (further discussed in Information Box ???). As such, it was initially intended to optimize on the consultation process, but it became apparent that landowners did not understand the independent nature of the EIA and the negotiation process was placed on hold. This is further discussed in Appendix C1. A Landowner map (Map 3) records the Landowners identified and contacted.¹

Similarly, the PPP team recognised the AmaKhosi's authority in the study area and understood that a different consultation approach would be required, without compromising the EIA process. As such, the PPP consulted the two AmaKhosi at the initial stages of planning and agreed to use only their channels to disseminate any study information. This communication channel was followed throughout the process and separate meetings are being held with the respective AmaKhosi to facilitate comment on this Draft EIR.

The necessity to hold separate meetings for the policy/decision makers and environmental groups as originally intended was reviewed. Rather, a joint Key Stakeholder Workshop was held in Dundee to encourage interaction between stakeholders representing a variety of interests and views of the proposed development. In support of the principle of inclusivity, a special effort was made to meet with key stakeholders who could not attend the workshop.

¹ There have been some inconsistencies with information received from landowners in terms of farm names and portion numbers compared to that received from the Deeds office. However, this information is more relevant to the Eskom Transmission negotiating team, and the Public Participation team focuses on identifying all the potentially affected landowners rather than the legal information

Importantly, the workshop discussions provided valuable input to the initial Scoping and helped focus the PPP process and specialist studies for the EIA phase. In particular, the Key Stakeholders agreed that as the Scoping Phase had been robust and as such, it was not necessary to distribute the Scoping Report and that this Draft EIR would suffice. Thus, this report is being made available for public comment to key stakeholder groups, various public venues, on the Eskom website and as stated previously, will be discussed with the AmaKhosi.

A comprehensive analysis of the various Public Participation Programme activities is provided in Appendix C1.

8. Specialist Investigations

8.1 Overview

As indicated previously, wider experience on EIAs for Transmission lines has provided a considerable understanding of the potential impacts and mitigation/minimisation measures arising from these developments. Hence, the EIA phase and associated specialist studies were initiated in parallel to the Scoping phase. For this reason, a draft Plan of Study for EIA was presented as part of the Plan of Study for Scoping and published for both authority and public inspection and comment.

To date the EIA process has been undertaken as proposed in the Plan of Study for Scoping. The Scoping Phase has been completed and a Scoping Report submitted. At the same time specialist investigations were carried out in the parallel EIA phase. The output from the Scoping exercise integrated with the EIA studies and this Draft EIR has been prepared. The stages in this process is set out in the sections below. The final Plan of Study for EIA is included Appendix E for reference, and is the same as that presented with the Scoping Report bar the correction of errata.

8.2 Specialist Studies

The following specialist studies were undertaken. The specialists involved are included for reference.

Role	Company and key personnel	Experience summary	Transmission line experience	Experience in area
Ecology (fauna and flora)	Indiflora Environmental Services – Johan Bodenstein	Has particular experience with linear developments, and good knowledge of the area.	√	√
Avi-fauna	Endangered Wildlife Trust – Kevin McCann	Extensive research on the impacts of transmission lines on birds	√	√
Socio-economic	Afrosearch – Brian Magongoa, Kay Brügge	EIA and SIA experience on Eskom Transmission and other projects, and specific experience in the area	√	√
Archaeology & Culture	Screening exercise undertaken by AMAFA – Annie van de Venter	Authority responsible for archaeology and cultural heritage in KwaZulu-Natal. Extensive research database for the area.		√

Visual impacts	Cave Klapwijk Associates – Menno Klapwijk	Specialist in visual impact analysis and experienced in transmission line studies	√	
Soils and geology	Kay Environmental – Kayode Okesanjo	Specialist in soil contamination and erosion, and experienced in Eskom Transmission developments	√	

The above team has been part of the public information documentation. No queries regarding any of the specialists have been received.

8.3 EIA Phase Process

The timing of the EIA Phase is set out in Table 1: Proposed Project Time-Line (Section 5). While there has been no change to this time-line, it is worth detailing the study process to date.

End October	Appointment of specialists, and introductory workshop. Description of Transmission line planning and construction process, and generic issues.
1 – 13 November	Desk-top research. Working map preparation.
13 November	Study team site visit. 2 nd integration workshop. Discussion of generic issues in relation to site conditions. Preliminary 'Issues Map' prepared. (<i>This working document was also presented to attendees at the Key Stakeholder Workshop on the 15th November</i>).
14 – 30 November	Detailed specialist investigations. Preparation of draft specialist reports.
3 December	3 rd Integration workshop. Presentation of specialist studies, integration of assessments, review of significance ratings, consideration of public comments and issues to date.
3 – 10 December	Finalisation of specialist reports and mapping.
8 – 15 December	Compilation of the Draft EIR
18 December	Distribution of Draft EIR for public comment

The comment period for the Draft EIR is 30 days, ending on the 18th January. Thereafter the report will be finalised and submitted to the authorities for a decision.

8.4 Review of the Impact Assessment Criteria

As indicated above, there was a review of the Impact Assessment Criteria at the last integration workshop. This was to ensure a common approach to the assignment of significance ratings. However, the review also identified the need to redefine the significance ratings, as the original definitions gave rise to different interpretations.

The revised definitions are presented in Appendix F. In summary, there were two main alterations made to the significance ratings (all other criteria remain unchanged):

- Significance ratings should be independent of mitigation potential (instead the 'before' and 'after' mitigation ratings will address this, and
- It was considered that impacts may be of a high significance, but should necessarily stop the project (as suggested by the original definition). Instead a 'No-Go' rating is included in the range of significance ratings and indicates that the development should not proceed.

The levels of impact significance therefore now include (see Appendix F):

- None
- Low
- Moderate
- High
- 'No-Go'

To highlight problem areas spatially within the study area, a map of 'No-Go' and 'Red-flag' areas has been produced. The 'Red-flag' areas indicate those areas where particular environmental concern has been raised in the study, and generally includes those areas that are rated at moderate and high levels of impact. These are presented in more detail in the Section 9.

8.5 Reporting Approach

The specialist reports are presented in Appendices R to W (see Table of Contents). These are independent reports though it is recommended that they are read in conjunction with the main report to gain an integrated overview of the assessment.

It is the duty of an EIA to achieve an integrated and balanced view of the environmental impacts and mitigation such that a decision may be made and understood by the authorities. However, the task of integrating the assessments is complicated, and relies on a level of understanding of the EIA process and the assessment criteria by the reader. It is important therefore that the reader is familiar with the approach, methodology and impact assessment criteria for the study.

8.5.1 Levels of Reporting

The report on the EIA is presented here at three levels:

Overview level: For readers seeking a general understanding of the assessments undertaken and the decision making process.

These readers need to refer to the main report, and in particular the sections to follow.

- Intermediate level:** For readers seeking greater detail in all of the issues addressed. These readers need to the main report and the Impact Tables in Appendix D.
- Specialist level:** For readers with specialist knowledge of either location, environmental issue or specialist field, and who need a detailed understanding of the assessment undertaken. In addition to the main report and Impact tables in Appendix D, the reader will also need to refer to the relevant specialist reports in Appendices R to W.

8.5.2 Specialist Reports

The specialist reports provide a description of the receiving environment, and address a range of generic issues and issues identified in the Scoping Phase of the study. The impact assessments are based on an understanding of the proposed development during its construction, operation and decommissioning phases.

The impacts related to any one issue may vary along a route, between routes and between phases. Reporting on the issue is therefore complex, and the interested reader is requested to invest some time in gaining an understanding of the detail covered.

It is worth noting at this stage that the specialist archaeological study was undertaken at a screening level by AMAFA. Based on their knowledge of the area it was agreed that if further specialist studies were required these would be undertaken during the detailed design stage of the planning process. It was anticipated that a specialist would be appointed to undertake a site survey of critical areas once the route has been selected – ie after the submission of the EIR. This has proved to be the case and further site work will be required. This is outlined in Section 9 and Appendix V. Appendix V contains correspondence from AMAFA. Unfortunately the map indicating the critical areas was not available for publication with the Draft EIR.

8.5.3 Impact Tables

The Impact Tables presented in Appendix D are a further development on the Issues Tables presented at the Key Stakeholder Workshop, and presented in the Scoping Report. They are an attempt to distil the complexity of issues and their spatial and temporal variation as presented in the individual specialist reports.

This distillation process is important for the reader to be able to step back and get the necessary broader understanding of the proposed development and associated environmental impacts such that an informed and balanced decision may be made.

However, the reader must be cautioned that the distillation process comes at a cost of a loss of detail and the reader is still recommended to refer to the specialist reports for further detail. Furthermore, the significance ratings provided in the Impact Tables are based on an integration of the different specialist assessments where they overlap. Hence, the ratings in the Impact Tables may differ on occasion from those in the specialist reports.

9. Environmental Impact Assessment

9.1 Overview of baseline conditions and the assessment.

(general, social, socio-economic)

The study area is depicted in Figure 1: Locality Map. Almost central to northern KwaZulu Natal, the study area depicts the hilly rural landscape that is characteristic of the region. Land use in the area varies in close accordance with land tenure; the central section of the study area is primarily tribal land under the Ngonyama Trust, and includes extensive grazing lands and patches of subsistence cropping, whereas the areas to the east and west of the tribal lands are privately owned farmlands (see Map 3: Landowner Information). The latter include cultivated lands, particularly in the western areas (Dundee side), but extensive grazing is common.

(social, socio-economic)

The main urban and town centres in the study include Dundee just to the northwest of the Pegasus sub-station, Vant's Drift some 20km east of Pegasus, and the townlands of Nqutu and Nondweni. The major economic centre in the area would be Dundee, but in terms of population the areas around Nqutu and Nondweni have the greater population densities. Unemployment is a particular concern of the communities.

(socio-economic)

The area is served by a number of provincial and district roads including the R33 through Dundee, the R68 (MR36-1) through Vant's Drift and Nqutu, and the R34 (MR47-2) that passes near the Umfolozi sub-station from Vryheid. The Vryheid-Ulundi-Richards Bay railway line runs roughly parallel to the existing northern 400kV line for approximately 15km near Umfolozi.

(ecology-flora)

The greater part of the study area may be described as grassland with pockets of scrub forest and bushland. Though there are significant areas of degradation and cultivation, there are

conservation worthy areas in both the local and national context – there is a proclaimed National Heritage Site some 15km west of Umfolozi sub-station, active game ranches adjacent, and much of the area between Pegasus and Vant's Drift is part of a conservancy (Dundee Farmers Association Conservancy).

(ecology-fauna)

There are some 43 mammal species known to occur in the area of which three are either rare or vulnerable; aardwolf, honey badger and antbear. There are over 20 species of amphibia common to the area (none Red Data), six lizard species (four Red Data), 23 snake species (one – African rock python – is a Red Data specie), the Red Data Natal hinged tortoise may occur in the area, and some ten fish species are known to occur in the area (including one – Pongolo rock catlet – Red Data specie). Though the list indicates a rich and diverse faunal resource in the study area, this is seen to be decreasing. The conservation areas mentioned above lend to the protection of habitats in localised areas, but any development in the study area would need to exercise care outside of these areas as well, particularly watercourses, bush and forest ecotones, and rocky/cliff areas that provide shelter to many of these species.

(ecology-flora)

Two of the vegetation areas (Moist tall grass veld and Dry tall grass veld) are near endemic communities within the study area, and another two are endemic veld forms (Sour sand veld and Dry lowland tall grass veld). That means these specific forms of veld are not found anywhere else in the world. It gives them a notable conservation status. Activities in these endemic veld forms will need to be kept to the minimum. They are poorly represented in official conservation areas and are in need of protection measures.

(ecology-flora)

There are two threatened plants in the study area; *Albizia suluensis* (tree), and *Encephalartos msinganus* (forb). Eight species of medicinal plants are known to occur, all are protected, and three are rare. Eight alien invader species have also been identified. These are generally in localised areas, and are therefore more easily controlled, though some species are particularly persistent, including Black and Silver wattle, Lantana and Syringa.

(erosion)

The topography of the area is characterised by a dense drainage network. Combined with shallow erosive soils, there is a very significant presence of erosion throughout the whole study area and adjacent areas. The areas between Nqutu and Nondweni are particularly sensitive and now exhibit severe cases of extensive erosion. Poor land management practices, and particularly overgrazing, are the main cause of the erosion. Such is the effect of land management, even evidence of wind erosion is present. Although it has not been recorded that the existing transmission lines and their access roads are contributing to the problem, it is of concern for this development that the terrain is very sensitive to disturbance.

(ecology, soils, birds)

There are two major rivers in the study area; the White Umfolozi and the Buffalo Rivers. These are significant water resources, and are sensitive to pollution. The Buffalo River is currently showing very high sediment loading. There is also a significant amount of small wetland areas in the study area. These are characteristic of upland areas where perched water tables form in the shallow porous soils. Though often seasonal, these support a more diverse habitat than the surrounding grasslands, and are considered to be valuable in the local context. They are also highly sensitive to disturbance for the same reasons as for erosion discussed above.

(birds)

Wetlands and surface water (dams and rivers) are one of the aspects of focus given by the bird specialist. In recent years there has been greater realisation of the impact of transmission lines on birds (and *vice versa*) and there has been extensive research in this field. There are as many as 53 bird species that will interact with transmission lines in the study area, of which 14 of them are classified as 'near threatened' or 'vulnerable'. Impacts on birds may occur in three ways; collision (during the operation of the line), disturbance of habitat (especially during construction), and electrocution (though incidence of the latter is relatively low on lines larger than 275kV).

(birds)

Perhaps the greater concern of the three is the concern of bird collisions. Recent research has revealed that collisions are far more significant than first thought, impacting on several threatened bird species, including bustards, cranes, storks and various waterbird species. Habitats supporting these particular bird species are grasslands and water bodies/wetlands – both of which are well represented throughout the study area. Additionally, the duration of the impact is long-term (the lifespan of the transmission line), and mitigation measures (bird flappers, etc.) are still to provide effective for all species. There is therefore a strong motivation from this issue to closely follow one of the existing lines, where it is expected that any increase in bird collisions will be most effectively minimised.

(birds)

An issue not always given a high importance relative to other bird impacts is the potential impacts of birds on the transmission lines and, more particularly, power supply. Faecal streamers from birds perched on the tower structures above the conductors can result in an *air gap breakdown* that can cause power dips in the supply network. Such power dips can cause serious production problems in industrial centres such as Richards Bay. Mitigation measures have, however, proved effective in minimising this impact. The proposed use of the cross-rope suspension pylon is much less 'perch-friendly', and on strain towers at bends in the transmission line route, 'bird guards' can be used on the structures above the conductors (refer to Appendix T).

(socio-economic, ecology)

Tourism is an important aspect of the economy of the region. Centred mainly on a rich historical resource, this is combined with 'eco-tourism' offered by the game reserves and game ranches in the local and wider area. Although sites of historical significance are limited in the study area, tourist routes pass through the area, particularly the route from Dundee, past the Pegasus sub-station and on to Rorke's Drift.

(visual)

The visual impact assessment, though it cannot avoid a measure of subjectivity in the evaluations, is based on a comprehensive set of criteria ratings (see Appendix U). For an understanding of the criteria and their combination the reader needs to refer to the report. However, for an overview it is helpful to consider a few key factors. From a visual perspective, the topography of the study area in general is judged to be relatively flat – ie it offers limited backdrop to the line and pylons and they are more likely to be seen in silhouette. (this definition of 'relatively flat' is contrary to the earlier discussions on drainage and erosion, but the different basis for assessment must be noted here). The visual diversity is also limited, and in conjunction with the general low vegetation (less than one metre), the Visual Absorption Capacity (VAC) of the study area is low to moderate. However, there is a difference between the northern and southern routes – views of the existing northern line are slightly more confined and there is more visual 'clutter' along the northern route, particularly in the eastern sections. This suggests a lower visual impact along the northern route, again more so in the eastern sections.

(visual, social)

In parallel with this assessment, there needs to be consideration of the character and 'sense of place' of the area. This implies a more spiritual element to the visual quality of the area. Here it is considered that there is a similar character about both the northern and southern routes in the western sections of the study area – there is some aesthetic and visual merit in these areas and there is a 'loosely' defined ambience. In the central sections of the study area the ambience of the area (both north and south) appears to be lower than the sections further west, and the visual impact is therefore slightly lower. In the eastern sections there is a more marked difference between the northern and southern routes. Along the southern route the character and ambience is considered to be higher than other sections of the routes assessed, with the result that the visual impact on the 'sense of place' in this area would be the highest in the area. Preference for the new line would therefore be placed on the northern route in this section of the study area. This study takes into account the existing lines and their contribution to the character on the area.

(visual, socio-economic – tourism)

The above assessment does not include consideration of impacts on visitors to the area. There are a number of main roads in the area that carry both domestic and tourist traffic. Critical viewpoints are seen to be the district road from Dundee to Rorke's Drift, passing Pegasus sub-

station and following the southern route for approximately 10km, the R68 and district roads through Nqutu, and R34 running parallel to the northern route near the Umfolozi sub-station. Given the visual assessments described above and the existence two 400kV lines in the area, the impact on tourism is considered to be moderate to low over much of the route, though in the eastern sections it is seen to be moderate to high on the southern route. The northern route is considered to offer a lower impact rating in the eastern areas.

(archaeology)

There is a high density of recorded archaeological sites at places in the study area, and there may be similar sites elsewhere in the study area. Mainly iron-age, and though the significance of the known sites is seen to be fairly low, there will need to be more specialist involvement in further planning of any new transmission line.

(social, all)

The baseline conditions described above are best summarised by Map 2: Red Flag and No-Go areas. (see Appendix P). In developing this map it has been possible to screen the No-Go issues. These include the need to avoid churches, gravesites, schools, clinics, and places of worship. Many of these that are near to the existing routes have been identified, though it will be necessary to undertake a more detailed survey of the preferred route during the design phase to ensure that all the sites have been identified. These sites have been considered No-Go in this study as, although they will not stop the project as a whole, they are seen impose a highly disruptive and potentially distressing impact on the local communities. In all cases these sites can be avoided by local diversions of the route. However, of the No-Go sites it is mainly the gravesites that are likely to be directly affected by the new line, particularly along the northern route.

9.2 Overall preference ranking of alternatives

Based on the detailed studies, and the integration and distillation process undertaken above and in the Impact tables of Appendix B, the overall preference per specialist field has been provided by each specialist. Each are ranked according to most preferred route to least preferred route. In addition to the specialist evaluations, two technical components are included; technical feasibility and construction cost. These two components were requested from Eskom Transmission.

The broad reasoning for the different preferences is summarised as follows:

Ecology	The National Heritage Site, and sensitive woodland areas adjacent to it in the eastern sections along the southern route is the main motivation for dropping options B and D. In the western areas the northern route is more diverse and
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more sensitive than the southern route which has more agricultural disturbance. Hence option C – the cross-over option – is the most preferred.

Birds Following the existing lines provides significantly greater mitigation against bird collisions than any other concern. Hence both options A and B rank very highly, though the northern route (option A) gets greater preference as the habitat of this route is more disturbed, and there appears to be more water areas and wetlands along the southern route (which will attract more birds).

Soils Erosion is a problem throughout the study area, though the northern route appears more sensitive and is more disturbed. Instead the cross-over route (option C) is given to offer the least impact on erosion, and it also avoids the very unstable area just north of Nqutu.

Ecology	Birds	Pedology	Archaeology	Visual	Social	Technical	Cost	
C	A	C		A	B	D	D	= Most Preferred Option
B	B			C	D	B	B	
A	C	B			C	C	C	
B				B				
D	D	A						
D	D	D		D	A	A	A	= Least Preferred Option

✗
↑

A Northern Route
 B Southern Route
 C South-North Cross-over
 D Southern alternative

Archaeology Preference rating pending submission of map of archaeological and historic sites.

Visual The overriding concern here is the open and more characterful visual quality of the southern route in the eastern sections. Hence options B and D are ranked lowest. Option A gets the highest ranking due to the presence of an existing line along the entire route, though option C is also given a high preference.

Social The lower population densities along the southern route mean that most of the socially related impacts will be lower along this route. However, option C is still given a relatively high ranking given that there is not a significant difference between the northern and southern routes in the eastern sections.

Technical feasibility and cost the more complex topography of the northern route will increase the cost of the construction of the line due to construction expenses and the likely greater number of self supporting and strain towers. The southern route offers the simpler and cheaper solution, with option D being preferred due to the long straight section to the Umfolozi sub-station. Nonetheless, option C is still given a fairly high preference rating.

It is suggested from the above that, while there may be different preference for the most preferred route, there is good reason to consider option C (= the cross-over route) as being the option that offers the least impact on the environment as a whole. Further this evaluation is seen to include the technical feasibility and cost factors.

It is important to note that the archaeological considerations are not included in this assessment at this stage. Though the indications are that the overall evaluation will not change, **this assessment is pending the maps of the archaeological investigations that were not available for the release of this document.**

10. Preliminary Conclusions

Pending public and authority comment on this draft EIR, and pending the mapping of the archaeological sites, it is proposed that option C, the cross-over route, is the route that offers the least impact on the environment provided the recommended mitigation and management measures are implemented. **Option C is therefore the preferred route for the new 400kV Transmission line between the Pegasus and Umfolozi sub-stations in KwaZulu-Natal.**

There is sufficient scope for local deviation of this route to avoid the No-Go sites identified in this study, and other sensitive sites that may be identified during the design phase.

Furthermore, there is good motivation for the need for a new 400kV Transmission line and that the alternatives for meeting the growth in demand for electrical power in the Richards Bay area are not advanced enough to meet the demand in the short-term. The No Go alternative will have a direct impact on the industrial and commercial expansion of the wider Richards Bay area, particularly in the short-term, as the necessary reliability of electricity supply cannot be guaranteed by Eskom with the status of the existing network.

These preliminary conclusions are the result of an intensive and comprehensive study. This has included the parallel processes of the Scoping Phase and the specialist assessments in the EIA phase. The public consultation exercise has been extensive and every effort has been made to include representative stakeholders in the study area.

Thus far, it is considered that the study process outlined in Section 5 has been successful and has not compromised the aims of the EIA study. The process has been supported by both the authorities and Interested and Affected Parties.

The public involvement process has been running in parallel with the servitude negotiation process, but due to concerns that there may be confusion among some landowners regarding the independence of these two processes, the negotiation process has been temporarily halted. It is important that the two processes are seen as separate.

11. Preliminary Recommendations

Pending comment on this draft EIR, the recommendations arising from this study focus mainly on the role and implementation of the Environmental Management Plan (EMP).

The Impact Tables set out a comprehensive set of recommendations for the EMP, and the reader is referred to Appendix D instead of listing them all here.

The role of the EMP is seen to be vital to the successful implementation of the various mitigation measures that have been recommended (Appendix D). There are considered to be three key measures to ensure the effective implementation of the EMP:

- Clear identification of responsibilities for the implementation of the EMP
- Appointment of adequately experienced or trained staff for the implementation of the EMP
- Application of the EMP for all phases of the life of the new line, including design, construction, operation and decommissioning.

It is worth noting that the EMP is intended to be a working document and, in compliance with ISO 14001 requirements, the EMP should be reviewed and updated on a regular basis throughout the life cycle of the development. It is therefore appropriate that the content of the EMP should give focus to current operation and planning purposes.

Specific to this development, it is recommended that further specialist involvement is employed during the design and construction phases:

- Specialist botanist to survey the preferred route to identify sensitive and endangered plants, including medicinal plants

-
- Archaeologist with experience in the Iron age to survey the preferred route to assess the site specific impacts on sites on the route, particularly the tower footings.
 - Specialist ecologist to inspect tower footings in sensitive areas
 - Specialist ecologist to assist in the identification of seasonal wetlands along the preferred route.
 - Bird specialist to review placement of 'bird flight diverters' at key locations along the preferred route.

It is also recommended that the process of communication and consultation with community representatives is maintained after the award of environmental authorisation, but particularly during the construction phase.



12. Further Activities envisaged

This draft EIR is published for public and authority review. The closing date for comments is the 18th January 2002, after which it is intended to finalise and submit the Final EIR to the authorities for approval.

It is intended to present the findings of the this draft EIR to the AmaKhosi in January 2002, prior to the closing date for public comment.

In the interim, the archaeological screening study will be finalised and included in the final EIR.



13. Concluding Remarks

The study process adopted for this study is considered to remain robust, and a comprehensive EIA and public participation process has been achieved to date. Though the Christmas period occurring during the comment period is of concern, it is considered that reasonable time is available for public review of the draft EIR.

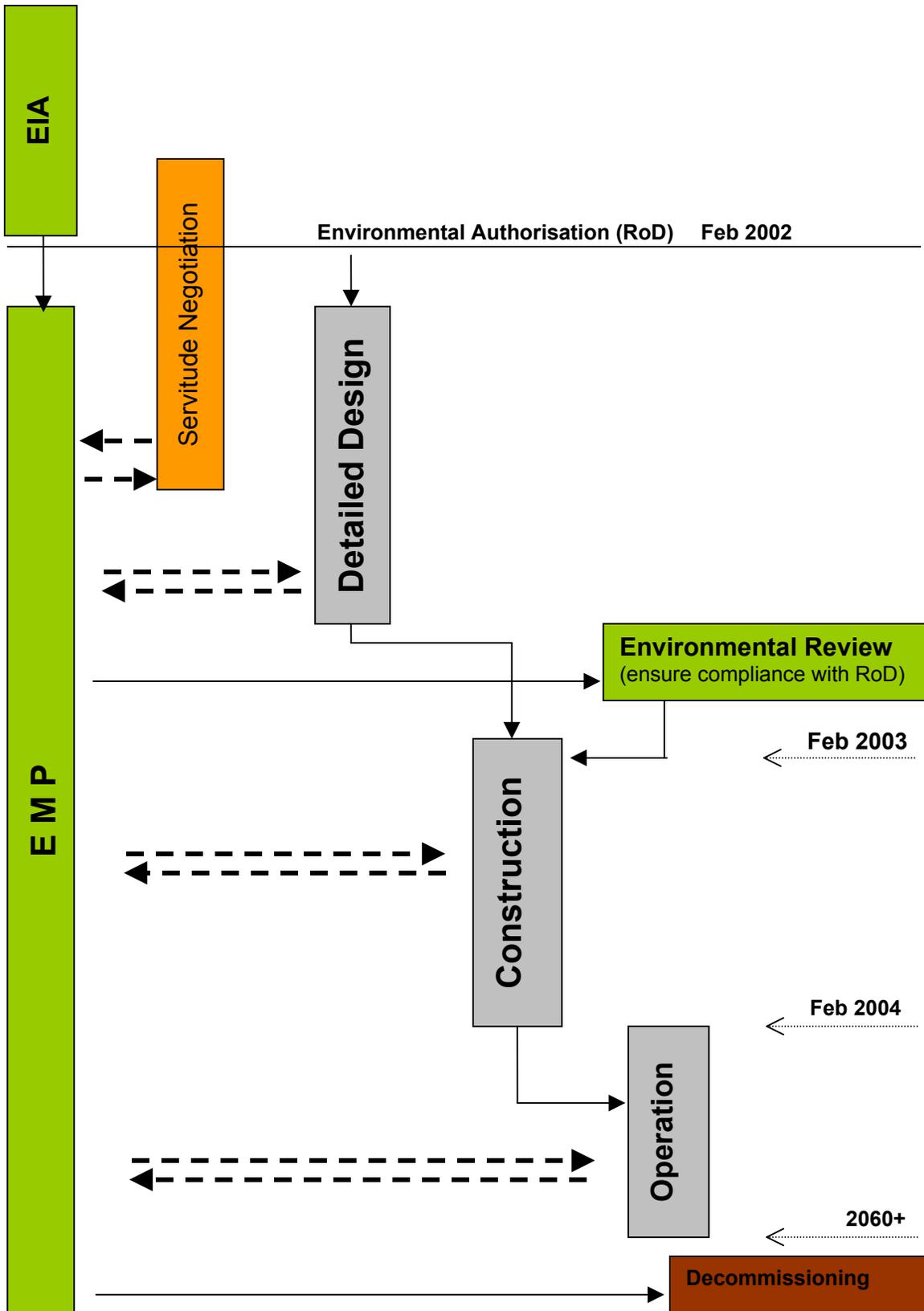
APPENDIX A

APPENDIX B

Transmission Line Planning, Design and Construction Process

(An overview of the planning process for the establishment and operation of a Transmission line, highlighting the environmental management function)

Time-line of activities for Transmission line establishment (Highlighting interaction with Environmental Management Plan – EMP)



Servitude Negotiation and the EIA Process

Transmission lines are constructed and operated within a servitude (55m wide for 400kV lines) that is established along its entire length. The servitude allows Eskom Transmission certain rights and controls that support the safe and effective operation of the line.

The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process, or just the negotiation process.

The negotiation process is undertaken by directly by Eskom Transmission. Important points relating to the EIA process are as follows:

- Servitude negotiation is a private matter between Eskom transmission and the landowner concerned.
- The negotiation process involves a number of stages (see separate information box), and culminates in the 'signing' a servitude. Here Eskom Transmission enters into a legal agreement with the landowner.
- The agreements will detail such aspects as the exact location and extent of the servitude, and access arrangements and maintenance responsibilities.
- Compensation measures agreed in each case.
- It may take place at any time in the planning of a new line
- It must be completed (ie the agreement must be signed) before construction starts on that property
- It is independent of the EIA process.

The EIA process has become important in the initial planning and route selection of a new transmission line. For this reason it would normally be preferable that the negotiation process begins after the EIA has been completed. At this stage there is greater confidence in the route to be adopted, and it would be supported by environmental authorisation.

However, it may be required that the negotiation process needs to start earlier, and may begin before or run in parallel to the EIA process. This may be due to tight timeframes, knowledge of local conditions and constraints, etc. Eskom Transmission has a right to engage with any landowner at any time, though they do so at risk if environmental authorisation has not been awarded.

The Negotiation Process

The negotiation process can be extensive, often running in to years on the longer lines. It is therefore critical that it is correctly programmed into the planning of a new line. The negotiation process involves:

- Initial meeting with the landowner
- The signing of an 'option' to secure a servitude (this indicates the owner will accept that the line will cross his property, subject to conditions to be finalized in the negotiation of the servitude agreement). An option is valid for one year.
- Once the route is confirmed (ie options signed with the upstream and downstream landowners) the servitude agreement will be finalised with the individual landowners. This agreement will set out the conditions for the establishment and operation of the servitude, and will be site specific (different landowners may have different requirements). Compensation payments are made when the servitude is registered at the Deeds office..
- Once the construction is complete and the land rehabilitated to the landowners satisfaction, the landowner signs a 'Final Release' certificate. Until such time Eskom Transmission remains liable for the condition of the land.
- Once the clearance certificate is signed, the responsibility for the line and servitude is handed over to the regional Eskom Transmission office. Prior to this the national office is responsible for the process.

Servitude Maintenance Responsibilities

The management of a transmission line servitude is dependent on the details and conditions of the agreement between the landowner and Eskom transmission. These may therefore vary from location to location.

However, it is common that there is a dual responsibility for the maintenance of the servitude:

- Eskom Transmission will be responsible for the tower structures, access roads (including erosion and rutting), water course crossings, and gates and fences relating to servitude access.
- The landowner will retain responsibility for the maintenance of the land and landuse within the servitude (eg cropping activities, veld management, etc.).

Exceptions to the above may arise where, for example:

- Dual use is made of the access roads and gates.
- Specific landuse limitations are set by Eskom Transmission within the servitude and which directly affect the landowner (eg forestry).

Notwithstanding initial compensation for such circumstances, different maintenance agreements may be entered into between the landowner and Eskom Transmission. For example, responsibilities for access road maintenance may rest with the landowner in the first instance (instead of Eskom Transmission), and vegetation control responsibilities may rest with Eskom Transmission in the second instance.

Maintenance responsibilities are, ultimately, be clearly set out in the servitude agreement.

The Construction Process

The following is a process will follow the entire route, beginning at the starting point of the new line. Each activity will follow the previous one, such that at any one point an observer will see a chain of events, with different teams involved. At any one time some or all of the different teams may be working at different points along the line.

Approximate team size:- gives an indication of the likely number of construction staff involved in each exercise.

Approximate duration at a point:- gives an indication of the likely time spent by the team at a point (typically a tower location) as they move along the route. These times may vary significantly depending on local conditions.

(the last column gives some indication of what an observer at a point may experience as the different construction teams pass through. There may be days of no activity in the process.

There are some 35 active days of construction at any point, though this may take place over a period of 2 months)

Activity	Approx team size	Approx. duration at a point
1. Centre line pegging and identification of new gates <i>(light vehicle access)</i>	3	1 day
2. Access Negotiations - an access plan is developed and agreed to by the landowner, Eskom and the contractor - rehabilitation measures are agreed to - photographs are taken before hand - access road will be established through recurring use (ie there will be no blading or scraping of a new road) <i>(light vehicle access)</i>	1	1 day
3. Tower pegging - the contractor will appoint a surveyor to undertake this work - the footing of the pylons will be set out - reports back if anything odd is found and the tower will be moved accordingly <i>(light vehicle access)</i>	5	1 days
4. New gate installation <i>(light vehicle access)</i>	5	1 days
5. Foundation nominations (for main structure and anchors) - soil types are checked to determine foundation requirements - trial pits are dug at the main foundation points – usually using mechanical back-actor/auger methods, though in a few circumstances manual labour may be used. <i>(heavy vehicle access)</i>	5	2 days
6. Excavation of foundation - foundations of up to 4 m x 4 m square are excavated and up to 4m deep depending on soil conditions - foundation pit then need to be covered or fenced off until foundation is poured <i>(heavy vehicle access)</i>	15	2 days
7. Foundation steelwork (reinforcing) - the steelwork is usually made up at the base camp and brought on to site by truck - all fitting, wiring is done on site (limited welding on site) <i>(heavy vehicle access)</i>	10	2 days

<p>8. Foundation (concrete) pouring</p> <ul style="list-style-type: none"> - shuttering - standard concrete truck used - if there are access problems, concrete will be mixed on site - helicopters will be used in exceptional circumstances - 28 day period required after concrete has been laid <p style="text-align: right;"><i>(heavy vehicle access)</i></p> <p style="text-align: center;"><i>(heavy usage of the servitude roads during this phase)</i></p>	20	2 days
<p>9. Delivery of tower steelwork</p> <ul style="list-style-type: none"> - steelwork is delivered in sections and assembled on site - one truck can transport one tower - transported from the factory to site (the towers are individually designed for each location) - access roads are clearly marked to ensure the correct tower is delivered <p style="text-align: right;"><i>(heavy vehicle access)</i></p> <p style="text-align: center;"><i>(extra long trucks will be used)</i></p>	5	1 day
<p>10. Assembly team/ Punching and painting</p> <ul style="list-style-type: none"> - the steelwork is fitted together and assembled on the ground - nuts are punched and non-corrosive paint is placed on the nuts <p style="text-align: right;"><i>(light vehicle access)</i></p>	10	3 days
<p>11. Erection</p> <p>Cranes (minimum of 50 tonne cranes) pick up the towers for final assembly.</p> <p style="text-align: right;"><i>(abnormal load vehicle access)</i></p>	20	2 days
<p>12. Stringing</p> <ul style="list-style-type: none"> - cable drums are placed next to each other within the servitude - stringing takes place in both directions from the drum stations - 5-10 km can be strung from 1 station - the working area at each drum station will be as long as 130m, but will be confined to the servitude width. Intensive vehicle movement may take place within this working area - a pilot tractor will place the pilot cable on the ground - this cable is then pulled up through the use of a pulley - conductors are never to touch the ground - in mountainous areas, a helicopter can be used or the pilot rope can be shot across valleys <p style="text-align: right;"><i>(abnormal load vehicle access)</i></p> <p style="text-align: center;"><i>(intensive vehicle activity likely within the working area)</i></p>	50	7 days
<p>13. Sag and tension</p> <p>The line is tensioned from each cable station to ensure minimum ground clearance heights are achieved (8.4m for 400kV lines and 10m for 765kv lines)</p> <p style="text-align: right;"><i>(heavy vehicle access)</i></p>	10	3 days
<p>14. Rehabilitation</p> <ul style="list-style-type: none"> - rehabilitation is a continuous process during the construction phase - rehabilitation will typically only commence after the first 100 towers have been strung - there is a one year guarantee on the contractors work during which rehabilitation must be concluded– thereafter he is paid the outstanding amount <p style="text-align: right;"><i>(heavy and light vehicle access)</i></p>	5 - 15	2 – 10 days dependent on site conditions

Construction Camps

The entire construction workforce is usually accommodated on a 'construction camp' that will be situated at some point along the route. The location is selected by the contractor who will take into account such aspects as access to the construction site, access to services, access to materials, etc. The contractor will enter into an agreement with a landowner for the establishment of the construction camp.

The various teams will travel from the camp to the construction site each day. The site moves continuously with the progression of the line, so the teams will perhaps travel a greater distance to the site each time.

All materials are stored at the construction camp with the exception of the steel towers (which may come direct from the factory) and concrete (unless the site is very remote, when concrete may be mixed on site)

As a rule of thumb, there is usually one construction camp per 100km of transmission line.

APPENDIX C1

PUBLIC PARTICIPATION PROGRAMME REPORT

APPENDIX C2

Register of Interested and Affected Parties

APPENDIX C3

Database of Interested and Affected Parties

(Portions of this database include information received by the PIP consultant that may be confidential, including contact details. This information is made available to the Department of Agriculture and Environmental Affairs, but is not being released to the wider public.)

APPENDIX D

Revised Issues Table

This Issues Table has evolved from a generic environmental Issues Table provided to Key Stakeholders as part of the Background Information Document, Key Stakeholder Information Package and discussions at the Key Stakeholder Workshop. The initial list was based on experience gained through undertaking EIAs on Transmission lines throughout South Africa in recent years. The Issues Table now also contains issues which are specific to the study area. The table also indicates which issues will be studied further as part of the EIA and which will be dealt with as part of the Eskom Transmission Environmental Management Plan.

APPENDIX E

Plan of Study for EIA

*(This document is the same as presented in the Scoping Report,
bar the correction of errata.)*

APPENDIX F

Impact Assessment Criteria

PEGASUS-UMFOLOZI 400kV TRANSMISSION LINE ENVIRONMENTAL IMPACT ASSESSMENT

IMPACT ASSESSMENT CRITERIA

These criteria are drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989. These criteria include:

- **Nature of the impact**

This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.

- **Extent of the impact**

Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.

- **Duration of the impact**

The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.

- **Intensity**

The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.

- **Probability of occurrence**

The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

The impacts should also be assessed in terms of the following aspects:

- **Legal requirements**

The specialist should identify and list the relevant South African legislation and permit requirements pertaining to the development proposals. He / she should provide reference to the procedures required to obtain permits and describe whether the development proposals contravene the applicable legislation.

- **Status of the impact**

The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

Degree of confidence in predictions

The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

Significance Ratings

Based on a synthesis of the information contained in the above-described procedure, the specialist is required to assess the potential impacts in terms of the following significance criteria:

- **No significance:** the impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** the impacts will have a minor influence on the proposed development and/or environment.
- **Moderate significance:** the impacts will have a moderate influence on the proposed development and/or environment.
- **High significance:** the impacts will have a major influence on the proposed development and/or environment.
- **No-Go:** the impacts would be of such a negative nature that the development should not proceed. Any such impact would be catastrophic on the development or the environment.

APPENDIX G

Internal Reviewer's Report

Prof J Ridl has provided two reviews to date:

- 1) Comment on the Plan of Study for Scoping and the Draft Plan of Study for the Environmental Impact Assessment.
- 2) Comment on the Scoping Report.

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Our reference: Prof JA Ridl/jar
Your reference: Mr S Dunsmore

30 October 2001

PROCON Environmental Technologies
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Witbank
1035

Fax: 013-6974618

Dear Sirs

PLAN OF STUDY FOR SCOPING AND DRAFT PLAN OF STUDY FOR EIA

I have given careful consideration to the plan of study prepared by you and I am satisfied that it complies with the law. Equally importantly, it spells out a process that will ensure that there is an appropriate level of public accountability.

I have become increasingly concerned at the interpretation of our relevant authorities of the regulations and their acceptance of processes sometimes termed 'mini EIA' or 'EIA level scoping'. What results is neither scoping nor analysis as required by the regulations is properly undertaken. In my respectful view, it is not open to the relevant authority to condone a deviation from the regulations except by way of a general exemption under section 28A of the Environment Conservation Act 73 of 1989. In such event, good cause would have to be shown as to why the application of the regulations is not appropriate in the circumstances. This not the approach usually adopted and in my view, the processes sanctioned by some relevant authorities contravene the regulations. This leaves the issue of their authorisation on the basis of such a process vulnerable to appeal or review. Serious compromises can and have occurred. Delay is the inevitable and usually costly result.

There is good reason to keep 'scoping' and 'assessment' separate and distinct from each other, despite their close interrelationship. As you well know, the former process is an information gathering process and the latter an evaluation and weighting of the impacts identified during scoping. By allowing them to be convoluted, has the potential to compromise both phases.

There is nothing in the regulations that prohibits the running of the scoping and assessment phases in parallel, provided this is done with great sensitivity. The impacts of powerlines are well documented. The more complex impacts may require lengthy study. An early start on the assessment of these, particularly fieldwork that needs to cover all four seasons is perfectly in

order. The process will not be compromised by making disclosure of these potential impacts and that they will be subjected to assessment, irrespective of the lack of public concerns raised during scoping. What is critical, is that the public is informed that assessment has commenced, or will commence simultaneously with scoping. The process must also admit input from the public on these identified impacts so as to ensure that the public concern over the impacts is accurately captured and brought into the assessment process. It is not unusual to find a developer's perspective differs greatly from the public perspective of the very same issue.

If assessment is to commence with scoping, a draft plan of study for the EIA should be submitted and published for the relevant issues on the clearly stated condition that it is a draft that will be amended or supplemented as the issues emerge during scoping. This is on the assumption of course that they differ from or add to the matters identified in the plan of study for the EIA. It is also appropriate to identify the specialists nominated to attend to the relevant studies. If local communities have any objections or concerns about an appointment, they may be raised at an early stage. Consultants must be appointed on the basis that if there is serious and credible objection to their appointment, they will be replaced. Obviously, if an interested and affected party objects to particular appointment, good reasons will have to be advanced. The consultant concerned will have common law remedies against such a person if the comments are defamatory. This provision must not open the door to the denigration of the professional integrity of preferred consultants.

I emphasise the need to undertake the relevant components of the process faithfully in accordance with the regulations. Departmental practice, with respect, counts for nothing in a legal dispute. For clarity, the components are set out:

- Application for authorisation (no review, merely submitted)
- Plan of study for scoping (authority review, but my advice is that this should be published and comment invited within a short period)
- Scoping report (subject to authority and public review and possible amendment)
- Plan of study for EIA (authority review, but again, invite public input, especially at the draft stage since it will be submitted with the POS for scoping – note the possibility of amendment of the draft for formal submission)
- EIR (subject to authorities and public review)
- Decision and ROD.

Finally, it is important that written acceptance of time limits be obtained from the relevant authority. Regulation 3(5) provides for agreement to be reached between the relevant authority and the applicant. In the absence of this agreement, it may be argued that no time limits apply. This lends itself to abuse. The relevant authority must be put on terms to reach agreement and the time limits published in the plan of study for scoping.

I am happy to serve as an internal reviewer on legal compliance and more specifically to ensure public accountability in the process.

I hope this is of assistance

Yours faithfully



PROF JA RIDL
DIRECTOR

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Our reference: Prof JA Ridl/jar
Your reference: Karin Bowler

6 December 2001

PBA INTERNATIONAL
PER E-MAIL: karinbow@iafrica.com

Dear Karin

PEGASUS SCOPING REPORT

I refer to the comments I have made on the document itself. None indicate a flaw in the process or in the content of the report. They are cautionary.

This review will be short. If the process embarked upon is followed, I will be satisfied that the test of public accountability will have been satisfied. No compromise has occurred in running the different components of the statutory process simultaneously. The relevant authority will have sufficient information to make an informed decision on the basis of the documentation submitted. In my view, the report satisfies the requirements of the regulations.

To the extent that you need my endorsement, it is hereby given.

Yours sincerely



JEREMY RIDL

APPENDIX Q

ESKOM TRANSMISSION'S GENERIC EMP

APPENDIX V**SPECIALIST STUDY – ARCHAEOLOGY**

A screening exercise has been undertaken by AMAFA and the following correspondence indicates the process undertaken to date. The map of recorded sites was not available for the publication of the draft EIR but will be included in the final EIR with an accompanying analysis.