ESKOM HOLDINGS LIMITED

Braamhoek Pumped Storage Scheme

DRAFT SCOPING REPORT:

ACCESS ROADS FOR THE BRAAMHOEK PUMPED STORAGE SCHEME

Contract Number: 4600011104

Date: April 2005

EXECUTIVE SUMMARY

Eskom Holdings Limited (Eskom) has determined that in order to meet the expected peak electricity demand, South Africa requires additional peaking generation capacity by 2012. This requirement has been confirmed by the National Integrated Resource Plan of the National Electricity Regulator (available from http://www.ner.org.za). Eskom is thus planning the development of the Braamhoek Pumped Storage Scheme (PSS).

An Environmental Impact Assessment (EIA) was undertaken for the proposed Braamhoek PSS, which was completed in June 1999. A comprehensive Environmental Impact Report (EIR) was submitted to the Department of Environmental Affairs and Tourism (DEAT) for approval. The Minister of Environmental Affairs and Tourism issued a Record of Decision (RoD) authorising the construction of the Braamhoek PSS on 13 December 2002.

In terms of the conditions of the Braamhoek PSS RoD, Eskom is required to complete an EIA for the proposed access roads and transmission lines. The two separate EIAs were commissioned in 2004. This report only covers the EIA for the proposed access roads. The Braamhoek Consultants Joint Venture (BCJV) has been appointed by Eskom to undertake the EIA for the upgrade of existing roads and the construction of new roads to provide access to the Braamhoek PSS.

An extensive public participation programme has allowed Interested and Affected Parties (I&APs) to identify issues and potential environmental impacts associated with the construction of this road network during the Scoping Phase of the EIA to date. The BCJV Environmental Team and its appointed specialists have further identified potential environmental impacts associated with the construction and operational phases of the road upgrading and construction. Investigations will be conducted during the EIA Phase to supplement the available information. These specialist studies will quantify the environmental impacts accurately and recommend management and mitigation measures to minimise negative and maximise positive impacts. The following specialist studies are planned for the EIA Phase:

- Ecological including fauna and flora;
- Surface water;
- Air quality;
- Land-use;
- Geology, soils and erosion;
- Visual and aesthetics;
- Noise;
- Socio-economic; and
- Heritage resources.

The access roads for the project include external access roads and internal access roads. With regard to the external access roads, two alternatives have been considered, and are put forward and discussed in the Scoping Report:

- Alternative 1: Use existing National Road 3 (N3) and Regional Road 103 (R103); and
- Alternative 2: Provide direct access from the N3.

The Scoping Phase identified that the preferred alternative would be to use the existing access route to the site, Alternative 1 (use of existing N3 and R103). This alternative will be carried forward into the EIA.

Four alternatives for the internal access roads have been identified for consideration during the Scoping Phase and are discussed in this Scoping Report, namely:

- Alternative 1 – Braamhoek Pass;
- Alternative 2 – De Beers Escarpment;
- Alternative 3 – De Beers Skeurklip; and
- Alternative 4 – Kiesbeen.

The two access road routes which have been identified to be carried forward for investigation in the EIA Phase are Alternative 1 (Braamhoek) and Alternative 2 (De Beers Escarpment). The choice of these two routes is based on predicted environmental impacts and economical considerations of access road upgrade and construction, as well as access between the Lower and Upper Reservoirs during operation.

ACCESS ROADS FOR THE BRAAMHOEK PUMPED STORAGE SCHEME

DRAFT SCOPING REPORT

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GLOSSARY

ACER	ACER Africa Environmental Management Consultants
BCJV	Braamhoek Consultants Joint Venture
BID	Background Information Document
CCWR	Computing Centre for Water Research
D48	District 48
DME	Department of Minerals and Energy
DSR	Draft Scoping Report
DEAT	Department of Environmental Affairs and Tourism
ECA	Environment Conservation Act
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Plan
ESKOM	Eskom Holdings Limited
FS DTEEA	Free State Department of Tourism, Environmental and Economic Affairs
FSR	Final Scoping Report
I&APs	Interested and Affected Parties
Km	kilometre
Km^2	Square kilometre
KZN	Kwa Zulu Natal
KZ DAEA	KwaZulu Natal Department of Agriculture and Environmental Affairs
m	metre
MAP	Mean Annual Precipitation
mm	millimetre
m^2	square metre
m^3	cubic metre
MW	Mega-watt
N3	National Road 3
NEMA	National Environmental Management Act
NGOs	Non-Governmental Organisations
PoSS	Plan of Study for Scoping
PSS	Pumped Storage Scheme
PPP	Public Participation Process
RoD	Record of Decision
R103	Regional Road 103
WESSA	Wildlife and Environment Society of South Africa

1 INTRODUCTION

1.1 Background

Eskom Holdings Limited (Eskom) has determined that to meet the expected peak electricity demand, South Africa requires additional peaking generation capacity by 2012. This requirement has been confirmed by the National Integrated Resource Plan of the National Electricity Regulator (available from http://www.ner.org). In order to provide the expected demand by this date, Eskom is planning the development of the Braamhoek Pumped Storage Scheme (PSS).

Poltech compiled and submitted an Environmental Impact Report (EIR) for the Braamhoek PSS to the Department of Environmental Affairs and Tourism (DEAT) in 1999. The Minister of Environmental Affairs and Tourism issued a Record of Decision (RoD), approving the proposed Braamhoek PSS on the 13 December 2002.

Final design of the scheme commenced in 2004. The Braamhoek Consultants Joint Venture (BCJV) has been contracted to complete the final design of the scheme. The BCJV has been additionally appointed to address various environmental authorisation processes. Construction of the scheme is planned to commence in 2007.

The proposed site for the pumped storage scheme is situated 23 km north-east of Van Reenen on the farms of Zaaifontein, Braamhoek and Bedford (**Figure 1**). The study area forms part of the uThukela Regional District and is situated on the boundary of Kwa Zulu Natal and the Free State. The area falls within the Drakensberg escarpment and the proposed Upper Reservoir is on the head water tributary of the Wilge River, which flows into the Vaal River system. The proposed Lower Reservoir is in the headwater of the Klip River, which in turn flows south-eastwards into the Tugela River.

The scheme's two reservoirs will be interconnected by enclosed tunnel systems, with pump-turbine units with a potential generation capacity of approximately 1332 MW. Hydroelectric turbine generating units will be situated in the tunnel system and will be used to pump water from the Lower Reservoir to the Upper Reservoir during low demand periods.

Water released from the Upper Reservoir to the Lower Reservoir will pass through the turbine generating units, thereby providing the kinetic energy to drive the units. In this manner electricity is generated, which is then used to supplement other generating units on the national grid, such as coal fired power stations, during periods of peak demand. The turbine generating units are used to pump the water back to the Upper Reservoir in periods of low electricity demand. In this manner clean electricity is produced from a reusable source of kinetic energy.

The development of pumped storage schemes is limited by the minimum specifications for such schemes with regard to *inter alia* requirements related to water supply, appropriate reservoir basins with sufficient elevation and minimum horizontal distance, connection to the national electricity transmission grid, geology of base rock and environmental impacts. Environmental impacts could potentially also be caused by the upgrade and construction of access routes required for the construction and continued operation of the pumped storage scheme.

To assist in meeting its obligations with respect to the conditions in the EIA RoD for the pumped storage scheme, and to achieve benefits at international, national, regional and local levels that will offset negative impacts that could result from the construction and operation of the Braamhoek PSS, Eskom has formed the Braamhoek Partnership with BirdLife South Africa and Middelpunt Wetland Trust. The objectives of the Braamhoek Partnership are to:

- Effectively manage environmental impacts at the Braamhoek PSS and Bedford Wetland Park site before, during and post scheme construction;
- Ensure the integration of social, economic and environmental factors into both the planning and implementation phases of the Braamhoek PSS; and
- Initiate and monitor appropriate environmental projects relating to the site and the area impacted by the scheme, in order to improve the functioning of the wetland, thereby providing a sustainable environment for the threatened and other species found on the site.

The purpose of this Scoping Report is to identify potential environmental (socio-economic and biophysical) impacts, and consider various alternatives for road routings, and to reflect the findings of the comprehensive Public Participation Process (PPP) undertaken as part of the Environmental Impact Assessment (EIA) process. This information will be carried forward to the impact assessment phase of the EIA.

1.2 Overall Project Objectives

The scope of work for the Scoping Phase included the following:

- Identify potential environmental impacts; and
- Identify Interested and Affected Parties (I&AP), and their issues and concerns.

The project is also required to ensure:

- Compliance with the relevant requirements of the Environment Conservation Act (ECA, Act 73 of 1989), and the associated regulations;
- That the process is consistent with the Guidelines that pertain to the Environmental Impact Management Process (i.e. Department of Environmental Affairs and Tourism Guideline Document: EIA Regulations, April 1998); and
- That the process adheres to the principles of the National Environmental Management Act (NEMA, Act 107 of 1998). In this regard, the Scoping Report must address both the biophysical and socio-economic issues related to the proposed project and suggest practical mitigation or enhancement measures.

1.3 Structure of the Draft Scoping Report

Section 3.2.3.1 of the "Guideline Document: EIA Regulations – Implementation of Sections 21, 22 and 26 of the Environmental Conservation Act (April 1998)" issued by the Department of Environmental Affairs and Tourism: Sub-Directorate Environmental Impact Management contains a suggested format for Scoping Reports. The format provided below is consistent with this approach.

This Draft Scoping Report (DSR) includes the following components:

- Description of the proposed project, the various alternatives and the affected environment;
- Description of how the environment could potentially be affected by the project proposals;
- Description of the environmental issues identified during the consultation process;
- Description of the public consultation process;
- Technical assessment of the various road alternatives and of the potential environmental and socio-economic impacts; and
- Conclusions and recommendations on the way forward.

The DSR will be updated with written comments received from I&APs during the Comment Period (25 April to 25 May 2005). Thereafter, the Final Scoping Report (FSR) will be submitted to the Kwa Zulu Natal and Free State Regional Environmental Offices for their formal consideration and submission to DEAT for their approval.

2 PROJECT DESCRIPTION

The site for the proposed Braamhoek PSS is situated 23 km north-east of Van Reenen on the farms of Zaaifontein, Braamhoek and Bedford. The study area forms part of the uThukela Regional District and is situated on the boundary of KwaZulu Natal and the Free State Province. The area falls within the Drakensberg escarpment. The proposed Upper Reservoir is on the head water tributary of the Wilge River, which flows into the Vaal River system. The proposed Lower Reservoir is in the headwater of the Klip River, which in turn flows south-eastwards into the Tugela River. The scheme's two reservoirs will be interconnected by enclosed tunnel systems, with pump-turbine units with a potential generation capacity of approximately 1332 MW.

The upgrading of existing roads and the construction of new access roads will be required for the construction and operation of the Braamhoek PSS. Road upgrading and construction is planned to commence approximately a year before the construction of the pumped storage scheme (i.e. 2006).

The upgrading of roads and construction of new roads is a listed activity in terms of Section 22 of the ECA of 1989. An EIA is therefore required for the upgrade and construction of these access roads.

To construct and operate the Braamhoek PSS, three levels of roads will be required:

- Roads providing access to the scheme from existing regional roads i.e. "external" access roads;
- Roads linking the Upper and Lower Reservoir sites i.e. "internal" access roads; and
- Roads providing access within the Upper and Lower Reservoir sites, as well as within the proposed Construction Camp i.e. "internal site" roads.

These roads will be approximately 10 m wide, but will have a 30 m wide road reserve, and therefore a 30 m wide corridor of potential impacts on the environment. The upgrading of existing roads requires suitable road construction material, which will be obtained from borrow pits. Trucks and other vehicles will use these roads during construction and operation of the scheme. Various alternate routes are currently under investigation, as will be described in **Section 3**, and as indicated in the site layout diagrams provided in **Figures 2 - 5**.

Gravel roads used by Eskom, during construction activities (e.g. at the Upper Reservoir site) prior to the upgrade and construction of the access roads, will be maintained by Eskom during the period of their use (**Figures 2 – 5**). Thereafter their maintenance will revert back to the relevant road authorities.

3 PROJECT ALTERNATIVES

This section describes the various alternatives for road construction, upgrading and alignment.

3.1 External Access Roads

Site roads are required to link various components of the scheme for external access. To provide "external" access to the reservoir and other components of the scheme sites, existing roads can be utilised from the existing National Road 3 (N3) at Swinburne in the north and from Regional Road 103 (R103) via Besters in the south. This alternative would require a new, wider bridge over the Wilge River.

As existing roads will be utilised for external access, environmental impacts are expected to be minimal. The upgraded roads will be designed to mitigate environmental impacts.

An alternative that was also briefly considered and presented in the Background Information Document (BID) for external access is to provide direct access from the N3 at Van Reenen. This alternative could eliminate a bridge over the Wilge River, that would be required on the De Beers Pass route if access is obtained from Swinburne.

3.2 Internal Access Roads

Four alternatives have been proposed for the internal access roads. Some of the alternatives have minor variations, which will be investigated for internal access between the Upper Reservoir site (on the farm Bedford) and the Lower Reservoir (on the farm Braamhoek). The access road alternatives are summarised in **Table 1**. In this table, the distance between the Lower Reservoir and the Upper Reservoir sites is provided. The total gravel road required for the alternative, and the total paved road required for the alternative is also provided. The four alternatives investigated include:

3.2.1 Alternative 1 - Braamhoek

This road alternative will result in a total distance between the Lower and the Upper Reservoir of 19 km. This alternative requires the construction of 24 km of new road. The route follows the Drakensberg Escarpment using the existing track, Braamhoek Pass. The new section of road will link in with the existing road network to the south of the Lower Reservoir, where the District Road 48 (D48) and Provincial Road 275 (D275) will be upgraded to link to the R103 near Besters. This alternative is illustrated in **Figure 2.**

3.2.2 Alternative 2 – De Beers Escarpment

This road alternative will result in a total distance between the Lower and the Upper Reservoir of 32 km. This road alternative requires the construction of 23 km of new road. The existing road D48 will be upgraded and a new link road along the

escarpment will provide a link to the Upper Reservoir site. The D48 and D275 will be upgraded to link to the R103 at Besters. This alternative is illustrated in **Figure 3**.

3.2.3 Alternative 3 – De Beers Skeurklip

This road alternative will result in a total distance between the Lower and the Upper Reservoir of 58 km. This alternative utilises the full length of the S61 and D48, but requires that these roads be fully upgraded. The S922 provides the link to the Upper Reservoir site. The D48 and D275 will be upgraded to link to the R103 at Besters. This alternative is illustrated in **Figure 4**.

3.2.4 Alternative 4 – Kiesbeen

This road alternative will result in a total distance between the Lower and the Upper Reservoir of 114 km. This alternative uses the existing N3 through Van Reenen's Pass for access to the Drakensberg Escarpment. This alternative is illustrated in **Figure 5**. The S790 and S922 will provide a link from the N3 to the Upper Reservoir. D48 and D275 will provide the link from the N3 to the Lower Reservoir.

Table 1 – Access Road Alternatives Summary (Refer to Figures 2 – 5)

Alternative	Distance (km)
Alternative 1 – Braamhoek	
Travel distance from Lower to Upper Reservoir	19
Paved - upgrades/ new roads (F-E, E-I, I-K, K-N, K-P, P-S)	56
Gravel – maintained by Eskom during the construction period (A-R, R-T, T-P)	34
Alternative 2 – De Beers Escarpment	
Travel distance from Lower to Upper Reservoir	32
Paved - upgrades/ new roads (F-E, E-J, J-I, I-K, K-N, J-T, T-S)	67
Gravel – maintained by Eskom during the construction period (A-R, R-T)	29
Alternative 3 – De Beers Skeurklip	
Travel distance from Lower to Upper Reservoir	58
Paved – upgrades/ new roads (F-E, E-J, J-I, I-K, K-N, J-R, R-B, B-S)	93
Gravel – maintained by Eskom during the construction period (A-R)	16
Alternative 4 – Kiesbeen	
Travel distance from Lower to Upper Reservoir	114
Paved – upgrades/ new roads (A-R, R-B, B-S, F-E, E-I, I-K, K-N)	84

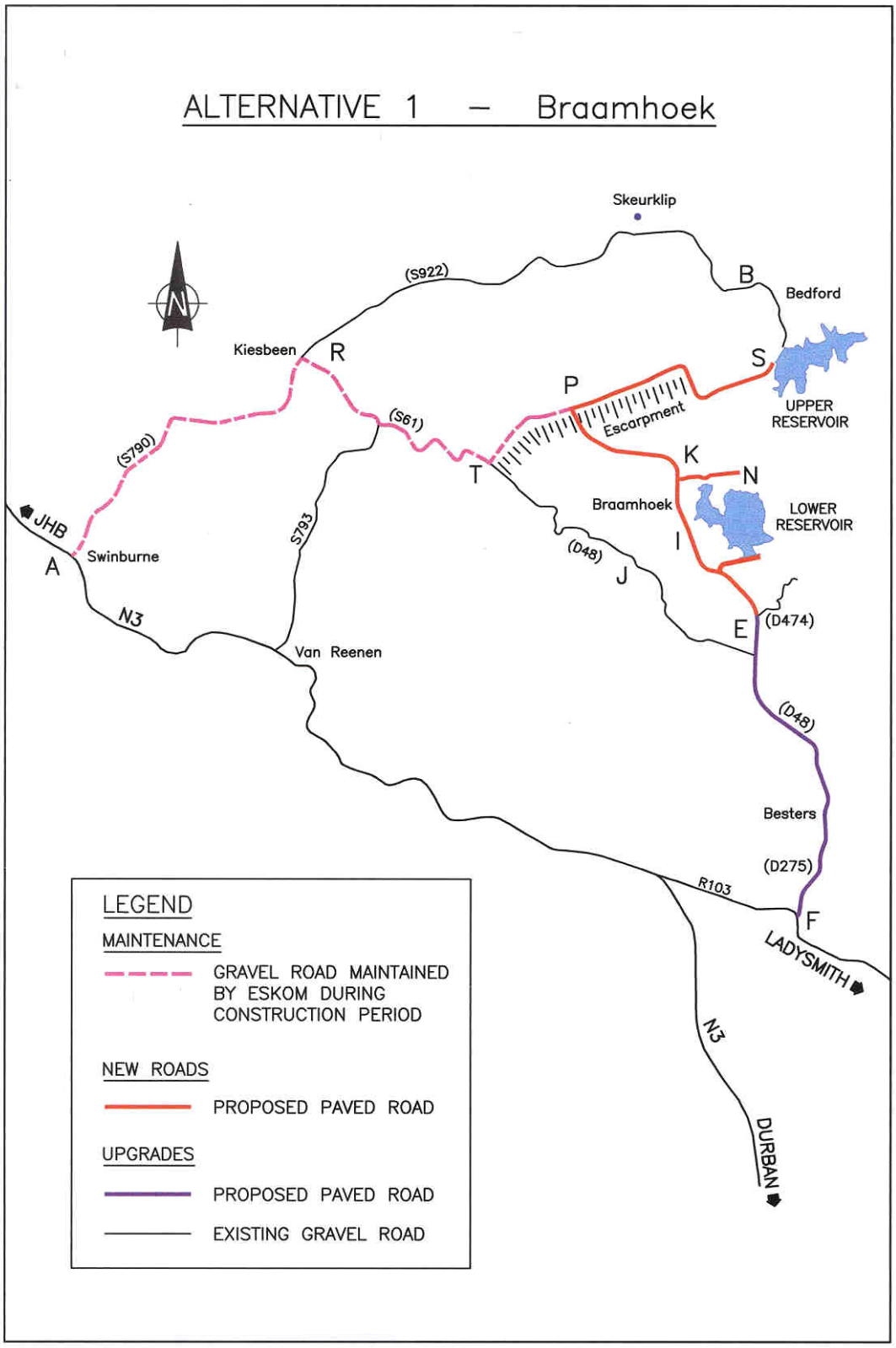

Figure 2: Alternative 1 - Braamhoek

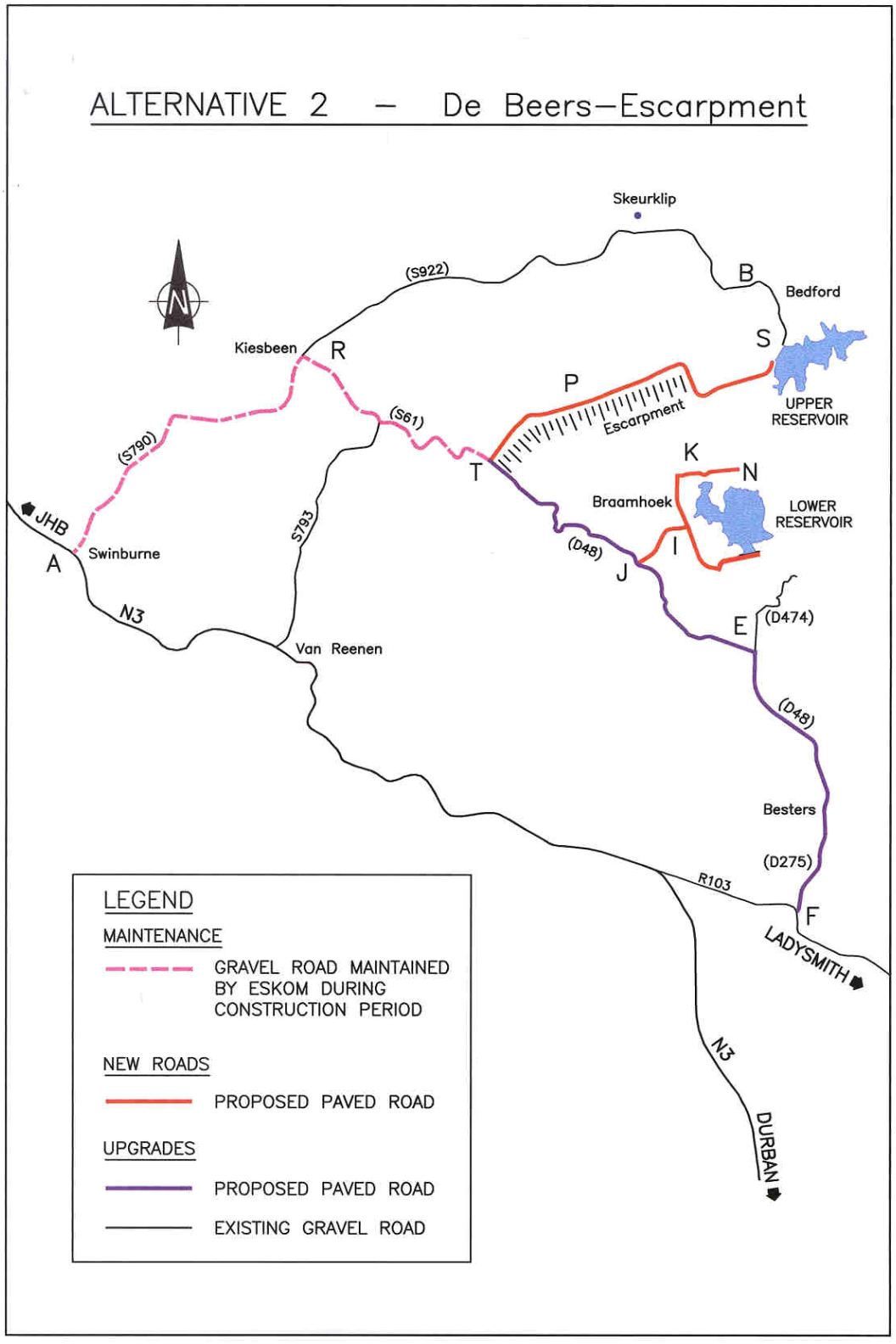

Figure 3: Alternative 2 – De Beers Escarpment

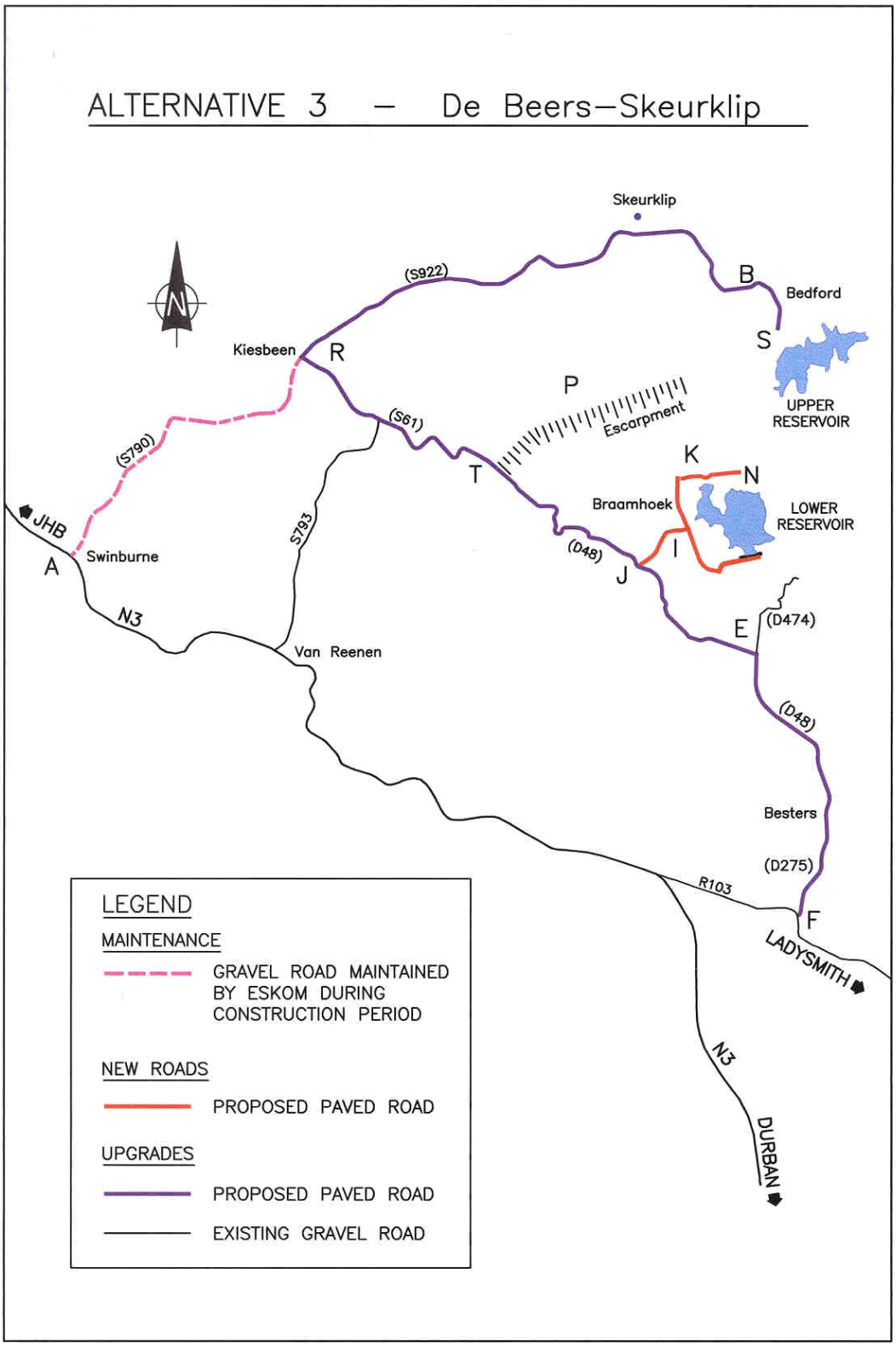

Figure 4: Alternative 3 – De Beers Skeurklip

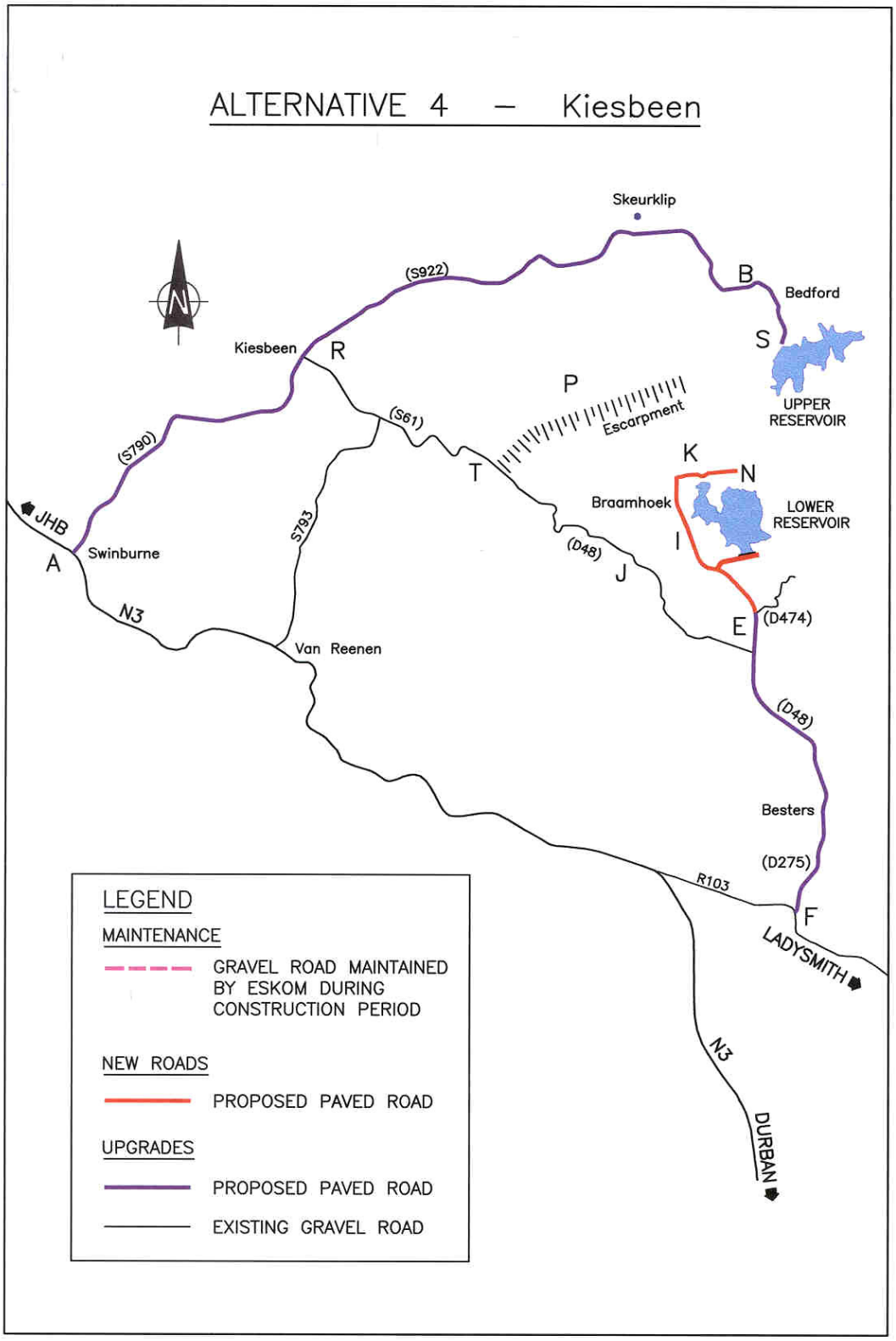

Figure 5: Alternative 4 - Kiesbeen

3.3 Internal Site Roads

The following surfaced internal roads will be required to provide access to the various components of the scheme in addition to the main access roads described above. These roads will also form part of the EIA process for site access roads:

- Approximately 18 km of road in the vicinity of the Lower Reservoir, comprising:

    1. An entrance road;
    2. Access to the Construction Camp;
    3. Access to the Lower Reservoir wall;
    4. Access to the outfall structure;
    5. Access to the main access tunnel entrance;
    6. Access to the surge chamber access tunnel entrance; and
    7. Access to the exploratory tunnel entrance.

- Approximately 7 km of road in the vicinity of the Upper Reservoir site, comprising:

    1. An entrance road;
    2. Access to the Upper Reservoir wall;
    3. Access to the intake structure;
    4. Access to the surge shaft; and
    5. Access to the site buildings.

These roads will need to be constructed and would be privately owned by Eskom.

4 ASSESSMENT OF PROJECT ALTERNATIVES

The EIA Phase will concentrate on the preferred alternatives for the project. As such it was required that the project alternatives during the Scoping Phase and preferred alternatives be identified, in conjunction with I&APs, the project engineers and using all of the information available to date. The assessment considered the following aspects:

- Biophysical impacts;
- Socio-economic impacts; and
- Development costs.

The results of the assessment are discussed below.

4.1 External Access Roads

There are two alternatives for external access roads and each is discussed below.

4.1.1 Alternative 1: Use existing N3 and R103

- Minimal disturbance of fauna and flora because of use of existing roads;
- Potential impacts on Wilge River due to a crossing required on De Beer's Pass;
- Less costly alternative because it involves only upgrading of existing roads;
- Less material will be required from borrow pits; and
- No distinction can be made between the alternatives in terms of potential pollution from construction activities, aesthetic impacts and socio-economic impacts.

4.1.2 Alternative 2: Provide direct access from N3

- This alternative is not a viable option, however it has been mentioned in this report, in order to demonstrate consideration of an alternative;
- Significant disturbance of fauna and flora because of the new road;
- Opens up a completely new road corridor;
- Significant amounts of material will be required from borrow pits to construct the new road;
- More costly alternative because it requires the construction of a new road; and
- No distinction can be made between the alternatives in terms of potential pollution from construction activities, aesthetic impacts and socio-economic impacts.

4.1.3 Preferred alternative

The alternative that will cause the least negative environmental impacts is considered to be the one that requires only upgrading of the existing roads. This alternative, gaining access via the N3 and R103, will however require the construction of a bridge over the Wilge River on the De Beer's Pass to provide access from Swinburne. This alternative will be more cost-effective than the other alternative considered i.e. gaining direct access from the N3.

4.2 Internal Access Roads

Four alternatives were considered for internal access roads as discussed below. Refer to **Table 1** for distance of each of the proposed alternatives.

4.2.1 Alternative 1 – Braamhoek Pass

- This alternative is the most direct route between the Lower and the Upper Reservoirs (19 km);
- This alternative is the second most economical alternative in terms of construction costs;
- In places the route will follow the original ox-wagon route on the Braamhoek Pass;
- Due to the new alignment to accommodate the design speed, this route will require new road construction;
- Road construction could potentially have a negative impact on the fauna and flora and heritage resources;
- New road alignment could potentially have a negative visual/aesthetic impact;
- Road construction will involve the construction of sharp 'hairpin' bends;
- On top of the escarpment, a further 16 km of new road will be required;
- Requires large amounts of material for the 24 km of new road construction from borrow pits;
- More costly than Alternative 2 (De Beers Escarpment) due to construction of new roads;
- Positive socio-economic impact due to improved access; and
- No distinction can be made between the alternatives in terms of potential pollution from construction activities.

4.2.2 Alternative 2 – De Beers Escarpment

- Results in a travelling distance of 32 km between the Upper and Lower Reservoir sites – this is the second shortest route, distance wise;
- Less costly than all three other alternatives (1, 3, and 4) because it requires only 23 km of new road construction;
- Follows mostly existing road with 23 km of new road, therefore minimal disturbance of fauna and flora;
- Requires large amounts of material for the 23 km of new road construction from borrow pits;
- Positive socio-economic impact due to improved access; and
- No distinction can be made between the alternatives in terms of potential pollution from construction activities.

4.2.3 Alternative 3 – De Beers Skeurklip

- This alternative is the third shortest route between Upper and Lower Reservoirs (58 km);
- The distance is almost double the distance of Alternative 2 (De Beers Escarpment), making travel time between the Upper and Lower Reservoir sites longer and thus this will have an detrimental effect on the scheme from an operational point of view;
- This alternative is also the most costly to construct;

- Uses existing roads almost entirely therefore this alternative will cause little disturbance to fauna and flora and heritage resources;
- Requires relatively little material from borrow pits;
- Positive socio-economic impact due to improved access; and
- No distinction can be made between the alternatives in terms of potential pollution from construction activities.

4.2.4 Alternative 4 – Kiesbeen

- This alternative is the longest route (114 km) – almost double Alternative 3 (De Beers Skeurklip) and almost four times the distance of Alternative 2 (De Beers Escarpment);
- This alternative is the second most costly to construct;
- From an operational point of view, this alternative is not viable as the distance and travel time is too great;
- Uses existing roads and therefore would cause little disturbance to fauna and flora and heritage resources;
- Requires relatively little material from borrow pits; and
- No distinction can be made between the alternatives in terms of potential pollution from construction activities.

4.2.5 Preferred alternatives

Alternative 1 (Braamhoek) and Alternative 2 (De Beers Escarpment) have been identified as the preferred internal access road alternatives. These alternatives are the two shortest routes, and the two least costly alternatives. From an operational point of view, these will be the best alternatives for Eskom. From an environmental point of view, there do not, at this stage, appear to be any fatal floors, which would prevent these alternatives from becoming the preferred road route. These two alternatives will, however, be subjected to detailed assessment during the EIA Phase.

5 LEGISLATIVE CONTEXT

In terms of Regulation 1182, published in terms of Section 21 of the Environmental Conservation Act, 1989 (Act 73 of 1989), the following construction and upgrading activities will take place as a result of the project:

- Roads will be constructed, erected or upgraded; and
- Canals and channels, including diversions of the normal flow of water in a riverbed and water transfer schemes between water catchments and impoundments will be laid out.

In certain case a change in land use, from agriculture or undetermined, may be required for the construction of new access roads.

These activities are all classified as Schedule One activities and therefore need to be authorised by the DEAT. These Schedule One activities therefore require an EIA.

DEAT has published EIA guidelines, which will be closely followed in this EIA process.

6 STATUS OF THE EIA AND PUBLIC PARTICIPATION PROCESS

This EIA was registered with DEAT along with the submission of the Plan of Study for Scoping in September 2004, which was subsequently approved by DEAT on 08 December 2004 (Reference Number. 12/12/20/671) (see **Appendix A**). The Scoping Phase of this EIA has now been concluded and this Draft Scoping Report (DRS) will be submitted to I&APs for review and then the Kwa Zulu Natal and Free State Regional Environmental Offices for their and DEAT's formal consideration, and submission to DEAT national for their approval.

ACER Africa Environmental Management Consultants (ACER) is responsible for the Public Participation Process (PPP) as part of the EIA. This PPP addresses both this EIA, as well as the EIA currently being conducted for the transmission lines. The two EIA processes are, however, completely separate and the issues raised by I&APs will be dealt with separately in the two separate EIAs.

The discussion below details the approach to the Scoping Study, in terms of both the environmental scoping and the PPP.

6.1 Approach to the Scoping Study

This Scoping Study is intended to identify potential environmental, social and economic aspects of the various alternatives for road routings and outline issues of concern raised by I&APs.

The Scoping Study comprised the following steps:

- Submission of EIA Application Forms and Plan of Study for Scoping (POSS) (**Appendix A**);
- Identification of I&APs (**Appendix B** and **Figure 6**);
- Compilation of an electronic I&AP database (**Appendix B**);
- Advertisement of the EIA in the media (**Appendix C**);
- Compilation of a Background Information Document (BID) (**Appendix D**);
- Sending out of personalised letters to key stakeholders advising them of the EIA process (**Appendix C**);
- Stakeholder briefing sessions with key stakeholders and traditional authorities;
- Key stakeholder workshop (**Appendix F**);
- Public Open Days in Colenso (30-11-2004), Van Reenen (01-12-2004), and Driefontein (02-12-2005) (**Appendix G**);
- Compilation of I&AP issues report for inclusion in the DSR (**Appendix I**);
- Technical assessment of alternatives; and
- Compilation of a Draft Scoping Report (DSR).

Upon completion of the DSR, I&APs will be given the opportunity to review and comment on this report. This process will include the following tasks:

- Advertising the availability of the DSR;
- Sending out of personalised letters advising stakeholders of the availability of the DSR;
- Distribution of the DSR to public places;

- Hold a public meeting to obtain I&AP feedback on the DSR;
- Hold various focus group meetings with key stakeholder groups.
- Compilation of the Final Scoping Report (FSR) and submission to authorities;
- Distribution of FSR to key stakeholders; and
- Sending out progress feedback letters to stakeholders.

6.2 Public Participation Programme (PPP)

The following section provides a detailed description of the PPP conducted for the proposed upgrade and construction of access roads for the Braamhoek PSS. This process is in accordance with the NEMA of 1998, and the ECA (Section 22) of 1989, and its associated EIA Regulations. Best practice principles, such as the core values held by the International Association for Public Participation, were also applied. ACER was the Public Participation Consultant with support from the lead consultants and the project proponent, Eskom.

The PPP was synchronised with the PPP process for Eskom's 400 kV Transmission Power Line and Substation Integration EIAs. Where possible, activities were combined for optimisation and, importantly, to avoid stakeholder fatigue with the duplication of information.

Drawing from the principles contained in legislation and from best practice, the following standards guided the PPP for this project:

- Inclusive consultation that has taken place with all sectors of society and that has afforded a broad range of stakeholders the opportunity to become involved (bearing in mind that it is not practically possible to personally consult with every individual in the project area);
- Wide announcement of the project in a variety of ways and over an extended period of time;
- The provision of sufficient and easily accessible information in non-technical language to enable meaningful contributions by members of the public through the assessment process;
- Providing information to members of the public in a variety of forms, *viz*. by way of discussion documents, presentations at meetings and workshops, visual displays, and the print and broadcast media;
- Making special efforts to include the needs and desires of historically disadvantaged communities;
- Allowing sufficient time for members of the public to examine material and to provide inputs;
- Enabling stakeholders to provide inputs by various methods, for example, written submissions, comment sheets, e-mails, faxes, briefing meetings, workshops, public meetings and personal contact with members of the Environmental Impact Assessment (EIA) team; and
- Providing stakeholders with ongoing feedback and acknowledgement, and the opportunity to verify that their issues have been considered (and if not, to receive an explanation for this).

An intensive PPP was conducted during the period October 2004 and April 2005.

The PPP for the proposed construction and upgrade of access roads for the Braamhoek PSS is structured into four phases, *viz.* preparation, scoping, impact assessment and announcement of the Record of Decision (RoD). Only the first two phases (preparation and scoping) can be reported on to date (**Figure 7**).

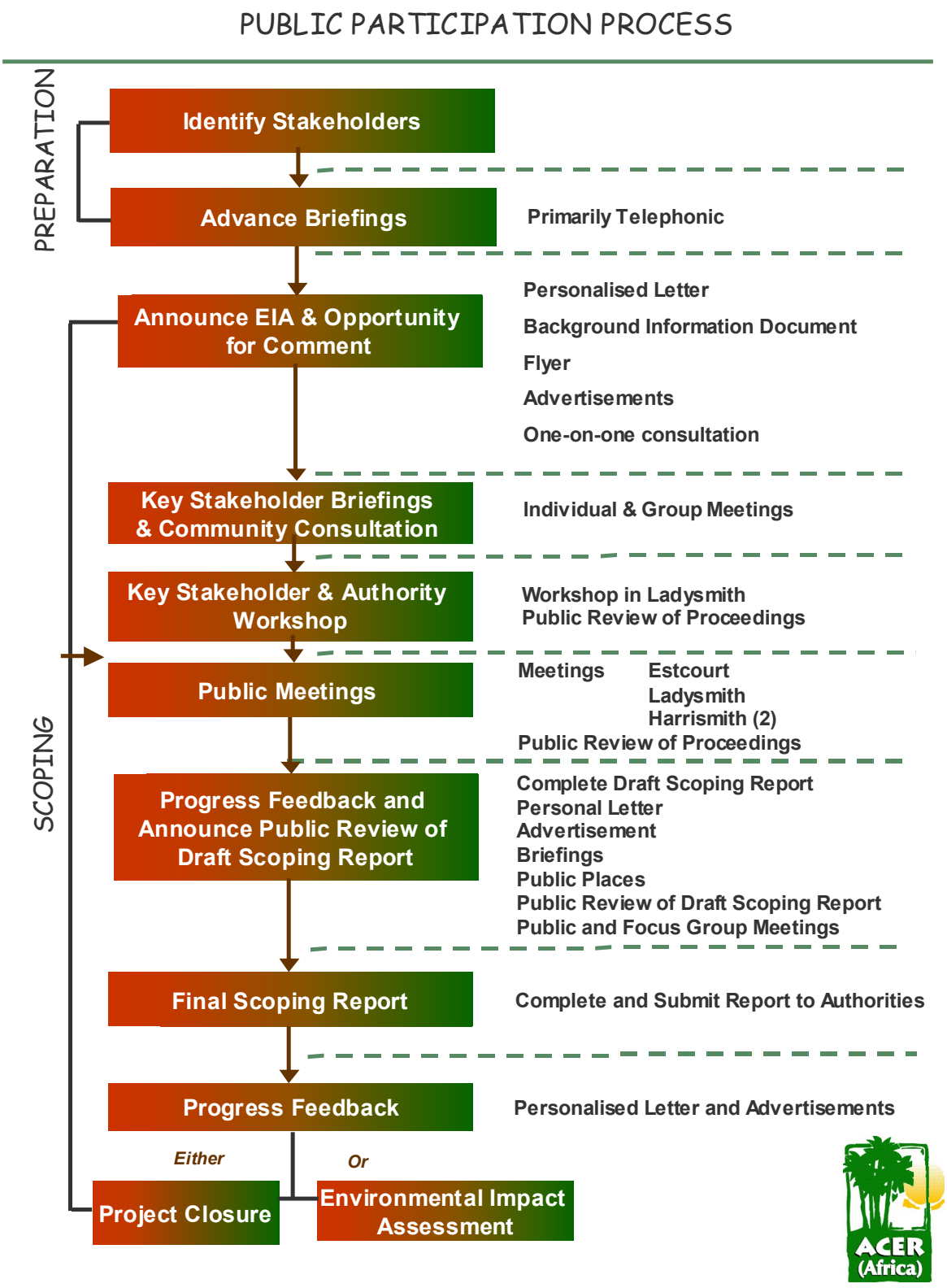

Figure 7: Public Participation Process

6.2.1 Preparation Phase

The identification of stakeholders and the creation of a comprehensive stakeholder database (see **Appendix B** and **Figure 6**). This is an on-going exercise that will continue for the duration of the project. Up to the present, stakeholders represent a wide sectoral distribution of society, *viz*.

- National and Provincial Government (Transport, Environmental Affairs, Tourism, Agriculture, Education, etc.);
- Local Government (District and Local Municipalities);
- Conservation authorities, notably, Ezemvelo Kwa Zulu Natal Wildlife, and environmental groups, for example, the Wildlife and Environment Society of Southern Africa (WESSA) and Birdlife Africa;
- Farmers Unions and Associations;
- Tourism Associations;
- Traditional Authorities and local communities;
- Non Government and Community Based Organisations;
- Landowners;
- Learners;
- Media; and
- Academics and consultants.

Those I&APs considered to be key stakeholders were personally briefed about the project, by telephone, through Key Stakeholder Workshops and via the BIDs.

6.2.2 Scoping Phase

The announcement of the project commenced in November 2004 and was achieved by a variety of methods:

Personalised Letters.

Personalised letters in English, Afrikaans and Zulu were sent on 25 November 2004 to approximately 800 people, predominantly in the study area but also from further afield, informing them of the proposed project and inviting them to participate in the environmental assessment process (**Appendix C**).

Background Information Documents, Flyers and Comment Sheets.

BIDs, flyers and Comment Sheets were available in English, Afrikaans and Zulu (**Appendix D**). They were sent to approximately 800 stakeholders with the personalised letters on 25 November 2004, and also made available at the following public places in the study area:

- Ladysmith/ Emnambithi Municipal Offices;
- Ladysmith Public Library;
- Estcourt/ Umtshezi Municipal Public Library;
- Hlomisa School, Harrismith District; and
- Hamilberg School, Harrismith District.

Statutory Advertisements

Table 2 provides a list of newspapers in which the EIA announcements were placed, as required by the EIA Regulations (**Appendix C**). Advertisements were in English, Afrikaans and Zulu.

Table 2: Published EIA Announcements

Publication	Distribution	Language	Insertion Date
Natal Witness	Regional	English	26 November 2004
Ilanga	Regional	Zulu	25 November 2004
Harrismith Chronicle	Community	English	26 November 2004
Harrismith Chronicle	Community	Afrikaans	26 November 2004
Estcourt and Midlands News	Local	English	26 November 2004
Rapport	National	Afrikaans	28 November 2004
Sunday Times	National	English	28 November 2004
Ladysmith Gazette	Local	English	26 November 2004

An article was published in the Agri-SA Magazine in the February/March 2005 issue (**Appendix E**).

The project web site (www.eskom.co.za/eia) hosts the EIA documentation. PPP documents currently loaded onto the web site include advertisements, the BID and the comment sheet. The project web site will be updated shortly.

Key Stakeholder and Authority Workshop

A Key Stakeholder Workshop was held on 30 November 2004 at the Ladysmith Royal Hotel. The purpose of this workshop was to enable key stakeholders, the proponent and the Authorities to interact directly with each other, and to identify issues of concern. The consultants and the proponent, Eskom, gave presentations on the EIA process and the project, after which key stakeholders were given the opportunity to raise their issues and concerns.

Key Stakeholder Workshop documents can be viewed in **Appendix F** and issues that were raised during the workshop have been captured in a Comment and Response Report, which is included as **Appendix I** of this document.

Public Open Days

Four Public Open Days were convened as follows:

- 29 November 2004, Estcourt/Umtshezi Municipal Public Library, 13h00 to 18h00.
- 30 November 2004, Ladysmith Royal Hotel, 13h00 to 18h00.
- 1 December 2004, Hamilberg School (Harrismith District), 10h00 to 12h00.
- 1 December 2004, Hlomisa School (Harrismith District), 14h00 to 17h00.

The purpose of the Public Open Days was to enable I&APs, the proponent and the project team to interact directly with each other, and to identify issues of concern. There were presentations by the consultants and the proponent, Eskom, after which

I&APs were given the opportunity to raise their issues and concerns (translations were provided, where necessary). Posters were presented on a mobile display with detailed project information and maps. Project information was available in English, Afrikaans and Zulu.

Public Open Day documents can be viewed in **Appendix G** and issues that were raised during the meetings have been captured in the Comments and Response Report, which is included as **Appendix I** of this document.

Focus Group Meetings

Focus Group Meetings were held at the request of stakeholders. Two focus group meetings were convened as follows:

- 18 February 2005, Ladysmith/ Emnambithi Local Municipality, 08h00 to 10h00.
- 18 February 2005, Various Harrismith District Farmers Associations and local residents, 18h00 to 21h00.

The purpose of the Focus Group Meetings was to enable I&APs and the project team to interact directly with each other, and to identify issues of concern.

Focus Group Meeting documents can be viewed in **Appendix H** and issues that were raised during the meetings have been captured in an Issues and Response Report, which is included as **Appendix I** of this document.

Interaction through the Public Participation Office

The public and registered I&APs were provided with the contact details (telephone, facsimile, postal address and e-mail address) of the Public Participation Office in order for them to interact directly with the PPP team, either with queries or to submit comment. All interactions were recorded on the database and the issues captured in the Comment and Response Report, which is included as **Appendix I** of this document.

Landowner Identification

The process of landowner identification is a lengthy and difficult process as there is no single database that records all the property names, associated landowner names and contact details. To date, ACER has identified as many potentially affected landowners as possible and briefed them about the project. This is an on-going exercise that will continue for the duration of the project until all landowners have been identified and consulted. Please refer to **Appendix B** and **Figure 6**.

Public review of Draft Scoping Report (DSR)

The following PPP activities comprise the public review process of the DSR (**Appendix J**):

- The DSR will be made available in the public domain for review and comment before it is finalised and submitted to the National Department of Environmental Affairs and Tourism (DEAT), Free State Department of Tourism, Environmental and Economic Affairs (FS DTEEA) and Kwa Zulu Natal Department of Agriculture and Environmental Affairs (KZN DAEA). The duration of the comment period will be a minimum of four weeks (25 April – 25 May 2005);

- A letter has been sent to all registered I&APs informing them of the report's availability and Comment Period;
- Key stakeholders will be contacted telephonically;
- Print media advertisements will be placed in national, regional and local newspapers in English, Afrikaans and Zulu;
- The DSR with comment sheets will be made available at public venues and on the project web site;
- Assistance, where required, will be provided to I&APs in order to facilitate understanding of the DSR so that I&APs have the opportunity to provide comment;
- Meetings will be held with key stakeholder groups to discuss the DSR at their request; and
- Comments on the DSR will be included in a Comment and Response Report and submitted to DEAT, FS DTEEA and KZN DAEA with the Final Scoping Report.

7 DESCRIPTION OF THE ENVIRONMENT

7.1 Introduction

This section provides a description of the receiving biophysical and socio-economic environment. The following specialist studies will be initiated in the EIA Phase of this project, which will serve to supplement the information already available and concentrate on the roads to be upgraded or constructed:

- Ecological including fauna and flora;
- Surface water;
- Air quality;
- Land-use;
- Geology, soils and erosion;
- Visual and aesthetics;
- Noise;
- Socio-economic; and
- Heritage resources.

7.2 Topography

The topography of the proposed site is typical of the Drakensberg escarpment. The Upper Reservoir site (Bedford farm) is situated at an altitude of 1700 m and consists of rolling grassland, with incised drainage lines.

The Lower Reservoir (Braamhoek farm) is situated in the foothills of the Drakensberg escarpment at an altitude of 1220 m, in typical grassland with rolling hills, small streams, erosion gullies and a few farm dams.

7.3 Climate

7.3.1 Location and Catchment Delimitation

The Bedford and Braamhoek catchments defined for the hydrological study undertaken by Poltech in 1999, cover a total area of 74.53 km^2. This area was delimited into sub-catchments using 1:50 000 topographic maps as shown in **Figure 8**.

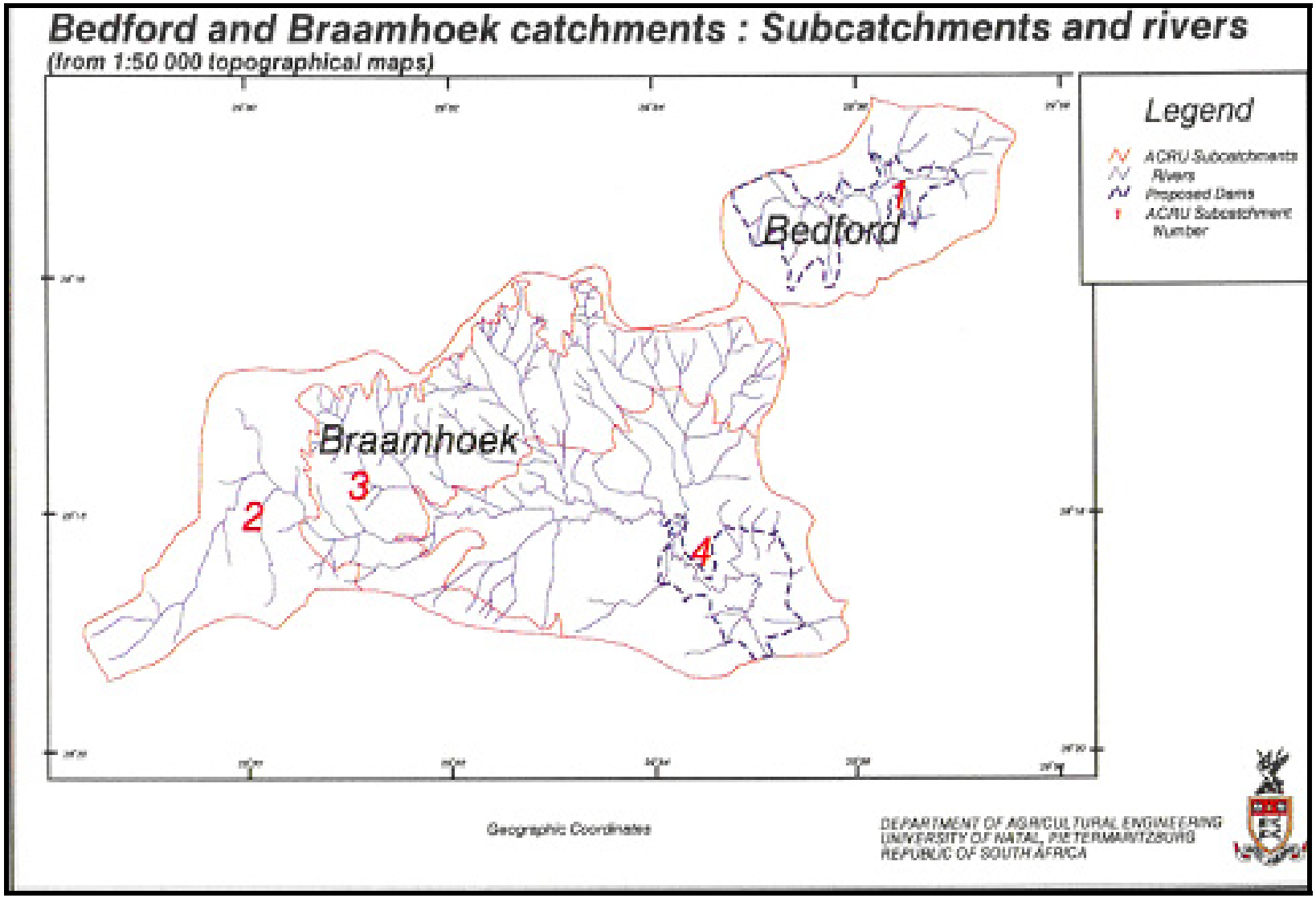

Figure 8: Delimited Sub-catchments (Poltech, 1999)

The areas and mean altitudes are provided in **Table 3** for each sub-catchment.

Table 3: Bedford and Braamhoek subcatchment information (Poltech, 1999)

Catchment	Subcatchment	Area (km^2)	Mean Altitude (m)
Bedford	1	12.59	1750
	Total	12.59	
Braamhoek	1	15.85	1650
	2	22.21	1550
	3	23.88	1300
	Total	61.94	

7.3.2 Rainfall

In order to account for the regional, seasonal and daily diversity of rainfall, data was extracted from the rainfall database managed by the Computing Centre for Water Research (CCWR). In total, 19 rainfall stations were identified in the study area as indicated in **Table 4**. Two rainfall stations (0333682 and 0334174, station numbers 11 and 14 respectively) were selected as the most appropriate "driver" stations for the four sub-catchments after considering available information and distance from the sub-catchments. The data from the Van Reenen station (which is on top of the escarpment) indicates a Mean Annual Precipitation (MAP) of 1004 mm, while the station at Moorside (which is below the escarpment) indicates a MAP of 847 mm.

Table 4: Rainfall data (Poltech, 1999)

Station number	SAWB number	Station name	Latitude		Longitude		First year of record	Last year of record	MAP (mm)	Altitude (m)
			°	‘	°	‘				
1	0333814	Sans Souci	28	04	29	28	1920	1928	593.6	1768
2	0333904	Lesliefontein	28	04	29	30	1994	1997	695.9	1800
3	0334244	Essenwood	28	04	29	39	1935	1945	1113.5	1463
4	0334037	Santiago	28	07	29	32	1961	1964	824.4	1890
5	0334008	Bachelors Home	28	08	29	32	1964	1990	819.4	1844
6	0334193	Jackalspruit	28	12	29	37	1913	1937	1360.9	1731
7	033643	Tandjiesberg	28	13	29	22	1911	1914	803.0	1858
8	0334344	Kestell Road	28	14	29	42	1918	1920	337.5	1480
9	0333675	Afgunst	28	15	29	23	1959	1961	787.4	1810
10	0333738	Waterfall	28	18	29	25	1994	1995	835.9	1859
11	**0333682**	**Van Reenen**	**28**	**22**	**29**	**23**	**1913**	**1988**	**1004.4**	**1670**
12	0333803	Grosvenor Downs	28	23	29	27	1924	1954	1182.3	1524
13	0333713	Scotston	28	24	29	24	1930	1945	1198.4	1631
14	**0334174**	**Moorside**	**28**	**24**	**29**	**37**	**1914**	**1997**	**847.4**	**1219**
15	0334205	Quaggasdrift	28	24	29	40	1914	1936	798.2	1177
16	0333897	Addington	28	25	29	25	1928	1942	980.8	1347
17	0333804	Wyford	28	25	29	26	1914	1965	1109.4	1371
18	0333805	Moorside, Besters	28	25	29	27	1987	1989	1025.7	1227
19	0334175	Moorside, Besters	28	25	29	26	1933	1986	839.1	1249

7.3.3 Temperature and Potential Evaporation

Table 5 and **Table 6** below provide mean temperatures and evaporation for the study area, respectively.

Table 5: Monthly Mean Temperatures (Poltech, 1999)

Catchm.	Sub-catchm.	Mean monthly temperatures (°C)																					
		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		Min	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*	*Min*	*Max*
Bedford	1	12.1	24.0	11.8	23.5	10.4	22.4	7.3	20.2	3.7	18.0	0.7	15.4	0.7	15.7	3.0	17.9	6.1	20.5	8.2	21.5	9.9	22.0	11.2	23.5
Braamhoek	2	12.3	24.4	12.1	23.8	10.7	22.7	7.6	20.4	4.0	18.2	1.1	15.6	1.0	15.9	3.2	18.1	6.2	20.7	8.4	21.8	10.1	22.4	11.5	23.9
	3	12.8	24.7	12.6	24.2	11.3	23.1	8.4	20.9	5.2	18.6	2.4	16.0	2.4	16.4	4.3	18.5	6.9	21.1	8.9	22.1	10.5	22.8	11.9	24.3
	4	14.2	26.9	13.9	26.4	12.5	25.3	9.2	23.1	5.2	20.8	2.1	18.3	2.0	18.6	4.3	20.7	7.7	23.1	10.1	24.2	11.8	25.0	13.3	26.5

Table 6: Monthly Evaporation (Poltech, 1999)

Catchm.	Sub-catchm.	A-pan equivalent potential evaporation (mm)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bedford	1	179.1	149.2	143.3	119.9	104.6	89.3	101.4	137.5	157.0	164.8	168.3	190.1
Braamhoek	2	183.2	152.2	145.4	120.1	104.2	89.4	101.3	137.2	158.3	168.0	171.3	193.6
	3	183.6	153.8	146.1	120.6	104.5	90.0	101.7	137.5	159.1	170.0	172.0	194.3
	4	199.9	167.9	156.4	124.2	106.2	92.4	103.2	138.6	166.1	183.1	185.5	208.6

7.4 Geology and Soils

The Upper and Lower Reservoir sites are separated by the Great Escarpment, which is a giant horseshoe-shaped feature peculiar to southern Africa, where it separates an elevated interior plateau from a coastal hinterland at lower altitude (Poltech, 1999). The Great Escarpment was initially located along the coastline at the time of the break-up of the Gondwanaland super-continent between 160 and 120 million years ago. Erosion has driven it inland to its present position since that time. As it receded, vast erosion surfaces were formed simultaneously above and below the escarpment. Remnants of the oldest of these, the African surface, form the lower interfluves at elevations of around 1750 - 1800 m in the vicinity of the Upper Reservoir site. In this watershed area, African planation has been relatively recent. Despite this, substantial thick weathered and residual material has developed on dolerites and sandstones close to the edge of the escarpment.

The access roads to the Lower Reservoir site lie within the upper part of the Ladysmith Basin, formed by ongoing erosion along headwater tributaries of the Tugela River. In this area all vestiges of the African surface have been removed by erosion, and the landscape is dissected and characterised by frequent dolerite koppies and relatively thin soil mantles, except in the high rainfall zone in proximity to the escarpment. The influence of active down-cutting within streams emerging from the base of the escarpment, such as the Braamhoekspruit, can be seen in over-steepening of parts of the scarp front, which has led to large slope failures in some areas, for example, to the east of the pumped storage schem site (Poltech, 1999).

In the area of the access roads to the Upper Reservoir site, local relief is of the order of 100 m. Low, flat topped koppies and spurs characterise the landscape and have resulted from the strong structural influence of flat-lying strata of the Karoo Supergroup, particularly the Rooinek Sandstone, which outcrops extensively in the area. Locally, streams have incised through the sandstone to depths of up to 50 m, forming small waterfalls and narrow valleys, one of which is a headwater of the Wilge River and contains the Upper Reservoir site.

The study area is underlain by sedimentary rocks of the Karoo Supergroup, more specifically of the Ecca and Beaufort Groups, which have been intruded by dolerites of the Karoo Dolerite Suite. The sedimentary units are of Middle to Upper Permian age (260 - 250 million years), while the dolerites belong to the Lower Jurassic age (183 million years). The Ecca Group is represented at the base of the succession by the Volksrust Formation, which comprises a monotonous series of dark greyish-blue silty mudstones and claystones, which were deposited in a sheltered, nearshore, marine environment (Poltech, 1999). Although these rocks do not appear to have undergone deep weathering (3 – 5 m of pale yellowish or greyish clayey, residual soil was observed in a deep erosion donga in the foothill zone), they are typical of many Karoo mudrocks in experiencing rapid disintegration on the exposure of fresh surfaces to the air.

The Beaufort Group comprises the bulk of the geological column, with almost the entire face of the escarpment being cut in these rocks. The basal unit of the succession is the Frankfort Member, which is some 130 m thick, including some thin dolerite sills. Previously known as the Estcourt Formation, this unit consists of a succession of inter-bedded greyish white to greyish blue siltstone and sandstone

layers, which often contain abundant mica along bedding planes. The sandstones are usually dirty when fine textured, classifying as greywackes, becoming cleaner as they coarsen upwards to become sublitharenites.

Above the Frankfort Member is a series of strata dominated by dark greyish mudrocks. Some 280 m in thickness, this unit contains numerous two to five metre thick horizons of greyish white sandstone. In the upper part of the succession two thicker sandstone bands outcrop conspicuously in the escarpment face. The mudrocks of this unit are fairly typical of other Karoo mudrocks in their propensity to disintegrate in exposure to the air.

The upper edge of the escarpment is formed by a prominent sandstone known as the Rooinek Member. In reality, this unit consists of a series of sandstone bands, separated by thin mudstone horizons, but, as a whole, it forms a resistant stratum about 50 m in thickness, which also outcrops very widely in the plateau area behind the escarpment.

With regards to soil, distributions are complex, and, in order to define units suitable for environmental management purposes, individual soil profile types have been grouped into associations. Comprehensive laboratory testing was carried out on a representative suite of soil samples to confirm the soil classifications and to define the range of physical and chemical soil properties typical of the area.

Many of the soils, especially in the high rainfall area close to the escarpment, are highly leached and strongly acidic (Partridge, 2005). The presence of light textured, silty subsoils underlain by slaking mudrock renders many of these soils very susceptible to erosion. This characteristic is confirmed by the presence of numerous dongas.

Soils of the gully and wetland areas are also highly susceptible to disturbance, especially by developments that would impact upon their hydrology and the accelerated ingress of sediments from their catchments (Poltech, 1999).

7.5 Surface Water

The proposed site of the Upper Reservoir, and thus the associated roads infrastructure, is situated in a tributary of the upper reaches of the Wilge River system in the Free State Province. The catchment area in which the site is located is the C81 quaternary catchment as indicated by the WR90 report (Midgely *et al*, 1994). The catchment lies at an altitude of 1700 m, has an area of 382 km^2 and a mean annual precipitation (MAP) of 882 mm.

The proposed site for the Lower Reservoir and associated roads is situated on a tributary of the headwaters of the Braamhoekspruit, which in turn is a tributary of the Klip River.

Water samples were collected from two streams on the farm Bedford and one from the Braamhoekspruit in April 1998. The water quality of the two streams on the farm Bedford have similar water chemistry, differing only in terms of hardness, whereas that from the Braamhoek stream had significantly higher concentrations of calcium, sodium, potassium and magnesium. Hardness and alkalinity (measured as $CaCO_3$) was also higher in the water collected from the Braamhoek stream. These samples were collected in April and it is conceivable that the concentrations of these elements

may change seasonally. It is anticipated that the turbidity and sediment load in the Braamhoekspruit will increase during summer rainfall periods reflecting the changes in land use.

7.6 Fauna and Flora

No vegetation communities and plant species of special conservation and/or scientific importance were identified in the study area during the Poltech EIA study. A few species of ornamental value occur at both of the proposed reservoir sites, notably geophytes. A more detailed specialist study will be undertaken during the EIA Phase to determine any species of conservation and/or scientific importance along the two selected alternative routes.

Soils in the area of the proposed internal access roads are highly erodable and therefore rather sparse vegetation cover is evident due to the overgrazing and trampling by domestic animals.

Vegetation in the area of the access roads on the lower site is particularly prone to infestation by alien invasive plant species, specifically *Acacia dealbata* and *Acacia mearnsii*.

Afro-montane forest occurs against the slopes of the Drakensberg Escarpment between the Upper and Lower Reservoirs (Braamhoek Pass). Forest covers less than 0,2 % of the total surface of South Africa, yet it is the essential habitat for many species of plant and animal. This is the third largest complex of this forest type in KwaZulu Natal and is therefore of considerable conservation significance. This Afro-montane forest will not however be affected by construction of the roads, as existing tracks will be used.

With regards to fauna, no large mammal species were observed during any of the numerous site visits performed during the Poltech EIA study period. Nevertheless it is possible for mammals to migrate from the area to be disturbed by road construction or upgrading. Furthermore, once in operation, the proposed scheme will be a “low activity “plant with little traffic associated with operations.

Various avian Red Data fauna species have however been identified in the study area, particularly at the Upper Reservoir site, where the White Winged Flufftail (*Sarothrura ayresi*) has been spotted. Bald Ibis *(Geronticus calvus)* and Crowned Crane (*Balearica regulorum)* also reside in the wetland areas on the upper site.

The Drakensberg area is recognised in the South African Red Data Book as one of seven sensitive areas that contain the majority of threatened heptofauna (reptiles). Of the eight taxa of threatened status recorded to the Drakensberg area the distribution of three coincide with the location of the proposed development. These three taxa include the following (Poltech, 1999):

- The Spiny Crag Lizard (*Pseudocordylus spinosus*)which is found in a habitat of scattered boulders in open grassland located on the lower slopes (1500 - 2500 m) of the Drakensberg, from Giant's Castle in Natal to Golden Gate in the Free State;

- The Striped Harlequin Snake (*Homoroselaps dorsalis*) which has a range from the Highveld extending to the Natal Midlands and enjoys a grassland habitat; and
- The Breyer's Longtail Seps (*Tetradactylus breyeri*) which lives in mountain grassland in the South east Transvaal and adjacent Natal and Free State.

It is unlikely that any rare or endangered insects will occur along the chosen road routes, as they do not contain any locality specific plant communities. These two components are closely associated with each other.

A fauna and flora specialist study will be undertaken during the next phase of this EIA process to supplement this information.

7.7 Socio-economic Environment

An overview of the existing socio-economic profile of the study area was determined based on existing information and surveys undertaken in the study area. A profile was compiled of existing economic activities and socio-economic trends of the study area during the Poltech EIA. This profile was then used to determine the extent of potential direct and indirect effects of increased development investment in the study area.

7.7.1 Economic Sectors

Trade is the main economic activity in the study area. The Poltech EIA concluded that the construction of the pumped storage scheme would not have a major influence on trade, however it could create additional employment. This would result in increased demand for goods and this could, in turn, lead to a temporary increase in the trade sector. This will likely also be the case with the construction of access roads.

7.7.2 Employment

Within the broader study area most of the employment opportunities created by local businesses are within the main towns (Poltech, 1999). The average size of business sites is approximately 25 m^2, which is considered to be small business. The average number of years in business is 9,4 years. This indicates a relatively stable business environment, with a potential to grow. The local businesses do not provide many employment opportunities, but the construction of the pumped storage scheme and associated access roads may lead to increased economic activities and consequently employment, even though this will only be temporary.

7.7.3 Access to services

Most of the local businesses have access to the following services:

- Electricity;
- Health;
- Education;
- Sport;
- Water; and
- Sanitation.

According to Poltech (1999), water is mainly supplied by boreholes and is used for the following purposes:

- Cleaning;
- Gardening;
- Stock watering; and
- Personal washing.

From this data it is evident that the study area is economically not very developed, with very few businesses located in the area. The businesses that are situated in the area are very small and do not provide employment to many people. The construction of the Braamhoek PSS and associated access roads could temporarily lead to the stimulation of economic activities and employment in the study area.

8 KEY ISSUES RAISED BY STAKEHOLDERS IN THE SCOPING STUDY

Below is the summary of issues raised by I&APs for the upgrading and construction of access roads as part of the EIA process. Items are grouped per topic, in order to assist in providing a summary of issues raised.

Tourism-related issues (2 comments received):
Concern about improvement of tourism potential and whether vehicles will be able to utilize the roads after construction. Query about whether a visual impact assessment will be conducted.

Agriculture and farming operations (2 comments received):
Comment raised on surface roads improving farming activities. Concern about evaluations of rates payable on land that will be utilized by Eskom and access to private land.

Ecological impacts and biodiversity conservation (8 comments received):
Request for clarity with regards to alternative routes in order to investigate biodiversity issues. Concern raised about impact on virgin land within study area. Suggestion of use of alternative road, which will result in less disturbance to both plant and bird life. Concern about wetland conservancy. Proposal to assist with specialist studies. Query regarding cost of ecological impacts.

Cultural heritage resource management (5 comments received):
Suggestion of appointing qualified specialists to identify and assess potential heritage resources. Proposal to offer services for a Cultural Heritage Impact Assessment structured to capture impacts on physical cultural sites. Objection to construction of roads as these might traverses through graves.

Social and socio-economic issues (14 comments received):
Comment on obtaining permission to access private property. Concern about proposed development having negative impacts on surrounding communities
i.e. increased levels of crime, informal settlement, heavy traffic on rural communities, new employment opportunities affecting existing businesses and the social impacts on migrant workers e.g. the spread of STDs. Other concerns raised involved accommodation facilities for employees and the public use of roads and monitoring to ensure contractor's use these roads. Comment about proposed infrastructure assisting in poverty alleviation. Appreciation of the upgrading of roads as this will benefit the surrounding communities. Comment on the need to integrate development plans with that of Local Municipality.

Land tenure and compensation (3 comments received):
Concern about effect of development on land ownership and compensation for land. Request for more information about the servitudes and compensation process.

Job creation and economic opportunities (15 comments received):
Concern raised with reference to if and how the project will create jobs, if Eskom will provide training for those that lack skills and if local communities will be given preference.

Project alternatives (32 comments received):
Majority of the respondents were in support of Alternative 4 (Kiesbeen) as it is cost-effective and environmental disturbance will be minimal. Some also showed preference for Alternatives 2 (De Beers Escarpment) and 3 (De Beers Skeurklip).

Technical queries and comments (13 comments received):
Concern about the construction of roads and maintenance of the proposed access roads.

The detailed Comments and Response Report can be found in **Appendix I**.

9 POTENTIAL ENVIRONMENTAL IMPACTS

A list of potential environmental (bio-physical and social) impacts has been identified using the following information:

- Project description;
- Site inspections of the project area;
- Various specialist studies commissioned by Eskom
- Poltech EIA and specialists studies from 1999;
- EIA for the proposed N3 Toll Road compiled by Cave Klapwijk and Associates; and
- Issues and concerns raised by I&APs.

Potential positive and negative impacts are discussed for each phase of the project below. These impacts pertain to both the External and the Internal Access Roads.

9.1 Construction Phase

Potential positive and negative impacts relating to the construction phase are discussed below.

9.1.1 Fauna and flora

The preferred alternative for the construction of access roads allows for the upgrading of existing roads, although there are sections, which will require new road alignment. Internal access roads must also be constructed. Upgrading of existing roads will entail road widening and borrow pit excavation, which will necessitate the clearing of fauna and flora. Construction of completely new roads will disturb fauna and flora in areas that have been relatively undisturbed to date. Fauna and flora will also be temporarily displaced in Construction Camp(s), although the surrounds should not be affected significantly due to strict controls to be implemented and audited, as will be required by the Braamhoek PSS Construction and Operations Environmental Management Plan (EMP).

9.1.2 Surface water

Surface water could be negatively affected by the construction of roads. This could occur through spillages of pollutants, leaking equipment and vehicles and the transporting of equipment and staff across watercourses (via bridges). At this time, no river diversions are planned for the construction of roads. Impacts will be further assessed as part of the EIA phase, and mitigation measures will be addressed in the EMP.

9.1.3 Geology and soils

Material will be required for road construction and surfacing, and this will be obtained from borrow pits to be approved by the Department of Minerals and Energy (DME). Soils could additionally be negatively impacted by vegetation clearing, which could result in soil erosion. Mitigation of cumulative impacts on easily erodable soils are to be addressed in the EMP.

9.1.4 Land use

The predominant land use in the study area is agriculture. Although Eskom has purchased the land on which the reservoirs will be located, various farms will be traversed by the access roads. This would cause a loss of agricultural land along the road corridor.

9.1.5 Aesthetics

The construction of roads could cause potentially negative visual impacts, as well as noise and dust from construction vehicles and equipment.

9.1.6 Heritage resources

Items of archaeological and heritage value have been discovered at various locations in the study area, and the construction of access roads could have a negative impact on such items as yet undiscovered. This can only be confirmed once a new survey has been conducted of the study area, as will be initiated during the EIA Phase.

9.1.7 Socio-economic impacts

The construction of access roads could have a positive impact on the socio-economic environment because it will create jobs temporarily and could stimulate some economic activity in the area. This may, however, create downstream negative impacts if the area experiences an influx of people looking for work related to the construction of the roads and scheme. Socio-economic issues will be investigated during the EIA Phase.

9.2 Operational Phase

Impacts associated with the operational phase are discussed below.

9.2.1 Fauna and flora

Fauna and flora will be permanently displaced along the road reserve. These roads will also provide corridors of access to previously undisturbed areas, which could have a negative downstream effect by providing better access.

9.2.2 Surface water

Surface water bodies may be permanently impacted upon by road crossings, which provide access to the streambeds and sensitive ecosystems.

9.2.3 Geology and soils

No further impacts are expected with regard to geology and soils during the operational phase.

9.2.4 Landuse

As in the case of the construction phase, loss of agricultural land will be caused by the road corridors and borrow pits, which may run through farmland.

9.2.5 Aesthetics

The natural appearance of the project area will be affected by the presence of permanent roads. Noise levels will initially be higher during the construction of the Braamhoek PSS, but will later be minor due to the relatively low levels of traffic expected during the operational phase.

9.2.6 Heritage resources

As in the case of the construction phase, the road corridor could lie over sites of archaeological and heritage significance. Potential impacts on the heritage resources will be addressed in detail in the EIA Phase.

9.2.7 Socio-economic impacts

The roads will provide better access to services within existing towns and may have a positive impact in this way. Increased accessibility to the area could result in further development while road maintenance could create limited job opportunities. During the construction phase of the actual Braamhoek PSS, expenditure by the developer will likely stimulate the economic sector in the area, which will be a significantly positive impact. One potentially negative socio-economic impact could be caused by an influx of people into the area in search of jobs, which could lead to other negative impacts.

10 CONCLUSIONS AND RECOMMENDATIONS

The construction and upgrading of the road network to the Braamhoek PSS is a pivotal step in the construction of the two reservoirs and associated infrastructure. The project as a whole will substantially supplement the current electricity supplied by Eskom via the National Grid, and reduces the risk of comprimising South africa's long-term energy security. It is therefore important that the upgrading and construction of roads in the area begin as soon as possible.

An extensive PPP has allowed I&APs to identify potential environmental impacts associated with the upgrade and construction of this road network during the Scoping Phase of the EIA to date. The BCJV Environmental Team has further identified potential environmental impacts associated with the construction and operational phases of the road construction and upgrading. Further specialist investigations will be conducted during the EIA Phase to supplement the information available and identify any other potential environmental impacts. These specialist studies will quantify these impacts accurately and recommend management and mitigation measures to minimise negative and maximise positive impacts. The following specialist studies are planned for the EIA Phase:

- Ecological including fauna and flora;
- Surface water;
- Air quality;
- Land-use;
- Geology, soils and erosion;
- Visual and aesthetics;
- Noise;
- Socio-economic; and
- Heritage resources.

The way forward includes involves the following steps (**Appendix J**):

- Obtain feedback from DEAT and I&APs on the Draft Scoping Report;
- Issue a Final Scoping Report;
- Develop a Plan of Study for EIA (which includes a PPP process) and submit to DEAT;
- Obtain feedback from DEAT on Plan of Study for EIA;
- Initiate specialist studies; and
- Compile the draft Environmental Impact Report (EIR).

Alternatives to be taken forward for further investigation in the EIA Phase include:

External Access Roads

Alternative 1 (use of existing N3 and R103) is the preferred option, which will be carried forward to the EIA Phase. Existing roads will be utilised for this alternative, and thus no detrimental environmental impacts are anticipated as this stage, from utilisation of this alternative.

Internal Access Roads

The two internal access routes, which are recommended to be carried forward for full investigation in the EIA Phase are:

- Alternative 1 – Braamhoek; and
- Alternative 2 – De Beers Escarpment.

These recommendations are based on the information provided in this Draft Scoping Report.

11 REFERENCES

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APPENDIX A

PLAN OF STUDY FOR SCOPING AND CORRESPONDENCE WITH ENVIRONMENTAL AUTHORITIES

APPENDIX B

STAKEHOLDER DATABASE

APPENDIX C

PROJECT ANNOUNCEMENT ADVERTISEMENT AND PERSONALISED LETTERS

APPENDIX D

BACKGROUND INFORMATION DOCUMENT, FLYERS AND COMMENTS SHEETS

APPENDIX E

ARTICLE PUBLISHED IN AGRI-SA MAGAZINE

APPENDIX F

KEY STAKEHOLDER WORKSHOP

APPENDIX G

PUBLIC OPEN DAY

APPENDIX H

FOCUS GROUP MEETINGS

APPENDIX I

COMMENTS AND RESPONSE REPORT

APPENDIX J

FUTURE PUBLIC PARTICIPATION