PROPOSED CONSTRUCTION OF THEARNOT-GUMENIDOUBLE CIRCUIT 400 KV TRANSMISSION LINE AND THE UPGRADE OF THE GUMENI SUBSTATION, MPUMALANGA PROVINCE

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GLOSSARY OF ABBREVIATIONS

DEA:	Department of Environmental Affairs
EIA:	Environmental Impact Assessment
EMP:	Environmental Management Plan
GDP:	Gross Domestic Product
GSDM:	Gert Sibande District Municipality
HDSA:	Historically Disadvantaged South African
I&AP:	Interested and Affected Party
IDP:	Integrated Development Plan
IWULA:	Integrated Water Use License Application
kV:	Kilovolt
LoM:	Life of Mine
SIA:	Social Impact Assessment
SDF:	Strategic Development Framework
SMME:	Small, Medium Size Enterprises
STLM:	Steve Tshwete Local Municipality

1. INTRODUCTION

1.1 Background

Due to the growing demand for electricity, increasing pressure is placed on Eskom's existing power generation and transmission capacity. The power load around the Nelspruit and Emthonjei areas are mainly supplied by the Prairie and Marathon Substations. A part of the transmission network in the Lowveld consumer load network (Prairie, Acornhoek, Marathon, Simplon, Merensky, Infulene, Matola and Komatipoort Main Transmission Substation) is voltage and thermally constrained[1].

In addition, Eskom's Grid Planning Division has received a feasibility application from Assmang Ferrochrome and Nkomati mine with a total demand exceeding 200 MW. These mining load applications will be supplied directly from the new Gumeni Main Transmission Substation. The proposed power line will further assist in alleviating the thermal and voltage constraints experienced within the Lowveld consumer load network[2].

To provide for the growth in electricity demand in the Mpumalanga Province, Eskom thus proposes the construction of the Arnot-Gumeni double circuit 400 kV transmission line and the upgrade of the Gumeni Substation.

The proposed project thus entails the following activities:

- The construction of a new double circuit 400kV power line from Arnot to Gumeni Substation;
- The installation of a second 500 MVA 400/132 kV transformer at Gumeni Substation.

Before a project of this nature can proceed an Environmental Impact Assessment (EIA) needs to be undertaken. Baagi Environmental Consultancy, as Environmental Assessment Practitioners (EAP), has been appointed by Eskom Holdings SOC Limited: Transmission Division to conduct an Environmental Impact Assessment (EIA) for the proposed Arnot-Gumeni Transmission Line Project.The EIA process consists of two phases, namely the Scoping Phase and a detailed Environmental Impact Assessment Phase. As part of the EIA process a Social Impact Assessment (SIA) was undertaken.

[1] Baagi Environmental (2012) Draft Scoping Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province
[2] Baagi Environmental (2012) Draft Scoping Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province

1.2 Study Area and Route Alternatives

The study area is located within the Mpumalanga Province. The area affected by the proposed project falls under the jurisdiction of the Nkangala District Municipality and specifically the Emakhazeni Local Municipality and the Steve Tshwete Local Municipality, as well as the Gert Sibande District Municipality, and specifically the Albert Luthuli Local Municipality. The main towns and settlements in the area are Arnot, Belfast(Emakhazeni), Wonderfonteinand Machadodorp (Enthokozweni).

The double circuit 400 kV Transmission Line (approximately 60 km) is proposed from the Arnot Substation(approximately 35 km north west of Carolina) to run in an easterly direction to the Gumeni Substation which is again located to the south of Machadodorp (Enthokozweni). Within the study area there are various existing lines, namely the[3]:

- Approved 400 kV Hendrina-Gumeni transmission line (construction to start towards the end of 2012);
- An existing 275 kV transmission line;
- The existing Arnot-Maputo 400 kV transmission line; and
- Various distribution lines.

The second 500 MVA 400/132 kV transformerwill be installed within the boundaries of the Gumeni Substation and will be in close proximity to the existing 500 MVA 400/132 kV transformer.

Five different route alternatives were assessed as part of the Scoping study, namely:

- Alternative 1 (Orange corridor);
- Alternative 2 (Blue corridor);
- Alternative 3 (Purple corridor);
- Alternative 4 (Yellow corridor); and
- Alternative 5 (Green corridor)

[3] Baagi Environmental (2012) Draft Scoping Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province

For a more detailed map of the above mentioned corridors refer to the Draft Scoping Report[4]. During the Scoping Phase, however, it was recommended that only Alternative 1, 3 and 5 would be further assessed during the EIA phase of the project. A 2 km wide route alternative corridor was thus assessed for each of the proposed alternative alignments.

1.2.1 Alternative 1 (Orange corridor)

The proposed Alternative 1 corridor will run parallel to the existing 400 kV Arnot-Maputo power line, situated south of Arnot. Thereafter Alternative 1 will run parallel to an existing distribution HV line in a north easterly direction. Alternative 1 will subsequently link up and run parallel to the approved Hendrina-Gumeni power line.

This alternative is approximately 56 km in length and crosses various roads including the R33 which is an important transport and economic route. Arnot power station aerodrome is situated 600 m east of Alternative 1 and may be potentially affected by the proposed 400 kV transmission line route. The Strathrae Colliery is also situated within the 2 km corridor.

1.2.2 Alternative 3 (Purple corridor)

The Alternative 3 route alignment will run parallel to the N4 Maputo Corridor, situated north of Arnot. This corridor is considered to be the main link between Gauteng, Mpumalanga and Mozambique.

Alternative 3 is approximately 60 km in length and crossed various roads including the R33. An existing railway line, linking Machadodorp (Enthokozweni)with Hendrina Power Station transects various sections of the route alignment. The St Micheil's and Fins Estate civil aerodrome are situated 490 m and 1.7 km north of this corridor.

1.2.3 Alternative 5 (Green corridor)

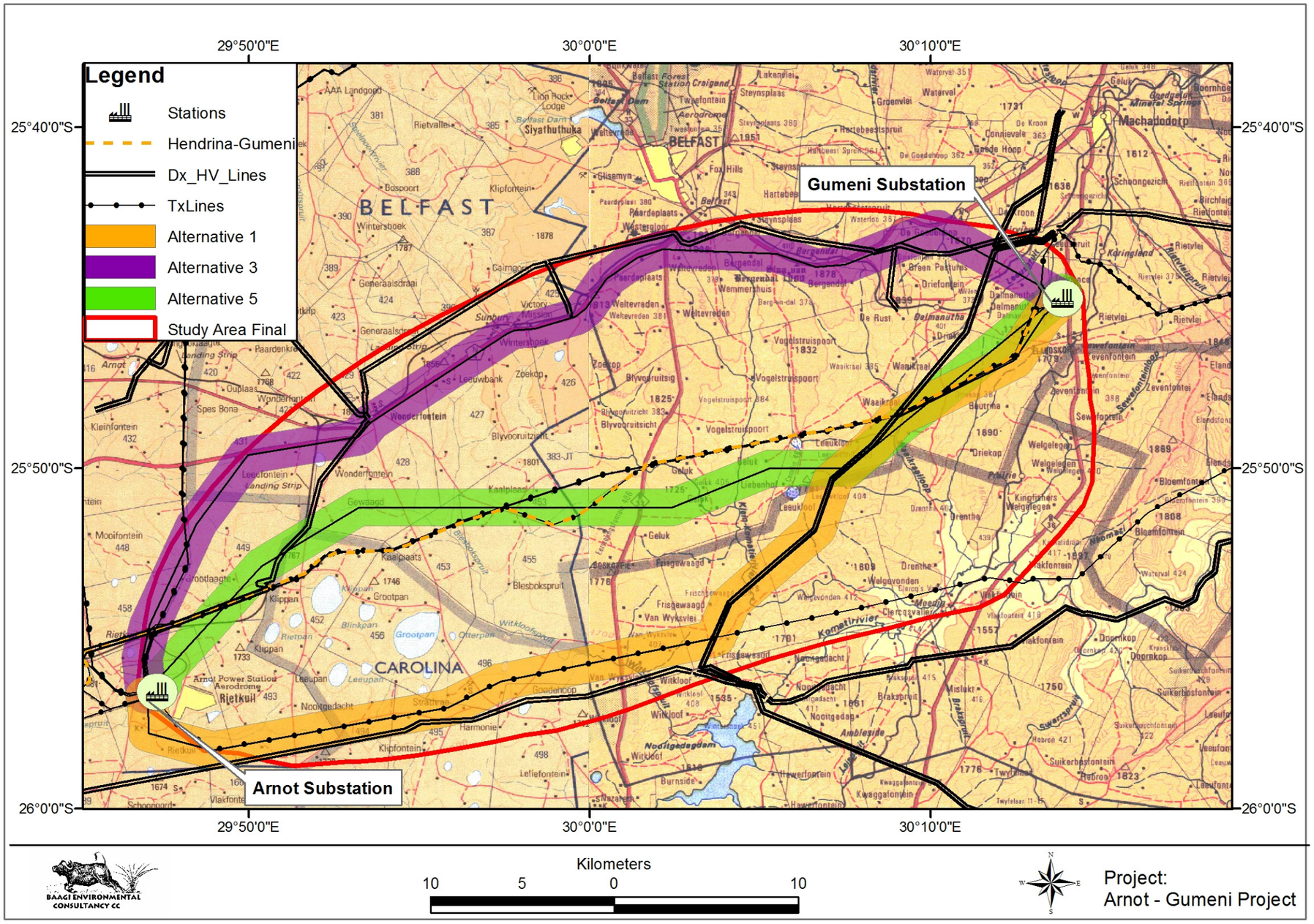
Alternative 5 is approximately 55 km in length and crosses the approved Hendrina-Gumeni power line as well as various roads including the R33. Arnot Power Station aerodrome is situated 1100m south of Alternative 5. This corridor also transects various mining operations such as Gleco Mining and an Exxaro coal mine.

1.3 Locality map

Herewith a map of the study area and alternative alignments:

[4] Baagi Environmental (2012) Draft Scoping Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province

Locality map 1: Arnot-Gumeni Transmission Line Project



1.4 Construction Phase

Construction of the proposed Transmission power line is expected to last for approximately 24 months. As the proposed Arnot-Gumeni transmission line should be operational during 2016, construction is anticipated to start in 2014[5].

During the construction period various teams could be deployed along the length of the line. There will thus be different teams working at different points along the line undertaking different activities at each point. The construction phase discussed in this document refers to the planning of the construction process, the transportation of material and equipment, as well as personnel, the initial site preparations (e.g. clearing of vegetation, planning and construction of additional access routes) and the actual construction and construction-related activities, which include the tower pegging, installation of gates (where required), excavation of foundations, foundation pouring (concrete), tower assembly and erection, stringing of the conductors, and site rehabilitations.

Additional access roads might be required in order to access the proposed Transmission power line during the construction and maintenance (operational) phases. This could be done to fulfil Eskom's requirements as well as those of the affected property owners, although new access roads usually lead to additional environmental and possibly social impacts.

The location of the proposed construction camp where workers would be housed would be determined during the Environmental Management Plan (EMP) phase of the project. The camp would be within the 2km alignment corridor and will be approximately one hectare in extent. If feasible and viable the construction camp would utilise old vacant homesteads instead of construction new facilities[6].

Impacts associated with the construction phase of the project is thus of a short duration, temporary in nature, but could have long term effects on the surrounding environment.

1.5 Maintenance and Operational Process

The operational life of power lines are usually between twenty five (25) and thirty (30) years and thus viewed as a long term process. The impacts usually associated with this phase are therefore

[5] Baagi Environmental (2012) Draft Scoping Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province
[6] Baagi Environmental (2012) Draft Scoping Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province

perceived by affected parties to be more severe, although not necessarily the case as power lines and a substation could be viewed by many as a “dormant operation”. The duration of these impacts, however, should not only be the critical issue, but aspects such as the extent, the intensity and significance would have to be considered.

Maintenance undertaken during the operational phase is highly technical and requires skilled personnel. Maintenance activities are thus undertaken by Eskom personnel or specialised contractors and are anticipated to have some short term impacts.

1.6 Technical Considerations

The servitude width required to accommodate the towers on which the transmission power line will be strung would be a maximum of 55m wide, thus 27.5 m on both sides of the centre line. The servitude width is required for the safe operation of the transmission lines and reliability of electricity supply to consumersand therefore no structures are allowed within the servitude.

The exact width of the servitude could further depend on the type of pylon tower required. Different towers are considered namely the Guyed Double Circuit Suspension Tower and the Self Supporting Double Circuit Suspension Tower.

The maximum distance between towers for a 400 kV transmission line varies from 350 metres to 400 metres. Bend points and steep angles should also be considered when finalising the tower positions along a route.

The separation distance (centre to outer boundary of servitude) of a 400 kV transmission line from an existing 275kV transmission power line would be 51 metres. For boundary or perimeter fences (whether electrified or not) a distance of 40 metres from the proposed transmission line is recommended. This distance could be reduced, but the fence must then be earthed. The maximum preferred distance from roads is 90 metres from the centre of the line and for railway lines it is approximately 10 metres. Eskom can request the provincial or national authorities to relax the distance with regards to roads. The distance between power lines and the railway could also be mitigated if the railway line is earthed. This, however, has severe cost implications.

1.7 Negotiation Process

Once the EIA process has been completed and a positive authorisation has been received for a route corridor, the Eskom negotiator for the project will start the negotiations with each landowner. An independent registered valuator would be appointed to assess the value of the land. In cases of disagreement, the land owner can appoint his/her own selected valuator to also provide an assessment of the land value. During this process, the issue of devaluation of the land would have to be addressed.

When the land value and the final alignment have been agreed upon Eskom would enter into a contract with the land owner to obtain the servitude.

It should be noted that Eskom acquires the servitudes according to the Constitution and the Expropriation Act which states that the actual financial loss must be compensated. This is thus is a once off payment agreed upon by the landowner and Eskom. Eskom cannot pay rentals as this is not mandated by any legislation.

2. DEFINITION OF A SOCIAL IMPACT ASSESSMENT

Burdge (1995) describes a Social Impact Assessment as the "…systematic analysis in advance of the likely impacts a development event (or project) will have on the day-to-day life (environmental) of persons and communities." A SIA therefore attempts to predict the probable impact of a development (before the development actually takes place) on people's way of life (how they live, work, play and interact with one another on a daily basis), their culture (their shared beliefs, customs and values) and their community (its cohesion, stability, character, services and facilities), by:

- Appraising the social impacts resulting from the proposed project;
- Relating the assessed social impacts of the project to future changes in the socio-economic environments that are not associated with it. This would serve to place the impacts of the project into context;
- Using the measurements (rating) to determine whether the impacts would be negative, neutral or positive;
- Determining the significance of the impacts; and
- Proposing mitigation measurements.

An SIA is thus concerned with the human dimensions of the environment, as it aims to balance social, economic and environmental objectives and seeks to predict, anticipate and understand the potential impacts of development.

The usefulness of an SIA as a planning tool is immediately clear, in that it can assist the project proponent to conceptualise and implement a project in a manner which would see the identified negative social impacts addressed through avoidance or mitigation and the positive impacts realised and optimised. It would also allow the community to anticipate, plan for and deal with the social changes once they come into effect. In this sense then, the SIA is an indispensable part of the EIA, the Environmental Management Plan (EMP) and any participative activity (e.g. community involvement in mitigation and monitoring during planning and implementation).

3. PURPOSE OF THE REPORT

The aim of the SIA Report is to:

- Determine the current socio-economic status of the area and the social characteristics of the receiving environment;
- Indicate the anticipated core impact categories and impact areas (possible hot spots);
- Identify anticipated positive socio-economic impacts of the proposed project, including positive impacts and provide enhancement measures for these impacts;
- Identify and highlight negative socio-economic impacts (social hot spots) of the proposed project and indicate mitigation measures to deal with these impacts;
- Present the findings, recommendations, and conclusions of the social study.

4. METHODOLOGY

The broad steps followed as part of the SIA are discussed below.

4.1 Scope of the Assessment

Based on information received from the client and Baagi Environmental, the scope of the assessment was determined. A site visit was undertaken during November 2011 to enable the consultants to familiarise themselves with the area and the social characteristics of the receiving environment.

4.2 Literature Review, Analysis and Desktop Studies

The literature review and desktop studies assisted the consultants in establishing the social setting and characteristics of the study area, as well as the key economic activities.

4.3 Data Gathering

4.3.1 Primary Data

Primary data assisted the consultants in establishing the social setting and characteristics of the study area, as well as the key economic activities. Interviewing of 'key' persons also formed part of the research process.

4.3.2 Secondary Data

Secondary data, which was not originally generated for the specific purpose of the study, were gathered and analysed for the purposes of the study. Such data included the census data, project maps, local histories, planning documentation such as the draft Integrated Development Plans (IDP) and Strategic Development Frameworks (SDF) of the various municipalities found in the study area.

4.3.3 Consultation

Information gathered and social issues identified and verified during the public participation process (focused on the host community) undertaken as part of the Scoping and EIA Phases, also served as key input to the social assessment.

4.4 Profiling

Profiling serves to build on information generated during the Scoping phase. It involves a description of the social characteristics and history of the area being assessed, an analysis of demographic data, changes in the local population, and the land-use pattern in the study area, as well as any other significant developments in the area and thus social character over time. The profiling process is a combination of secondary and primary research, site visits, and consultation. This could include information on:

- Historical background;
- Social characteristics;
- Culture, attitudes and socio-psychological conditions;
- Population characteristics;
- Community and institutional structures;
- Community resources; and
- Broad economic impacts.

The broad profiling will typically include descriptions regarding the following:

- The social trends and current conditions;
- The land-use in the area;
- The demographical profile and social characteristics of the host community;
- Other potential developments in the area;
- The local and regional economy; and
- Potential economic links between the proposed project and its environs.

4.5 Projection and Estimation of effects

A baseline assessment indicates the current reality in the social and related aspects of the affected environment. A baseline assessment is necessary to enable a logical and theoretically sound analysis of social impacts. It forms part of the process of identifying important cause-and-effect relationships and a comparative framework for anticipated changes and impacts.

The output of this phase is the impact matrix and mitigation measures.

4.6 Variables

The following variables are typically assessed (Burdge, 1995) as part of the Social Impact Assessment:

- Population impacts;
- Community/institutional arrangements;
- Conflicts between local residents and newcomers;
- Individual and Family level impacts;
- Community infrastructure needs; and
- Intrusion impacts.

For assessing the impacts associated with the proposed project, the above variables were adapted to allow the assessment of the full range of social impacts relevant to the specific project. These variables would relate to the construction and operational phases of the proposed project.

4.7 Significance Criteria

During the Environmental Impact Assessment Phase, the anticipated social impacts were rated according to the rating approach described below. This rating approach is based on the approach specified by Baagi Environmental.

Table 1: Significance Criteria

CRITERIA	DESCRIPTION
Nature	Includes a description of what causes the effect, what will be affected and how it will be affected. Impacts can either be positive or negative. Negative impacts require mitigation measures to reduce their significance.
Extent	The physical and spatial scale of the impact.
Duration	The lifetime of the impact is measured in relation to the lifetime of the proposed development.
Intensity	Examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment.
Probability	This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time.
Status	Description of the impact as positive, negative or neutral, and direct or indirect.

CRITERIA	DESCRIPTION
Significance	A synthesis of the characteristics described above and assessed as low, medium or high. A distinction will be made for the significance rating without the implementation of mitigation measures and with the implementation of mitigation measures.

4.7.1 Duration

The lifetime of the impact is measured in relation to the lifetime of the proposed development.

Table 2: Duration Criteria

DESCRIPTION	EXPLANATION	WEIGHT
Short term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than any of the development phases.	1
Medium term	The impact will last up to the end of the phases, where after it will be negated.	3
Long term	The impact will continue or last for the entire operational lifetime of the project, but will be mitigated by direct human action or by natural processes thereafter.	4
Permanent	The impact is non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient	5

4.7.2 Scale

The physical and spatial scale (extent) of the impact is classified below.

Table 3: Scale Criteria

DESCRIPTION	EXPLANATION	WEIGHT
Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.	1
Site	The impact could affect the whole, or a significant portion of the site.	2
Regional	The impact could affect the area around the site including neighbouring (residential and commercial) properties.	3

4.7.3 Magnitude / Severity

This refers to the degree (magnitude/severity) to which the proposed activity would affect the existing environment.

Table 4: Magnitude Criteria

DESCRIPTION	EXPLANATION	WEIGHT
Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.	2
Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.	6
High	Function or process of the affected environment is disturbed to the extent where the function or process temporarily or permanently ceases.	8

4.7.4 Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time. The classes are rated as follows:

Table 5: Probability Criteria

DESCRIPTION	EXPLANATION	WEIGHT
Improbable	The possibility of the impact occurring is very low, either due to the circumstances, design or experience.	1
Probable	There is a possibility that the impact will occur to the extent that provisions must therefore be made.	2
Highly probable	It is most likely that the impacts will occur at some stage of the project.	4
Definite	The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory measures or contingency plans to contain the effect.	5

4.7.5 Level of Significance

Significance is determined through a synthesis of the impact assessment criteria:

Sum (Duration + Scale + Magnitude) x Probability.

The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, the significance is noted as “positive”.

Table 6: Level of Significance

DESCRIPTION	EXPLANATION	WEIGHT
Negligible	Without mitigation: The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.	**≤ 20**

DESCRIPTION	EXPLANATION	WEIGHT
	With mitigation: The impact will be mitigated to the point where it is regarded to be insubstantial.	
Low	Without mitigation: The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs. With mitigation: The impact will be mitigated to the point where it is of limited importance.	**› 20 ≤ 40**
Moderate	Without mitigation: The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required. With mitigation: Despite mitigation, the impact will remain significant. However, within the overall context of the project, the persistent impact does not constitute a fatal flaw.	**› 40 ≤ 60**
High	Without mitigation: The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or cost of management intervention will be a significant factor in mitigation.	**› 60**

4.7.6 Cumulative Impacts

The possible cumulative impacts will also be considered. Cumulative impact, in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

4.8 Assumptions and limitations

With regards to the SIA undertaken, the following should be noted:

- A SIA aims to identify possible social impacts that could occur in future. These impacts are based on existing baseline information. There is thus always an uncertainty with regards to the anticipated impact actually occurring, as well as the intensity thereof. Impact predictions have been made as accurately as possible based on the information available at the time of the study.
- The SIA relied on the information received during the public participation process undertaken as part of the EIA process. Additional data gathering, research and consultation were undertaken. Sources consulted are not exhaustive and additional information can still come to the fore to influence the contents, findings, ratings and conclusions made.

- Demographic information was dependent on statistics from StatsSA, as well as municipal documentation. Most of the information is still based on the 2001 statistics and the Community Survey undertaken during 2007. The demographic changes that took place since then should be considered although the lack of more recent demographic data is not seen as a limiting factor, and it is not anticipated to influence the outcome of the report.
- Technical and other information provided by the client is assumed to be correct.
- Individuals view possible social impacts differently due to their association with the anticipated impact. Impacts could therefore be perceived and rated differently than those contained in the SIA Report.
- The aim of the SIA was to assess the impacts associated with the proposed Arnot-Gumeni Transmission line project. Cumulative impacts as a result of other transmission line projects in the area were not assessed.

5. BASELINE DESCRIPTION OF THE RECEIVING ENVIRONMENT

5.1 General Description of the Study Area

The study area is located within the Mpumalanga Province which lies in eastern South Africa, north of KwaZulu-Natal and bordering Swaziland and Mozambique. It constitutes 6.5% of South Africa's land area. In the north it borders on Limpopo, to the west Gauteng, to the southwest the Free State and to the south KwaZulu-Natal. The capital is Nelspruit (recently renamed to Mbombela).

A number of District Municipalities (DMs), and Local Municipalities (LMs) form part of the study area in which the study corridors fall, namely:

- Nkangala District Municipality
    - Emakhazeni Local Municipality
    - Steve Tshwete Local Municipality
- Gert Sibande District Municipality
    - Albert Luthuli Local Municipality

5.2 Key aspects of the Nkangala District Municipality and affected local municipalities

The Nkangala District Municipality consists of 160 towns and villages. The District shares the western side of its borders with the economic hub of South Africa, Gauteng. The district's economy is dominated by electricity, manufacturing and mining. These sectors are followed by community services, trade, finance, transport, agriculture and construction. The relatively large

economies of Steve Tshwete LM (Middelburg) and Emalahleni LM (Witbank/Emalahleni) sustain the economy of the Nkangala District to a large extent and are based on the steel industry with high reliance on the manufacturing sector[7].

The two local municipalities affected by the proposed development that falls under the jurisdiction of the Nkangala District Municipality are the Emakhazeni Local Municipality and Steve Tshwete Local Municipality.

5.2.1 Emakhazeni Local Municipality

The area is situated on the highest part of the Steenkampsberg Plateau at approximately 2 072 m above sea level, with the Dullstroom station being the highest point in Mpumalanga. The Suikerboschkop koppies are situated in the west of the area. The landscape declines from the plateau towards the escarpment and the Lowveld to the Mozambique Coast in the east.

There are various rivers and watercourses traversing the area, the most prominent of these being the Crocodile River in the north and Komati River in the south. There are numerous wetlands and sensitive environmental areas associated with these rivers, particularly around Dullstroom. These rivers are also popular for fly-fishing, attracting large number of tourists to the area.

There are four Nature Reserves in the area, namely the Tullach-Mohr Reserve on the eastern boundary of the area, the Dullstroom Nature Reserve situated north of Dullstroom and the Verloren Valley Nature reserve situated in the north of Emakhazeni. Lastly is the Ntsinini Nature Reserve situated east of Waterval Boven.

Farming is the dominant economic activity in the Emakhazeni area occupying the largest part of the physical area. Small towns have developed throughout the area, which serve as service centres to the agricultural sector[8].

The 2001 census divided the municipality into the following main towns and settlements:

Table 7: Emakhazeni LM: Main towns and settlements

TOWNS / SETTLEMENTS	AREA (KM^2)	POPULATION	MOST SPOKEN LANGUAGE
Belfast	67.63	2,425	Afrikaans
Dullstroom	48.10	600	English

[7] www.nkangaladm.org.za
[8] www.emakhazenilm.co.za

TOWNS / SETTLEMENTS	AREA (KM^2)	POPULATION	MOST SPOKEN LANGUAGE
eMgwenya	1.02	3,785	Swazi
Emthonjeni	1.17	4,112	Swazi
Machadodorp(Enthokozweni)	36.77	1,465	Afrikaans
Sakhelwe	0.76	2,920	Northern Sotho
Siyathuthuka	1.71	7,485	Zulu
Waterval Boven	1.99	1,908	Swazi
Remainder of the municipality	4,576.32	18,291	Southern Ndebele

5.2.2 Steve Tshwete Local Municipality

The Steve Tshwete Local Municipality (STLM) came about in 2001. The municipal area covers approximately 3993 square kilometers and includes the following towns: Middelburg, Mhluzi, Hendrina, Kwazamokuhle, Rietkuil, Pullenshope, Komati, Presidentsrus, Naledi, Lesedi, Kranspoort, Blinkpan, Koornfontein, Kwamakalane, and Doornkop. The STLM is a category B municipality[9].

The population is estimated at 143 000 citizens in terms of the 2001 census. According to an estimation done in 2004 this figure has increased to 146 776 individuals. The majority of residents in the STLM lives in the town of Middelburg and Mhluzi whilst others reside in smaller towns such as Hendrina, Kwazamokuhle, as well as mining and other small settlements found in the vast rural areas[10].

The 2001 census divided the municipality into the following main places:

[9] www.stevetshwetelm.gov.za
[10] www.stevetshwetelm.gov.za

Table 8: Steve Tshwete LM: Main towns and settlements

TOWNS / SETTLEMENTS	AREA (KM^2)	POPULATION	MOST SPOKEN LANGUAGE
Doornkop	4.56	1,191	Southern Ndebele
Hendrina	2.63	890	Afrikaans
Kranspoort Dorp	6.39	153	Afrikaans
KwaZamokuhle	2.32	12,845	Zulu
Mhluzi	7.06	46,012	Zulu
Middelburg	63.14	42,306	Afrikaans
Remainder of the municipality	3,891.16	39,399	Southern Ndebele

5.3 Key aspects of the Gert Sibande District Municipality and affected local municipality

The Gert Sibande District Municipality (GSDM) is bounded by Ekurhuleni Metro of the Gauteng Province to the west, Sedibeng DM of the Northern Free State DM to the south west, Ehlanzeni DM to the north east of Mpumalanga Province, Nkangala DM to the north of Mpumalanga Province, Amajuba DM to the south east of KZN and Swaziland to the east. According to the 2001 Census, the majority of its 900 007 residents speak IsiZulu.

The GSDM is an economic hub for mining, agriculture and tourism. It is also home to large scale industries such as Sasol, Eskom, Mondi and other gold and coal mines. The centrality of the offices ensures easy access to the District by stakeholders, rural communities and aims to ensure cost effectiveness[11].

5.3.1 Albert Luthuli Local Municipality

The Albert Luthuli Local Municipality falls under the jurisdiction of the Gert Sibande District Municipalitywith its seat in the town of Carolina.

The 2001 census divided the municipality into the following main places:

[11]www.gsibande.gov.za

Table 9: Gert Sibande LM: Main towns and settlements

TOWNS / SETTLEMENTS	AREA (KM^2)	POPULATION	MOST SPOKEN LANGUAGE
Badplaas	0.86	276	Afrikaans
Bhevula	11.91	4,092	Swazi
Carolina	18.69	2,952	Afrikaans
Diepgezet	4.89	229	Swazi
Duma	28.80	1,760	Zulu
Eerstehoek	638.65	41,780	Zulu
Ekulundeni	1.49	4,490	Swazi
Embhuleni	63.37	45,249	Swazi
Emfumbeni	24.29	1,314	Zulu
Emjindini	12.41	1,202	Swazi
Empuluzi	0.28	3	Swazi
Enikakuyengwa	73.34	9,235	Swazi
Lukwatini	4.86	5,181	Swazi
Mandlamakhulu	17.87	1,067	Swazi
Mpisikazi	49.57	19,415	Zulu
Mpuluzi	7.84	11,855	Zulu
Ndlela	14.56	3,012	Swazi
Sandleni	27.06	544	Zulu
Silobela	1.97	9,167	Zulu
Steynsdorp	1.14	585	Swazi
Tshabalala	2.32	3,296	Zulu
Remainder of the municipality	4,566.75	21,242	Swazi

5.4 Key towns or settlements within the study area

5.4.1 Belfast (Emakhazeni)

Belfast or Emakhazeni is a small town in Mpumalanga Province, with a population of about 10000 individuals. The town, which is situated just to the northof the study area,is renowned for its excellent trout fishing conditions. Sheep and dairy farming take place here as well as maize, potatoes and timber are produced. Coal and black granite are mined around Belfast. Around 6 million tulip bulbs are produced here annually for export.

Belfast is the main gateway to the picturesque Mpumalanga Highlands and warm Lowveld areas, renowned for its surrounding scenery and unique flora and fauna. Belfast provides the perfect base from which to explore and enjoy the beauty of the indigenous landscape[12].

5.4.2 Carolina

Carolina is situated to the south of the study area. It is a mixed farming and small scale coal and precious stone mining community. The Komati Gorge and associated Komati River are situated in the vicinity of Carolina. The small settlement Silobela houses mostly Swazi speaking people.

5.4.3 Machadodorp

Machadodorp or eNtokozweni is situated to the north east of the study area and north of the Gumeni Substation. The local economy is sustained by the Assmang Ferrochrome mine and logging industries based on the pine plantations around the town. A large contingent of contract workers employed at the Nkomati mine also reside in Machadodorp, contributing a large part of the town's economy[13].

5.4.4 Wonderfontein

Wonderfontein is a small settlement next to the N4 that developed at the Wonderfontein station. The settlement is host to the Wonderfontein Mill and Grain Enterprises (Pty) Ltd., the Thusong Services Centre, the Landmark Co-op, Wonderfontein Clinic, a fuel station and some smaller businesses.

5.5 Socio-economic indicators of the population profile

The following table provides a brief description of the socio-economic indicators and socio-demographic profile of the population within the study area.

[12] www.belfastsouthafrica.com
[13] www.machadodorp.ocm

Table 10: Socio-economic indicators of the population profile

	MPUMALANGA PROVINCE	NKANGALA DM[14]	EMAKHAZENI LM[15]	STEVE TSHWETE LM[16]	GERT SIBANDE DM[17]	ALBERT LUTHULI LM[18]
SOCIO-ECONOMIC INDICATORS						
Population[19]	3365885	1018826	43007	142793	900 007	187936
Brief analysis	*Even though it is one of the smaller provinces, Mpumalanga has a population of more than 3 million people (the second-smallest province after Gauteng), The total population in the potentially affected municipalities is estimated at approximately 1.9 million people of which the majority (1018826) stays within the Nkangala DM. Spatially GSDM is the largest of the three Districts in Mpumalanga Province at 31 846 km², covering 40% of the Mpumalanga Province's land mass.*					
Age Groups and Gender	36% of the population is under the age of 15.	The youth constitutes the largest share of the population. In 2007, 60% of NDM's population	65% of the population fall within the age group 15 to 65 years of age.[20]	30% of the population is between the age group 0 to 14 years and 29% between 15 to 29 years, as	62% of the populationfall within the age group 15 to 65 years[22]. (census 2007)	More than 40% of the population is older than 14 years of age[23].

[14]Nkangala District Municipality. 2011. Integrated Development Plan: 2012–2013
[15]Emakhazeni Local Municipality. 2010. Integrated Development Plan: 2011-2016
[16]Steve Tshwete Local Municipality. 2007. Integrated Development Plan: 2008-2009
[17]Gert Sibande District Municipality. 2011. Integrated Development Plan:2012-2016
[18]Albert Luthuli Local Municipality. 2010. Integrated Development Plan: 2011–2016
[19] Census 2001
[20] Community survey 2007

	MPUMALANGA PROVINCE	NKANGALA DM[14]	EMAKHAZENI LM[15]	STEVE TSHWETE LM[16]	GERT SIBANDE DM[17]	ALBERT LUTHULI LM[18]
		was under the age of 30 years, 25% between 30 and 49 years and 14% was 50 years and older.		well as between 30 to 49 years[21].		
Brief analysis	*The age and sex structure of the population is a key determinant of population change and population dynamics. The character of the age distribution is an indication of both current and future needs regarding educational provision for younger children, health care for the whole population and vulnerable groups such as the elderly and children, employment opportunities for those in the economic age groups, and provision of social security services such as pension and assistance to those in need. The above provides evidence that the age group (15-65 years) constituted the largest share of the affected municipalities' population. It should also be noted that all the municipalities have large numbers of individuals categorised as youth which makes the provision of education and job creation imperative. It also implies that there is a significant portion of the population that are able to participate in the local economy as a source of labour.*					
Population Stability	No data available	The population growth rate increased by about 2% between the period 2001 and	According to the Community Survey of 2007, the population in ELMdecreased by	No Data Available	No Data Available	The population increased with 3% from 2001 until 2007.

[22] Community survey 2007
[23] Community survey 2007
[21]Steve Tshwete Local Municipality. 2006. Local Economic Development Plan

	MPUMALANGA PROVINCE	NKANGALA DM[14]	EMAKHAZENI LM[15]	STEVE TSHWETE LM[16]	GERT SIBANDE DM[17]	ALBERT LUTHULI LM[18]
		2007.	11% from 2001 until 2007.			
Brief analysis	*No reasons for the decrease in the population figure could be given. This could, however, be attributed to the HIV/Aids prevalence and to a possible outmigration of young adults to other municipalities or provinces in search of employment.*					
Education and Skills Levels	9800 people in 2001 reported to have post school education.	30% of males and 37% of the females have no schooling	13.8% of the population has no-schooling and 1.4% of the population has matrix and bachelor degree.	3% of the municipality has a tertiary or higher qualification	20% of persons over 20 years within the municipality have no schooling	No Data Available
EMPLOYMENT AND INCOME						
Employment Stats	Mpumalanga's official unemployment rate is 26,3%	Nkangala had an average unemployment rate of 30%	60% of the population is economically active.	35% of the population are unemployed	63% of the population is economically active.	22% of the population is unemployed
Brief analysis	*Unemployment occurs when a person is willing and able to work but is unable to find employment. The unemployment rate is defined as the percentage of those in the labour force who are unemployed but actively seeking work. The relatively high unemployment rate remains a challenge to the various municipalities and for the country as a whole. Priority should thus be given to addressing the issue.*					
Income	287 000 employed people earned an income of	Nkangala's annual per capita personal income in nominal terms (current	The annual per capita income for the municipality is R12 136	84% of the inhabitants fall within the lower bracket income	Most of the population earn less than R3538 per month	Most of the population earn less than R3200 per month

	MPUMALANGA PROVINCE	NKANGALA DM[14]	EMAKHAZENI LM[15]	STEVE TSHWETE LM[16]	GERT SIBANDE DM[17]	ALBERT LUTHULI LM[18]
	R800 or less per month. As few as 15 000 earned R12 800 or more per month.	prices) that showed noticeable improvement from R9 665 (R805 per month) in 1996 to R32 172 (R2 681 per month) in 2009		(R400-R800 pm)		
Brief analysis	*Poverty rate is described as the percentage of people living in households with an income less than the poverty income. Poverty income is defined as the minimum monthly income needed to sustain a household and it varies according to the household size, i.e the larger the household the larger the income would be required to keep its members out of poverty. The Municipal figures provided are questionable as it seems as if some data could have not been included as part of the figures. For the local municipalities it is clear that poverty still prevails.*					
SOCIAL DYNAMICS						
Health						
Brief analysis	*The HIV estimates for Nkangala, as with the Province, reflect a declining trend. According to Global Insight, HIV estimates for Nkangala peaked in 2004 at 141 160 and has since come down to 126 723. In contrast, and understandably so, AIDS estimates continued to rise to the latest 2008 figure of 11 136. However, it is noteworthy that the AIDS estimates growth rate, which was as high as 56% in 1997, has dropped off to only 0.4% in 2008. Based on this, it can be assumed that the AIDS estimated number is close to its peak and may start to decline in the near future, similar to the HIV growth rate (-3.1 %).*					
Crime						
Brief analysis	*According to the SAPS data of 2010, murder statistics went down slightly, however a big increase in business and residential robberies throughout the province has been experienced.*					

	MPUMALANGA PROVINCE	NKANGALA DM[14]	EMAKHAZENI LM[15]	STEVE TSHWETE LM[16]	GERT SIBANDE DM[17]	ALBERT LUTHULI LM[18]
COMMUNITY RESOURCES						
Infrastructure	82% of the population use electricity for lighting	47% of the population uses electricity for heating and 48% for cooking	27% of the population uses electricity for heating and 27% for cooking	9174 houses require formal electricity structures and 53% of the population uses electricity for heating and 53% for cooking	27% of the population uses electricity for heating and 30% for cooking	19% of the population uses electricity for heating and 21% for cooking
Housing	77% of the population live in formal dwellings.	75% of the population live in formal dwellings and 18% of the population live in informal dwellings	68% of the population live in formal dwellings and 9% of the population live in informal dwellings.	A total of 9469 formal houses are required. 74% of the population live in formal dwellings and 16% of the population live in informal dwellings.	56% of the population live in formal dwellings and 22% of the population live in informal dwellings.	58% of the population live in formal dwellings and 22% of the population live in informal dwellings.
Basic Service Delivery	3% of the population still uses the bucket system and 12% of the population has no toilet facilities. 85% of	5% of the population still has no access to toilet facilities.	7% of the population still has no access to toilet facilities.	5344 houses do not receive formal refuse removal, and are not connected to a sewage system. 7% of the population still has	11% of the population still has no access to toilet facilities.	8% of the population still has no access to toilet facilities.

	MPUMALANGA PROVINCE	NKANGALA DM[14]	EMAKHAZENI LM[15]	STEVE TSHWETE LM[16]	GERT SIBANDE DM[17]	ALBERT LUTHULI LM[18]
	the population has access to piped water.			no access to toilet facilities.		
Brief analysis	*Due to the predominantly rural area with scattered settlements, the affected area has a dispersed spatial structure. Population densities vary from very high (urban areas) to very low (small settlements and the rural areas). Most people are located in settlements adjacent formal urban towns with a high level of housing and sanitation needs. However, there is also high degree of need in the less densely populated rural areas. Backlogs are the highest in the areas of sanitation, followed by electricity and then water. Electricity backlogs are most severe in rural areas and amongst households on farms.*					

5.6 Natural Resources and Land-Use

The western side of the study area is characterised by mining activities as well as cultivated land. Small pockets of forestry areas are found in the western and central section of the study area, and the eastern section of the study area can be classified as natural vegetation used as farmland (mainly for grazing of cattle). Sections of the Komati gorge falls within the eastern section of the study area.

Crop production mainly includes maize and soya beans, as well as some oats and "weeping love-grass" ("Oulandsgras": Eragrostis curvula).

The Belfast Dam with some tourist facilities are situated to the north of the study area just east of Belfast, and the Nooitgedacht Dam Nature Reserve is to the south of the study area in the vicinity of Carolina.

5.7 Tourism Industry

The Nkangala District offers considerable tourism potential. The economy of the eastern areas of the District is already growing due to the increasing popularity of tourist destinations in the Emakhazeni Local Municipality area. The natural beauty, rural character and popularity of fly-fishing are the main attractions to this area. The northwestern areas of the District also offer opportunities for tourism, through the consolidation of the various nature reserves and open spaces in this area[24].

The N4 plays a major role in linking Gauteng with the tourism establishments within the Emakhazeni Local Municipality area. This municipality was also identified as part of the trout triangle by the Mpumalanga Tourism Growth Plan in 1999[25].

The demarcation of a tourism belt and focus areas in the Nkangala District will serve to promote and enhance the tourism potential in this area. It should be noted that the intention is not to reserve this area purely for tourism developments or to exclude tourism developments from any other area in the region. The intention is rather to focus investment and incentives in this area, to the benefit of poor communities in the northern regions and rural areas. This tourism belt incorporates sensitive wetlands and conservation areas, nature reserves and some of the

[24]Nkangala District Municipality. 2011. Integrated Development Plan: 2012–2013
[25]Emakhazeni Local Municipality. 2010. Integrated Development Plan: 2011-2016

proposed ecological corridors in the District. The protection of these areas should thus be of high priority as part of this concept.

In principle, tourism facilities should be promoted within this belt, but in terms of the following guidelines:

- Protection of prime agricultural land;
- Ability to provide adequate infrastructure services to the developments;
- Environmental protection and conservation; and
- Protection of the rural character and scenic qualities of the area.

5.8 Economy

Farming is the dominant economic activity in the Emakhazeni LM area occupying the largest part of the physical area. Small towns have developed throughout the area, which serve as service centres to the agricultural sector. Smaller mining activities are being initiated within the local municipality boundaries[26].

The local economy of the Steve Tshwete Local Municipality is one of the largest in the district economy dominated by the mining sector, followed by the mining sector. Various Eskom power plants are also found in the area. Informal and secondary economy employment also plays an important role in income to households, but formal figures with regards to these sectors are not readily available[27].

5.9 POPULATION IMPACTS

5.10 Inflow of workers

5.10.1 Construction phase

Given the specialists nature of transmission line construction, specialist contractor and sub-contractor teams would be appointed by Eskom for the construction phase of the project. These contractor teams would consist of highly skilled specialists and semi-skilled workers with specific experience within the field of erecting transmission linesand upgrading of substations such as project and construction managers, contract supervisors, construction foremen and general labourers. The nature, extent and intensity of this impact would thus depend on the number of

[26]www.emakhazenilm.co.za
[27]Steve Tshwete Local Municipality. 2006. Local Economic Development Plan

locals that could form part of the contractor teams and whether construction camps would be set up to house the temporary "outside" workforce within the study area (also refer to section5.12).

Due to the anticipated size of the construction workforce and the location of the proposed corridors it is apparent that the impacts associated with the inflow of temporary workers to the overall study area is not expected to result in severe negative impacts on the local communities' social networks, even if the majority of the workforce would be from outside the community (worst case scenario). With regards to Alternative 3, however, this aspect received a higher rating due to the small settlements found along the proposed route.

In addition to the above, general intrusions with regards to the inflow of construction teams relate to noise generated by these workers, possible littering, and possible unauthorised entry to properties. These aspects would be further discussed under the relevant sections within this document.

It is furthermore not expected that the inflow of temporary workers would put additional pressure on the current infrastructure and service delivery in the area, as their immediate needs would be provided through the construction camp infrastructure and services provided on site, or by the existing infrastructure and services available in the study area.

THEME	**INFLOW OF WORKERS**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Short term (1)	Short term (1)	Short term (1)	Short term (1)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Highly probable (4)
Significance without mitigation	Low (40) (-)	Low (40) (-)	Low (40) (-)	Low (36) (-)
Cumulative Impacts	• Possible increase in criminal activities in the area due to criminals taking advantage of the presence of outsiders being in the area			

THEME	INFLOW OF WORKERS			
	• Impacts associated with the construction camps			
Mitigation measures	• Eskom and the contractors should maximise the use of local labour where possible by developing a strategy to involve local labour in the contractor teams and construction process. • Before construction commences, representatives from the local municipality and community-based organisations, as well as neighbouring and/or affected residents should be informed of the details of the construction company (contractor), size of the workforce and construction schedules. • Conditions stipulated by property owners in terms of the construction activities should be implemented and monitored. • Contractors and temporary employees should behave fittingly at all times. • Workers should receive fines if they do not adhere to the conditions, rules and regulations. • Workers should be made aware of property owners' concerns regarding construction work on their properties so that they are familiar with the sensitive issues. • A specific contact person should be identified to allow community members and property owners to easily direct their queries and concerns and obtain general information regarding the construction process			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Low (-)

5.10.2 Operational phase

An inflow of workers during the operational phase is expected to be extremely limited as maintenance is expected to be undertaken once or twice a year. Possible negative intrusion impacts are, however, foreseen where maintenance personnel would have to access private properties without prior notice to the property owner as in the case of emergencies or when workers are responsible for misconduct (e.g. possible poaching of small livestock or game, neglect to close farm gates and driving through the veld).

This impact is however anticipated to be of a short duration with a low intensity. For the Gumeni substation site this impact is rated negligible.

THEME	INFLOW OF WORKERS			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**

THEME	INFLOW OF WORKERS			
Duration of impact	Short term (1)	Short term (1)	Short term (1)	Short term (1)
Scale of impact	Site (2)	Site (2)	Site (2)	Footprint (1)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Probable (2)	Probable (2)	Probable (2)	Probable (2)
Significance without mitigation	Low (18) (-)	Low (18) (-)	Low (18) (-)	Negligible (8) (-)
Cumulative Impacts	• Possible criminal activities undertaken on properties			
Mitigation measures	• Eskom personnel should preferably not access private properties without prior notification of the property owners. • Eskom maintenance personnel should be in possession of the required identification documents and clothing when undertaking maintenance work. • Vehicles used should be clearly marked. • Eskom personnel should behave properly at all times			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

5.11 Influx of job seekers

5.11.1 Construction phase

Jobseekers are usually seen as “outsiders” coming from areas surrounding the local communities. In the case of the proposed Arnot-Gumeni power line project situated in a low density rural area, jobseekers would refer to all individuals gathering at the actual construction sites. These jobseekers could thus be from the nearest towns and settlements or even further afield. Furthermore, workers, whether employed or unemployed, from the farms within the study area could be among the jobseekers.

Due to the rural character of the area and the fact that the proposed routes would cross private farms would make the influx of large numbers of jobseekers to the construction areas of the transmission line unlikely. There is however the possibility that jobseekers could gather at specific sites in close proximity to the mining areas(western section of study area) or small

settlements and towns where the population is more densely concentrated, as well as at the construction areas near main roads such as the R33, R36 and N4. Therefore Alternative 3 received a higher rating than the other alignments due to the various settlements along the entire proposed route and the proximity of the corridor to the N4. The influx of jobseekers however remains possible along the other alternative alignments.

As the Gumeni Substation is situated adjacent the R36 and approximately 10 km from the town of Machadodorp (Enthokozweni) and the Emthonjeni settlement, the influx of jobseekers at the substation is quite possible. The socio-economic conditions of the majority of people in close proximity to the Gumeni substation, the large number of youths found in the Machadodorp (Enthokozweni)area, as well as the fact that the Gumeni substation was recently constructed, would also make the presence of jobseekers at the Gumeni construction site a high probability. The main influx of jobseekers can thus be expected from the Emthonjeni settlement closest to the site.

THEME	**INFLUX OF JOB SEEKERS**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Short term (1)	Short term (1)	Short term (1)	Short term (1)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Probable (2)	Probable (2)	Highly Probable (4)	Highly Probable (4)
Significance without mitigation	Low (20) (-)	Low (20) (-)	Low (40) (-)	Low (36) (-)
Cumulative Impacts	• Added pressure on service delivery and the existing infrastructure with resultant additional socio-economic burdens for the local municipalities and surrounding property owners should the jobseekers come from outside the study area, but permanently remain in the area after the construction period has ceased • Increased impact should other construction projects such as the construction of the approved Hendrina-Gumeniproject be undertaken concurrently with this project in the same study area			
Mitigation	• The number of job opportunities available as part of the proposed project and the			

THEME	INFLUX OF JOB SEEKERS			
measures	recruitment process should be clearly communicated • The communication strategy should ensure that unrealistic employment expectations are not created • The use of local labour should be maximised through contractual conditions set for the sub-contractors			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Low (-)

5.11.2 Operational phase

Only maintenance activities and emergency repair work would be undertaken during the operational and maintenance phase of the proposed Arnot-Gumeni transmission line. Limited activities would also take place at the Gumeni substation site which would make the inflow of jobseekers negligible.

No mitigation measures are thus proposed.

THEME	INFLUX OF JOB SEEKERS			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Site (2)
Magnitude of impact	Low (2)	Low (2)	Low (2)	Low (2)
Probability	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)
Significance without mitigation	Negligible (9) (-)	Negligible (9) (-)	Negligible (9) (-)	Negligible (8) (-)
Cumulative Impacts	• None anticipated			
Mitigation measures	• None proposed			

THEME	INFLUX OF JOB SEEKERS			
Significance with mitigation	Negligible (-)	Negligible (-)	Negligible (-)	Negligible (-)

5.12 Accommodation of workforce

5.12.1 Construction phase

The location of the proposed construction camp where temporary workers would be housed during the construction phase of the project would be determined during the Environmental Management Plan (EMP) phase of the project. Further identification of such a site would be the responsibility of the appointed contractor and has to be approved by Eskom. The camp would be within the 2km alignment corridor and will be approximately one hectare in extent. If feasible and viable the contractors would utilise old vacant homesteads instead of constructing new accommodation facilities[28]. From a social perspective the latter would be the preferred option. It is further anticipated that the equipment yard would be form part of the construction camp or would be located in very close proximity to such an accommodation facility.

Negative social impacts, however, could occur whether existing buildings would be used or not. These refer to the following:

- Misbehaviour of construction workers at the construction camp (alcohol abuse, prostitution, temporary sexual relationships with local women with possible unwanted pregnancies, spreading of sexually transmitted diseases and so forth);
- Disrespect for the local culture (if a large number of the workers include outsiders or even foreigners);
- Mismanagement which could result in safety and security concerns;
- Social conflict between the local community and outsiders;
- Mismanagement which could lead to localised environmental problems (lack of sanitation and waste management, littering and so forth);
- Increased risk of fires;

[28] Baagi Environmental (2012) Draft Scoping Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province

- Negative impacts on the environment could result in related health impacts on the surrounding communities such as pollution of water sources due to improper sanitation facilities, solid waste management or wastewater management.
- The development of informal vending "stations" where food and small goods are sold could, if not properly managed, also lead to littering, and possible pollution of water sources.

Experience has also shown that any increase in crime in an area is usually accounted by the local communities to the presence of "outsiders" in a study area. Various social problems could result due to such a situation and should therefore be carefully managed.

THEME	**ACCOMMODATION OF WORKFORCE**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Regional (3)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Highly probable (4)
Significance without mitigation	Moderate (48) (-)	Moderate (48) (-)	Moderate (48) (-)	Moderate (48) (-)
Cumulative Impacts	• Consequences of misbehaviour of workers living at the construction camp (as discussed above) • Mismanagement which could create environmental and health risks • Possible increase in crime due to criminals taking advantage of the construction camp and workers being in the area			
Mitigation measures	• It is recommended that the construction camps be placed in close proximity to existing infrastructure and services.The final location of the construction camp and/or possible utilisation of existing vacant farmsteads should be discussed and finalised with representatives from Eskom, the local municipality and relevant property owner(s). • Transport facilities should be arranged for the workers to and from their accommodation to the construction sites. • Before construction commences, representatives from the local municipalities,			

THEME	ACCOMMODATION OF WORKFORCE			
	community-based organisations such as the local Farmers' Associations, and local leaders (e.g. councillors), as well as affected property owners should be informed of the construction activities and schedules. • Illegal and disruptive practices associated with the construction camps should be avoided. A reporting system should be put in place whereby complaints can be lodged. • Residents in close proximity to the construction camps should be informed of the correct procedure for lodging complaints with regard to the behaviour of contractors and/or pollution. • The management of the construction camp should adhere to the EMP. Proper water, sanitation and waste disposal measures should be in place. • The local police services and any Community Policing Forum should be kept informed of the planned developments to ensure that they would be able to adequately deal with any type of disruptive behaviour. • Equipment yards should be fenced off to avoid unauthorised access to these yards			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Low (-)

5.12.2 Operational phase

No construction camp would be required during the operational phase of the project. This impact is thus not rated and no mitigation measures are proposed.

THEME	ACCOMMODATION OF WORKFORCE			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Not applicable (N/a)	N/a	N/a	N/a
Scale of impact	N/a	N/a	N/a	N/a
Magnitude of impact	N/a	N/a	N/a	N/a
Probability	N/a	N/a	N/a	N/a
Significance without	N/a	N/a	N/a	N/a

THEME	ACCOMMODATION OF WORKFORCE			
mitigation				
Cumulative Impacts	• None anticipated			
Mitigation measures	• None proposed			
Significance with mitigation	N/a	N/a	N/a	N/a

6. COMMUNITY AND INSTITUTIONAL IMPACTS

6.1 Employment opportunities

6.1.1 Construction phase

The construction of transmission lines and the upgrading of substations are undertaken by contractors or sub-contractors appointed by Eskom. These contractors usually use their own teams (consisting of between 40 and 50 individuals[29]) of skilled and trained personnel from outside the study area to undertake the majority of the construction activities. The different teams are involved with the different construction activities at different locations. All would thus not necessarily be on site at the same time. As indicated above, these teams consist of project managers, construction managers, contract supervisors, construction foremen and general labourers.

Only some few local employment opportunities could be created which could have some limited short-term positive impacts for the local communities if local Small, Medium and Micro Enterprises (SMME's) are involved. Their involvement would be focused on the lower skilled construction activities such as bush clearing, fencing and digging of foundations.Construction workers are thus employed for intermittent periods over the construction timeframe which is anticipated to be two years (24 months).

Should any locals be employed it could enhance the extremely limited social benefits associated with the project.

[29] Baagi Environmental (2012) Draft Scoping Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province

THEME	**EMPLOYMENT CREATION**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Short term (1)	Short term (1)	Short term (1)	Short term (1)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Regional (3)
Magnitude of impact	Low (2)	Low (2)	Low (2)	Low (2)
Probability	Probable (2)	Probable (2)	Probable (2)	Improbable (1)
Significance without mitigation	Negligible (12) (+)	Negligible (12) (+)	Negligible (12) (+)	Negligible (6) (+)
Cumulative Impacts	• Improvement in quality of life for a selected few even if only for a short duration			
Mitigation measures	• It is recommended that the contractor and subcontractor employ semi-skilled and unskilled labour from the study area to avoid conflict between locals and outsiders with regards to the securing of employment. • Eskom should stipulate in their contracts with the contractors that local labour should be used for e.g. bush clearing, road construction and fencing. • Ward councillors could assist in determining available local labourers that could be considered for possible employment. • Eskom should ensure an equitable process whereby minorities and previously disadvantaged individuals (women) are also taken into account. • It is recommended that Eskom implements a skills audit and develops a skills database. • Capacity building and skills transfer should immediately commence to ensure that locals are employable. • It should be ensured that contractors use local skills, or train semi-skilled people or re-skill appropriate candidates for employment purposes where possible. • On-site training should focus on the development of transferable skills (technical, marketing and entrepreneurial skills) to ensure long term benefits to the individuals involved			
Significance with mitigation	Low (+)	Low (+)	Low (+)	Negligible (+)

6.1.2 Operational phase

The main operational and maintenance activities are highly specialised and undertaken by Eskom Transmission personnel and/or contractors. Limited job opportunities exist for local SMMEs or local labourers to source temporary employment during the operational phase such as the inspections of the lines and servitudes, the clearing of the servitude and general maintenance activities. These opportunities are however extremely limited.

THEME	EMPLOYMENT CREATION			
Phase	OPERATIONAL PHASE			
Site Description	ALTERNATIVE 1 (Orange)	ALTERNATIVE 3 (Purple)	ALTERNATIVE 5 (Green)	GUMENI SUBSTATION UPGRADE
Duration of impact	Short term (1)	Short term (1)	Short term (1)	Short term (1)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Regional (3)
Magnitude of impact	Low (2)	Low (2)	Low (2)	Low (2)
Probability	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)
Significance without mitigation	Negligible (6) (+)	Negligible (6) (+)	Negligible (6) (+)	Negligible (6) (+)
Cumulative Impacts	• None anticipated			
Mitigation measures	• Should opportunities arise for employment during the operational phase, Eskom should consider locals for any intermittent or permanent opportunities.			
Significance with mitigation	Negligible (+)	Negligible (+)	Negligible (+)	Negligible (+)

6.2 Local economic contribution

6.2.1 Construction phase

The proposed Arnot-Gumeni transmission line project and the upgrading of the Gumeni substation is an Eskom initiative which is also funded by this parastatal. Costs involved with the project would thus indirectly have to be endured by the consumers. No direct economic benefits

would accrue to the property owners where the line would traverse,local communities, and/or the affected municipalities as a result of the proposed transmission line project. During the construction phase, however, some minor local economic benefits may be realised through the possible temporary employment of local labourers, and the purchase and/or contract of local goods and services associated with the construction industry which could strengthen the local economy for a limited period.

THEME	**LOCAL ECONOMIC CONTRIBUTION**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Regional (3)
Magnitude of impact	Low (2)	Low (2)	Low (2)	Low (2)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Highly probable (4)
Significance without mitigation	Low (32) (+)	Low (32) (+)	Low (32) (+)	Low (32) (+)
Cumulative Impacts	• Possible economic spin-offs as a result of local procurement • Possible increased income and enhanced local spending • Possible enhanced local economic benefits should the approved Hendrina-Gumeni project be constructed concurrently with this project in the same study area			
Mitigation measures	• Local procurement should be aimed at local businesses as far as possible. • Local sourcing of materials would assist in providing more economic and employment opportunities for the local people. • Maximise the use of local labour even if the number of locals that would be employed would be limited. • Accommodate, but regulate the activities of vendors in the vicinity of the construction areas and at the construction camps			
Significance with mitigation	Low (+)	Low (+)	Low (+)	Low (+)

6.2.2 Operational phase

As the proposed Arnot-Gumeni project would assist in increasing the capacity to the Gumeni substation it would assist in meeting the demand for additional electricity in the Lowveld region of Mpumalanga, with subsequent positive impacts at regional level. The proposed project can therefore be seen to assist the mining industry to expand (e.g. Assmang Ferrochrome Mine near Machadodorp/Enthokozweni), and serve as an injection to the economic standard of the areas benefitting from the improvement, which could subsequently result in socio-economic development in those areas.

Placing the proposed power line across existing or future mining areas in the western section of the study area could however influence the mineral production with possible indirect negative impacts on the Gross Domestic Product (GDP) of the area. This possible negative impact would be further discussed under section 6.3 and would thus not be considered as part of the rating below.

THEME	**LOCAL ECONOMIC CONTRIBUTION**			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Highly probable (4)
Significance without mitigation	Moderate (52) (+)	Moderate (52) (+)	Moderate (52) (+)	Moderate (52) (+)
Cumulative Impacts	• Stimulation of local mining industry and regional economy			
Mitigation measures	• Eskom should aim to turn the indirect local economic benefits into direct local and regional benefits through the provision of stable and sufficient electricity supply to the region thereby stimulating the local economy and by ensuring investor confidence in the region			
Significance	Moderate (+)	Moderate (+)	Moderate (+)	Moderate (+)

THEME	LOCAL ECONOMIC CONTRIBUTION			
with mitigation				

6.3 Impact on mining activities and mining areas

6.3.1 Construction phase

Construction of the proposed power line across existing or future mining areas would influence the mineral production and possibly the Life of Mine (LoM) with indirect impacts on the Gross Domestic Product (GDP) of the area. Various existing mines are operating in the western section of the study area and a number of new mining licence applications have been initiated.

It has been noted that the following mining areas are affected by the alternative route corridors:

Table 11: Mining areas[30]

ROUTE ALTERNATIVE	MINING RIGHTS	SURFACE RIGHTS	COMPANY INVOLVED
Alternative 1: (Orange)	Arnot Colliery Strathrae Colliery	Arnot Colliery Strathrae Colliery Arnot South	Exxaro North Block Complex (NBC) of Exxaro
Alternative 3: (Purple)	Arnot Colliery Belfast Block projects	Glisa South	Exxaro Exxaro
Alternative 5: (Green)	Arnot Colliery Eerstelingsfontein Sumo Colliery (defunct since 2000)	Eerstelingsfontein	Exxaro NBC of Exxaro

It should be noted that Exxaro operates a coal mining complex outside the town of Belfast (Emakhazeni) which is referred to as the North Block Complex (NBC) and which consists of the

[30]Table has been compiled based on information and maps received from Baagi Environmental

Glisa and Strathrae coal mines, as well as the proposed Eerstelingsfontein and Belfast Block projects. Farms in the study area belonging to Exxaro are Mooifontein, Grootlaagte, Rietkuil, Leeupan and Grootpan (near Arnot).The Glisa Colliery (NBC and Paardeplaats) is situated to the west of Belfast (Emakhazeni) and just north of Alternative 3 and thus falls just outside the study area boundaries. Glisa South, however falls within the corridor investigated as part of Alternative 3. The Strathrae Colliery on the farm Strathrae is approximately 15 km south of Wonderfontein on the Carolina-Wonderfontein Road (Alternative 1).The proposed Eerstelingsfontein Colliery (Alternative 5) of Exxaro is situated on the farm Eerstelingsfontein 406 JT which is located approximately 20 km south of Belfast (Emakhazeni) and would be an open cast mine[31]. Arnot Colliery has been in operation since 1972.

To the south of Belfast (Emakhazeni) some further applications have been launched such as the Richtrau Trading Application and the Northern Coal Application. These are located within the Weltevreden area. Proposed mining activities on the farm Vogelstruispoort situated to the east of the R33 and to the north of Alternative 5 have been abandoned[32].Other collieries within the study area include the Klippan Colliery (Shanduka Group)on the farm Klippan 452 JS (south of Alternative 5) , and the Onverdacht Colliery of Xstrata on the farm Kaalplaats 453 JS (just north of Alternative 5).The Mafube Colliery would be a joint venture between Exxaro and Anglo Coal.

Farms in the study area owned by Shanduka include three portions of the farm Grootpan (south of Alternative 5 and north of Alternative 1), two portions of the farm Klippan (south of Alternative 5), and portions of the farm Wonderfontein (Alternative 3). The group is also involved in a lease agreement with regards to the farm Kaalplaats (Alternative 5)[33].

From the above it is thus clear that Exxaro's mining activities would be affected by the three different route alignments investigated as part of the EIA.During the public participation process it was indicated that Alternative 1 (orange) would be the most viable option from Exxaro's point of view. Based on further information received during the public participation process, Alternative 1

[31]WSP Environment and Energy. 2012. Draft Environmental Assessment Report: Part 1: Introduction and Project Description: Proposed Eerstelingsfontein Mine, Emakhazeni (Belfast), Mpumalanga

[32]Mr. Koos Pretorius: Chairperson of the Escarpment Environmental Organisation: Personal communication (July 2012)

[33]Baagi Environmental. 2012. Draft Issues and Response Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province

(orange) also seems to be the favourable option for Shanduka as the other two alignments traverses some of their proposed mining areas[34]. The Strathrae Colliery (Alternative 1) is mostly underground mining which makes the development of a power line in this area plausible.

Within Alternative 5 (green corridor), it should be noted that the Eerstelingsfontein Colliery is in the planning phases with its Integrated Water Use License Application (IWULA) still to be completed. The Sumo Colliery has not been in operation since 2002. Alignments along this route alternative could thus be routed to accommodate the proposed future mining activities.

Where construction would take place in mining areas, safety and security issues should be considered. The upgrading of the Gumeni Substation is not anticipated to negatively impact on the existing Assmang Ferrochrome Mine or its planned extensions near Machadodorp(Enthokozweni).

THEME	**IMPACT ON MINING ACTIVITIES AND AREAS**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	High (8)	High (8)	Low (2)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Improbable (1)
Significance without mitigation	Moderate (44) (-)	Moderate (52) (-)	Moderate (52) (-)	Negligible (7) (-)
Cumulative Impacts	• Possible sterilisation of coal reserves and limitations with regards to mining extensions			

[34]Baagi Environmental. 2012. Draft Issues and Response Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province

THEME	IMPACT ON MINING ACTIVITIES AND AREAS			
Mitigation measures	• Different types of towers (if technically and economically feasible) should be considered to limit the negative impacts on the mining activities • Buffer zones around areas where blasting takes place should be considered • Mine representatives should be involved with finalisation of the detailed alignments and tower positioning to ensure the least impact on mining activities			
Significance with mitigation	Low (-)	Moderate to Low (-)	Moderate to Low (-)	Negligible (-)

6.3.2 Operational phase

The mining activities noted under section 6.3.1 and the possible impact of the alternative transmission line route alignments on these activities remain applicable for the operational life of the mine. The alignments should be carefully assessed to determine the most feasible route to ensure the least impact on existing and future mining activities, as well as limiting any possible safety risks.

The economic and safety risks should thus be taken into account. Underground mining (shallow and deep) could pose various challenges with the erection of the towers due to the stability of the soil (foundation stability). The intensity would depend on the soil conditions, the mining depth and overlaying material. Blasting activities usually associated with open cast mining activities could also pose safety risks and influence the reliability of supply.The buffer zones (approximately 500 metres) specified should thus be adhered to.

Furthermore, some type of mining methods (e.g. dragline excavations) should preferably not be undertaken in close proximity to power lines. The movement of vehicles near power lines also pose various hazards. Technically mining can take place within the servitude and between the tower positions, although it poses various operational challenges and again safety risks. Ideally the entire servitude width would therefore have to be preserved which would result in the sterilisation of the coal reserves within the servitude, thereby resulting in negative economic implications for the mining companies.

Fire risks associated with mining activities and the presence of power lines also remains a concern.

THEME	IMPACT ON MINING ACTIVITIES AND AREAS			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	High (8)	High (8)	Low (2)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Improbable (1)
Significance without mitigation	Moderate (48) (-)	Moderate (56) (-)	Moderate (56) (-)	Negligible (8) (-)
Cumulative Impacts	• Possible sterilisation of coal reserves and limitations with regards to mining extensions			
Mitigation measures	• Different types of towers (if technically and economically feasible) should be considered to limit the negative impacts on the mining activities • Buffer zones around areas where blasting takes place should be considered • Mine representatives should be involved with finalisation of the detailed alignments and tower positioning to ensure the least impact on mining activities • Where the proposed transmission line would be in close proximity to mining activities, it should be clearly marked with e.g. reflective equipment • Cable heights and low points should be indicated by clearance warning signs. Clearance heights should thus be measured • Vehicle movements in close proximity to power lines should be undertaken on dedicated route travelling plan • Different equipment and vehicles should adhere to their specific clearances from power lines. This should be stipulated in the mining safety plans. • Mining safety plans with regards to power lines should be strictly implemented			
Significance with mitigation	Moderate to Low (-)	Moderate to Low (-)	Moderate to Low (-)	Negligible (-)

6.4 Impact on airfields

6.4.1 Construction phase

According to the Scoping Report prepared by Baagi Environmental, some airfields have been identified within the study area and include the following:

- Arnot Aerodrome near Arnot Substation (in close proximity to Alternatives 1 and 5)
- Waterloo Aerodrome near St. MicheilsInternational Leisure Estate (Alternative 3)
- Fins Estate Aerodrome on the farm Goedehoop 362 JT (approximately 2 km north of Alternative 3)[35]

In addition the following was identified:

- A disused landing strip on the farm Leeufontein (Alternative 3);
- Rietkuil landing strip on the farm Rietkuil near Alzu;
- An unregistered landing strip of the farm Generaalsdraai (close to Alternative 3);
- A disused landing strip near Sunbury Station (close to Alternative 3);

The above airfields are used as base for crop dusting and fire fighting if required. During the construction of the proposed transmission line limited impacts on the airfields are anticipated. Care however should be taken with the construction activities within the vicinity of such airfields and the possibility of low flying aircraft should be communicated to contractors.

THEME	**IMPACT ON AIRFIELDS**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)

[35] Baagi Environmental (2012) Draft Scoping Report for the proposed construction of the Arnot-Gumeni double circuit 400 kV Transmission Line and the upgrade of Gumeni Substation, Mpumalanga Province

THEME	IMPACT ON AIRFIELDS			
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Improbable (1)
Significance without mitigation	Moderate (44) (-)	Moderate (44) (-)	Moderate (44) (-)	Negligible (7) (-)
Cumulative Impacts	• None anticipated			
Mitigation measures	• The details of the preferred route alignment and position of the aerodromes should be communicated and negotiated with the Civil Aviation Authority's Obstacle Section to obtain the necessary approvals from them • Special conditions or regulations to adhere to in the vicinity of the airfields should be communicated and clearly noted by the contractors			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

6.4.2 Operational phase

Transmission lines in close proximity to landing strips and helicopter pads could impact on the ability of the pilots to ensure a successful flight and landing. Lines in these areas should thus be placed outside the "safe zone" to ensure that the activities can proceed without any safety risks. This is especially important in the event of fires to ensure effective fire fighting services. Moving of airfields and landing strips would not be a viable option due to the economic implications and the difficulty in finding alternative suitable land.

According to the Civil Aviation Authority (CAA), the Civil Aviation Regulation Part 139 01 29(a) states that "No person on a licensed aerodrome or approved heliport (*should*) obstruct or interfere with the proper use of the aerodrome or heliport." Part 139 01 30 continues with obstacles within a distance of 8km from an airport".[36]For the proposed Arnot-Gumeni project, however, it should

[36]Mr. Louis Wood (2012) CAA

be noted that the smaller airfields are not classified as airports and that the mentioned regulation does not necessarily apply. The actual safe zone for each airfield that could possibly be affected should thus be negotiated and communicated with the CAA.

THEME	IMPACT ON AIRFIELDS			
Phase	OPERATIONAL PHASE			
Site Description	ALTERNATIVE 1 (Orange)	ALTERNATIVE 3 (Purple)	ALTERNATIVE 5 (Green)	GUMENI SUBSTATION UPGRADE
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Improbable (1)
Significance without mitigation	Moderate (48) (-)	Moderate (48) (-)	Moderate (48) (-)	Negligible (8) (-)
Cumulative Impacts	• None anticipated			
Mitigation measures	• The details of the preferred route alignment and position of the aerodromes should be communicated and negotiated with the Civil Aviation Authority's Obstacle Section to obtain the necessary approvals from them, in the event that the proposed power line would be in close proximity to such airfields			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

7. INDIVIDUAL AND FAMILY LEVEL IMPACTS

7.1 Impact on farming activities

7.1.1 Construction phase

Cattle farming and crop production are found throughout the study area. The proposed power line could thus have an impact on some of these farming activities during the construction phase due to the increased risk of veld fires as a result of the presence of construction workers in the area. In most cases these possible negative impacts are expected to manifest in the long term as

any damage to the veld and/or crops could take some time to be rehabilitated or recover and the possible loss of animals/wildlife could be seen as a permanent negative impact with severe financial consequences. It should, however, be noted that if the contractor adhere to the guidelines stipulated in the Environmental Management Programme and the contract with Eskom, these negative impacts are not likely to occur.

Construction activities would further intrude on private properties such as the farms found in the study area. Disruptions to these property owners' existing infrastructure (e.g. gates, fences, roads etc.) could occur as the construction activities would lead to an increase in vehicles and machinery making use of private gravel roads. In areas, where erosion is already taking place this would be problematic, especially if workers do not keep to the roads. Furthermore, if workers do not close gates it could result in stock losses. These negative impacts could thus indirectly impact on the effectiveness of the farming activities undertaken.

Should additional access roads have to be constructed it could possibly sterilise grazing land and areas for crop production. Tower positions could limit the resource use and productivity of agricultural land and clearing of areas for the towers could have a short term impact on cultivated land.

With regards to the upgrading of the Gumeni substation,no additional impacts on the surrounding activities are foreseen.

THEME	**IMPACT ON FARMING ACTIVITIES**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Probable (2)	Probable (2)	Probable (2)	Improbable (1)
Significance without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Negligible (7) (-)
Cumulative	• Possible negative economic impacts for property owners due to negative impact on			

THEME	IMPACT ON FARMING ACTIVITIES			
Impacts	resource use			
Mitigation measures	• Eskom should discuss the construction schedule and activities with the affected farmers to enable them to plan their farming activities and animal movement according • A quantification of possible losses (crop farming) should be done based on a property specific basis once a final route alignment has been determined. • During the negotiation phase, possible impacts on the use of irrigation equipment should be established. The route alignment in the preferred corridor might then have to be adapted to avoid such equipment. • Eskom should select towers and construction approaches to have the minimum impact on agricultural practices • The proposed transmission power line should be placed on the boundaries of the crop fields where possible (if the impact would be deemed less by the property owner) • Difficulties experienced when crop dusting is undertaken should be noted when finalising the tower positions and servitude alignment • Conditions and/or specific requests relating to construction activity raised by property owners should be included in the EMPR • Construction teams should not drive recklessly on the gravel roads and should adhere to all road regulations • Contractors should make sure that no materials are left on the properties after construction activities have been completed • Livestock would have to be moved and fenced from the construction activities • Should additional access roads be required it should be planned to suit the needs of Eskom as well as the property owner.			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

7.1.2 Operational phase

Crop dusting activities, mainly in the western section where the majority of crop production activities are found, is usually undertaken once a year. Depending on the circumstances and crop requirements, crop dusting can be intensified. In some areas the existing distribution power lines and transmission power lines are complicating the effective spraying of the entire field of crops. An additional power line in close proximity to the existing lines could thus be problematic.

The following areas where crop production is taking place make use of centre pivot irrigation systems:

- The farm Leeufontein: two centre pivots (Alternative 3)
- The farm Kaalplaats: twelve centre pivots (Alternative 5). The existing power line and the approved Hendrina-Gumeni power line traverse this farm and it is therefore assumed that the impact of the power lines on the centre pivots and vice versa have been considered. An additional power line in this area, however, could be more challenging;
- The farm Zoekop: One centre pivot (close proximity to Alternative 3);
- The farm Leeuwbank: Two centre pivots (Alternative 3);
- The farm Paardeplaats (Alternative 3);
- The farm Van Wyksvlei (Alternative 1)

It should be noted that the list above is just an indication of the areas where these could be located. During the negotiation process and the finalisation of the route alignment the location of the centre pivot irrigation systems on the various affected properties should be established and avoided as far as technically possible.

In the long term, even if the farming activities would be maintained, the negative impacts are not perceived to be severe as most farming activities could continue underneath transmission lines. However, the intensity of the impact on each of the properties should be determined once a preferred corridor has been approved. The size of the property, the extent of the agricultural activities and the crops cultivated also influence the significance of this impact.

An additional concern raised by select property owners indicated the lack of maintenance within the servitude and around the towers resulting in the growth of weeds which could become problematic for crop production if not attended to. Littering (paper and disused steel and other materials) is also a source of concern and should be attended to by the Eskom maintenance personnel.

THEME	**IMPACT ON FARMING ACTIVITIES**			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)

THEME	IMPACT ON FARMING ACTIVITIES			
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Improbable (1)
Significance without mitigation	Moderate (48) (-)	Moderate (48) (-)	Moderate (48) (-)	Negligible (8) (-)
Cumulative Impacts	• Possible negative economic impacts for property owners due to negative impact on resource use			
Mitigation measures	• The proposed transmission power line should be placed on the boundaries of the crop fields where possible (if the impact is deemed less by the property owner) • Difficulties experienced when crop dusting is undertaken should be noted when finalising the tower positions and servitude alignment • Towers should be placed in such a way as to avoid impacting on the operation of the centre pivot irrigation systems • Maintenance personnel should travel in a marked vehicle and should wear uniforms to ensure that the personnel are easily identifiable as Eskom personnel • Ideally permission should be sought before entering properties			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

7.2 Disruption in daily living and movement patterns and proximity of homesteads

7.2.1 Construction phase

During the construction of the power line, temporary disruptions in the daily living and movement patterns of private property owners could be foreseen, especially if their homesteads and dwellings would be in close proximity to the construction sites. The main construction activities would include land clearance (vegetation) where required, excavations for tower foundations, assembly and erection of the towers and stringing of the lines. The foremost land-uses in the study area include the following:

- Agricultural land with farming activities, homesteads and worker dwellings (mainly maize and cattle);
- Mining areas and mining related settlements;
- Residential areas such as the towns or settlements of Belfast (Emakhazeni), Wonderfontein and Machadodorp(Enthokozweni);

- Select tourism establishments; and
- Small settlements along the N4 and railway line.

Disruptions in daily living and movement patterns could thus occur as a result of:

- Construction related activities;
- Increase in vehicular and construction worker movement on local gravel and tarred roads (R36 and R33), as well as on the N4 which is already accommodating high traffic volumes; and
- Noise impacts.

In cases where the farm dwellings or homesteads are in close proximity to the construction area, these impacts would be more severe. With regards to Alternative 3 which is more densely populated (Arnot, Rietkuil, Wonderfontein, settlements along the N4 and so forth) the impact on the daily living and movement patterns of those residents would thus be more intense compared to the residents of the other two alternative alignments. Of some concern is the Arnot and Rietkuil area where limited space would be available for the construction of the proposed power line due to the location of the Arnot power station, the existing lines entering and exiting the substation and the location of the Arnot substation. Care should be taken to avoid the Rietkuil settlement, as well as other buildings around the substation and power station.

Due to the relative limited construction process associated with the upgrading of the substationand the fact that no settlements are in close proximity to the Gumeni Substation, the impacts associated with the substation construction would be deemed less intense compared to the construction of the power line. The nearest settlement is Machadodorp(Enthokozweni) and the Emthonjeni settlement.

The impacts associated with the power line construction are however intermittent and of a short duration and are thus rated as moderate.

THEME	**DISRUPTION IN DAILY LIVING AND MOVEMENT PATTERNS AND PROXIMITY OF HOMESTEADS**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Short term (1)	Short term (1)	Short term (1)	Short term (1)

THEME	DISRUPTION IN DAILY LIVING AND MOVEMENT PATTERNS AND PROXIMITY OF HOMESTEADS			
Scale of impact	Site (2)	Regional (3)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Probable (2)	Highly probable (4)	Probable (2)	Improbable (1)
Significance without mitigation	Low (18) (-)	Low (40) (-)	Low (18) (-)	Negligible (5) (-)
Cumulative Impacts	• Possible increase in criminal activities • Possible conflict between outsiders and locals			
Mitigation measures	• Property owners that would be affected by the transmission line construction should be consulted prior to the construction phase with regards to the construction schedules, transportation routes, construction of additional access roads and construction methods to be used • Eskom should keep the construction of access roads to a minimum and rather use the existing infrastructure, as the construction and maintenance of these roads are very costly, impact on the residents' daily living and movement patterns, and create a potential for erosion • Workers should be easily identifiable • Activities should adhere to normal working hours • The movement of construction vehicles should be limitedto off-peak periods (where possible) • The movement of construction vehicles in areas where sensitive receptors are situated e.g. schools and pedestrians should be limited • Machinery and vehicles should be in good working order to limit excessive noise pollution			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

7.2.2 Operational phase

The impact on daily living and movement patterns during the life of transmission lines mainly refer to the change in the visual environment as the proposed transmission line is expected to have a permanent negative visual impact on the landscape. This could again impact on the sense of place, influence the residents' perception of their environment and possibly impact on the daily living and movement patterns of residents. The social impact in this regard would thus be more

severe in areas where the line is unable to easily blend in with the surrounding environment or where the transmission line is erected in close proximity to homesteads and/or dwellings.

Although new power lines alongside existing power lines could create a so-called "industrial corridor", it should be noted that it could have more of an impact on the daily living and movement patterns in those specific areas, as the separation distance between two 400kV power lines should be 55m (minimum of 35m where constraints are experienced)and between a 400 kV transmission line and an existing 275kV transmission power line 51 metres is recommended. One could thus argue that more land is sterilised due to the servitude requirement of 55m and the additional different separation distances that would be required. The intensity of this impact would depend on the type of activities undertaken in that area, as the servitude areas could still be used (e.g. for agricultural activities and grazing). This would thus be applicable to Alternative 1 with an existing transmission line for half of the corridor route and distribution lines for the other section of the corridor. This is further valid for Alternative 5 where an existing 275 kV line is situated and where the approved Hendrina-Gumeni power line would, for most of the study area, run parallel the existing 275 kV line.

No buildings or tall structures higher than 4m, are however, allowed in the servitude and the transmission line alignment would thus aim to avoid any homesteads and dwellings.

During the operational and maintenance phase property owners such as the farmers would experience some intrusions when maintenance and emergency work is undertaken. Possible negative impacts refer to littering, speeding, leaving gates open, driving on private roads and so forth. Should the Eskom workers remain responsible in their actions and adhere to good conduct the negative impacts in this regard could be mitigated.

It is not anticipated that maintenance at the substation would impact on property owners' daily living and movement patterns.

THEME	**DISRUPTION IN DAILY LIVING AND MOVEMENT PATTERNS AND PROXIMITY OF HOMESTEADS**			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)

THEME	DISRUPTION IN DAILY LIVING AND MOVEMENT PATTERNS AND PROXIMITY OF HOMESTEADS			
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Highly Probable (4)	Probable (2)	Highly Probable (4)	Improbable (1)
Significance without mitigation	Moderate (48) (-)	Low (24) (-)	Moderate (48) (-)	Negligible (8) (-)
Cumulative Impacts	• Possible economic impact due to loss of resource use • Possible land devaluation due to visual impacts			
Mitigation measures	• Mitigation measures proposed by the Visual Impact Assessment should be implemented. • Consideration should be given to the placement of the towers and the type of towers that would be used. Towers with the smallest footprint (e.g. double circuit structures) with its associated more confined impact would be preferable • Maintenance personnel should travel in a marked vehicle and should wear uniforms to ensure that the personnel are easily identifiable as Eskom personnel • Ideally permission should be sought before entering properties			
Significance with mitigation	Low (-)	Low (-)	Moderate to Low (-)	Negligible (-)

7.3 Impact on schools

7.3.1 Construction phase

Movement of workers on school properties or in close proximity to the school, increased noise and dust pollution during construction activities, as well as the movement of heavy vehicles and transporting of materials could pose safety risks to the learners and could impact on their learning environment. Due to the characteristics of the study area and the low density, it is anticipated that the possible negative impacts on the schools could be limited.

The following schools are found in the study area[37]:

- Alternative 1:

[37]Source: Google Earth

- Inhlanhla Primary School: south of Gumeni Substation along the R36
- Siphakamile Combined School: South of Strathrae within the corridor next to the Wonderfontein-Carolina Road

- Alternative 3:
  - Arnot Colliery Primary School: at Arnot Colliery within corridor
  - Laerskool Rietkuil: near Arnot Colliery and Arnot Substation in Rietkuil settlement
  - Blomplaas Primary School: located within the corridor near Paardeplaats next to the N4
  - Sojuba Primary School: West of Wonderfontein
  - Nhlupheko Primary School: East of Wonderfontein at Sunbury station
  - Mmanyoni Primary School: South of Alternative 3 along the Geluk gravel road
- Alternative 5:
  - Morelig Combined School: North of Alternative 5 along the Wonderfontein-Carolina Road
  - Mthombomuhle Primary School: South of Alternative 5 along the Wonderfontein-Carolina Road near Klippan
  - Thokozani Combined School: north of Alternative 5
  - Eerstelingsfontein Primary School: South of Alternative 5 along the R33

From the above schools identified,the main schools that could be affected by the proposed transmission line alignment are within Alternative 3 and include the Arnot Colliery Primary School, the Blomplaas Primary School and within Alternative 1 the Siphakamile Combined School. Should Alternative 1 or 3 be the preferred alignment, the detailed alignment should aim to avoid these specific sensitive receptors and any outdoor activities undertaken by the learners. The servitude should further aim to avoid impacting on any future developments such as expansions of the education facilities.

THEME	**IMPACT ON SCHOOLS**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Short term (1)	Short term (1)	Short term (1)	Short term (1)

THEME	IMPACT ON SCHOOLS			
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Low (2)	Low (2)
Probability	Highly probable (4)	Highly probable (4)	Probable (2)	Improbable (1)
Significance without mitigation	Low (36) (-)	Low (36) (-)	Low (10) (-)	Negligible (5) (-)
Cumulative Impacts	• None anticipated			
Mitigation measures	• Should Alternative 1 or 3 be the preferred alignment, special attention should be given to avoid the schools as indicated • Movement of vehicles on routes used by learners and pedestrians should be avoided, especially during peak times			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

7.3.2 Operational phase

The main impact foreseen on schools and learners attending these schools would refer to the possible increased safety and security risk due to maintenance workers entering school properties (if required), as well as possible health risks associated with transmission lines. These aspects are further discussed under Sections 7.7 and 7.8 respectively.

As the study area has a low density, these possible impacts are not likely to occur as the area where the schools are situated could allow for deviations of the alignment to successfully avoid the identified schools (Also refer to Section 7.3.1).

THEME	IMPACT ON SCHOOLS			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)

THEME	IMPACT ON SCHOOLS			
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Low (2)	Low (2)
Probability	Probable (2)	Probable (2)	Improbable (1)	Improbable (1)
Significance without mitigation	Low (24) (-)	Low (24) (-)	Low (8) (-)	Negligible (8) (-)
Cumulative Impacts	• None anticipated			
Mitigation measures	• Maintenance personnel should travel in a marked vehicle and should wear uniforms to ensure that the personnel are easily identifiable as Eskom personnel • Ideally permission should be sought before entering school properties			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

7.4 Impact on tourism

7.4.1 Construction phase

The tourism establishments and attractions within and bordering the study area forms part of the Highlands Meander and are mainly located in the eastern mountainous part of the area, near the Komati Gorge. These include but are not limited to:

- Berg-en-Dal site dating from the Anglo Boer War located on the farms Leeuwkloof 404 and Wemmershuis just south of the N4 in close proximity to Alternative 3;
- Inyamazane and Forelwater Country Retreat situated north of the N4 near Belfast (Alternative 3);
- Hadeco Tulip Farm situated at Paardeplaats adjacent the N4 where annual tourism festivals are held (Alternative 3);
- Leeuwkloof Estate (Farm Leeukloof) situated east of the Geluk-Nooitgedacht gravel road approximately 12 km south of the N4 where Alternative 1 and 5 meets;
- Highland Springs Country Estate (being developed) as a resort on Portion 10 of the Farm Weltevreden which is south of Alternative 3;

- Rolling Hills Estate (formerly known as the St. Micheils International Leisure Estate) just east of Belfast and north of the N4;
- Kloppenheim Country Estate situated north of the N4 near Machadodorp(Enthokozweni);
- Sanford Guest House situated north of the N4.
- The Nooitgedacht Nature Reserve including the Nooitgedacht Dam falls just outside the study area and is situated approximately 10 km from Carolina on the Komati River

The construction activities would be distributed over the entire transmission line corridor for a period of approximately 24 months. Therefore some negative intrusion impacts are associated with the inflow of the workforce especially where construction activities take place in close proximity to tourism ventures and where it is clearly visible to the tourists.

In this regard possible negative impacts are only foreseen on the Leeuwkloof Estate, should Alternative 1 or 5 be preferred. In the case of Alternative 3 being the preferred alignment negative impacts are anticipated on the Hadeco Farm, Inyamazane and Forelwater, the Berg-en-Dal site, as well as the Highland Springs Country Estate. Careful consideration should thus be given to the alignment within these areas where the tourism establishments are situated. With regards to Alternative 1 and 5, it could be preferable that an alignment as close to the existing alignment be followed to limit the negative impacts on the Leeuwkloof Estate and the activities undertaken on the farm.

THEME	**IMPACT ON TOURISM**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Probable (2)	Probable (2)	Probable (2)	Improbable (1)
Significance without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Negligible (7) (-)

THEME	IMPACT ON TOURISM			
Cumulative Impacts	• None anticipated			
Mitigation measures	• Deviating line alignments away from tourism establishments and activities throughout the study area could serve as mitigation measure • Representatives of tourism establishments that would be affected by the transmission line construction should be consulted prior to the construction phase with regards to the construction schedules, transportation routes, construction of additional access roads and construction methods to be used • Eskom should keep the construction of access roads to a minimum and rather use the existing infrastructure, as the construction and maintenance of these roads are very costly, impact on the residents' daily living and movement patterns, and create a potential for erosion • Workers should be easily identifiable • Activities should adhere to normal working hours • The movement of construction vehicles should be limited to off-peak periods (where possible) • Machinery and vehicles should be in good working order to limit excessive noise pollution			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

7.4.2 Operational phase

As indicated above as part of section 7.4.1some tourism establishments within the alternative corridors that could be affected include:

- Alternative 1:
    - Leeuwkloof Estatewhich is situated 12 km south of the N4 adjacent the Geluk-Nooitgedacht gravel road on the farm Leeukloof. This estate is focused on fly fishing in seven dams, mountain biking, quad biking, birding and horse rides. Four self-catering units have been built with a view to the east over a dam. The accommodation facilities and activities are thus reliant on the scenic value of the area.[38]
- Alternative 3:

[38]www.leeuwkloof.co.za

- Hadeco Tulip Farm located at Paardeplaats approximately 5 km from Belfast. Annual tulip and music festivals are held on the property.
- Inyamazane and Forelwater with holiday cottages and fly-fishing activities
- The Berg-en-Dal site located on the farms Leeuwkloof 404 and Wemmershuis is visited by numerous tourists on a regular basis;
- Highland Springs Country Estate that are being developed as a holiday destination with various cottages, fly fishing activities and other outdoor recreational activities and facilities.

- Alternative 5:
  - Leeuwkloof Estate

The above tourism establishments and their activities are nature based and thus highly dependent on the quiet rural and scenic quality of the area for their economic survival. The development of the tourism potential within the Emakhazeni Local Municipality is a priority as the area is viewed as the "gateway to the major tourism attraction points in Mpumalanga…"[39]The municipal area was also identified as part of the "trout triangle" within the Mpumalanga Tourism Growth Plan of 1999. The IDP further stated that the rural character and scenic quality has been the key success to the tourism industry in the area. The tranquil rural character of the area should thus be preserved and promoted.

In this regard the N4 plays an important link between the various tourism establishments. The intensity of this impact would thus be based on the proximity of the proposed line to the type of tourism activity, but would also manifest *en-route* to tourism sites or areas. An alignment along the N4 with possible negative impacts on the scenic quality, the tourism establishments along this road and the number of tourist making use of this road would make a power line alignment along Alternative 3 not preferable.

In terms of Alternative 1 and 5, careful consideration should be given to the alignment in the Leeukloof area to avoid any long term negative visual impacts on the Leeuwkloof Estate with subsequent negative financial impacts and possible job losses. It should further be noted that a third power line in this area could result in severe negative visual impacts irrespective of the

[39]Emakhazeni Local Municipality. 2011. Integrated Development Plan 2012-2013

detailed alignment with possible negative tourism and economic implications for the establishment.

THEME	IMPACT ON TOURISM			
Phase	OPERATIONAL PHASE			
Site Description	ALTERNATIVE 1 (Orange)	ALTERNATIVE 3 (Purple)	ALTERNATIVE 5 (Green)	GUMENI SUBSTATION UPGRADE
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Site (2)	Regional (3)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	High (8)	Medium (6)	Low (2)
Probability	Probable (2)	Probable (2)	Probable (2)	Improbable (1)
Significance without mitigation	Low (24) (-)	Low (30) (-)	Low (24) (-)	Negligible (8) (-)
Cumulative Impacts	• Possible economic losses and job losses if the tourism sector is negatively affected due to the visual impact associated with the proposed project			
Mitigation measures	• Avoid placing the transmission line in close view of restaurants and accommodation facilities where the visual beauty of the area is the main attraction point; • Avoid placing the transmission line across properties used for eco-tourism and leisure activities such as fly fishing and other outdoor recreational activities. Should avoidance not be possible, the alignment should avoid the main activity areas and preferably be placed on the border of the properties			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

7.5 Impact on land value

7.5.1 Construction phase

With regards to the construction phase no impact on the land value is foreseen, except in worst cases where the construction sites have not been rehabilitated to its original state and/or where environmental degradation occurred, e.g. erosion. This could then have subsequent negative impacts on the land value. If the mitigation measures proposed by the various specialists have

been incorporated into the EMPR and have been implemented this possible negative impact could be successfully attended to.

Concerns have been raised that the negotiation process, land value and finalisation of the contract are concluded long before the actual compensation for the servitude is paid to the property owners. During the time that lapsed, property prices have usually increased. Re-negotiation of the contracts would thus be fair.

THEME	**IMPACT ON LAND VALUE**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Probable (2)	Probable (2)	Probable (2)	Probable (2)
Significance without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Low (22) (-)
Cumulative Impacts	• Possible devaluation of land			
Mitigation measures	• During the construction process the EMPR should be strictly adhered to • The negotiation process between Eskom and the property owners should be concluded as rapidly as possible and compensation should be undertaken immediately thereafter			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Low (-)

7.5.2 Operational phase

Farmers are concerned that the proposed transmission line would negatively affect their property values, which could be further worsened if environmental damages were experienced during the construction process.

Although the perception exist that the power line could permanently negatively impact the land value, experience has shown that general commercial farming activities (e.g. cattle farming and maize production) could continue without any disruption in terms of the land and resource use. It should, however, be noted that various issues should be considered when aiming to establish the impact on the land value would include the location and size of the property, the presence of existing lines, the land use, the resource use, the proximity of new proposed line(s) to dwellings, tourism related structures, and so forth. The impact on the land value is thus very difficult to quantify from a social perspective.

With regards to tourism establishments the site specific impacts could have a higher significance and the impact on the land value is thus rated slightly higher for Alternative 3 where the majority of tourism establishments are located.

THEME	**IMPACT ON LAND VALUE**			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	High (8)	Medium (6)	Low (2)
Probability	Probable (2)	Probable (2)	Probable (2)	Probable (2)
Significance without mitigation	Low (24) (-)	Low (28) (-)	Low (24) (-)	Negligible (16) (-)
Cumulative Impacts	• Negative implications for property owners			
Mitigation measures	• Placement of the power line along the farm boundaries where possible would limit the possible negative economic impacts • Tourism establishments should preferably be avoided			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

7.6 Visual impact and sense of place

7.6.1 Construction phase

The main visual impact associated with the construction phase would be the actual construction sites, and possible storage of material and equipment, as well as the disruption of the soil and vegetation due to the tower footprints and new access routes.

The actual construction sites however would have a limited temporary negative visual impact.

For more details refer to the Visual Impact Assessment undertaken as part of the EIA process.

THEME	**VISUAL IMPACT AND SENSE OF PLACE**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Probable (2)	Probable (2)	Probable (2)	Probable (2)
Significance without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Low (22) (-)
Cumulative Impacts	• None anticipated			
Mitigation measures	• The construction sites should be kept litter free • The construction areas should be rehabilitated as soon as the construction process allows • A release form should be signed by the affected property owners ensuring that the construction areas have been left in a good condition • Mitigation measures as proposed by the Visual Impact Assessment should be implemented			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Low (-)

7.6.2 Operational phase

The SIA does not include a detailed Visual Impact Assessment, but only aims to portray the perception of Interested and Affected Parties with regards to the visual impact and change to the landscape character due to the proposed transmission line.

The main adverse impact of a transmission line on the land value relates to the visual and aesthetic impacts of such land. Once the change in landscape character can be proven to have impacted on the existing land use and resource use, negative impacts on the land value could occur. Invasion of a new servitude on possible future developments on such properties could further worsen the impact. This aspect, however, is very difficult to quantify from a social perspective.

The visual impact in the eastern section of the study area could be a grave concern to the property owners as this area lends itself more to tourism and undisturbed viewpoints due to the presence of larger sections of mountainous and valley areas. No mining activities, except for the Assmang Ferrochrome mine are found in this section of the study area which further adds to the visual quality. The area, however is disturbed by various tarred and gravel roads as well as the existing 275 kV power line. Another disturbance would be the approved Hendrina-Gumeni power line which would run parallel to the existing line and which could soon be constructed. The proposed Arnot-Gumeni 400 kV power line would thus introduce an additional visual impact to some sections of the study area. The proximity of the towers to homesteads, worker dwellings and the intrusiveness thereof would definitely add to the negative visual impact experienced by some of the residents, and possibly by tourists visiting these areas.

The upgrading of the Gumeni Substation is anticipated to only have a small add on effect to the existing visual impact of the substation.

From a social perspective, however, it is therefore difficult to determine the intensity of the visual impact. The reasons being that various social factors play a critical role in determining an individual's "sense of place" as it is influenced by their mindset, preferences, emotions, linkages with the environment, but also by cultural influences and the activities undertaken on the affected properties. As explained above, some I&APs could perceive the visual impact in a very negative light, whilst others could have a more neutral stand.

The intensity of the negative visual impact of the proposed transmission line would further depend on the perception of the viewer. It is, however, not anticipated that the proposed project would alter the host community's standard of living or quality of life, even though it would have a negative impact on the sense of place. The impact on the "sense of place" does not readily lend

itself to mitigation. Since the sense of place is non-economic and non-transferable, it cannot be mitigated through reimbursement or relocation of individuals.

The proposed power line is anticipated to change the sense of place and rural character of the study area. Irrespective of the alignment preferred, careful consideration should be given to the type of towers to be used to ensure the least intrusive technology possible.

THEME	**VISUAL IMPACT AND IMPACT ON SENSE OF PLACE**			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Highly probable (4)	Highly probable (4)	Highly probable (4)	Highly probable (4)
Significance without mitigation	Moderate (52) (-)	Moderate (52) (-)	Moderate (52) (-)	Low (32) (-)
Cumulative Impacts	• Possible devaluation of properties due to negative visual impact			
Mitigation measures	• Placement of the power line along the farm boundaries where possible would limit the possible negative visual impacts • Careful consideration should be given to the type of towers to be used to ensure the least intrusive technology possible • Avoid tourism nodes and/or establishments where possible • Mitigation measures as proposed by the Visual Impact Assessment should be strictly adhered to			
Significance with mitigation	Moderate (-)	Moderate (-)	Moderate (-)	Moderate (-)

7.7 Health risks

7.7.1 Construction phase

Health related impacts during the construction phase of the proposed project refer to the spread of sexually transmitted diseases and HIV/Aids between workers (usually outsiders) and the local population. Additional infections (even limited) with long-term possible regional consequences, therefore remain a source of concern.

Lack of monitoring and controlling the construction sites, as well as inadequate accommodation facilities for jobseekers and workers could also result in health risks due to environmental pollution.

THEME	**HEALTH RISKS**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Probable (2)	Probable (2)	Probable (2)	Probable (2)
Significance without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Low (22) (-)
Cumulative Impacts	• Increase of the existing HIV/Aids prevalence			
Mitigation measures	• Careful consideration should be given to the location of the construction site where workers would be accommodated • Littering should be prevented by ensuring adequate facilities at the construction sites to dispose of refuse • Sufficient water and sanitation facilities should be provided for the workers on site during the construction period • Informal vending stations (if it occurs) should be closely monitored to ensure that no environmental pollution occurs • Local labour should be employed as far as possible.			

THEME	HEALTH RISKS			
	• An HIV / Aids awareness campaigns should be focused on the contract workers. • Adequate water supply and sanitation related facilities should be provided to the workers at the construction sites. • Local labour should be employed as far as possible to avoid additional pressure of outsiders on the existing services			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Low (-)

7.7.2 Operational phase

Concerns with regards to the impact of the "electrical current" on residents remain a source of concern. Drawing on the existing body of research, the World Health Organisation has stated that it is becoming increasingly unlikely that exposure to EMFs constitutes a serious health hazard, although it concedes that some uncertainty remains. However, EMF can be reduced (through shielding, engineering techniques or line designs) and be decreased with an increase in distance from the power line[40]. The 55 m servitude area limits the constant exposure to these EMFs and according to the Eskom regulations no one is allowed to live within the servitude. These health concerns are sensitive issues and should not be dismissed as irrelevant, especially with regards to the areas where various dwellings are found.

THEME	HEALTH RISKS			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Site (2)	Site (2)	Site (2)	Site (2)

[40]Empetus CC (2006). Electric and Magnetic Fields from overhead power lines – A summary of technical and biological aspects

THEME	HEALTH RISKS			
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Probable (2)	Probable (2)	Probable (2)	Probable (2)
Significance without mitigation	Low (24) (-)	Low (24) (-)	Low (24) (-)	Low (24) (-)
Cumulative Impacts	• None anticipated			
Mitigation measures	• Eskom and the local municipalities should regular inspect the servitude and put a strategy in placeto deal with any possible illegal "squatting" in the servitude areas. • The safety exclusion zone should be strictly adhered to • Homesteads and dwellings should be avoided when finalising a route alignment			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Low (-)

7.8 Safety and security risks

7.8.1 Construction phase

The inflow of individuals unfamiliar to the resident population is almost always perceived to increase the criminal activities in the area. According to property owners small livestock such as sheep are usually targeted by construction workers during large scale construction activities. This was again experienced with the recently completed road construction in the Belfast area and would thus remain a concern with regards to the proposed Arnot-Gumeni project. Additional access roads on farms are also perceived to negatively influence the safety and security in the area as it could serve as potential access routes to criminals.Although it is difficult to determine whether these safety and security impacts will occur, the sensitivities in this regard should be noted.

The construction activities as such could furthermore pose a safety risk to the workers. People and animals could also be in danger if entering construction sites or in cases where there is a significant increase in heavy vehicles making use of local roads. Storage of hazardous substances at the contractorscamp such as fuels, oils and lubricants further increases safety risks.

Although the safety and security impacts are anticipated to be possible with a low significance due to the extent of the size of the possible outside workforce and short duration of the

construction phase, it remains critical that these are mitigated by implementing strict guidelines for worker conduct and movement. It is thus expected that the construction activities of the power line would not increase the safety and security risk if mitigation measures related to contract workers and heavy vehicles are applied.

THEME	**SAFETY AND SECURITY RISKS**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Medium term (3)	Medium term (3)	Medium term (3)	Medium term (3)
Scale of impact	Regional (3)	Regional (3)	Regional (3)	Site (2)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Probable (2)	Probable (2)	Probable (2)	Probable (2)
Significance without mitigation	Low (24) (-)	Low (24) (-)	Low (24) (-)	Low (22) (-)
Cumulative Impacts	• Possible increased in criminal activities			
Mitigation measures	• Personal protective equipment and clothing should be given to workers and enforced to avoid construction related accidents. • The movement of construction vehicles through towns or near settlements should be carefully planned to limit any negative impacts on the residents and pedestrians • Construction vehicles should keep to the speed limits. • Signs must be erected at strategic locations throughout the area, warning residents and visitors about the hazards around the construction sites and the presence of heavy vehicles • The contractor and Eskom should develop safety management plans which should be discussed with construction workers prior to construction. • Construction workers should preferably not prepare food at the construction sites to limit the risks of veld fires. • Construction sites should be fenced off to avoid unauthorised entry. • Local labour should be used as far as possible to limit the influx of an outside work force and potential outside jobseekers. • Safety and security measures should be discussed with the property owners and			

THEME	SAFETY AND SECURITY RISKS			
	local safety and security structures e.g. the local Community Policing Forums and/or Farmers Unions • Hazardous substances (oils, fuels and lubricants) to be stored above ground and under cover within secured areas to avoid unauthorised entry to these areas or tampering with the substances			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Low (-)

7.8.2 Operational phase

The presence of the proposed double circuit 400kV line will lead to an increased risk of fire due to the possibility of lightning striking the line. In the event that various lines are placed in close proximity to each other it would increase the fire risk and risk to Eskom in ensuring stable electricity supply.

Safety and security impacts due to movement of workers on private properties are a possibility and unauthorised entry of properties during the maintenance phases by non-Eskom workers also remains a concern.This could hamper the daily living and movement patterns of the affected property owners. As maintenance, however, would be undertaken once or twice a year, the impact is perceived to be minimal.

Other safety and security risks during the operational phase mainly refers to emergency situations e.g. emergencies with electrical equipment at the substation site which could lead to explosions and other incidences. Should the emergency services of the local municipalities be unable to effectively deal with such emergencies it would result in cumulative negative impacts. Although the possibility of such accidents happening is relatively low, this issue requires pro-active measures to be put in place.

THEME	SAFETY AND SECURITY RISKS			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of	Regional (3)	Regional (3)	Regional (3)	Site (2)

THEME	SAFETY AND SECURITY RISKS			
impact				
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Medium (6)
Probability	Probable (2)	Probable (2)	Probable (2)	Probable (2)
Significance without mitigation	Low (26) (-)	Low (26) (-)	Low (26) (-)	Low (24) (-)
Cumulative Impacts	• None anticipated			
Mitigation measures	• The servitude management should be monitored on an ongoing basis. • Eskom should, in conjunction with the local municipalities, develop an emergency management plan to specifically deal with the increased risk of veld fires • Maintenance personnel should travel in a marked vehicle and should wear uniforms to ensure that the personnel are easily identifiable as Eskom personnel • Ideally permission should be sought before entering properties			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Low (-)

8. COMMUNITY INFRASTRUCTURE

8.1 Impact on infrastructure and services

8.1.1 Construction phase

During the construction phase, traffic to and from the construction sites are anticipated to be low.Existing roads will be utilised as far as possible. Where the servitude would cross roads, a temporary impact such as possible closing of roads could occur for very short periods of time, especially during the stringing of the line.Should additional access roads be required, this would be discussed and negotiated with the affected property owners during the servitude negotiation phase of the project. These roads should fulfil the purpose of Eskom, but should also serve the needs of the property owner. Storm water control measures would also be implemented to limit the possibility of erosion.

Crossing of existing power lines could furthermore make the construction process more challenging. In some areas the servitude width could most probably be increased due to the separation distance of the various lines. This could thus result in additional social impacts and therefore the crossing of existing lines should be avoided where at all technically possible and/or

feasible. This is mainly applicable to the areas around the Arnot and Gumeni substations, as well as a large section of Alternative 3 where various distribution lines traverses the corridor investigated. Alternative 5 also crosses the existing 275 kV line and approved Hendrina-Gumeni line at specific points. Moreover, an existing transmission line is located within the western section of Alternative 1 and distribution lines within the eastern section of this alternative alignment.

Buffer zones between railway lines and proposed power lines should also be noted with regards to Alternative 3.

The impact on the infrastructure during the construction phase would be temporary and should all road restrictions, and operational and safety requirements be adhered to during the construction phase, the impact on the infrastructure and services are expected to be minimal.

Workers are not expected to make use of the existing transportation modes as formal transportation would be arranged for them between the construction sites (if applicable) and the construction camps where they would be staying for the duration of the construction period. These workers might only make use of the formal transport services over weekends for e.g. recreational, shopping or leisure activities. It is not anticipated that this small additional number of travellers would have any impact on the transportation services currently provided within the area.

THEME	**IMPACT ON INFRASTRUCTURE AND SERVICES**			
Phase	**CONSTRUCTION PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**
Duration of impact	Short term (1)	Short term (1)	Short term (1)	Short term (1)
Scale of impact	Site (2)	Site (2)	Site (2)	Footprint (1)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Probable (2)	Probable (2)	Probable (2)	Probable (2)
Significance without mitigation	Low (18) (-)	Low (18) (-)	Low (18) (-)	Negligible (8) (-)

THEME	IMPACT ON INFRASTRUCTURE AND SERVICES			
Cumulative Impacts	• None anticipated			
Mitigation measures	• Eskom should contact the relevant government departments and other possible stakeholders regarding the possible impact on infrastructure prior to construction. Written agreement should be sought from these affected parties to allow the project proponent to cross the various types of infrastructure. • Construction schedules should again be discussed and finalised with the affected government departments and other affected stakeholders prior to the construction commencement date • Rehabilitation of new access roads for construction vehicles should be undertaken as soon as the construction process allows. • There should be strict adherence to speed limits when using local roads and when travelling through residential areas. • Access routes and access points for heavy construction vehicles should be indicated to warn motorists of the movement of these vehicles. • Limit the movement of construction vehicles to off-peak periods (where possible)			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

8.1.2 Operational phase

Possible long-term impacts on the use of centre pivot irrigation systems, airfields and mining infrastructure are anticipated. The possible impacts were discussed under Section 6.3, 6.4, and 7.1. For a rating of the impacts refer to those sections.

During the operational phase of the transmission line, vehicle movement as part of the maintenance activities is anticipated to be negligible although in some cases private roads could be used to access the power lines. Property owners in the area indicated that they are not satisfied with the way in which maintenance has been done in the past e.g. vehicles not keeping to the roads, reckless driving on the roads and so forth. This possible negative impact on the road infrastructure should thus be mitigated.

THEME	IMPACT ON INFRASTRUCTURE AND SERVICES			
Phase	**OPERATIONAL PHASE**			
Site Description	**ALTERNATIVE 1 (Orange)**	**ALTERNATIVE 3 (Purple)**	**ALTERNATIVE 5 (Green)**	**GUMENI SUBSTATION UPGRADE**

THEME	IMPACT ON INFRASTRUCTURE AND SERVICES			
Duration of impact	Long term (4)	Long term (4)	Long term (4)	Long term (4)
Scale of impact	Site (2)	Site (2)	Site (2)	Footprint (1)
Magnitude of impact	Medium (6)	Medium (6)	Medium (6)	Low (2)
Probability	Probable (2)	Probable (2)	Probable (2)	Improbable (1)
Significance without mitigation	Low (24) (-)	Low (24) (-)	Low (24) (-)	Negligible (8) (-)
Cumulative Impacts	• None anticipated			
Mitigation measures	• Conditions to access farms should be discussed during the negotiation phase • An Environmental Control Officers and Farm Liaison officer could be appointed to ease communication between the property owners and Eskom • Maintenance personnel should travel in a marked vehicle and should wear uniforms to ensure that the personnel are easily identifiable as Eskom personnel • Maintenance personnel should keep to the service roads • Maintenance vehicles should be operated according to all road regulations • Maintenance vehicles should be in good working order • Ideally permission should be sought before entering properties			
Significance with mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

9. THE NO-GO ALTERNATIVE

Should the proposed project not proceed, no construction related impacts would realise which could, in some instances, be viewed as a positive aspect where intense negative impacts on the social environment is expected. Additional negative visual impacts, impacts on the sense of place and possible spill over impacts on the tourism industry would then also not occur.

It is becoming apparent that the existing power lines and substations are under severe pressure to continue supplying the area with sufficient and stable electricity supply. Without the necessary upgrades of the network grid through the proposed Arnot-Gumeniproject, including the upgrading of the Gumeni Substation, the network would not be able to supply a consistent supply. Mining

applications which creates some economic wellbeing could then be negatively affected. The proposed project would thus assist in reducing the network constraints in the supply to the Mpumalanga area.

As the project aims to strengthen the supply and improve the supply consistency to all customers, from a social point of view, the no-go option should not be supported.

10. DECOMMISSIONING

After the expected 25 year lifespan of the Arnot-Gumeni Transmission Line and substations, it is anticipated that the equipment will either be upgraded or the entire facility will be completely decommissioned. This would depend on the economic feasibility of the various options. Decommissioning would entail the following:

- The physical removal of the transmission lines and towers which would be a reversal of the construction process;
- The finalisation of a rehabilitation programme in consultation with the affected property owners;
- The disposal of the materials of the transmission line at an approved waste disposal facility or alternatively recycling of the materials;
- Negotiations with regards to land owner and servitude rights.

Typical social impacts associated with decommissioning of the proposed facility or issues that should be investigated include the following:

- A repeat of construction related intrusion impacts due to the replacement of the infrastructure;
- Job-losses in the case of dismantling of infrastructure (even limited);
- Temporary job creation in the case of the replacement of the infrastructure with newer technology;
- The change in community infrastructure;
- Disruptions and nuisance factors associated with the actual decommissioning or replacement of the infrastructure such as noise and visual impacts; and
- Safety factors associated with the decommissioning of the infrastructure.

As decommissioning or the replacement of the infrastructure is likely to only take place within approximately 25 to 30 years, it is recommended that a detailed Social Impact Assessment be undertaken then to determine the actual impacts on the changing social environment at that stage.

11. SUMMARY TABLE OF ANTICIPATED SOCIAL IMPACTS

11.1 Construction Phase

The following table provides a summary of the impact ratings as anticipated to occur during the construction phase of the project.

Table 12: Summary of Impacts anticipated during the construction phase

SIGNIFICANCE	ALTERNATIVE 1 (Orange)	ALTERNATIVE 3 (Purple)	ALTERNATIVE 5 (Green)	GUMENI SUBSTATION UPGRADE
POPULATION IMPACTS				
Inflow of Workers				
Without mitigation	Low (40) (-)	Low (40) (-)	Low (40) (-)	Low (36) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Low (-)
Influx of Jobseekers				
Without mitigation	Low (20) (-)	Low (20) (-)	Low (40) (-)	Low (36) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Low (-)
Accommodation of Workforce				
Without mitigation	Moderate (48) (-)	Moderate (48) (-)	Moderate (48) (-)	Moderate (48) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Low (-)
COMMUNITY AND INSTITUTIONAL IMPACTS				
Employment opportunities				
Without mitigation	Negligible (12) (+)	Negligible (12) (+)	Negligible (12) (+)	Negligible (6) (+)
With Mitigation	Low (+)	Low (+)	Low (+)	Negligible (+)
Local economic contribution				
Without mitigation	Low (32) (+)	Low (32) (+)	Low (32) (+)	Low (32) (+)
With Mitigation	Low (+)	Low (+)	Low (+)	Low (+)

SIGNIFICANCE	ALTERNATIVE 1 (Orange)	ALTERNATIVE 3 (Purple)	ALTERNATIVE 5 (Green)	GUMENI SUBSTATION UPGRADE
Impact on mining activities and mining areas				
Without mitigation	Moderate (44) (-)	Moderate (52) (-)	Moderate (52) (-)	Negligible (7) (-)
With Mitigation	Low (-)	Moderate to Low (-)	Moderate to Low (-)	Negligible (-)
Impact on airfields				
Without mitigation	Moderate (44) (-)	Moderate (44) (-)	Moderate (44) (-)	Negligible (7) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)
INDIVIDUAL AND FAMILY LEVEL IMPACTS				
Impact on farming activities				
Without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Negligible (7) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)
Disruption in daily living and movement patterns and proximity of homesteads				
Without mitigation	Low (18) (-)	Low (40) (-)	Low (18) (-)	Negligible (5) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)
Impact on schools				
Without mitigation	Low (36) (-)	Low (36) (-)	Low (10) (-)	Negligible (5) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)
Impact on tourism				
Without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Negligible (7) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

SIGNIFICANCE	ALTERNATIVE 1 (Orange)	ALTERNATIVE 3 (Purple)	ALTERNATIVE 5 (Green)	GUMENI SUBSTATION UPGRADE
Impact on land value				
Without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Low (22) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Low (-)
Visual impact and sense of place				
Without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Low (22) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Low (-)
Health risks				
Without mitigation	Low (22) (-)	Low (22) (-)	Low (22) (-)	Low (22) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Low (-)
Safety and security risks				
Without mitigation	Low (24) (-)	Low (24) (-)	Low (24) (-)	Low (22) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Low (-)
COMMUNITY INFRASTRUCTURE				
Impact on infrastructure				
Without mitigation	Low (18) (-)	Low (18) (-)	Low (18) (-)	Negligible (8) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

11.2 Operational Phase

The following table provides a summary of the impact ratings as anticipated to occur during the operational phase of the project.

Table 13: Summary of Impacts anticipated during the operational phase

SIGNIFICANCE	ALTERNATIVE 1 (Orange)	ALTERNATIVE 3 (Purple)	ALTERNATIVE 5 (Green)	GUMENI SUBSTATION UPGRADE
POPULATION IMPACTS				
Inflow of Workers				
Without mitigation	Low (18) (-)	Low (18) (-)	Low (18) (-)	Negligible (8) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)
Influx of Jobseekers				
Without mitigation	Negligible (9) (-)	Negligible (9) (-)	Negligible (9) (-)	Negligible (8) (-)
With Mitigation	Negligible (-)	Negligible (-)	Negligible (-)	Negligible (-)
Accommodation of Workforce				
Without mitigation	N/a	N/a	N/a	N/a
With Mitigation	N/a	N/a	N/a	N/a
COMMUNITY AND INSTITUTIONAL IMPACTS				
Employment opportunities				
Without mitigation	Negligible (6) (+)	Negligible (6) (+)	Negligible (6) (+)	Negligible (6) (+)
With Mitigation	Negligible (+)	Negligible (+)	Negligible (+)	Negligible (+)
Local economic contribution				
Without mitigation	Moderate (52) (+)	Moderate (52) (+)	Moderate (52) (+)	Moderate (52) (+)
With Mitigation	Moderate (+)	Moderate (+)	Moderate (+)	Moderate (+)

SIGNIFICANCE	ALTERNATIVE 1 (Orange)	ALTERNATIVE 3 (Purple)	ALTERNATIVE 5 (Green)	GUMENI SUBSTATION UPGRADE
Impact on mining activities and mining areas				
Without mitigation	Moderate (48) (-)	Moderate (56) (-)	Moderate (56) (-)	Negligible (8) (-)
With Mitigation	Moderate to Low (-)	Moderate to Low (-)	Moderate to Low (-)	Negligible (-)
Impact on airfields				
Without mitigation	Moderate (48) (-)	Moderate (48) (-)	Moderate (48) (-)	Negligible (8) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)
INDIVIDUAL AND FAMILY LEVEL IMPACTS				
Impact on farming activities				
Without mitigation	Moderate (48) (-)	Moderate (48) (-)	Moderate (48) (-)	Negligible (8) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)
Disruption in daily living and movement patterns and proximity of homesteads				
Without mitigation	Moderate (48) (-)	Low (24) (-)	Moderate (48) (-)	Negligible (8) (-)
With Mitigation	Low (-)	Low (-)	Moderate to Low (-)	Negligible (-)
Impact on schools				
Without mitigation	Low (24) (-)	Low (24) (-)	Low (8) (-)	Negligible (8) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)
Impact on tourism				
Without mitigation	Low (24) (-)	Low (30) (-)	Low (24) (-)	Negligible (8) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

SIGNIFICANCE	ALTERNATIVE 1 (Orange)	ALTERNATIVE 3 (Purple)	ALTERNATIVE 5 (Green)	GUMENI SUBSTATION UPGRADE
Impact on land value				
Without mitigation	Low (24) (-)	Low (28) (-)	Low (24) (-)	Negligible (16) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)
Visual impact and sense of place				
Without mitigation	Moderate (52) (-)	Moderate (52) (-)	Moderate (52) (-)	Low (32) (-)
With Mitigation	Moderate (-)	Moderate (-)	Moderate (-)	Moderate (-)
Health risks				
Without mitigation	Low (24) (-)	Low (24) (-)	Low (24) (-)	Low (24) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Low (-)
Safety and security risks				
Without mitigation	Low (26) (-)	Low (26) (-)	Low (26) (-)	Low (24) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Low (-)
COMMUNITY INFRASTRUCTURE				
Impact on infrastructure				
Without mitigation	Low (24) (-)	Low (24) (-)	Low (24) (-)	Negligible (8) (-)
With Mitigation	Low (-)	Low (-)	Low (-)	Negligible (-)

12. CONCLUSIONS

12.1 General

From a social perspective the following general conclusions can be made:

- Positive and negative social impacts are associated with the proposed Arnot-Gumeni project, although the negative impacts are not of such a nature that the proposed project could not continue.

- The most severe impacts expected to occur during the construction phase of the transmission line and substation upgrading are intrusions and disturbances related to the influx of workers and jobseekers to the area, the accommodation of workers within the area, as well as the possible impact on mining activities and mining areas, as well as the impact on airfields.
- The impacts associated with the construction phase are usually of a temporary nature and could, in most cases, satisfactorily respond to mitigation.
- The main impacts associated with the operational phase of a transmission line and substation revolve around the sterilisation of land, the visual impact which again impacts on the sense of place and possibly on the daily living and movement patterns of residents. Subsequent negative impacts could further impact on tourism establishments that rely on the scenic quality of the area.
- Transmission lines are perceived to have a negative impact on property values, but the extent of the impact would depend on whether the resource use of the property is affected or when the servitude invade the existing land uses and possible future developments on such properties.The intensity of the negative visual impact of the proposed transmission line would further depend on the perception of the viewer. It is, however, not anticipated that the proposed project would alter the host community's standard of living or quality of life, even though it would have a negative impact on the sense of place. The impact on the "sense of place" does not readily lend itself to mitigation. Since the sense of place is non-economic and non-transferable, it cannot be mitigated through reimbursement or relocation of individuals.
- The main farming activities in the area such as maize production and cattle farming could continue within the servitude. Tower footprint areas, however, would be sterilised. In this regard centre pivot systems and areas where crop dusting takes place should be avoided where possible.
- Sensitive receptors such as school learners, as well as homesteads and dwellings should be avoided.
- Impacts on property values could only be successfully assessed once a final route alignment has been negotiated with the affected property owners.
- The alternative route corridors assessed as part of the proposed Arnot-Gumeni power line traverses various mining areas and activities. Construction of the proposed power line across existing or future mining areas would influence the mineral production and possibly the Life of Mine (LoM) with indirect impacts on the Gross Domestic Product (GDP) of the area. Operational risks refer to economic implications due to the possible impact on the resource use, as well as safety risks and the possibility of increased fires.

- Buffer zones around airfields should be allowed. Once a preferred corridor has been selected, the detailed route alignment should be negotiated and communicated with the CAA.
- Limited positive impacts on a local scale are foreseen as the employment opportunities for construction workers are extremely limited. Regional economic contributions can occur as a result of indirect economic spin-offs created by the future stable electricity supply.
- Safety and security risks remain of concern. Minor negative impacts on farming activities are foreseen should safety and security of those farmers not be compromised through the presence of the construction and/or permanent workforce.It is thus imperative that pro-active mitigation measures to limit the risks be strictly implemented.
- Negative population impacts are not anticipated to materialise during the operational phase of the proposed project.
- Employment opportunities during the operational and maintenance phase are negligible and no benefits to the local communities are foreseen.

12.2 Route Alternatives

With regards to the route alternatives or corridors assessed, the following concluding remarks should be noted:

12.2.1 Alternative 1 (Orange)

Alternative 1 could be pursued, although the following should be noted:

- The Siphakamile Combined School is in close proximity to the Strathrae mining activities within the corridor of Alternative 1. This sensitive receptor should be avoided.
- Centre pivot irrigation systems within the corridor should be avoided.
- The Strathrae mining activitiesis mostly underground mining which makes the development of a power line in this area plausible.
- During the public participation process Exxaro and Shanduka mining have indicated that Alternative 1 is their preferred alignment option.
- Construction of an additional power line along Alternative 1 would develop a so-called industrial corridor due to the presence of a transmission line and distribution lines along this corridor. Negative impacts would thus be concentrated within one area, although it could have severe negative impacts for the property owners due to the possible devaluation of the properties. The intensity of this impact would depend on the type of activities undertaken on the various properties in that area. It should, however, be noted that the servitude areas could still be used for agricultural activities and grazing.

- Care should still be taken to follow an alignment in close proximity to the existing alignment and the Hendrina-Gumeni line to limit any possible negative impact on the tourism establishments in the Leeukloof area.
- The Arnot Aerodrome near Arnot Substation in close proximity to Alternative 1 should be avoided. Safety zones should be determined and adhered to.

12.2.2 Alternative 3 (Purple)

Alternative 3 is not recommended to be implemented from a social point of view due to the following specific aspects:

- Various settlements are located within the corridor and situated adjacent the N4 and railway line. Homesteads and dwellings would thus have to be avoided to limit the negative impacts with regards to the visual intrusion of power lines, as well as the daily living and movement patterns of the residents.
- The influx of workers within the more densely populated areas could have a marked influence on the social networks and the influx of jobseekers with subsequent negative social consequences within these areas are highly likely;
- Buffer zones between the proposed transmission line, railway line and distribution lines found within the corridor would make the alignment challenging. Crossing of these lines, the railway line, as well as the N4 would further complicate the construction process.
- Some schoolswithin the corridor such as the Arnot Colliery Primary School and the Blomplaas Primary School should be avoided.
- Existing and proposed mining activities within the corridor could be negatively affected by the proposed power line and vice versa.
- Centre pivot irrigation systems within the corridor should be avoided.
- Landing strips and an airfield in close proximity to the corridor should be avoided.
- Centre pivots found along Alternative 3 should be avoided.
- Various tourism establishments (as indicated under section 7.4) along or near this route could be negatively affected due to the negative impact on the scenic quality and “sense of place” of the area.

12.2.3 Alternative 5(Green)

Alternative 5 could be pursued, although the following should be noted:

- Construction of an additional power line along Alternative 5 would develop a so-called industrial corridor due to the presence of a 275 kV transmission line and the approved Hendrina-Gumeni transmission line along this corridor. Negative impacts would thus be concentrated within one area, although it could have severe negative impacts for the property owners due to the possible devaluation of the properties. The intensity of this impact would depend on the type of activities undertaken on the various properties in that area. It should, however, be noted that the servitude areas could still be used for agricultural activities and grazing.
- Centre pivot irrigation systems within the corridor should be avoided.
- Within Alternative 5, it should be noted that the Eerstelingsfontein Colliery is in the planning phases with its Integrated Water Use License Application (IWULA) still to be completed. There is thus the possibility that this mine would develop within the corridor.
- Care should still be taken to follow an alignment in close proximity to the existing alignment and the Hendrina-Gumeni line to limit any possible negative impact on the tourism establishments in the Leeukloof area.
- The Arnot Aerodrome near Arnot Substation in close proximity to Alternative 5 should be avoided. Safety zones should be determined and adhered to.

12.3 Upgrading of the Gumeni substation

Due to the relative limited construction process associated with the upgrading of the substationand the fact that no settlements are in close proximity to the Gumeni Substation, the impacts associated with the substation construction would be deemed less intense compared to the construction of the power line

Operational activities would be limited and negative social impacts as a result of the operation and maintenance of the substation are not deemed significant.

13. RECOMMENDATIONS

13.1 General

From a social perspective the following general recommendations can be made:

- From a social perspective it can be concluded that the proposed Arnot-Gumeni project would not result in permanent damaging social impacts
- Mitigation measures to limit any negative social impacts should be implemented as far as possible.

- Homesteads, dwellings, settlements and tourism establishments should be avoided where technically possible and economically feasible.
- Due to the size and visual intrusion of the proposed transmission line, the characteristics of the rural area would permanently change. The sense of place would thus be negatively affected. However, it is still anticipated that once operational, the operation of the proposed power line and substation would have limited negative impacts on the social environment. It is anticipated that farming activities (crop production and cattle farming) could continue on those sections of the properties that are not affected by the tower footprints.
- The use of local labour should be maximised as it could assist in mitigating various possible negative social impacts, but would also enhance the limited potential benefits of the proposed project to the local community members.
- The possible negative impact on the safety profile of the local communities and farmers would remain a source of concern. Safety and security measures must thus be addressed pro-actively and throughout the life of the project.

13.2 Route Alternatives

Based on the social impact assessment, the following recommendations are made with regards to the route alignments assessed:

- Route Alternative 3 (purple) is not recommended from a social perspective due to the anticipated negative impacts on the settlements found along the N4, the location of the railway line within this corridor, possible impacts on tourism establishments and traffic making use of the N4, as well as the possible likelihood of the influx of jobseekers along this alignment.
- Both Alternative 1 (orange) and Alternative 5 (green) could be followed from a social perspective.Mitigation measures, however, should be implemented to avoid possible negative impacts as discussed in the document.
- Based on the preference by the mining industry for Alternative 1 (orange) and the fact that two lines are already present in close proximity to Alternative 5 (green), as well as the possibility that the Eerstelingsfontein mine would go ahead, Alternative 1 (orange) could be more preferred than Alternative 5 (green).
- A possible route selection could also include Route Alternative 1 (orange) from the Arnot Substation and then to cross over in the vicinity of the R33 to follow the alignment of Route Alternative 5 (green) (in the vicinity of the farm Geluk). From there the alignment of Route Alternative 1 (orange) and 5 (green) is approximately a similar corridor. Care should still be

taken to follow an alignment in close proximity to the existing alignment and the Hendrina-Gumeni line to limit any possible negative impact on the tourism establishments in the Leeukloof area (where the green and orange alternative meets – from where the line traverses the Geluk-Nooitgedacht gravel road).

13.3 Upgrading of the Gumeni substation

Based on the social assessment it is not anticipated that the upgrading of the Gumeni substation would result in severe negative impacts. The upgrading of the substation can thus continue as planned.

14. SOURCES CONSULTED

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14.3 Consultation

Mr. Johan Steele: Property owner of the farms Generaalsdraai, Leeubank, Wintershoek, Wonderfonteinand Kaalplaats

Mr. Gawie van Rensburg: Property owner of the farm Grootlaagte

Mr. Gerrit Roos: Representative of the farms Leeubank and Zoekop

Mr. John William Duggan: Property owner of the farm Berg en Dal

Mr. Edwin Duggan: Property owner of the farm Wemmershuis

Mr. Koos Pretorius: Property owner of the farm Zoekop & Chairperson of the Escarpment Environmental Organisation

Mr. Machiel Cloete: Property owner of the farm Rietvlei

Mr. Frik Prinsloo: Property owner of portions of the farms Van Wyksvlei, Blesbokspruit, Geluk, Kaalplaats and Eerstelingsfontein

Mr. Louis Wood: Civil Aviation Authority