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# PROPOSED BRAVO INTEGRATION PROJECT SOCIAL IMPACT ASSESSMENT FOR BRAVO 4 (PHASE 4)



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## **EXPERIENCE RECORD**

This report was compiled by **Mrs Narda Botha** of **Metro Concepts (Pty) Ltd**. Mrs Botha holds a B Art et Scien (*Town and Regional Planning*) degree from the North West University in Potchefstroom and has approximately 20 years' experience in this field, which includes the collection and analysis of socio-economic data, land use interpretation, control and future development proposal.

Socio economic research were included in the following projects:

- Social Impact Assessment for Moretele, 132kV transmission lines and substations.
- Socio-economic profile for the Comprehensive Urban Plan (CUP) for Kimberley in co-operation with the Swedish Government.
- Compiled the urban structure plan for Frankfort (Free State Provincial Government)
- Compiled the urban structure plan for Winburg (Free State Provincial Government)
- Compiled the urban structure plan for Oranjeville (Free State Provincial Government)
- Involved with the compiling of structure plans for towns in the Free State as well as for the "Restricted Development Areas" surrounding the Vaaldam.
- Compiled a town planning scheme for Vredefort and Mokwalo (Free State Provincial Government)
- Compiled a town planning scheme for (Free State Provincial Government)
- Ad-hoc research projects e.g. "Upgrading of Central Business Districts" and "Guidelines for the evaluating of applications on the banks of the Vaal River, Vaaldam and the Barrage Area inside the Vaal River Complex guide plan area" (Free State Provincial Government)



## **Indemnity**

This report is based on the available literature, reports, databases, maps and project information supplied by Envirolution. The findings, results, observations, conclusions and recommendations given in this report are based on the author's best professional knowledge as well as information available at the time of the study. Therefore the author reserves the right to modify aspects of the report, including the recommendations, if and when new information may become available from ongoing research or further work in this field, or pertaining to this investigation.

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## **EXECUTIVE SUMMARY**

The growing demand for electricity is placing increasing pressure on Eskom's existing power generation and transmission capacity. Eskom (SOC) is committed to implementing a Sustainable Energy Strategy that complements the policies and strategies of National Government. Eskom aims to improve the reliability of electricity supply to the country, and in particular to provide for the growth in electricity demand in the Gauteng and Mpumalanga provinces. For this reason, Eskom obtained environmental authorisation to construct the new 400 kV Bravo (Kusile) coal-fired Power Station between Bronkhorstspuit and Witbank in 2007. Construction of the Kusile power station has already commenced. Due to this construction, the new Bravo Power Station needs to be integrated with the existing Eskom electricity infrastructure.

In this regard Eskom also obtained environmental authorization on 09 October 2009 from the Department of Environmental Affairs (DEA) for the construction of two new 400kV power lines from the Kendal Power Station (near Ogies) to the Zeus Substation (near Secunda), one powerline will further join to an existing power line that spans from the Kendal Power Station to Kusile Power Station in the Mpumalanga Province (DEA Reference No. 12/12/20/1095). Each of these lines will be approximately 70 km's in length with a combined length of 140km. The lines will run parallel to each other. Please refer to the locality map (Figure 1) for further details. Following approval by DEA in 2009, it has been identified that certain tower footings associated with the power lines may impact on watercourse crossings and drainage lines. Thus requiring Environmental Authorisation in terms of the National Environmental Management Act (NEMA) (Act 107 of 1998). Activities identified in Listing Notice 1 of General Notice Regulations (GN R.) 983 and Listing Notice 3 of GN R. 985 are triggered by the proposed project and thus a Basic Assessment (BA) process is being undertaken. Specialist Ecological (Flora and Fauna), Avifauna, Wetland, Social and Heritage Assessments were undertaken during the Basic Assessment.

The proposed transmission power line corridors starts out in the Emalahleni Local Municipality, traverses a very small portion of Victor Khanye Local Municipality before it terminates at the Zeus power station in Govan Mbeki Local Municipality. The Emalahleni and Victor Khanye Local Municipalities are located within the Nkangala District Municipality, whereas the Govan Mbeki Local Municipality forms part of the Gert Sibande District Municipality. Both these districts are located within the Mpumalanga Province (MP).

This particular SIA also took into account the significance, spatial, duration, degree of probability and degree of certainty that a potential impact might have on the social environment. Impacts can either be negative, neutral or positive. The impacts are also categorised according to the various project stages, i.e. construction and decommissioning, and operation and maintenance. Mitigation measures have also been identified with the aim to reduce the potential negative impacts and to enhance the potential positive impacts.

The impact of the proposed Bravo 4 project have a number of negative impacts in the geographic, demographic and socio-cultural processes. However all of these impacts can be mitigated successfully if effectively managed. These impacts and their associated mitigation measures are summarised in the table below:



Impact	Mitigation Measures
On mining activities	<ul style="list-style-type: none"> <li>• The location of the Transmission power line should be determined in consultation with mining companies.</li> <li>• It is preferable to avoid mining operations at these plants altogether.</li> </ul>
Possible risks associated with the presence of transmission power lines	<ul style="list-style-type: none"> <li>• Scientific studies regarding this possible impact should be studied and the results must be communicated to community.</li> </ul>
On watercourses	<ul style="list-style-type: none"> <li>• Construction camps to be located not closer than 50m from the edge of riparian habitat / wetland buffer zone.</li> <li>• As far as possible, use existing bridge crossings as access roads.</li> <li>• Storm-water containing sediment can be discharged to grassland buffers to ensure sediments fall out prior to water entering surface water bodies. Care must be taken that storm-water containing hydrocarbons and other pollution sources are not discharged.</li> <li>• Implement suitable storm-water measures during construction to manage ingress of runoff into watercourses.</li> <li>• Ensure proper storage of material (including fuel, paint) that could cause water pollution.</li> <li>• Ensure proper storage and careful handling of hazardous substances with spill prevention materials at hand.</li> <li>• Ensure proper waste management and housekeeping.</li> <li>• Demarcated areas where waste can be safely contained and stored on a temporary basis during the construction phase should be provided.</li> <li>• When adequate volumes of waste (not more than 1 month) have accumulated, all waste is to be removed from site and disposed of at a licensed facility.</li> <li>• Waste is not to be buried on site.</li> </ul>
<p>Economic impacts including:</p> <ul style="list-style-type: none"> <li>• Compensation for servitude</li> <li>• Direct formal and/or informal employment opportunities for local individuals, and</li> <li>• Indirect formal and /or informal business opportunities to local individuals.</li> <li>• Electricity supply and economic growth.</li> </ul>	<p><b>Compensation:</b></p> <ul style="list-style-type: none"> <li>• Appoint a land valuator with experience be experience.</li> <li>• The process should be conducted with the necessary respect, and the negotiator should be transparent about the process and expectations (do not engage in “empty promises”).</li> <li>• The negotiation should be done for the whole servitude and not part of the servitude.</li> <li>• Contracts should be reviewed by an independent body.</li> <li>• Land owners should be made aware that a pre- and post-evaluation of their land value is possible.</li> <li>• In the case of tribal authorities, Eskom should consider establishing a trust fund in consultation with the tribal authority (as a form of compensation) for the community that is jointly administrated by Eskom and the tribal authority. Community development projects can then be funded from the trust fund, which would aid sustainable development in the area.</li> </ul> <p><b>Employment:</b></p> <ul style="list-style-type: none"> <li>• Unskilled job opportunities should be afforded to the inhabitants of the communities closest to the proposed construction site. Means to achieve this are suggested below:</li> <li>• Identify types and levels of employment that the development can offer.</li> <li>• Local individuals should be employed for work components that do not require a substantial amount of skill, e.g. foundation excavation, vegetation clearance, erection of gates, cleaning services, and security guards</li> </ul>



	<ul style="list-style-type: none"> <li>• Appoint a local labour broker. The process of procurement should be monitored by Eskom to ensure that the process was transparent and equal opportunities were afforded.</li> <li>• Refer contractors to jobseeker’s databases kept by local community structures when sourcing local labour.</li> <li>• Individuals with the potential to develop their skills should be afforded training opportunities.</li> <li>• Identify targets for BEE and local employment.</li> <li>• Reserve agreed percentage of higher level positions for local employment.</li> <li>• Location of appropriate transport providers who would be available to assist contractors in transporting worker to and from these sites.</li> <li>• Younger people tend to have higher levels of education and may stand in line for higher levels of employment. Opportunities for the employment of younger people should be maximised.</li> <li>• Individuals with the potential to develop their skills should be afforded training opportunities.</li> <li>• Equal opportunities for employment should be created to ensure that the local female population also has access to these opportunities.</li> <li>• Through consultation with relevant key stakeholders, identify the segment that might benefit from informal indirect opportunities, and promote skills development and subsidisation initiatives that are sustainable.</li> <li>• Encourage, in consultation with key stakeholders, construction workers to use local services.</li> <li>• Mechanisms should be developed to provide alternative solutions for creating job security upon completion of the project.</li> <li>• Payment should comply with applicable Labour Law legislation in terms of minimum wages.</li> <li>• Where local labourers are employed on a more permanent basis, these labourers should be registered with the Unemployment Insurance Fund (UIF), Pay as You Earn or any other official bodies as required by law. This would enable the workers to claim UIF as a means of continuous financial support when the workers’ positions during construction itself have become redundant or once the construction phase comes to an end.</li> </ul> <p><b>Business:</b>          Make use of local suppliers of goods and services where possible. Means to achieve this are suggested below:</p> <ul style="list-style-type: none"> <li>• Engage with local businesses to assist with meeting requirements for tender processes and documentation.</li> <li>• Identify targets for BEE and local procurement</li> <li>• Communicate supply chain opportunities through the project’s website and communication materials.</li> <li>• Communicate supply chain opportunities through local business networks.</li> <li>• Expedite process of registering local service providers on Eskom’s procurement database.</li> <li>• Engage with local stakeholders to establish a local business forum to increase access to opportunities.</li> <li>• Provide information regarding the types of business opportunities and economic and economic spin-offs that may arise from the proposed development.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Participatory workshops in which interested members of local communities can be guided with regards to types of business opportunities that could arise.</li> <li>• Provide the local business network in advance of construction with a list of required goods and services as well as procurement tendering requirements.</li> <li>• Investigate ways of enabling potential sub-contractors from low-income areas to tender.</li> <li>• Set up linkages for small business loans, as well as small business skills training.</li> </ul> <p><b>Employment:</b></p> <ul style="list-style-type: none"> <li>• Individuals with the potential to develop their skills should be afforded training opportunities. Eskom should be involved in this process.</li> <li>• Make use of local labour on unskilled maintenance components, such as servitude maintenance.</li> <li>• Where local labourers are employed on a more permanent basis, cognisance should be taken of the Labour Law in terms of registering the worker with the Unemployment Insurance Fund (UIF), Pay as you earn (PAYE), workman’s compensation and all other official bodies as required by law. This would enable the worker to claim UIF as a means of continuous financial support when the worker’s position on the construction team has either become redundant or once the construction phase comes to an end.</li> </ul> <p><b>Electricity supply and economic growth:</b> None</p>
<p>On family structures and social networks associated with the presence of construction workers.</p>	<ul style="list-style-type: none"> <li>• Raise awareness amongst construction workers about local traditions and practices.</li> <li>• Inform local businesses about the expected influx of construction workers so that they can plan for the extra demand.</li> <li>• 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.</li> <li>• Ensure that the local communities communicate their expectations of construction workers’ behaviour.</li> <li>• Conditions stipulated by property owners in terms of the construction activities should be implemented and monitored.</li> <li>• Maximise local employment to minimise the need for housing of temporary workers which could lead to social problems of integration with the local community.</li> <li>• All construction activities should be restricted to working areas.</li> <li>• Construction workers should wear name tags and clothing to ensure that they can be readily identified as belonging to the construction workforce. This should be applicable to all construction workers, including those locally recruited.</li> <li>• What workers bring on site should be monitored. The provision of catering on-site will reduce the chances that substances such as alcohol are brought on-site or used during working hours, reducing the likelihood of alcohol related conflict and disturbances.</li> </ul>



	<ul style="list-style-type: none"> <li>• Workers should receive fines if they do not adhere to the conditions, rules and regulations.</li> <li>• Workers should be made aware of property owners' concerns regarding construction work on their properties so that they are familiar with the sensitive issues.</li> <li>• 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.</li> <li>• Eskom personnel should preferably not access private properties without prior notification of the property owners.</li> <li>• Eskom maintenance personnel should be in possession of the required identification documents and clothing when undertaking maintenance work.</li> <li>• Vehicles used should be clearly marked.</li> <li>• Eskom personnel should behave properly at all times.</li> </ul>
<p>Possible influx of unemployed job seekers and temporary workers.</p>	<ul style="list-style-type: none"> <li>• Maximise local employment according to strategies outlined previously.</li> <li>• The number of job opportunities available as part of the proposed project and the recruitment process should be clearly communicated.</li> <li>• The communication strategy should ensure that unrealistic employment expectations are not created.</li> <li>• Access to the construction site should be controlled.</li> <li>• Have clear rules and regulations for access to the construction camp to control loitering.</li> <li>• The use of local labour should be maximised through contractual conditions set for the sub-contractors.</li> <li>• Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company.</li> <li>• Construction workers must also be provided with identification tags.</li> </ul>
<p>Relocation of existing and new households and/or population segments.</p>	<ul style="list-style-type: none"> <li>• Avoid the resettlement and/or displacement of households as far as possible.</li> <li>• If resettlement is unavoidable, residents should be sufficiently compensated and assisted with the relocation process.</li> <li>• A form of compensation should also be granted to individuals who are residing in informal settlements within the servitude.</li> <li>• A formal grievance procedure should be implemented and communicated to landowners to ensure a fair and transparent process.</li> <li>• Eskom (or its appointed contractor) should monitor areas where people gather in the field on a regular basis as this is normally the first indication that settlement might take place in the area. These people should be removed in co-operation with the local SAPS to prevent the formation and/or expansion of informal settlements in such an area, especially if it encroaches upon the servitude.</li> <li>• The servitude should be inspected on a regular basis to determine whether any settlement has taken place, either within the servitude, or encroaching upon the servitude.</li> <li>• Households that encroach upon or settle within the servitude have to be relocated as soon as possible.</li> <li>• Eskom or its appointed contractors should assist these households with the relocation process.</li> <li>• Educate surrounding communities about the dangers of living in the servitude.</li> </ul>



	<ul style="list-style-type: none"> <li>• A form of signage on the towers should also indicate that it is dangerous.</li> <li>• In some way, a barrier (psychological and/or physical) should indicate that no structures should be built in the servitude.</li> <li>• One way of achieving such a barrier is to educate community leaders on the health and safety aspects of the servitude, who then in turn can ensure that settlement does not take place within the servitude.</li> </ul>
<p>On farming activities</p>	<ul style="list-style-type: none"> <li>• The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised.</li> <li>• Initial servitude clearing on the farmland should take place after the harvesting season, as far as possible. Landowners should be compensated for the loss of cultivated land.</li> <li>• Compensation for the temporary loss of cultivated land should be included in the negotiation process with the landowner.</li> <li>• Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area).</li> <li>• Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction.</li> <li>• An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.</li> <li>• All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc. should be rehabilitated at the end of the construction phase.</li> <li>• Eskom should discuss the construction schedule and activities with the affected farmers to enable them to plan their farming activities and animal movement accordingly.</li> <li>• The location of the construction camps where workers would be housed should be carefully considered to limit any possible negative social impacts.</li> <li>• The construction camp should be located near support services, and ideally not in the vicinity of residential dwellings.</li> <li>• Eskom must liaise with the farmers' associations and a protocol for gaining access to farms should be established and distributed to all parties involved. The impact of careless conduct on the side of contractors must be acknowledged and the contractors should receive an induction in terms of the relevant code of conduct to which they should adhere.</li> <li>• Access to the construction site should be controlled.</li> <li>• Have clear rules and regulations for access to the construction camp to control loitering.</li> <li>• Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company.</li> <li>• Construction workers must also be provided with identification tags.</li> </ul>
<p>Possible disputes between workers, contractors and labour-brokers.</p>	<ul style="list-style-type: none"> <li>• Establish a community stakeholders' forum where labour related issues can be addressed in consultation with local community representatives on a regular basis, to improve relationships and build trust.</li> <li>• Make use of local labour brokers.</li> <li>• Ensure utmost sensitivity in the treatment of workers on-site, particularly regarding potential racial issues that may be implicated. This also applies to the manner on which labour disputes when they occur, are handled by contractors and, when necessary, Eskom Project Managers.</li> </ul>



<p>On community and workers' health, including effects of dust, noise, sexually Transmitted Infections (STIs) and other infectious diseases.</p>	<ul style="list-style-type: none"> <li>• The impact of dust can be limited through taking proper dust abatement measures like watering of roads and control of traffic speed limit. The contractors will be required to incorporate such issue in to the management plan and submit with their contract proposals.</li> <li>• Noise pollution beyond the stated limits, can be minimized by the provision and use of proper hearing equipment for construction workers and working time should be limited in order not to affect the local communities in the vicinities.</li> <li>• An aggressive STI and HIV/AIDS awareness campaign should be launched, which is not only directed at the construction workers, but also at the community as a whole.</li> <li>• Condoms should be distributed by placing them at centrally located points and by ensuring that construction workers and community members area aware of the availability and locality of condoms.</li> <li>• Access to the construction site should be controlled to prevent sex workers from either visiting and/or loitering at the site.</li> <li>• Local women should be empowered. This could be achieved by employing them to work on the project, which in turn would decrease their (financial) vulnerability.</li> <li>• Regular leave should be given to contractors.</li> <li>• Provide entertainment to workers.</li> <li>• The construction work camps shall be maintained in a clean and healthy condition as prescribed by international standards.</li> </ul>
<p>Impact of the increase in traffic, including construction vehicles – access routes, dust, noise.</p>	<ul style="list-style-type: none"> <li>• Construction activities should be planned to minimise added disruption of traffic, especially during peak hours.</li> <li>• The closing of gates, especially in livestock farming areas must be reiterated.</li> <li>• Land owners should be informed in advance of any planned maintenance activities.</li> </ul>
<p>Possible security and safety risks.</p>	<ul style="list-style-type: none"> <li>• Construction workers should be clearly identifiable. Overalls should have the logo of the construction company on it and construction workers should wear identification cards.</li> <li>• Construction sites should be fenced and access should be controlled.</li> <li>• Loitering of outsiders at the either the construction site or at the construction village should not be allowed. Loiterers at the site should be removed in cooperation with the local branch of the South African Police Service (SAPS).</li> <li>• Contractors should regularly provide adequate safety equipment and orientation to his employees.</li> <li>• Project related vehicles will be required to abide by good driving conducts, obey speed limits and follow the rules of safe driving.</li> </ul>
<p>Visual impact and impact on sense of place.</p>	<ul style="list-style-type: none"> <li>• Develop and implement a Community Engagement and Interaction policy to create protocols and positive interactions with the local community in particular neighbouring landowners.</li> <li>• New infrastructure should be located in close proximity to existing infrastructure of a similar nature, as far as possible.</li> <li>• Rehabilitation of land to its previous condition should take place as soon as a pipeline is removed from a property.</li> <li>• Inform neighbouring property owners when construction will take place, including information on the nature and timeframe of the construction activities.</li> </ul>
<p>Impact of no-development option</p>	<p>N/A</p>



## **ACRONYMS**

<b>AIDS</b>	Acquired Immune Deficiency Syndrome
<b>CBD</b>	Central Business District
<b>CS</b>	Community Survey
<b>DEAT</b>	Department of Environmental Affairs and Tourism
<b>DWS</b>	Department of Water and Sanitation – DWS
<b>EAP</b>	Environmental Assessment Planner
<b>ELM</b>	Emalahleni Local Municipality
<b>EIA</b>	Environmental Impact Assessment
<b>EMF</b>	Electro Magnetic Fields
<b>EMP</b>	Environmental Management Plan
<b>ESTA</b>	Extension of Security of Tenure Act
<b>GDP</b>	Gross Domestic Product
<b>GDS</b>	Growth and Development Strategy
<b>GMLM</b>	Govan Mbeki Local Municipality
<b>GPS</b>	Global Positioning System
<b>GSDM</b>	Gert Sibande District Municipality.
<b>GVA</b>	Gross Value Add
<b>HIV</b>	Human Immune-deficiency virus
<b>IDP</b>	Integrated Development Plan
<b>MLL</b>	Minimum Living Levels
<b>MP</b>	Mpumalanga Province
<b>NDM</b>	Nkangala District Municipality
<b>NEMA</b>	National Environmental Management Act
<b>OHSA</b>	Occupational Health and Safety Act
<b>PPP</b>	Public Participation Process
<b>RDP</b>	Reconstruction & Development Programme
<b>RoD</b>	Record of Decision
<b>SAPS</b>	South African Police Service
<b>SDF</b>	Spatial Development Framework
<b>SIA</b>	Social Impact Assessment
<b>SIC</b>	Standard Industrial Classification Sector
<b>STI</b>	Sexually Transmitted Infections
<b>WHO</b>	World Health Organisation



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## **1. INTRODUCTION AND PROJECT BACKGROUND**

Eskom Holdings is a South African and vertically integrated utility that generates, transmits and distributes electricity. It supplies approximately 95% of the country's electricity and 60% of the total electricity consumed on the African continent. An electric power system is a complex assemblage of equipment and circuits for generating, transmitting, transforming and distributing electrical energy.

To better understand the social impacts both at regional and local level, it is necessary to briefly explain the nature of the project and related activities. Eskom relies on coal-fired power stations to produce approximately 90% of its electricity. Coal is used to heat water and convert it into steam at high temperatures and pressures. Hot steam at temperatures of between 500°C and 535°C is released and turns a large turbine connected to a rotating magnet to convert energy in the fuel into high voltage electric power.

In order for the electricity to be transmitted safely and efficiently, it must be at a high voltage (typically 400kV) and a low current. The transmission system carries the electric power in large amounts from generating stations to consumption areas. Electricity delivered by transmission circuits is then stepped down in facilities called substations to voltages more suitable for use in industrial and residential areas.

Among other things, substations are used to transform power from one voltage level to another; interconnect alternative sources of power; connect generators, transmission or distribution lines and loads to each other as well as provide switching for alternate connections and isolation of failed or overloaded lines and equipment. This transmission is also used to interconnect adjacent power systems for mutual assistance in case of emergency. The electricity is transformed down to 11 000 volts for local distribution and then further reduced according to the need - for example, 220 volts for domestic use. The electricity entering consumers' premises and homes has had a complex journey - from the initial high voltage transmission grid to a lower voltage distribution network. It has travelled over ground and (probably) underground for many kilometres and been transformed many times on the way.

The growing demand for electricity is placing increasing pressure on Eskom's existing power generation and transmission capacity. Eskom (SOC) is committed to implementing a Sustainable Energy Strategy that complements the policies and strategies of National Government. Eskom aims to improve the reliability of electricity supply to the country, and in particular to provide for the growth in electricity demand in the Gauteng and Mpumalanga provinces. For this reason, Eskom obtained environmental authorisation to construct the new 400 kV Bravo (Kusile) coal-fired Power Station between Bronkhorstspuit and Witbank (Emahlaheni) in 2007. Construction of the Kusile power station has already commenced and will comprise six units, each rated at an 800 MW installed capacity for a total capacity of 4 800 MW. Once completed, Kusile will be the fourth-largest coal-fired power station in the world.

Due to this construction, the new Kusile (Bravo) Power Station needs to be integrated with the existing Eskom electricity infrastructure.



The Bravo (Kusile) Integration Project spans the provinces of Gauteng and Mpumalanga and will be handled as five individual Environmental Impact Assessments (EIA), namely:

a) **Bravo 1 (DEAT Ref. No: 12/12/20/1093): Sol – Camden By-Pass Power Line (Phase 1)**

The intention of Bravo 1 is to build two 400 kV bypass lines for Zeus substation. The two 400 kV lines from Sol Substation and the two 400 kV power lines from Camden power station will be disconnected from Zeus substation and joined to each other to form two Camden - Sol 400 kV power lines. The location of the two bypass lines is planned to be within approximately 10 km radius of the Zeus substation. The project is located within the Govan Mbeki District Municipality.

The construction and operation of two (2) 400kV bypass transmission power lines, both approximately 10km in length, as follows:

- One (1) 400kV bypass transmission line between the Sol substation in Kriel and the Zeus substation in Secunda, and
- One (1) 400kV bypass transmission line between the Sol substation in Kriel and the Camden substation in Ermelo.

b) **Bravo 2 (DEAT Ref. No: 12/12/20/1094): Apollo and Kendal loop in and loop out lines (Phase 2)**

Eskom propose to construct four new 400 kV overhead power lines, located within the Emalahleni Local Municipality in Mpumalanga, to loop in and out of Kusile (previously known as Bravo) Power Station. The existing Kendal-Apollo line will be looped in and out of Kusile to form the Kusile-Apollo and Kusile-Kendal lines. In addition, the existing Duvha-Minerva 400 kV overhead power line will be looped in and out of Kusile Power Station, to form the Kusile-Duvha and Kusile-Minerva lines.

The construction and operation of two (2) 400kV loop-in lines into the new Kusile Power Station, both approximately 10km in length, as follows:

- One (1) 400kV loop-in line from the Kendal (Ogies) to Apollo (Centurion) transmission line; and
- One (1) 400kV loop-in line from the Duvha (Middelburg) to Minerva (Johannesburg) transmission line.

c) **Bravo 3 (DEAT Ref. No. 12/12/20/1097): Construction of a 400kV power line from Bravo Power Station to Lulamisa (Phase 3)**

In order for the Kusile power station to be integrated within the existing Eskom infrastructure, Eskom proposes to construct a new 400kV power line from the new Kusile Power Station to the existing Lulamisa substation in Kyalami, near Diepsloot. This line will be approximately 150 km in length and will run through the Bronberg area. The construction of this proposed 400 kV power line is aimed to ensure sufficient electricity supply to the Diepsloot and Johannesburg North areas, where currently frequent electricity shortages are experienced. The corridor covers an area from Victor Khanye in the east, to Diepsloot in the west.



d) **Bravo 4 (DEAT Ref. No: 12/12/20/1095): - Two new 90 km Kendal –Zeus 400 kV Power Lines (Phase 4)**

Eskom propose to construct two new 400 kV power lines, one from Kusile to Zeus and the other one from the Kendal Power Station (near Ogies) to the Zeus substation (near Secunda), Mpumalanga. These lines will run parallel to each other and will be approximately 95 km in length. These corridors merge into two corridors approximately 30 km from the Zeus substation.

e) **Bravo 5 (DEAT Ref. No: 12/12/20/1096): - New 10km Kusile (Bravo)-Vulcan Power Line (Phase 5)**

Eskom proposes to construct a 400 kV overhead power line, by-passing the existing Duvha Power Station, to form a new Kusile-Vulcan line near Emahlahleni, Mpumalanga. This by-pass line is planned to be approximately 10 km in length. The area to be investigated for this by-pass line is a 10 km radius surrounding the existing Duvha Power Station.

This report only focusses on **Bravo 4 (DEAT Ref. No: 12/12/20/1095)**. Separate Social Impact Assessment (SIA) Reports have been compiled for Bravo 3 and Bravo 5.

Eskom obtained environmental authorization on 09 October 2009 from the Department of Environmental Affairs (DEA) for the construction of two new 400kV power lines from the Kendal Power Station (near Ogies) to the Zeus Substation (near Secunda), one powerline will further join to an existing power line that spans from the Kendal Power Station to Kusile Power Station in the Mpumalanga Province (DEA Reference No. 12/12/20/1095). Each of these lines will be approximately 70 km's in length with a combined length of 140km. The lines will run parallel to each other. Following approval by DEA in 2009, it has been identified that certain tower footings associated with the power lines may impact on watercourse crossings and drainage lines. Thus requiring Environmental Authorisation in terms of the National Environmental Management Act (NEMA) (Act 107 of 1998). Activities identified in Listing Notice 1 of General Notice Regulations (GN R.) 983 and Listing Notice 3 of GN R. 985 are triggered by the proposed project and thus a Basic Assessment (BA) process is being undertaken.

Eskom has appointed Envirolution Consulting as independent environmental consultants, to undertake the Basic Assessment and Environmental Management Programme (EMPr) process. The main objective of the Basic Assessment and EMPr is to identify and assess potential environmental impacts associated with the proposed project, and to compile appropriate mitigation measures.

A water use license as lodged with Department of Water and Sanitation and subsequently approved on 19 November 2015.

A number of specialist assessments will be undertaken as part of the EIA and EMP. The updating of existing Social Impact Assessment (SIA) reports are included in these specialist studies. Metro Concepts (Pty) Ltd, was appointed by



Envirovolution Consulting (Pty) Ltd to update the existing Social impact Assessments (SIA's), compiled by Ms Nonka Byker, MasterQ Research for Bravo 4.

## **2. OVERVIEW OF THE SOCIAL IMPACT ASSESSMENT (SIA) PROCESS**

### **2.1 DEFINITION OF SOCIAL IMPACTS AND SOCIAL IMPACT ASSESSMENT (SIA)**

Social impacts can be defined as *“The consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organise to meet their needs and generally live and cope as members of a society. These impacts are felt at various levels, including individual level, family or household level, community, organisation or society level, Some social impacts are felt by the body as a physical reality, while other social impacts are perceptual or emotional.”* (Vanclay, 2002).

A Social Impact Assessment 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.

### **2.3 PURPOSE OF THE SOCIAL IMPACT ASSESSMENT**

The purpose of the Basic Social Impact Assessment is to identify, describe and analyse the anticipated positive and negative impacts (during construction and operational phases) that the proposed 400kV overhead transmission power lines and supporting towers could have on the socio-economic environment and notably the individuals and communities in the surrounding area.

The Basic Assessment Report must include:

- An understanding of the proposed project, including the route corridors, and the nature and timeframe of proposed activities.



- Gaining information on the baseline geographical and social-economic profile characterising the study area in terms of the following change processes:
  - Geographical processes: land use patterns;
  - Demographic processes: the number and composition of people;
  - Economic processes: the way in which people make a living and the economic activities in society;
  - Socio-cultural processes: the way in which humans behave, interact and relate to each other and their environment and the belief and value systems which guide these interactions;
- A description and evaluation of the socio-economic issues and potential impacts (including direct, indirect, cumulative impacts and residual risks) that have been identified.
- An evaluation of the direct, indirect, cumulative impacts and residual risks of the identified issues within the Basic Assessment Report in terms of the following criteria:
  - the nature, which shall include a description of what causes the effect, what will be affected and how it will be affected;
  - A statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts.
- Any aspects which are conditional to the findings of the assessment which are to be included as conditions of the Environmental Authorisation.
- Any gaps in knowledge at this point of the study.
- A reasoned opinion as to whether the proposed project should be authorised.

### 2.3 METHODOLOGY OF THE SOCIAL IMPACT ASSESSMENT

To ensure that the objectives of the study are answered, data had to be collected. Data mostly centred on a desktop study, in which the following documents were scrutinised:

- Determination of the scope of assessment, based on information received from Envirolution Consulting,
- As source document, the draft Social Impact Assessment Report for Bravo 4, as part of the Environmental Impact Assessment Process, prepared by Ms Nonka Byker, MasterQ Research November 2008.
- Review of literature and desktop studies, confirming the social setting and characteristics of the study area.
- Data, including census data, project maps and planning documents (2011 Census Survey and documents from Mpumalanga Province, Gert Sibande



and Nkangala District Municipalities, Govan Mbeki and Emalahleni Local Municipalities);

- Review of relevant planning and policy frameworks for the areas; and
- Review of information from similar projects;

The assessment of direct, indirect and cumulative impacts as well as other issues in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high).
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5;
- The **consequences (magnitude)**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- The **status**, which will be described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The *degree* to which the impact can be *mitigated*.

The **significance** is calculated by combining the criteria in the following formula:

$$S = (E+D+M)P$$

S = Significance weighting  
E = Extent  
D = Duration  
M = Magnitude  
P = Probability



The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

The summarizing of assessment impacts in a prescribed table format including the rating values as per above criteria.

Measures for inclusion in the draft Environmental Management Programme.

## **2.4 ASSUMPTIONS AND LIMITATIONS**

The following assumptions and limitations are relevant to this study:

- The 1996, 2001 and 2011 Census data were used for the purpose of this study. Although the data are not generally perceived as being entirely precise, it does give a broad reflection of the social environment.
- The social environment cannot be fragmented and will be discussed broadly. Given the scope of the project and approximate location of the route, detailed studies could not be done on every farm, town and/or settlement potentially affected.
- The general social impacts, which will be experienced by the communities affected by the line, will be largely similar. If the finding is otherwise, this is pointed out.
- It is not the purpose of this SIA report to quantify the resettlement impacts of each alternative. This will take place during the resettlement action plan stage of this development process.

## **2.5 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES**

The following legislation and regulatory documents are relevant to the SIA:

- Constitution of the Republic of South Africa (Act No. 108 of 1996);
- The Occupational Health and Safety Act (Act No. 85 of 1993);
- Extension of Security of Tenure Act (Act 62 of 1997) (ESTA);
- National Environmental Management Act (NEMA), No. 107 of 1998, as amended and Environment Conservation Act, No. 73 of 1989, as amended;
- The Environmental Impact Regulations of 4 December 2014;
- National Water Act, 1998 (Act No. 36 of 1998)
- Relevant Labour Relations Legislation



Table 1 gives a summary of the content of the above mentioned legislation and regulatory documents relevant to this Social Impact Assessment.

**Table 1: Summary of applicable legislation and regulatory documents**

Legislation/Policy	Purpose/Statement/Objectives	Measures/Strategies to be implemented
Constitution of the Republic of South Africa (Act No. 108 of 1996)	Everyone has the right to an environment that is not harmful to his or her health or well-being; and To have the environment protected for the benefit of present and future generations.	Prevent pollution and ecological degradation Promote conservation, and Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.
National Environmental Management Act (NEMA), No. 107 of 1998, as amended	A full EIA is required for all projects likely to have significant impacts on the environment because of the nature or extent of the activity, for instance if the effect of the activity is unpredictable, or there is a high risk of environmental degradation.	
EIA Regulations 2006 (repealed in 2010 and 2014)	The purpose of this Notice is to identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of the Act.	<p><b>Proposed Activity: GNR 983: 2014 (Listing Notice 1) Activity 12:</b> The development of – - buildings exceeding 100 square metres in size; Where such development occurs – (a) within a watercourse; or (c) within 32 metres of a watercourse, measured from the edge of a watercourse.</p> <p><b>GNR 983: 2014 (Listing Notice 1) Activity 19:</b> The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells grit, pebbles or rock of more than 5 cubic metres from– (i) a watercourse.</p> <p><b>GNR 985: 2014 (Listing Notice 3) Activity 14:</b> The development of – (xii) infrastructure or structures with a physical footprint of 10 square metres or more; Where such development occurs - (a) within a watercourse; (b) in Mpumalanga; (ii) if outside urban areas, in (dd) sensitive areas identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent Authority.</p>



<p>Extension of Security of Tenure Act (Act 62 of 1997) (ESTA)</p>	<p>This act provides for measures to facilitate the long-term security of land tenure, and also regulates the conditions of residence on certain land, the circumstances under which a person's right to reside on a particular piece of land may be terminated, and to provide for regulatory matters where persons have been evicted from a particular piece of land or land portion.</p>	<p><b>Chapter 4</b> of this act relates to the measures that have to be implemented when right of tenure is terminated on any lawful ground (e.g. in the case of relocation), provided that such a termination is just and has regarded the following factors:</p> <ul style="list-style-type: none"> <li>• The fairness of the agreement on which the owner relies;</li> <li>• The conduct of the parties giving rise to the termination;</li> <li>• The interests of the parties involved in relation to the comparative hardship of the owner and/or occupier of the land;</li> <li>• The existence of a reasonable expectation for the renewal of an agreement; and</li> <li>• The fairness of the procedure leading to termination, including whether or not the owner/occupier had been granted a reasonable opportunity to make representations before termination became effective.</li> </ul> <p>Section 14 under Chapter 4 outlines the procedures for the restoration of residence, the use of land, and compensation for damages. A person who was the rightful owner of the land may institute proceedings in a court of law, where after the court may make the following orders:</p> <ul style="list-style-type: none"> <li>• The restoration of residence and land use;</li> <li>• The repair, reconstruction or replacement of any building, structure or any other installations that the owner/occupier have enjoyed on his land prior to the removal and/or eviction;</li> <li>• The restoration of any services that the owner/occupier has a right to;</li> <li>• The payment of compensation;</li> <li>• The payment of damages, including but not limited to, damages inflicted by the removal process; or</li> <li>• Any other compensation the court may see fit.</li> </ul>
<p>National Water Act, 1998 (Act No. 36 of 1998)</p>	<p>The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways.</p>	<p>Factors to be taken into account in terms of this act include:</p> <ul style="list-style-type: none"> <li>• meeting the basic human needs of present and future generations;</li> <li>• promoting equitable access to water;</li> <li>• redressing the results of past racial and gender discrimination;</li> <li>• promoting the efficient, sustainable and beneficial use of water in the public interest;</li> <li>• facilitating social and economic development; providing for growing demand for water use;</li> <li>• protecting aquatic and associated ecosystems and their biological diversity;</li> <li>• reducing and preventing pollution and degradation of water resources;</li> <li>• meeting international obligations;</li> <li>• promoting dam safety;</li> <li>• managing floods and droughts, and for achieving this purpose, to establish suitable institutions and to ensure that they have appropriate community, racial and gender representation</li> </ul>



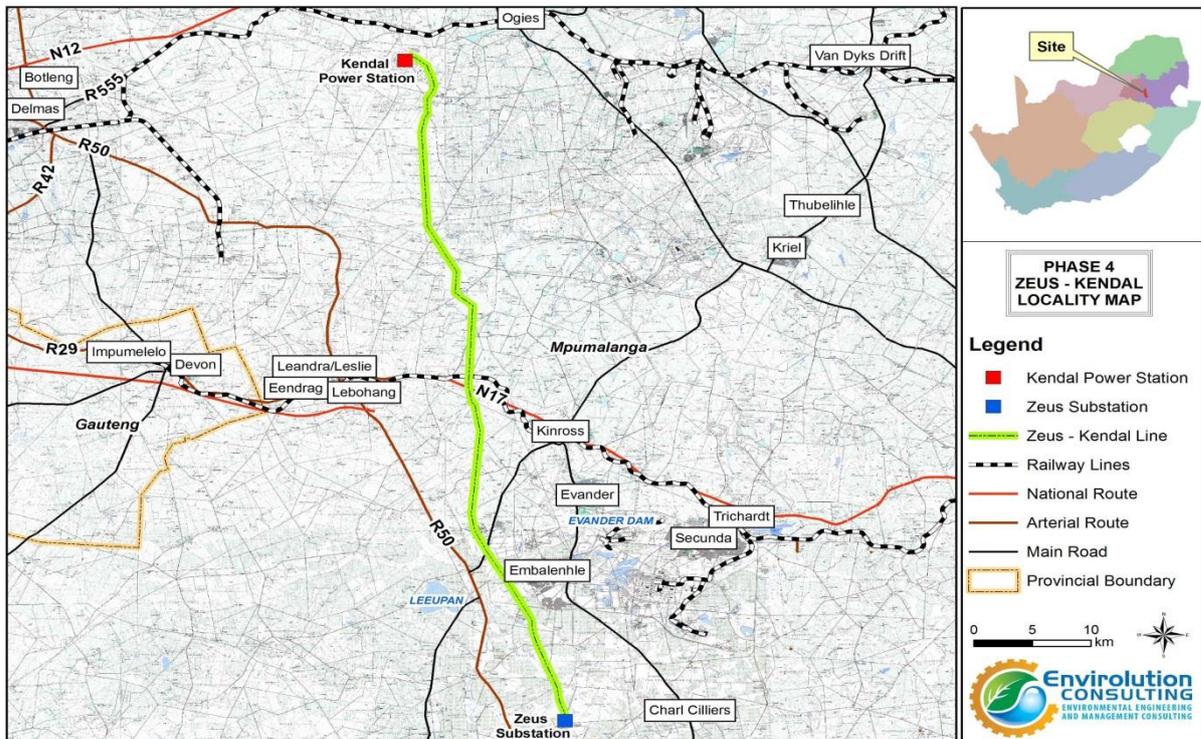
### 3. DESCRIPTION OF PROPOSED PROJECT

This section aims to describe the nature of the potential development. Understanding the nature and phases of the development is important, as certain impacts are likely to occur at different stages of the development.

#### 3.1 THE PROJECT

The two 400 kV power lines of approximately 70km in length, will run parallel to each other, starting 8 km south-west of Ogies at the Kendal power station and ending 20 km south-west of Secunda at the Zues Substation, an indication of the position of the power line is provided in Figure 1 below. The purpose of this line is to integrate the new Bravo Power Station into the Eskom grid to supply additional electricity to the Diepsloot and the Johannesburg north area.

**Figure 1: Phase 4 Zeus-Kendal Locality Map**



#### 3.2 DESCRIPTION OF PROJECT ACTIVITIES

##### 3.2.1 Servitude

The proposed 400kV transmission power lines will require a servitude of 55m in width, i.e. 27.5m both sides of the centre line. No structures are allowed within the servitude.

For forestry, the required servitude is 76 m wide, i.e. 38m each side of the centre line, due to fire risk and tree-felling. The servitude is required for the safe operation



(as required in terms of the Occupational Health and Safety Act regulations) of the power line and reliability (quality of supply) of electricity supply to consumers.

A servitude does not mean that the holder of the servitude, i.e. Eskom, is the owner of the land, but merely that Eskom has the right of way to convey electricity across the land, subject to conditions agreed between Eskom and affected landowners. A servitude provides Eskom certain defined rights for the use of the specific area of land:

- Access to erect a transmission line along a specific agreed route;
- Reasonable access to operate and maintain the line inside the servitude area;
- The removal of trees and vegetation that will interfere with the operation of the power line.

The registration of servitudes can be a lengthy process, as it requires contractual negotiations with each affected landowner. Once this is complete, an application for registration of the servitude is lodged with the Provincial Deeds Office against the property deed. The actual location of the towers on which the conductors will be strung is determined by a number of different factors, including:

- The outcome of Eskom negotiations with landowners, including landowner preferences;
- Environmental features and technical requirements.

### **3.2.2 Towers**

As part of the of two new 400kV power lines there is a footing that is proposed after every 400m, therefore a total of 386 tower footings of which there are approximately 145 towers that are impacting on watercourse crossings and drainage lines.

The following types of towers may be used on this project:

- Cross rope suspension tower
- Compact cross rope suspension tower
- Guyed-V suspension tower;
- Self-supporting suspension tower; and
- Self-supporting strain tower.

Different towers may be used along different sections of the routes to comply with the local conditions including, the terrain, ground clearance requirements, topology and geology. It is assumed that each tower would be erected on concrete footings with dimensions of 2 x 2 x 2 m (area = 4 m<sup>2</sup> and volume = 8 m<sup>3</sup>) for each concrete footing. The number of foundations will be dependent on the type of tower chosen. The installation of the foundations will take place under supervised conditions. All towers will be assembled simultaneously in stages, that is, bottom structures will be assembled for all towers in the first phase (phase 1), middle structures for all towers will be assembled simultaneously in the second phase (phase 2) and so on.



### **3.2.3 Access Roads**

The project will also entail the construction of associated infrastructure such as access roads and a centre line track within the servitude. Existing roads will be utilised as far as possible during construction and operation. Access roads will be established in areas where access is presently unavailable and are required to move construction equipment and personnel to and from the construction sites (tower positions). The centre line track is required for conductor stringing and on-going line inspections and maintenance activities.

Furthermore, access roads will be aligned and constructed within the provisions and to the specifications of private landowners. This is considered important for two primary reasons:

- Access roads should fulfill multi-purpose functions serving the needs of Eskom and the landowners.
- Landowners are acutely aware of sensitivities on their land and will be in an excellent position to inform Eskom of optimum alignments.

No roads that trigger NEMA Regulations Listed Activities will be required. The specifications for the access road will be contained within the Environmental Management Plan (EMP) that will be prepared for construction and which will become legally binding on Eskom and contractually binding on the Eskom-appointed contractors (with special care being taken with river/stream crossings, where potential environmental impacts are greatest, with due consideration for water use licences that must be obtained from the Department of Water and Sanitation - DWS).

### **3.2.4 Minimum Clearing Distances**

For safety reasons (as set out in regulations of the Occupational Health and Safety Act), the transmission line requires minimum clearance distances. These are summarized as follows:

- The minimum vertical clearance distance between the ground and 6 power line conductors is 8.1m;
- The maximum crop height permitted within the servitude is 4.3m;
- The minimum vertical clearance to any fixed structure that does not form part of the power line is 5.6m;
- The minimum distance of a 400 kV power line from a proclaimed public road is 95m from the centre line of the road.
- The minimum safe distance required from the centre of the power line to the edge of a domestic house is 40 – 50m.
- Farming activity, except for sugarcane and commercial forestry, can be practiced under the conductors, provided that there is adherence to safe working clearances, crop height restrictions and building restrictions.



### **3.2.5 Establishment of Construction Camps**

The establishment of construction camps will be done in accordance to the stipulations of the final Environmental Management Plan and negotiations with the affected landowners. The construction contractor would need to set up at least one site camp but this does not necessarily need to be near the power line route. The contractor may however prefer to use a fully serviced site at another location. The contractor will be encouraged to utilise already disturbed areas for construction camp purposes, in order to minimise cumulative impacts. It is likely that a number of construction camps would need to be established for the construction period

### **3.2.6 Water**

Water will be required for potable use and in the construction of the foundations for the towers. The water will be sourced from municipality points at locations closest to the area of construction.

### **3.2.7 Sewerage**

A negligible sewage flow is anticipated for the duration of the construction period. The Contractor is to provide portable toilet facilities for the use of his workforce at all work sites, and the contractor will ensure regular treatment of these facilities. The toilets will be serviced regularly, as specified by the final site specific EMPr.

### **3.2.8 Solid Waste Disposal**

Eskom has a strong commitment to waste minimisation and recycling. All solid waste will be collected at a central location at each construction site, and will be disposed at the registered waste site or stored temporarily until removal for recycling or disposal at an appropriately permitted landfill site in the vicinity of the construction site.

### **3.2.9 Foundations**

The excavations shall be kept covered or barricaded in a manner accepted by the Supervisor to prevent injury to people or livestock. Failure to maintain proper protection of excavations may result in the suspension of excavation work until proper protection has been restored.

### **3.2.10 Concrete Batching**

Concrete batching will be required for the foundations of the tower footing. The following guidelines are contained in the Eskom specification for the Transmission Line Towers and Line Construction:

- The Contractor shall be responsible for negotiating the site of his batching plant (if required) and the conditions under it may be established, with the



landowner. The Contractor shall be responsible for the proper management of the batching plant.

- Upon completion of works, the ground of the batching plant area shall be rehabilitated and the site cleaned and left as it was found and to the satisfaction of the Supervisor and landowner.
- The use of local water for concrete must first be negotiated with the landowner and the appropriate authorities. Such water is to be analysed and accepted by the Project Manager before use.

### **3.2.11 Stringing**

Once towers have been erected, cables will be strung between the towers. Stringing will be undertaken in accordance with Eskom's stringing procedure.

### **3.2.12 Bird Flight Diverters**

Bird flight deflectors will be fitted on the structures during the construction phase.

### **3.2.13 Electricity**

Diesel generators will be utilised for the provision of electricity where electricity connection is not readily available during construction.

### **3.2.14 Anti-Climbing Devices**

Anti-climbing devices shall be designed for each tower. These are to be attached at a height of approximately 3m, but not less than 2,5m above ground level.

## **3.3 DESCRIPTION OF CONSTRUCTION PROCESS**

It is estimated that the construction period for this project will be 18-24 months.

Generally, the construction of the power line is expected to consist of the following sequential phases, all of which has been approved under the existing authorisation for the power line (EIA DEA Reference No. 12/12/20/1095):

Pre-construction phase:

- Step 1: Feasibility and identification of line alternatives.
- Step 2: Basic Assessment input and environmental permitting.
- Step 3: Negotiation of final route with affected landowners.
- Step 4: Survey of the proposed route.
- Step 5: Selection of structures suited to the terrain and ground conditions.
- Step 6: Final design of the distribution line and placement of towers.
- Step 7: Issuing of tenders and eventually appointment of contractors for the project



Construction phase:

Step 8: Vegetation clearance and construction of access roads (if required).

Step 9: Pegging of structures.

Step 10: Construction of foundations.

Step 11: Assembly and erection of structures.

Step 12: Stringing of conductors.

Step 13: Rehabilitation of disturbed areas and protection of erosion sensitive areas.

Step 14: Testing and commissioning.

Operations and Maintenance Phase:

Vegetation will be maintained by Eskom in the operational phase of the project.

Construction teams:

During construction, teams are responsible for the excavation of foundations, concrete works, erection of steel structures, stringing of transmission cables, and site rehabilitation respectively. All these activities, including vehicular access and the pylon anchors, are required to take place within the negotiated servitude.

Construction activities will not be continuous for long but intermittent over periods of time. Therefore, it is anticipated that any impacts associated with construction workers are likely to be of medium intensity as a result of the low numbers of people employed intermittently over a large area.

Some of the initial activities only involve a limited number of specialised people that moves through the servitude. It is only when bush clearance starts that larger numbers of construction workers come onto site. The following teams are generally active on site:

- Bush clearance team:

This team could also be involved in erecting gates. The potential for recruiting local labour for these teams is extensive.

- Foundations team:

More than one team could be used to accelerate construction. Although there is an opportunity for local labour to be recruited in this team, it is limited to unskilled activities.

- Assembly team:

More than one team could be used to accelerate construction. Limited potential for recruitment of local labour exists as this task largely requires skilled labour.



- Erection team:

No potential for recruitment of local labour as highly skilled teams are required for this task.

- Stringing team:

Limited potential for recruiting local labour as this task largely requires skilled labour.

- Rehabilitation team:

These teams could be involved in different activities. Limited potential for recruiting local labour as this task largely requires skilled labour.

- Ongoing Maintenance:

During the life span of the Sub-transmission line i.e. approximately 25 years, ongoing maintenance is required to be performed from time to time. This maintenance work is undertaken by contractors employed by Eskom, and in compliance with the Environmental Management Programme (EMPr).

Although the number of staff employed (skilled and unskilled) depends on the contractor, teams are generally made up according to the following table. Unskilled labour is usually trained by the contractors and is usually sourced from local communities.

**Table 2: The likely staffing structure for the construction of the proposed works**

OPERATION	SKILLED	UNSKILLED
Bush clearing	20%	80%
Gate installation	20%	80%
Excavations	80%	20%
Stay installation	80%	20%
Tower installation	50%	50%
Stringing	80%	20%
Excavation	50%	80%
Steel erection	50%	50%
Electrical work	90%	10%



### **3.4 PROJECT LOCATION**

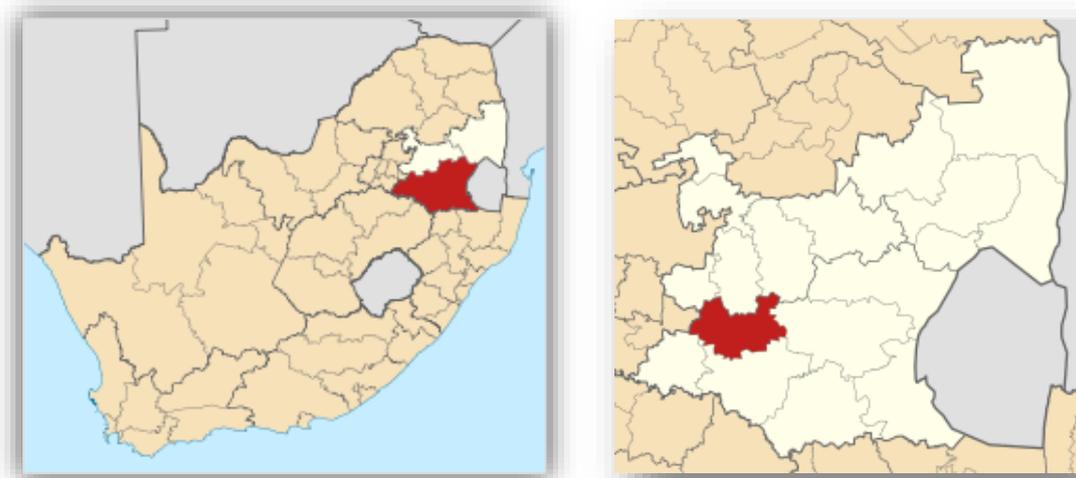
This project is situated in the Mpumalanga Province and falls under the jurisdiction of three local municipalities, namely:

- The Govan Mbeki Local Municipality in the Gert Sibanda District Municipality (Figure 2),
- The Emalahleni Local Municipality in the Nkangala District Municipality (Figure 3), and
- The Victor Khanye Local Municipality in the Nkangala District Municipality (Figure 3).

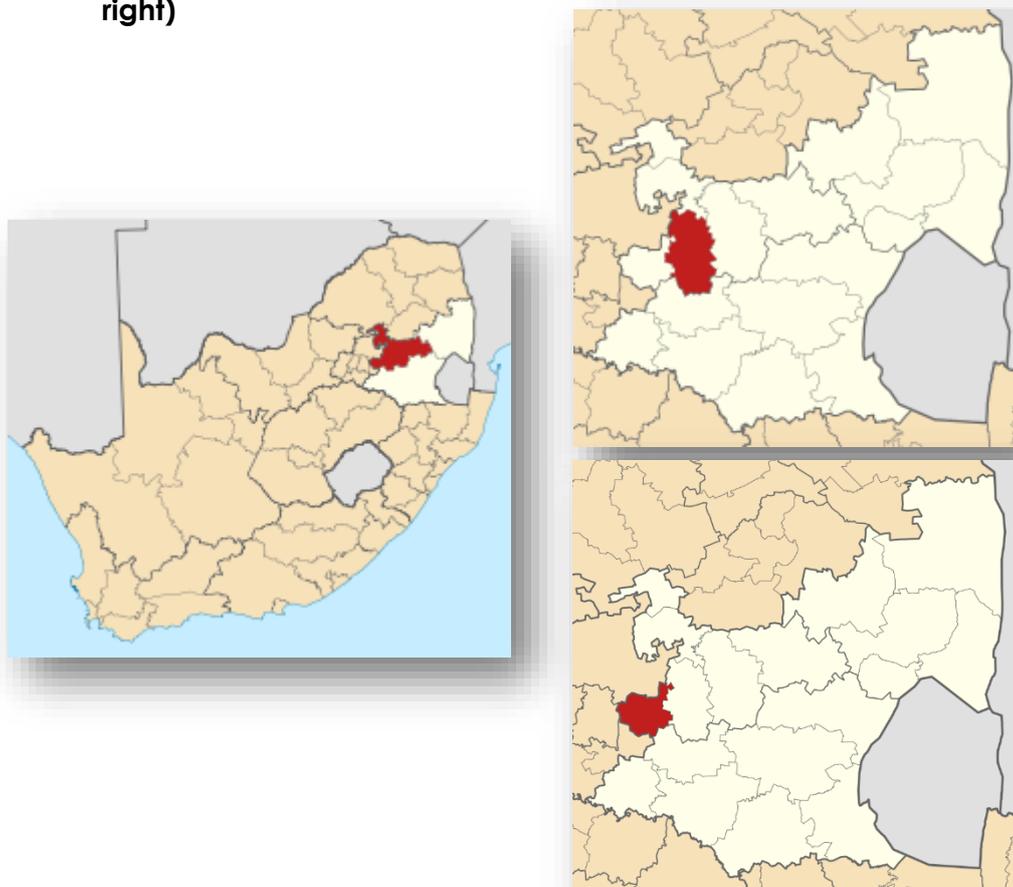
The study area falls within the Olifants River (Catchment B) and Vaal River (Catchment C) Primary Catchments. The main river in the northern section of the site is the Wilge River along with the Kromdraai Spruit and the Riet Spruit. All these watercourses drain primarily northwards towards the Olifants River. Several non-perennial streams and drainage lines also occur throughout the area, draining towards the main rivers. The southern section of the site drains towards the Vaal River and the main tributaries are the Waterval River, The Klip Spruit and the Boesman Spruit. The main drainage direction is southeast towards the Vaal River.

This proposed transmission corridor crosses the following farms: Schoongezicht 218IR, Leeuwfontein 219IR, Zondagsfontein 253IR, Uitvlugt 255IR, Kortlaagte 267 IS, Moedverloren 88IS, Blesbokspruit 52IS and 90IS, Uitmalkaar 126IS, Bolspruit 127IS, Kromdraai 128IS, Zandfontein 130 IS, Groot spruit 279IS, Rietkuil 283IS, Branddrift 322IS, Kromdraai 325IS and Vlakfontein 328IS.

**Figure 2: Location of Gert Sibande District Municipality (left) and Govan Mbeki Local Municipality (right)**



**Figure 3: Location of Nkangala District Municipality (left), Emalahleni Local Municipality (top-right) and Victor Khanye Local Municipality (Bottom-right)**



Nine (9) towns in Govan Mbeki Local Municipality and three (3) towns in the Emalahleni Local Municipality are situated within  $\pm 20\text{km}$  of the proposed powerline. Delmas in Victor Khanye Local Municipality is the nearest town to the proposed transmission line, and is located approximately 30km to the west.

## **4 BASELINE DESCRIPTION OF THE GEOGRAPHICAL, SOCIAL AND ECONOMIC PROFILE OF THE STUDY AREA**

### **4.1 MPUMALANGA PROVINCE**

From a perspective of the Mpumalanga Province, the energy sector plays a dominant role in the provincial economy, This province is home to 11 of Eskom's 13 coal fired power stations, and Mpumalanga, which accounts for a mere 6,3% of South Africa's gross area, generates a staggering 66% of Eskom's electricity.

Mpumalanga covers a land area of 79487 km<sup>2</sup>, which represents approximately 6.3% of the total area of South Africa. The table below shows Mpumalanga recorded a population size of 4 039 939, ranking it sixth as far as population size is concerned.



The province is largely rural in nature, which is evident in the relative low population density of 50.8 persons per km<sup>2</sup>, compared to Gauteng with a density of 724,62 persons per km<sup>2</sup>.

**Table 3: Population size and percentage changes by district and local municipality, censuses of 1996, 2001 and 2011**

Municipality	Population			Percentage change	
	Census 1996	Census 2001	Census 2011	1996 & 2001	2001 & 2011
<b>Gert Sibande</b>	<b>797 400</b>	<b>900 007</b>	<b>1 043 194</b>	<b>12,9</b>	<b>15,9</b>
Albert Luthuli	182 719	187 751	186 010	2,8	-0,9
Msukaligwa	105 368	124 812	149 377	18,5	19,7
Mkhondo	100 388	143 077	171 982	42,5	20,2
Pixley Ka Seme	70 178	80 737	83 235	15,0	3,1
Lekwa	90 080	103 265	115 662	14,6	12,0
Dipaleseng	39 042	38 618	42 390	-1,1	9,8
Govan Mbeki	209 626	221 747	294 538	5,8	32,8
<b>Nkangala</b>	<b>962 249</b>	<b>1 018 422</b>	<b>1 308 129</b>	<b>5,8</b>	<b>28,4</b>
Victor Khanye	53 208	56 335	75 452	5,9	33,9
Emalahleni	236 040	276 413	395 466	17,1	43,1
Steve Tshwete	135 335	142 772	229 831	5,5	61,0
Emakhazeni	37 004	43 007	47 216	16,2	9,8
Thembisile	241 360	256 583	310 458	6,3	21,0
Dr JS Moroka	259 302	243 313	249 705	-6,2	2,6
<b>Ehlanzeni</b>	<b>1 364 221</b>	<b>1 447 125</b>	<b>1 688 615</b>	<b>6,1</b>	<b>16,7</b>
Thaba Chweu	65 909	81 681	98 387	23,9	20,5
Mbombela	426 090	476 904	588 794	11,9	23,5
Umjindi	48 547	53 744	69 577	10,7	29,5
Nkomazi	277 864	334 669	390 610	20,4	16,7
Bushbuckridge	545 811	500 128	541 248	-8,4	8,2
<b>Mpumalanga</b>	<b>3 123 869</b>	<b>3 365 554</b>	<b>4 039 939</b>	<b>7,7</b>	<b>20,0</b>

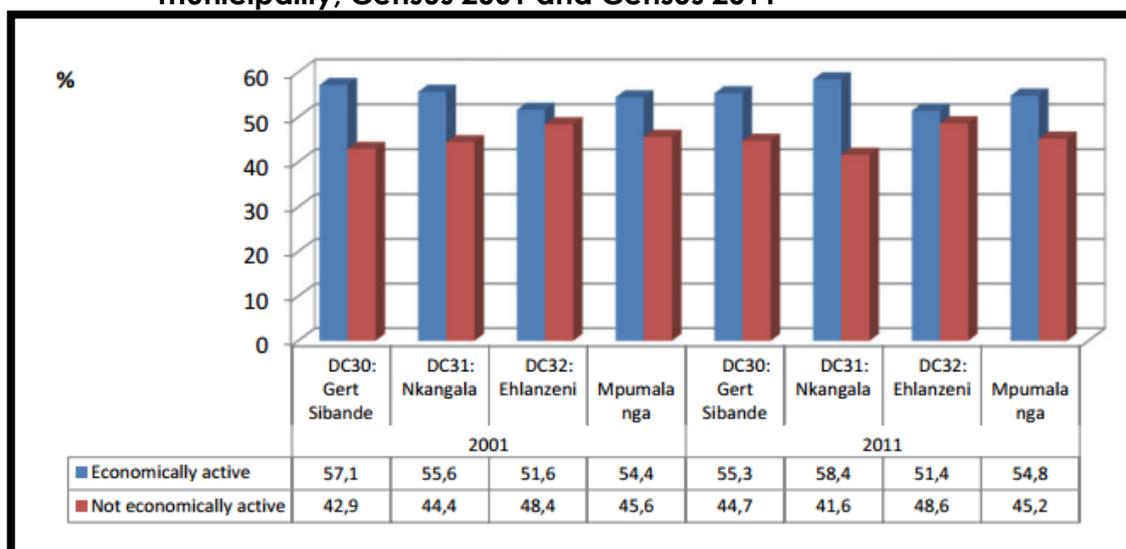
Source: Census 2011 Provincial Profile: Mpumalanga, Report 03-01-77

Table 3 gives the population of Mpumalanga from 1996 to 2011 by district and local municipality within the district. The population of Mpumalanga increased from 3 365 554 in 2001 to 4 039 939 in 2011, yielding a percentage change of 20%. In 2011, the district municipality with the highest population size was Ehlanzeni (1 688 615), while Gert Sibande recorded the lowest population (1 043 194). Mbombela Local Municipality had the highest population (588 000), and Dipaleseng the lowest (42 390). Steve Tshwete had the highest percentage change of 61%, followed by Emalahleni at 43,1%

The figure below shows that the proportion of the economically active population in Mpumalanga has slightly increased from 54,4% in 2001 to 54,8% in 2011, particularly in Nkangala district (an increase from 55,6% to 58,4%). Whereas the Ehlanzeni and Gert Sibande districts witnessed a decrease in the proportion of the economically active population (from 51,6% to 51,4% and from 57,1% to 55,3% respectively).



**Figure 4: Percentage of economically active and inactive population by district municipality, Census 2001 and Census 2011**



As mentioned in paragraph 3.4 this project is situated in the Mpumalanga Province and falls under the jurisdiction of following two local municipalities, namely:

- The Govan Mbeki Local Municipality in the Gert Sibanda District Municipality (Figure 2),
- The Emalahleni Local Municipality in the Nkangala District Municipality (Figure 3), and
- The Victor Khanye Local Municipality in the Nkangala District Municipality (Figure 3).

## 4.2 GERT SIBANDE DISTRICT MUNICIPALITY

Gert Sibande District Municipality falls within the Highveld Grasslands of Mpumalanga, and is bounded by the Sedibeng District Municipality of the Gauteng Province to the west, the Thabo Mofutsanyane and Fezile Dabi District Municipalities of the Free State Province to the southwest, the Amajuba and Zululand District Municipalities of Kwa-Zulu Natal to the south-east, Ehlanzeni District Municipality to the northeast, the Nkangala District Municipality to the northwest and Swaziland to the east.

At 31845.9 km<sup>2</sup>, the Gert Sibande District Municipality is the largest municipality in the Province, covering some 41% of the land. Apart from featuring the largest land area within the Province, the District host the largest agricultural sector, and is home to major industrial complexes associated with the petro-chemical industry.

As is the general case in Mpumalanga, there is a distinctive decrease in the intensity and concentration of people and activities within the District, away from the metropolitan areas of the City of Tshwane and Ekurhuleni. There is however a slight inverse in the population concentration levels towards the



eastern boundary of the District, due to the presence of the former homeland area of KaNgwane.

The total population of the Gert Sibande District Municipality amounts to 890 699 persons, constituting approximately 24% of Mpumalanga's total population. The population has remained relatively stable, with a slight decrease from 900,009 in 2001 to 890,699 in 2007 (Census Community Survey, 2007). These figures may however be influenced by economic and infrastructure developments such as the planned re-opening of a number of mothballed power stations by ESKOM.

In contrast to other districts in the Province, it is estimated that 64.5% of the District's population resides within urban areas, with the highest concentrations found in the towns of Evander, Secunda, Embalenhle and Bethal (Govan Mbeki); Standerton and Thuthukani (Lekwa); Ermelo (Msukaligwa) Piet Retief (Mkhondo); and the conglomeration of settlements forming part of the former homeland area of KaNgwane (Albert Luthuli).

#### **4.2.1 Govan Mbeki Local Municipality**

##### 4.2.1.1 History and Location of Govan Mbeki Local Municipality

Before 1995 all the above mentioned towns were separate local authorities.

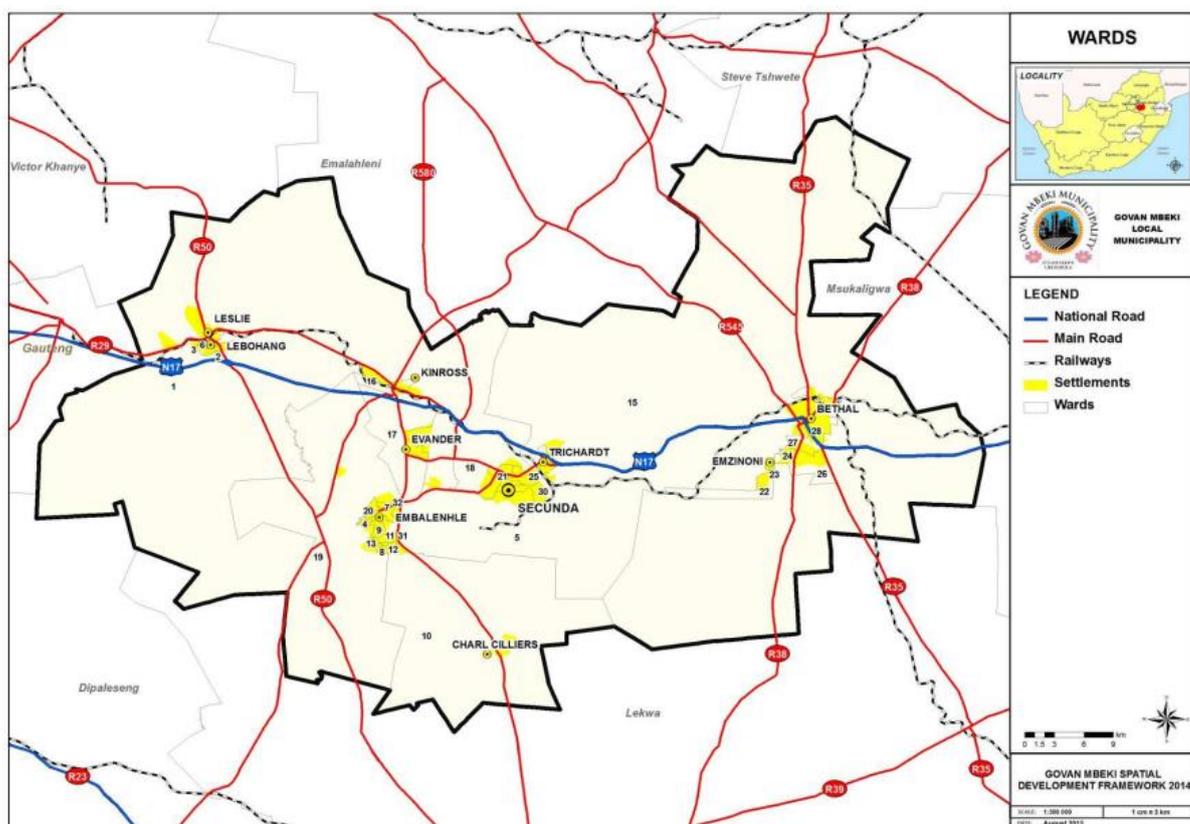
In 1995 Secunda, Trichardt, eMbalenhle, Evander, Kinross and Charl Cilliers consolidated to become the Highveld Ridge TLC while Bethal/eMzinoni and Leandra/Lebohang remained separate TLC's. During the final phase of local government rationalisation and transformation in South Africa in 2000 the TLC's of Highveld Ridge, Leandra and Bethal amalgamated to become the Govan Mbeki Local Municipality.

Govan Mbeki has the largest underground coal mining complex in the world which makes it an important strategic area within the national context.

Govan Mbeki Local Municipality is situated in the south-eastern part of Mpumalanga Province, abutting Gauteng Province in the south-west; approximately 150km east of Johannesburg and 300km south-west of Nelspruit (capital city of Mpumalanga). It is one of the 7 local municipalities under the jurisdiction of Gert Sibande District (the other districts being Ehlanzeni and Nkangala) and one of the 18 local municipalities within Mpumalanga.



Figure 5: Map of Govan Mbeki Local Municipality



Govan Mbeki is a primarily rural area with a number of towns situated within it:

- Leandra/Lebohang (Leslie, Eendracht and Lebohang) is situated on the western edge of the municipal area north of the N17.
- A conglomeration of towns are situated in the central part of the study area, namely Secunda, Trichardt, eMbalenhle, Evander and Kinross.
- Bethal/eMzinoni is situated on the eastern edge of the study area, abutting the N17.

4.2.1.2 Broad description of current land uses in Govan Mbeki Local Municipality (Geographic profile)

The area can be described as mostly agricultural/rural, with three (3) urban conglomerations situated within it, namely Leandra (Leslie, Lebohang, Eendracht) on the western edge, the Greater Secunda (Trichardt, Evander, Kinross and Secunda/eMbalenhle) conurbation in the central part and Bethal/eMzinoni on its eastern edge. Farming activities include both small scale and large scale commercial farming. Other land uses in the municipality include mining activities (coal and gold) and fuel from coal SASOL activities. Within urban conglomerates are various economic activities ranging from trade, finance, transportation, and construction and government services.



o Transport network

Roads: The N17 is the only national road which traverses the area, leading from Gauteng in the west either to Swaziland or via the N2 to Richards Bay in the east. The N17 is a very important road freight corridor linking Gauteng to Richards Bay, which an emerging coastal export port is increasingly competing with Durban for trade.

The provincial road network which extends throughout the municipal area and which includes the following regional roads:

- The R50, linking Standerton to the south with Delmas to the northwest through Leandra.
- The R547, linking Middelburg to the north with the R23 between Standerton and Greylingstad to the south through Kinross.
- The R546, from Kinross to Standerton.
- The R545, from Bethal to Ogies.
- The R38, linking Hendrina in the north to Standerton in the south through Bethal.
- The R580, linking Kriel and Delmas with Secunda
- The R544, branching off the R35 north of Bethal towards the northwest.

Rail: The east-west Johannesburg–Richards Bay freight rail line passes through Leandra, Kinross, Trichardt and Bethal, having stations in all these towns. From Trichardt a rail spur branches southwards past Secunda to serve SASOL in the south. Bulk freight such as coal, timber, fuel, maize, etc. is transported on this rail line between the coast and Gauteng. The rail infrastructure is owned and operated by Spoornet.

Air: There is one airfield in the area, namely the Secunda Airfield which has a tarred runway, control tower and landing lights.

o Mining

Coal mining:

Almost the whole municipal area is underlain by vast coal reserves of which SASOL is by far the major role player in this sector. Most of the coal mining currently takes place in the central part of the study area and this will remain so during the next 10 years. A total of 13 shafts are located in this area, as well as an extensive network of surface conveyor belts for the transport of the coal from the shafts to the SASOL plant and coal export facility.

Gold mining:

Pan African Resources and Taung Gold are the only gold mining title holders in Govan Mbeki and operate a number of shafts in the area west of Secunda, in the vicinity of Evander. The gold reefs are generally deep and shallow undermining is therefore not a



significant development constraint. Relatively large parcels of land are however sterilized by gold mining surface operations such as shafts and related infrastructure, rock dumps, mine dumps and slimes dams. The slimes dams in particular are significant constraints to development in terms of their size, dust pollution and downstream areas which could be affected by dam breaks and mudflows.

o Agriculture

The most prevalent land use in the rural areas of Govan Mbeki is commercial agriculture. Although soils in large parts of the study area are not ideally suited to arable agriculture, vast areas are being utilized for dry land crop cultivation (crops such as maize, sunflowers and beans). Unimproved grasslands are used for cattle and sheep grazing. Large chicken farming operations occur here and there. Improvements on the commercial farms mostly include the farmsteads (farmer's house, yard, farm stores, etc.) and labourer's compounds.

o Education

There are 59 primary, 19 secondary and 4 combined schools in Govan Mbeki Municipality. The majority of these schools are situated in the urban areas.

o Tourism

Govan Mbeki does not have the attributes to compete with established tourism areas such as the Mpumalanga Lowveld. Tourist facilities and attractions within the municipality include the following:

- Bethal dam.
- Bethal museum.
- Animal mini farm.
- Johannes Stegmann Theatre.
- Casper Breedt Centre.
- The Fire Station.
- Cosmos Country Tourism Information Centre.
- Lake Umuzi Waterfront.
- Graceland Hotel, Casino and Country Club.
- SASOL.
- Dairy and potato farms

o Watercourses

Several non-perennial streams and drainage lines also occur throughout the area, draining towards the main rivers. This southern section of the site drains towards the Vaal River and the main tributaries are the Waterval River, The Klip Spruit and the Boesman Spruit. The main drainage direction is southeast towards the Vaal River.



The proposed transmission line corridor does not traverse along any streams, but it does cross several. A large number of the existing power lines in the area are aligned along streams and drainage lines and historically the reasoning behind this was not to interfere with the farming activities. The recent emphasis on environmental impact limitation has however changed this perception.

- o Urban Areas

Initially the town of **Leandra** was meant to be an agricultural support centre but over the years it grew and developed due to the various mining activities in the area. However, the town lacks economic diversification, which in turn resulted in substantial urban decay, notably in the Central Business District (CBD) and industrial areas within the town. The residential areas of Leandra is characterised by formal housing structures in the form of single dwelling units on stands ranging between 1200m<sup>2</sup> and 3000m<sup>2</sup>. In addition, there are also still a fairly large number of vacant stands, some of which are serviced whilst others are not.

Industrial and commercial land uses are located to the south of **Leslie**, south of the railway line and east of the R50. Again there are a number of vacant stands within the industrial and commercial area. Although some business can also be found in the Leslie industrial area, most businesses are located within the CBD. As is the case with the rest of the town, the CBD is also in a state of urban decay. Community facilities in the area include churches, a mosque, a clinic, a community hall, a police station and two primary schools, of which the one is vacant.

**Secunda** is the biggest urban centre within the GMLM. The town was established in 1975 around the Sasol II and III developments as a result of the urgent need to house Sasol employees. The development and expansion of Secunda also lead to the revitalisation of some of the more dormant towns in the area, such as Trichardt. Today Secunda is the most diversified economic hub of the total district. As could be expected, the majority of the residential area consists of formal single dwelling housing structures, located on stands of approximately 900m<sup>2</sup> in size. Again there are a substantial number of vacant residential stands throughout the town. Apart from Sasol who is located to the south of town, Secunda also has two other industrial and commercial areas, namely a newly established light industrial/commercial area north of the CBD, and an industrial area on the north-eastern edge of town that is partially undeveloped. The vast majority of businesses and retail centres are situated in the CBD, where some parts are in need of upgrading. In addition to the seven shopping centres scattered throughout the town, other community facilities include a number of churches, schools (5 primary and 3 secondary), a private hospital and municipal clinic, a police station, and a magistrate's court.

**Trichardt** is situated east of and adjacent to Secunda. These two towns are only separated by a railway line and therefore appear to be a single town as opposed to two separate towns. The town was initially established as a farming support centre during the early 1900s. Trichardt threatened to



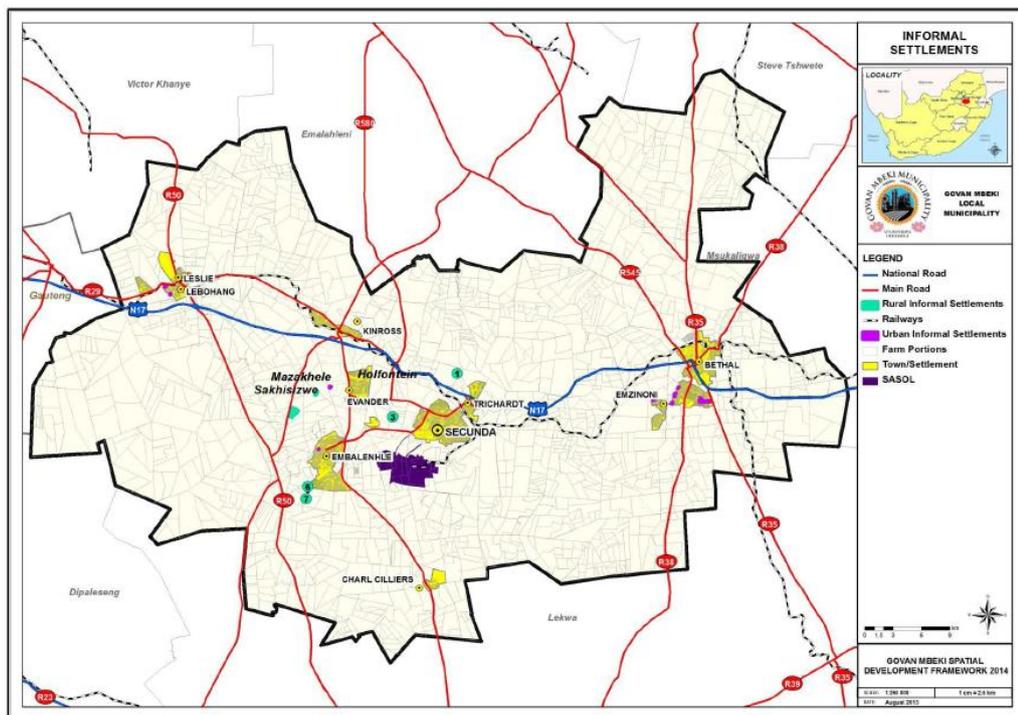
become a “ghost town” until SASOL developed its large plants in adjacent Secunda, which lead to development and diversification albeit on a smaller scale as Secunda. As a result of the presence of SASOL's hostels in Trichardt, the town has quite a high proportion of multiple residential units. Apart from these residential units, single residential components of approximately 1 300m<sup>2</sup> can also be found in the town. There are no informal settlements in Trichardt. Trichardt has no clearly defined industrial area. Light industrial and commercial areas are situated to the north-western part of town with no clear distinction between these areas and the adjacent residential areas. The businesses are mostly concentrated along the N17, which includes mostly motor trade and associated businesses.

**eMbalenhle** is the largest residential urban settlement area in the GMLM and was established in 1978 to accommodate members of SASOL's workforce. In this regard, SASOL's further expansion and development also lead to the development and growth of eMbalenhle. The main land use in eMbalenhle is residential in nature and therefore this town relies heavily on Secunda to meet its physical and economical needs. Although the town is well serviced, it is lagging behind economically

o Informal settlements

A number of informal settlements have established in the rural areas during the past few years, including Mazahkele, Holfontein, Sakhisizwe, Informal Settlements 1,3,6 and 7. These are indicated on the map below:

**Figure 6: Location of informal settlements in Govan Mbeki LM**



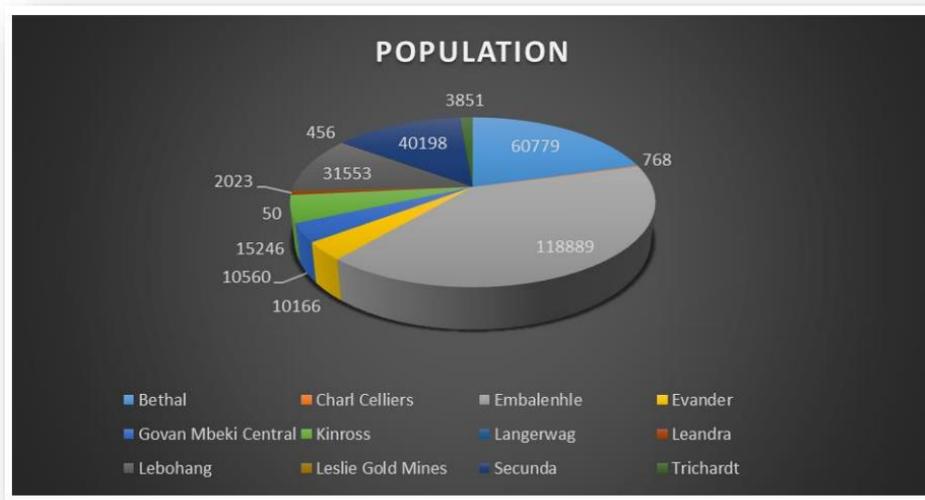
4.2.1.3 Demographic analysis/profile

**a) Population Size**

The total population within the Govan Mbeki Local Municipality increased from 221748 people in 2001 to 294538 people in 2011, which translates into 72765 people over the ten year period ( $\pm 7\ 276$  people per annum) or a percentage of 33%. The annualised population growth rate was measured at 3%.

Figure 7 below offers an indication into the population distribution per sub-place, and the density thereof.

**Figure 7: Govan Mbeki Local Municipality, Population Distribution per local area, 2011**



The most populated areas, are Secunda, eMbalenhle and Evander, with populations of over 10 000. It is evident that these areas are located in close proximity to the mining activities. These areas enjoy good accessibility, which also, which promotes migration to these areas.

The municipality consist of 8 towns and is structured into 32 wards. The southern portion of the proposed Bravo 4 project is situated in the following wards:

**Table 4: Govan Mbeki Local Municipality, Wards affected by Bravo 4 Project**

Ward	Township
1	Leandra and part of Kinross town
4, 7-14, 19, 29 to 32	Embalenhle
5, 20, 21, 30	Secunda
25	Secunda and Trichardt
16	Kinross
17 to 18	Evander



**b) Gender Profile**

The gender structure of the population is one of the key determinants of population change and dynamics.

**Table 5: Govan Mbeki Local Municipality, Gender Profile, 1996, 2001 & 2011**

Gender	1996	2001	2011
Males	52.91%	50.65%	51.68%
Female	47.09%	49.35%	48.32%

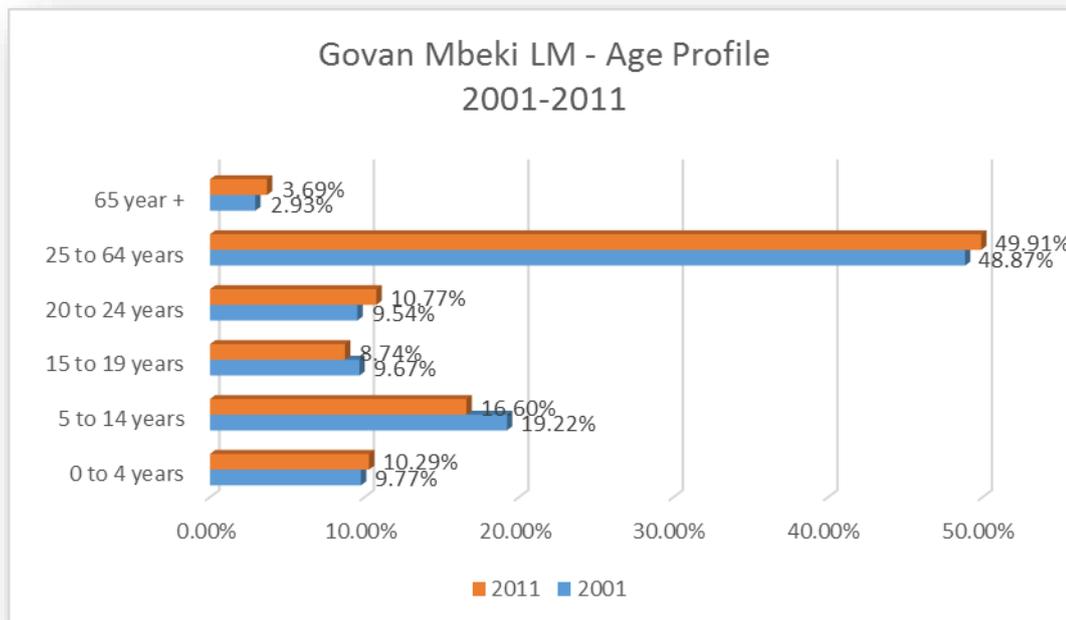
The above table indicates an increase of males and a decrease of females between 2001 and 2011. This is largely due to the nature of industries around the municipal area which tend to be more male oriented.

The increase of males can have an impact on issues of crime, prostitution and drug abuse.

**c) Age Profile**

Age distribution is an important indicator in terms of the development character and economic active aged segment of an area. Figure 8 indicates the age profile of the Govan Mbeki Local Municipality.

**Figure 8: Govan Mbeki Local Municipality, Age Profile 2001& 2011**



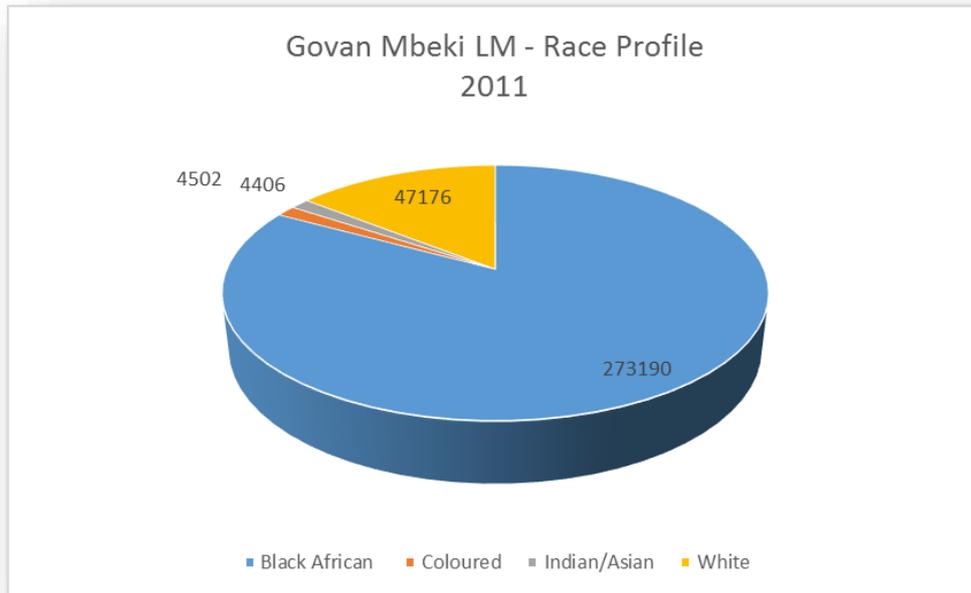
As shown in Figure 8 the Govan Mbeki Local Municipality is characterised by a strong economically active population segment, representing almost half (49.91%) of the total population. The Govan Mbeki municipal area has a limited older population segment (aged 65+).



**d) Race Profile**

During 2011 Govan Mbeki Local Municipality constitutes 82,97% Africans, 14.33% Whites, 1.37% Coloured and 1.34% Asians.

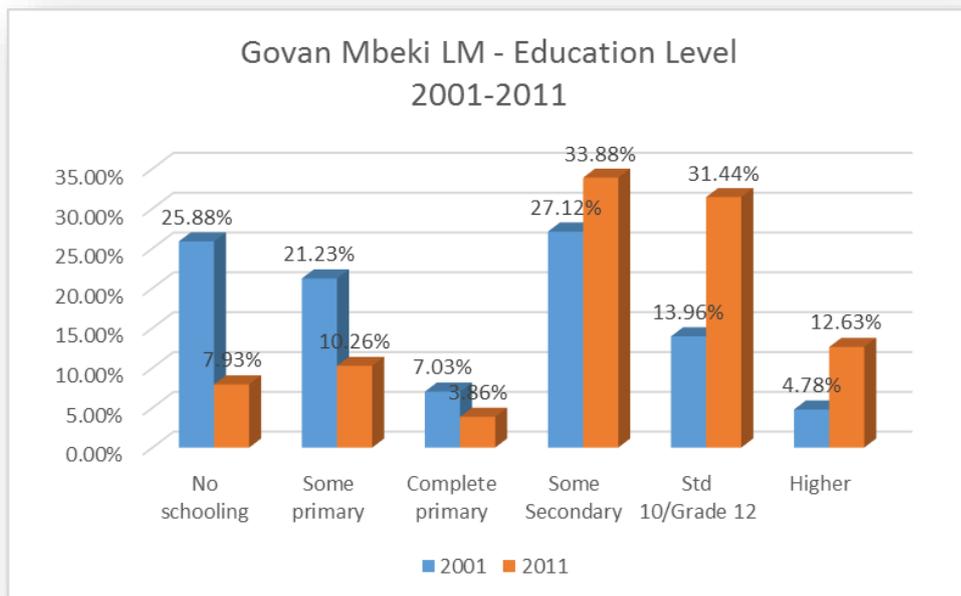
**Figure 9: Govan Mbeki Local Municipality, Race Profile 2001 & 2011**



**e) Educational Profile**

One of the driving forces behind social change is educational attainment, which in turn is linked to poverty levels as there appears to be a correlation between the level of educational attainment and income levels. People with higher educational levels tend to be economically better off, and therefore contribute more to the reduction of the unemployment rate.

**Figure 10: Govan Mbeki Local Municipality, Education Profile, 2001 & 2011**

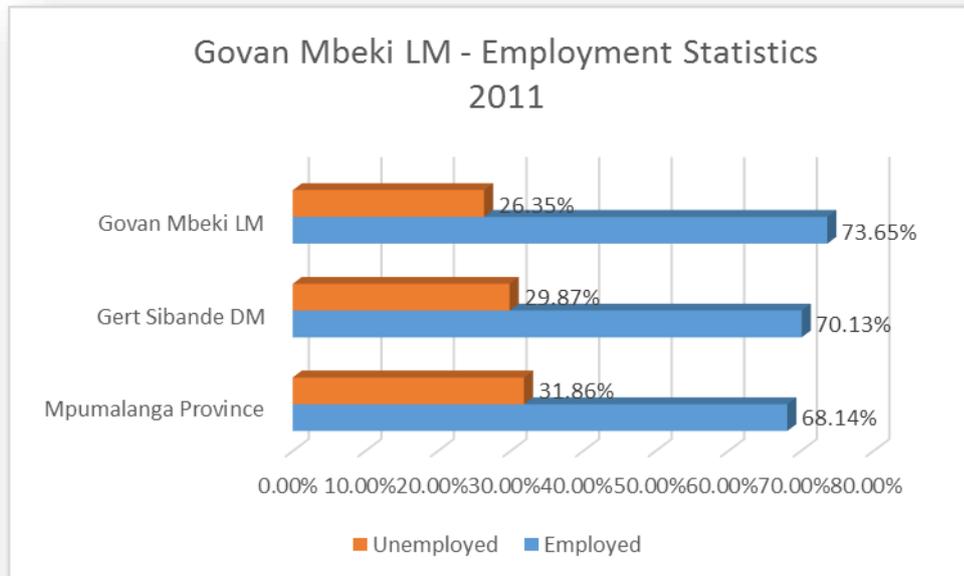


From Figure 10 it is clear that the overall level of education improved within the Govan Mbeki Local Municipality as the total number of no schooling declined significantly from 25.88% in 2001 to 7.93% in 2011. Furthermore, the total number of individuals with standard 10/grade 12 increased from 13.96% in 2001 to 31.44% in 2011 and the total number of individuals with a higher education increased from 4.78% to 12.63% for the same period.

**f) Employments Status**

The economic active age groups (15-64 years) increased. The size of this group (69.4%) within Govan Mbeki provides pressure on the local economy to provide jobs. The same trend is experienced overall. Figure 11 shows the Govan Mbeki Local Municipality's employment statistics, which are higher than that of the District Municipal area, and that of the Province. This information may affect the migration patterns from other districts within the Gert Sibande District, into Govan Mbeki.

**Figure 11: Govan Mbeki Local Municipality, Employment Status 2001 &2011**

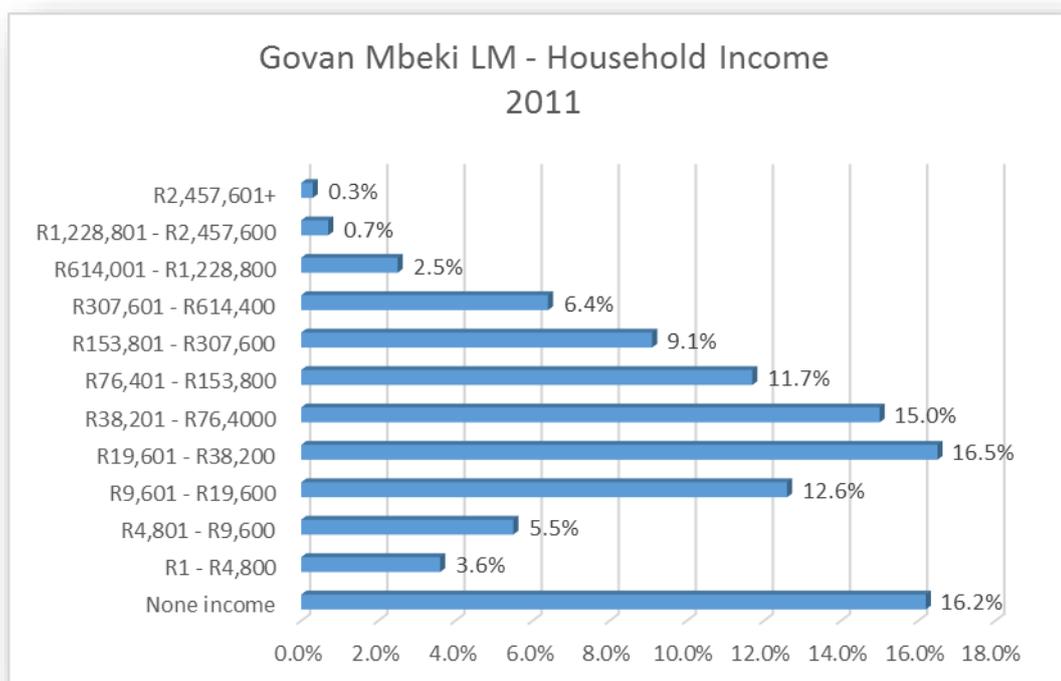


**g) Household Income**

Average household income for Govan Mbeki stood at R47 983 in 2001 and jumped to R125 480 in 2011. This shows a significant increase over the 10 year period, an indication that family incomes are improving.



**Figure 12: Govan Mbeki Local Municipality, Household Income 2011**



It was estimated that in 2011 that 54.50% of all the households in Govan Mbeki municipal area, were living below the Minimum Living Levels (MLL). (Note, the annual MLL income is calculated according to a MLL of R4 500 per month, which translates into R54 000 per annum). The annual income brackets do not allow for an actual MLL calculation, therefore a minimum MLL is indicated for all household earning an annual income of below R38 200.)

**h) Health Profile**

HIV prevalence rate for pregnant women stood at 45.8% in 2011 (an increase from 32.7% in 2010) while HIV prevalence rate-DHIS (excluding pregnant women) stood at 33.0% in 2011 (a decrease from 35.3% in 2010). The table below also highlights the number of public health facilities within Govan Mbeki.

**Table 6: Govan Mbeki, Health Indicators**

HEALTH INDICATORS	2009	2010	2011	Ranking: best(1)-worst (18)
HIV prevalence rate – survey (pregnant women attending antenatal clinic 15-49 years old)	40.0%	32.8%	45.8%	13
HIV prevalence rate –DHIS (excluding pregnant women)	35.3%	35.3%	33.0%	17
<b>PUBLIC HEALTH FACILITIES</b>				<b>2012</b>
Number of clinics				11
Number of community health centres				3
Number of hospitals				2



**i) Economic Indicators**

According to the Govan Mbeki IDP (2015/16) Gross Domestic Product (GDP %) for the period 1996-2011 averaged 3.3% and is projected to grow at an average of 4.6% per annum over the period 2011-2016. This rate is expected to be the best or highest in the province; better than both provincial and district averages. Gross Value Added (GVA) in 2011 stands at R30billion at current prices and 20.7 billion at constant 2005 prices; being the second largest in the province (with an 18.5% contribution).

Key sectors that are expected to contribute to the growth of the Govan Mbeki economy are manufacturing, finance and mining & electricity.

Statistics show that Govan Mbeki contributes 61.2% to the district economy; mainly through manufacturing (at 95.6%), mining (68.3%) and Construction (58.1%). Except for agriculture and utilities, all other industry sectors in Govan Mbeki dominate the district economy.

**Figure 13: Govan Mbeki Local Municipality, Formal Employment per Sector 2011**

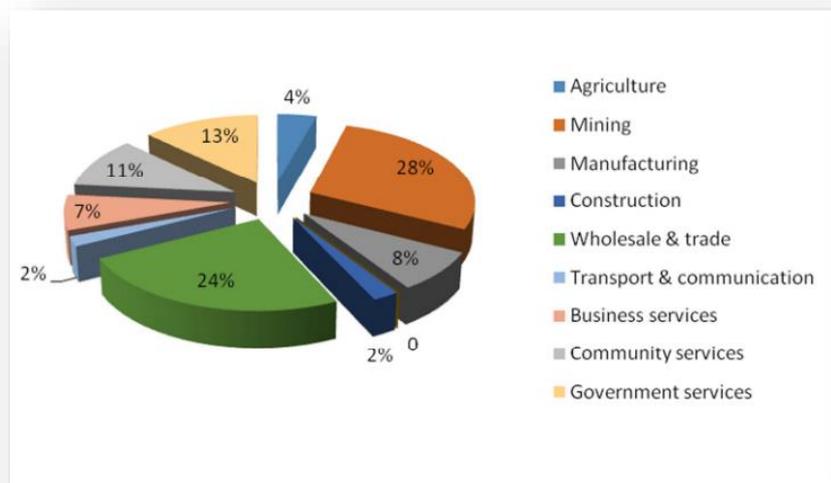


Figure 13 illustrates the community (11%) and government (13%) services sectors combined, provided roughly 35% of all employment in the municipality. This in essence provides a picture of the importance of government's role in the provision of services within the area. Other sectors that must be noted in this instance would be manufacturing and business services, which contributed 8% and 7% respectively to employment.

**4.2.1.4 Social Infrastructure Profile**

Access to housing, basic infrastructure and services including energy, water provision and sanitation may be considered as a general measure of well-being indicating households' level of living, as well as potential vulnerability status.

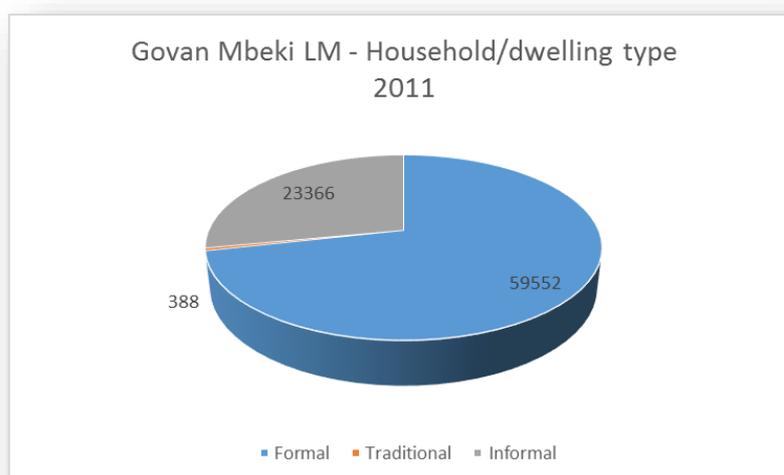


### a) Housing

Using the Statistics SA definition of a household and a dwelling unit, households can be categorised according to type of dwelling. The categories are:

- **Formal dwellings** - structures built according to approved plans, i.e. house on a separate stand, flat or apartment, townhouse, room in backyard, rooms or flat-let elsewhere etc., but without running water or without a flush toilet within the dwelling.
- **Informal dwellings** - shacks or shanties in informal settlements, serviced stands, or proclaimed townships, as well as shacks in the backyards of other dwelling types.
- **Traditional dwellings** - structures made of clay, mud, reeds, or other locally available material.

**Figure 14: Govan Mbeki Local Municipality, Households by dwelling type - 2011**



During 2011 a total of 71.48% of the households in Govan Mbeki Local Municipality lived in formal dwelling units, compared to 59% during 2001.

### b) Household Infrastructure (Energy, Water, Sanitation and Refuse Removal)

Table 6 below shows an increase in in all levels of services for households in the Govan Mbeki municipal area, from 2001 to 2011 and thus also an increase in the general wellbeing of household for the same period.



**Table 7: Govan Mbeki Local Municipality, Households with services, 2001 – 2011**

	<b>Percentage 2001</b>	<b>Percentage 2011</b>
Flushed toilet connected to sewerage	69.7%	88.9%
Weekly refuse removal	82.9%	91.7%
Piped (tap) water inside dwelling	33.3%	56.5%
Electricity for lighting	71.3%	90.3%

### **4.3 NKANGALA DISTRICT MUNICIPALITY**

Nkangala is the economic hub of Mpumalanga and is rich in minerals and natural resources. 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 district is located to the North-West of the province and is the smallest district in land mass (21%) and has the second largest population concentration (35%) in the province. It covers an area of about 2677.67 km<sup>2</sup> in extent. The Nkangala District Municipality is made up of six local municipalities, including Emalahleni.

#### **4.3.1 Emalahleni Local Municipality**

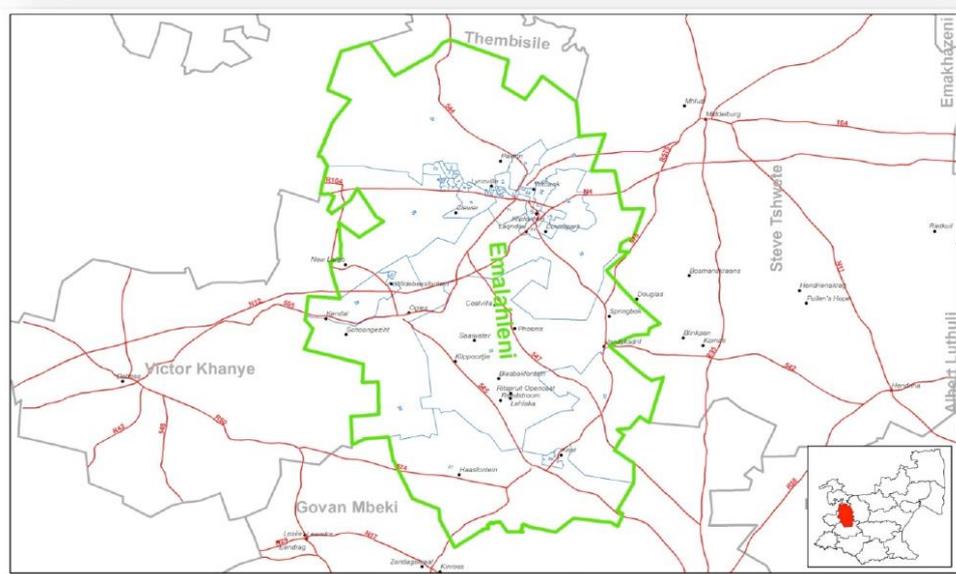
##### 4.3.1.1 History and Location of Emalahleni Local Municipality

The Emalahleni Municipal area, which means the “place of coal”, consists inter alia of the towns of eMalahleni, Kwa-Guqa, Ga-Nala and Ogies. The town of eMalahleni was established in 1903. It was named after a ridge of white rock located near the present railway station. In the early years, this ridge was a halting place for transport wagons and a trading post. eMalahleni has a large collection of heritage assets, which is currently under threat from rapid development. Emalahleni is probably the most industrialised municipal area in Nkangala and its landscape features mainly underground and opencast coalmines. This area has the largest concentration of power stations in the country. Its mining and industrial history is reflected in the area's heritage places. This includes elements of industrial history, military history, architectural/engineering and graves which should be protected and conserved.

Emalahleni Local Municipality is located within the Mpumalanga Province and is situated in the jurisdictional area of the Nkangala District Municipality. The district is located to the North-West of the province and covers an area of about 2677.67 km<sup>2</sup> in extent.



**Figure 14: Map of Emalahleni Local Municipality**



The southern areas of the Emalahleni Municipality form part of the region referred to as the Energy Mecca of South Africa, due to its rich deposits of coal reserves and power stations such as Kendal, Matla, Duvha and Ga-Nala, while the new Kusile power station is located a few kilometres to the east of Phola in the Victor Khanye municipal area. The Southward road and rail network connect the Emalahleni area to the Richards Bay and Maputo harbours, offering export opportunities for the coal reserves.

The Emalahleni Municipality area of jurisdiction consists of the main following towns/settlements, ranked according to population:

- eMalahleni complex;
- Ogies and Phola;
- Ga-Nala and Thubelihle;
- Rietspruit;
- Van Dyksdrift; and
- Wilge

4.3.1.2 Broad description of current land uses in Emalahleni Local Municipality (Geographic profile)

Unimproved grassland is a major land use in the geographical area of Emalahleni, covering approximately 56% of the total area. Mining, although a very important economic industry, consumes about only 6% of the surface area of Emalahleni. Table 8 below shows the area per land use category for Emalahleni Local Municipality.



**Table 8: Land Cover Category, Emalahleni Local Municipality**

Land Cover Category	Hectare	Percentage of Total
Agriculture-cultivated-dryland	81255	28.89%
Agriculture-commercial-irrigated	786	0.28%
Forest plantations	7960	2.83%
Herbland	8	0.003%
Improved grassland	974	0.35%
Mines and quarries	17551	6.242%
Thicket and bushland	2004	0.713%
Unimproved grassland	156830	55.77%
Urban/built-up land: commercial	118	0.042%
Urban/built-up land: industrial/transport	2553	0.91%
Urban/built-up land: residential	6631	2.36%
Urban/built-up land: small holdings	979	0.35%
Water bodies	2877	1.02%
Wetlands	666	0.24%
<b>Total Land Area</b>	<b>281193</b>	<b>100.00%</b>

Source: Emalahleni Local Municipality. Municipal Profile

o Transport network

Roads:

The Emalahleni area is well-connected at regional level by means of the freeways and regional road network. The N12 and N4 freeways provide access to Gauteng to the west, the economic heartland of the country. To the east the N4 connects Emalahleni with Middelburg and Mbombela, the provincial capital, as well as Maputo in Mozambique. Route R555 runs parallel to the N4 freeway from eMalahleni City up to Middelburg and attracts extensive residential and commercial activity close to eMalahleni.

Route R544 is a prominent north/south route, running through the central parts of Emalahleni, connecting the area with Moloto Road in Thembisile to the north. This road, together with routes R547 and R545, provide north-south linkages between eMalahleni City and the settlements in the south - specifically Ogies, Van Dyksdrift and Ga-Nala, and also to larger towns further south in the Gert Sibande District like Bethal, Ermelo and Secunda.

Railway lines

- Pretoria-Witbank-Komatipoort (inter-Provincial Main Line) - This line serves the manufacturing industries of Witbank and Middelburg and sections of the line transport coal for power stations and industries along the route.
- Witbank-Ogies-Welgedag-Apex (Inter-Provincial Main Line) - This railway line is used mainly for coal traffic originating in the Witbank/ Ogies area and directed to various destinations in Gauteng, Free State, North West and beyond.

Airfield:

The main airfield in the Emalahleni Local Municipality is located north of Klarinet. The runway is short, which limits the use of the airfield to small aircraft.



### o Agriculture

The non-urban areas of the Emalahleni Municipality consist mainly of farms and agricultural holdings. The agricultural holdings are mostly found on the periphery of the urban settlements. Many of these holdings are not used for agricultural activities, but for rural residential purposes or for operating service industries.

The Jackaroo Park A.H. along Middelburg Road and Riverview A.H. (eMalahleni) and Kendal Forest Holdings are increasingly used for light service industries.

In terms of agriculture, stock farming (sheep and cattle) and maize farming with some irrigated farming occur through the entire municipal area and especially along the river drainage basins. Intensive crop farming is mainly concentrated in the areas to the south of the N4 freeway while cattle and (limited) game farming are mostly located to the north of the N4.

### o Mining

Mining is mainly concentrated in the southern parts of the Emalahleni area, with large sections of the area affected by undermining and/or mineral rights.

Many of the mines have closed down as they reached the end of their lifecycle. In many instances insufficient attention was given to the rehabilitation of these mining areas when activity was terminated. This has had a significant effect on the environment in the form of sinkhole formation, subsiding, underground fires and seepage of water from underground workings.

The following existing mining operations have been identified within close proximity of the proposed transmission corridor:

- Stuart Colliery (open cast colliery);
- Leeuwfontein Colliery (open cast colliery);
- Leslie Gold Mine (deep cast underground); and
- Two unknown shafts (deep cast underground).

### o Power stations

Due to the rich coal reserves in the study area and surrounds, Eskom developed the Kendal, Ga-Nala, Matla, Wilge and Duvha power stations during the 1970's and 1980's to provide in future electricity needs for South Africa. This has led to the establishment of townships like Ga-Nala, Thubelihle and Wilge. The Wilge power station has since been decommissioned and demolished, and properties in the Wilge settlement were sold to private owners.

The new Kusile power station is located a few kilometres to the west of Wilge, within the area of jurisdiction of the Victor Khanye Local Municipality.



### o Watercourses

The main river in the northern section of the site is the Wilge River along with the Kromdraai Spruit and the Riet Spruit. All these watercourses drain primarily northwards towards the Olifants River.

Several non-perennial streams and drainage lines also occur throughout the area, draining towards the main rivers.

The proposed transmission line corridor does not traverse along any streams, but it does cross several. A large number of the existing power lines in the area are aligned along streams and drainage lines and historically the reasoning behind this was not to interfere with the farming activities. The recent emphasis on environmental impact limitation has however changed this perception.

### o Industrial (Manufacturing)

Emalahleni municipality has six major industrial areas, comprising a total of about 591 developed and 279 vacant industrial erven. This represents by far the largest cluster of industrial activity in the entire Nkangala District.

### o Retail and wholesale trade

The primary business centre in Emalahleni LM is the eMalahleni CBD, which includes 155 300m<sup>2</sup> of offices, retail, general business and commercial uses. There are also several decentralised nodes in the eMalahleni area comprising mainly retail uses, namely the Highveld Mall (85 000m<sup>2</sup>), Safeways Shopping Centre (19 000m<sup>2</sup>), and Klipfontein Shopping Centre (25 000m<sup>2</sup>) and the KwaGuqa Mall (22 000m<sup>2</sup>). The casino in eMalahleni (The Ridge) offers a hotel, restaurants and entertainment centre.

The junction of the N12 and N4 freeways is a prominent focal point in Emalahleni and several high tech industries and offices have been established in the vicinity of this junction over the past decade.

Ga-Nala and Ogies also have business nodes with offices, retail and general business uses. These two centres fulfil the function of central places to the surrounding farming areas.

Small, mostly informal business activities are conducted in the respective former township areas.

### o Community facilities

Most of the facilities are found in eMalahleni, with some facilities in the secondary towns.

### o Education

According to the Department of Education there are currently 34 pre-schools in the Emalahleni municipality. There are 58 primary schools and 19 secondary schools servicing the area, with a clear lack of facilities in Hlalanikahle.

There are currently four tertiary education facilities in the Emalahleni area. The Edupark in eMalahleni consists of the Tshwane University of Technology, Pretoria University and Unisa. The eMalahleni College is situated in the CBD in



close proximity to the municipal offices. The other tertiary institutions are the Mpondozankomo Technical College in Ackerville and the Coal Training College in Klipfontein. Considering the low literacy and employment levels, adult basic education (ABET) and skills training facilities would be required to improve the socio-economic status of the population.

- o Health

There are four hospitals in the Emalahleni area, namely the eMalahleni Provincial Hospital and Kosmos Private Hospital in eMalahleni, SANTA TB Hospital in Lynnville and Van Dyksdrift Mine Hospital.

Furthermore, there are 12 fixed clinics and three mobile clinics, with at least one clinic in every town. The population size of Lynnville, Kwa-Guqa and Hlalanikahle respectively justify more clinics. Rendering of primary health care services is the competency of province.

- o Housing

Formal settlements:

There is a strong trend of rental accommodation in the Emalahleni LM the majority of household rent the property they reside in (33.8%). There has been a decline in the total number of households occupying property rent-free (from 23.6% in 2001 to 19.6% in 2011).

In terms of the dwelling type profile, two thirds of households (66.8%) reside in a house or brick structure on a separate stand or yard followed by households residing in informal dwellings not in a backyard (14.7%).

Informal settlements and housing backlog:

Emalahleni Local Municipality has the largest number of widely distributed informal settlements in the Province, totalling 69 informal settlements. Emalahleni Municipality has an estimated housing backlog of approximately 44 734 units.

- o Spatial development (future land use)

The Emalahleni municipal population is expected to increase from 395 418 people in 2011 to 516 399 in 2020 and 646 708 in 2030. This implies an increment of 120 980 people (13 442 per annum) up to 2020, and an additional 130 309 people (13 031 per annum) from 2020 to 2030.

From this it is evident that the incremental population of 130 309 people will require an additional 40 721 residential units, and the urban footprint will expand by an additional 3721 hectares of land by the year 2030. In total, the urban footprint of the Emalahleni Local Municipality will thus increase by approximately 6854 hectares of land until the year 2030.



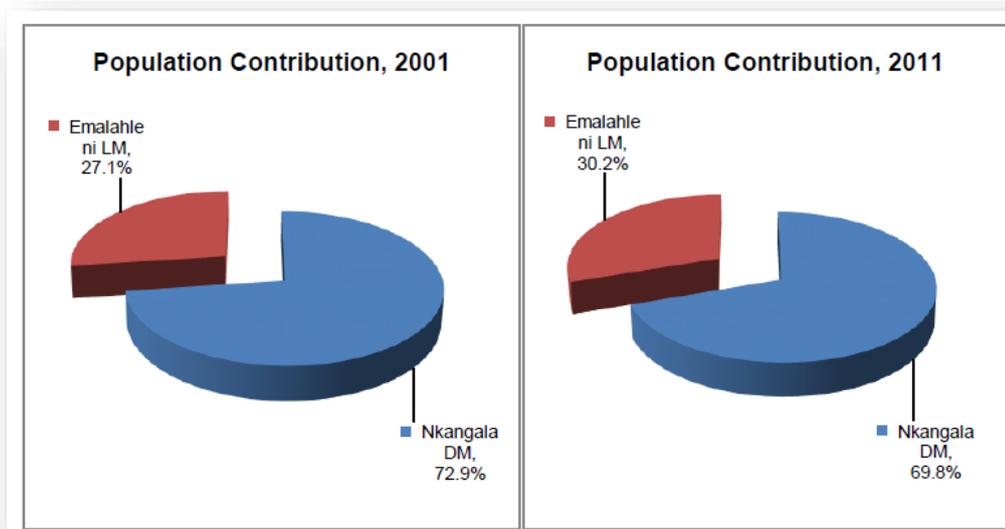
4.2.1.3 Demographic analysis/profile

**a) Population Size**

The total population within the Emalahleni Local Municipality (ELM) increased from 276 469 people in 2001 to 395 468 people in 2011, which translates into 118 999 people over the ten year period ( $\pm$  11 900 people per annum) or a percentage of 43.1%. The annualised population growth rate was measured at 3.6%.

Furthermore, the population contribution of the ELM to the Nkangala District increased slightly from 27.1% in 2001 to 30.2% in 2011.

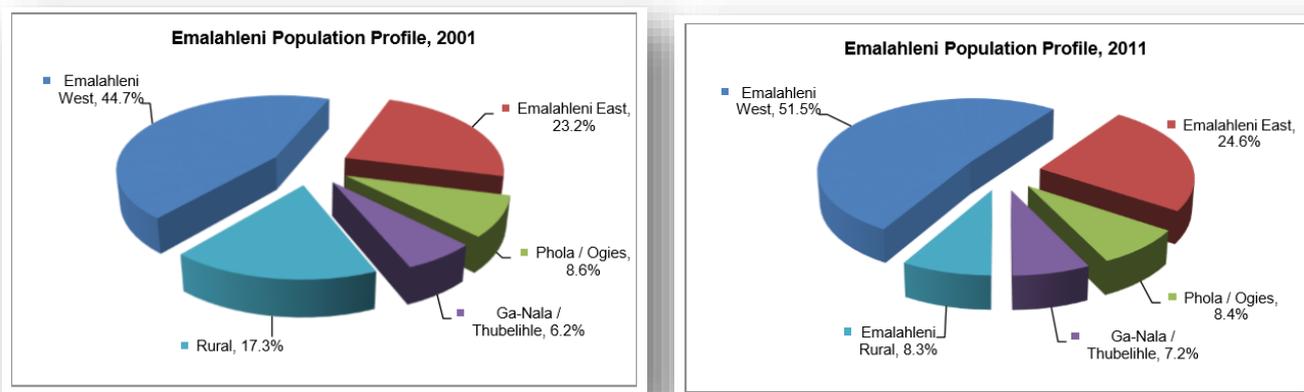
**Figure 15: Emalahleni Local Municipality Population Contribution to Nkangala District Municipality**



From Figure 16 it is clear that the Emalahleni rural area experienced a significant decrease in the total number of people residing within the area, from 17.3% in 2001 to 8.3% in 2011 (an 8.9% decline). On the other hand, Emalahleni West experienced an increase in the total number of people from 44.7% in and 2001 to 51.5% in 2011 (a 6.8% increase). Similarly, Emalahleni East noted a 1.4% increase from 23.2% in 2001 to 24.6% in 2011. This population shift can be attributed to urbanization trends, whereby households relocate to low income/ informal areas in close proximity to urban centres in hope of entering into the urban economy.



**Figure 16: Emalahleni Local Municipality, Population per area**



The northern portion of the proposed Bravo 4 project is situated in Wards 28, 30 and 27. These include the following urban/settlement areas located approximately 10km from the proposed Bravo 4 project: Wildebeesfontein, Wilge, Phola, Ogies, Kendal and Schoongesicht. Only 8,8% of the total population of the Emalahleni Local Municipality live in these three wards.

**b) Gender Profile**

The gender structure of the population is one of the key determinants of population change and dynamics.

**Table 9: Emalahleni Local Municipality, Gender Profile, 1996, 2001 & 2011**

Gender	1996	2001	2011
<b>Males</b>	51.73%	50.91%	52.79%
<b>Female</b>	48.27%	49.09%	47.21%

Source: Statistics South Africa, 2011

The above table indicates an increase of males and a decrease of females between 2001 and 2011. This is largely due to the nature of industries around the municipal area which tend to be more male oriented. The table also shows that there are more males than females, where the sex ratio is 111 males per 100 females in the municipality i.e. 52.8% males and 47.2% females. The number of females has gone down slightly which means the area attracts males compared to females.

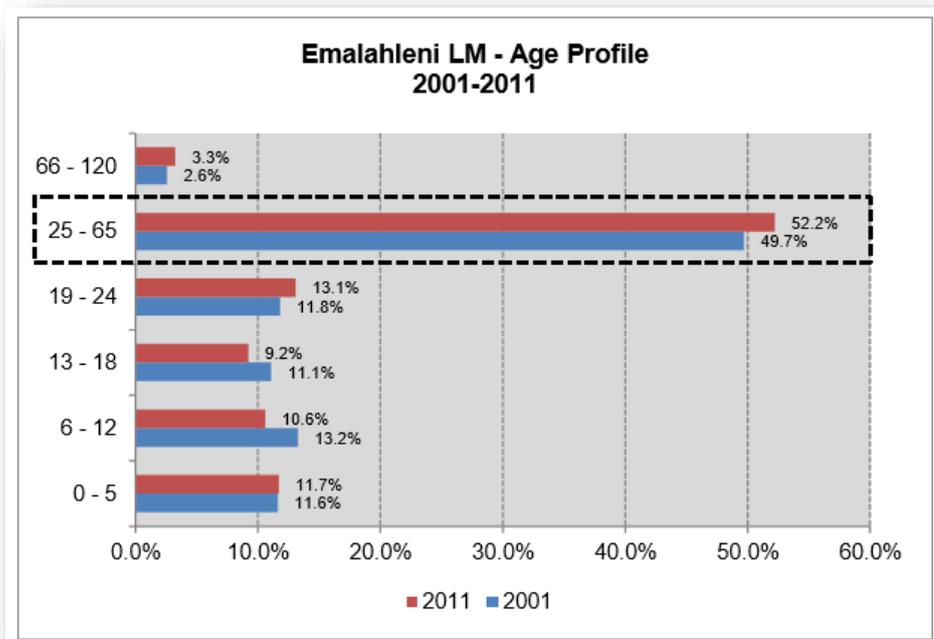
The increase of males can have an impact on issues of crime, prostitution and drug abuse.



**c) Age Profile**

Age distribution is an important indicator in terms of the development character and economic active aged segment of an area. Figure 17 indicates the age profile of the Emalahleni Local Municipality.

**Figure 17: Emalahleni Local Municipality, Age Profile 2001 & 2011**



As shown in Figure 17 the Emalahleni Local Municipality is characterised by a strong economically active population segment, representing more than half (52.2%) of the total population. The Emalahleni municipal area has a limited older population segment (aged 65+).

**d) Race Profile**

Emalahleni is divided into 34 wards which has a mixture of all races. It constitute 81.3% Africans, 15.7% Whites, 1.7% Coloured, 0.9% Asians and other 0.3%. The northern portion of the proposed Bravo 4 project is situated in Wards 28, 30 and 27. These include the following urban/settlement areas located approximately 10km from the proposed Bravo 4 project: Wildebeesfontein, Wilge, Phola, Ogies, Kendal and Schoongesicht. The following table shows the population distribution per race per ward.

**Table 10: Distribution of race per affected Ward and Emalahleni Local Municipality**

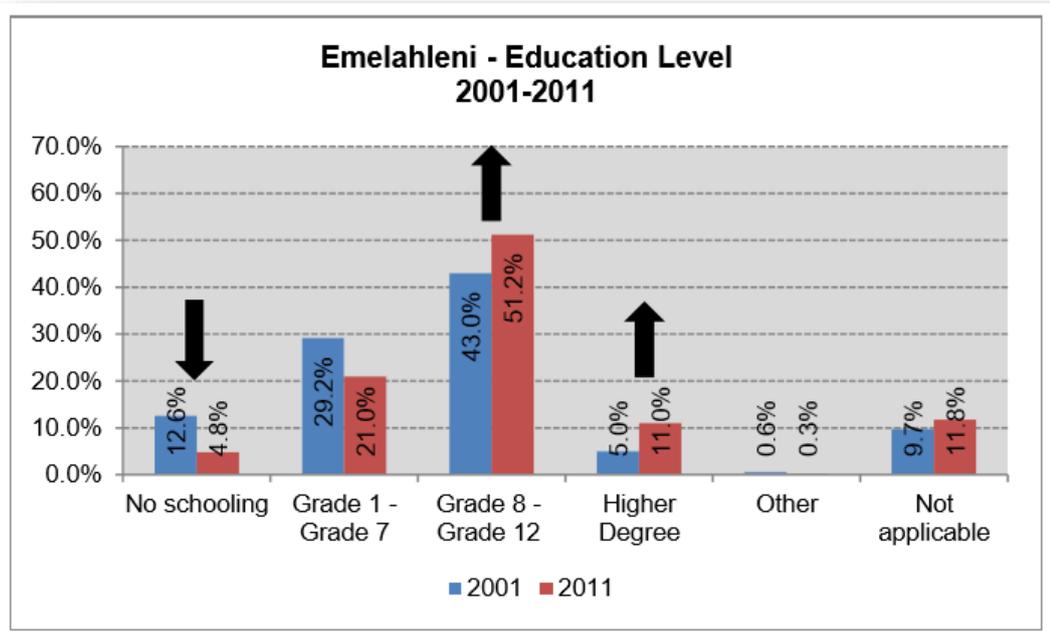
	Black African	Coloured	Indian or Asian	White	Other
<b>Emalahleni</b>	321668	6171	3562	61893	1626
<b>Ward 27</b>	5155	140	81	3543	6
<b>Ward 28</b>	14952	73	64	510	58
<b>Ward 30</b>	10354	102	18	2	20



**e) Educational Profile**

One of the driving forces behind social change is educational attainment, which in turn is linked to poverty levels as there appears to be a correlation between the level of educational attainment and income levels. People with higher educational levels tend to be economically better off, and therefore contribute more to the reduction of the unemployment rate. The education profile provides an indication of the literacy levels in the municipal area. Figure 18 illustrates the highest level of education for the Emalahleni Local Municipality.

**Figure 18: Emalahleni Local Municipality, Education Profile, 2001 & 2011**



From Figure 18 it is clear that the overall level of education improved within the Emalahleni LM as the total number of no schooling declined significantly from 12.6% in 2001 to 4.8% in 2011. Furthermore, the total number of secondary education (grade 8-12) increased from 43.0% in 2001 to 51.2% in 2011 and the total number of individuals with a higher education increased from 5.0% to 11.0% for the same period.

It is positive to note that within the Emalahleni Rural area, no schooling declined significantly from 17.6% in 2001 to 8.1% in 2011, whilst secondary education (grade 8 to 12) increased from 35.5% in 2001 to 47.9% in 2011.

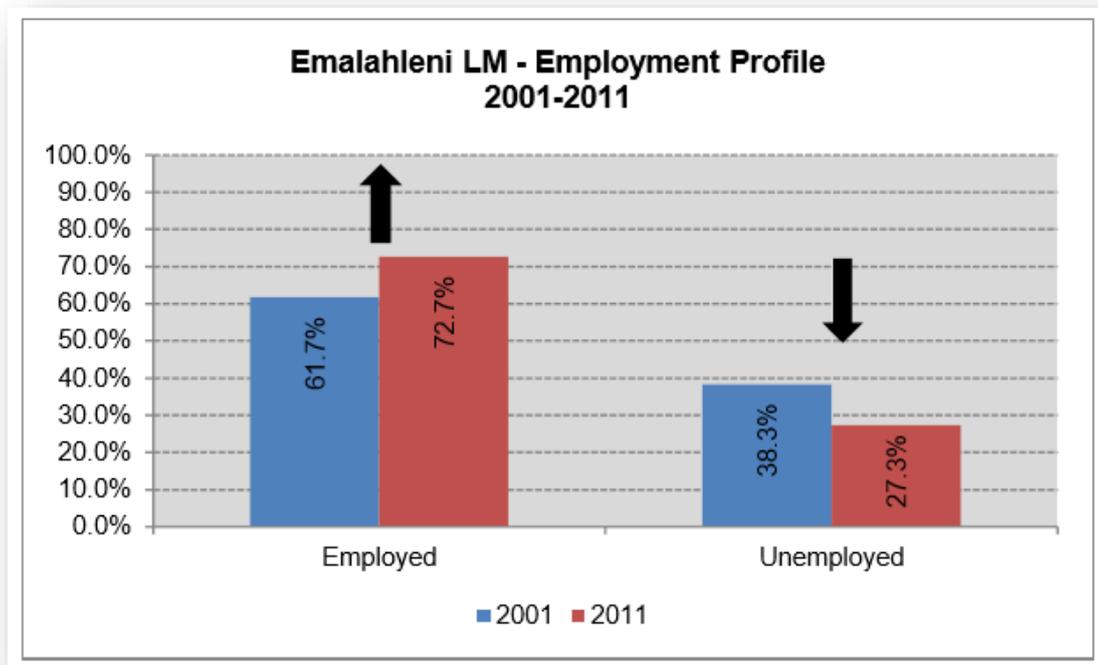
The 2011 highest level of education profile, indicates a large proportion of individuals within the local municipality (49.8%) have at least a secondary (Grade 8-12) level of education. Emalahleni East (24.6%) has the highest number of individuals with a higher education, while the highest level of 'no schooling' is namely in the Rural parts of the Municipality



**f) Employment Status**

Employment status is a good indication of the economic environment of a Municipality. Figure 19 indicates the employment status of the Emalahleni Local Municipality.

**Figure 19: Emalahleni Local Municipality, Employment Status 2001 & 2011**



The Emalahleni Local Municipality experienced an increase in the total number of jobs – from 61.7% to 72.7% in 2001 and 2011 respectively. Unemployment declined from 38.3% in 2001 to 27.3% in 2011. This is a good indication of a positive local economy

According to the 2011 profile the Emalahleni LM has a relatively high unemployment rate namely 27.3%, which is well above the national unemployment rate of 25.2% (as recorded for the fourth quarter of 2014, the worst rate of joblessness seen since the first labour force survey in 2008).

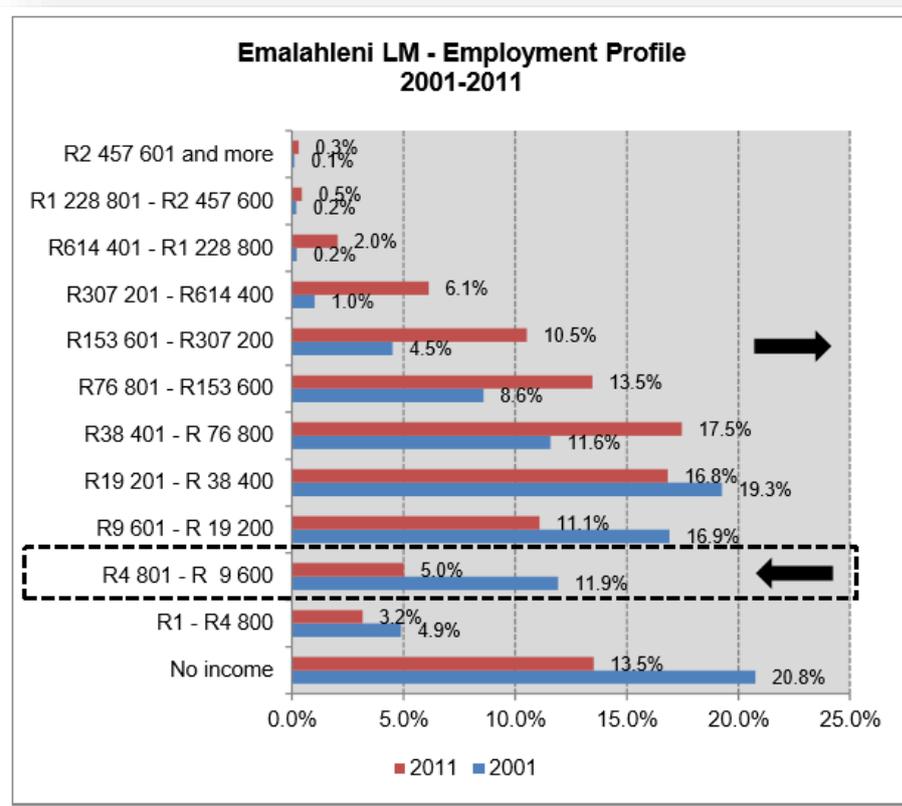
The Phola/ Ogies functional area has the lowest employment levels, recorded at 59.7% for 2011.

**g) Household Income**

Figure 20 indicates the annual household income within the Emalahleni Local Municipality.



Figure 20: Emalahleni Local Municipality, Annual Household Income



It is noted that there was a significant decline in the total number of households with no income from 2001 (20.8%) to 2011 (13.5%). Concurrently, the number of households that earn an annual income of R4 801 to R9 600 decreased significantly from 11.9% in 2001 to 5.0% in 2011.

Table 11 indicates the Minimum Living Levels (MLL) for the Emalahleni Local Municipality and the respective functional areas. (Note, the annual MLL income is calculated according to a MLL of R4 500 per month, which translates into R54 000 per annum). The annual income brackets do not allow for an actual MLL calculation, therefore a minimum MLL is indicated for all household earning an annual income of below R38 400.)

Table 11: Calculated Minimum Living Levels (R38 400 and below)

Functional Area / Local Municipality	MLL 2011
<b>Emalahleni LM</b>	<b>67.1%</b>
Emalahleni West	78.0%
Emalahleni East	37.2%
Phola/ Ogies	76.7%
Ga-Nala/ Thubelihle	61.9%
Emalahleni Rural	78.7%



It is evident that 67.1% of households within the Emalahleni LM earn an annual income well below the MLL, with the highest percentages of these households located in Emalahleni Rural (78.7%) and Emalahleni West (78.0%).

In terms of the Emahleni Municipality 2015/16 IDP the unemployment rate for females is 37.1% and for males is 20.8%, while the youth unemployment rate was 36,0%.

**h) Health Profile**

HIV prevalence rate of pregnant women in Emalahleni was 36,1% in 2011, which is an increasing trend. The HIV prevalence rate excluding pregnant women was 22,5% in 2011, which has decreased between 2009 and 2011. TB cases have decreased between 2009 and 2011. Table 12 also highlights the number of public health facilities within Emalahleni.

**Table 12: Emalahleni, Health Indicators**

HEALTH INDICATORS	2009	2010	2011	Ranking: best(1)-worst (18)
HIV prevalence rate – survey (pregnant women attending antenatal clinic 15-49 years old)	30.0%	34.4%	36.1%	6
HIV prevalence rate –DHIS (excluding pregnant women)	35.6%	17.4%	22.5%	9
TB cases	2079	2169	1671	14
<b>PUBLIC HEALTH FACILITIES</b>				<b>2011</b>
Number of clinics				20
Number of community health centres				4
Number of hospitals				3

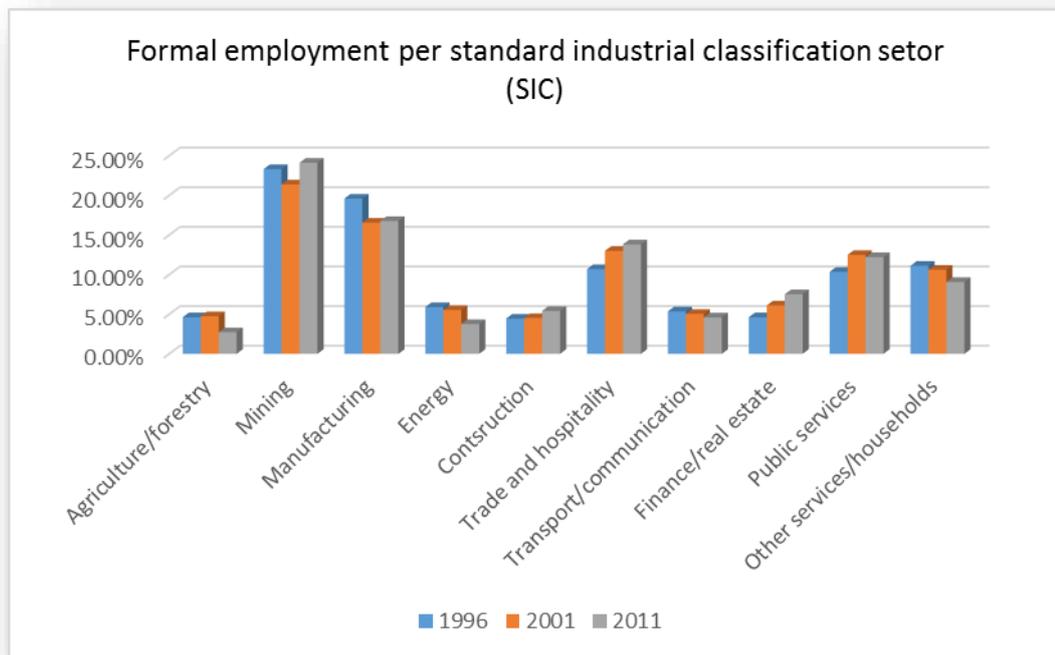
**i) Economic Indicators**

According to the Emalahleni IDP (2015/16) the Municipality is expected to record a Gross Domestic Product (GDP) growth of 3.3% per annum over the period 2011-2016. Emalahleni Local Municipality contributed a significant 17.9% to the provincial economy in 2011. The municipal Gross Value Add (GVA) in 2011 was R40.5 billion at current prices and R19.9 billion at constant 2005 prices, making it the third largest economy in Mpumalanga Province

Employment growth has been greater in some sectors than others. Figure 21 illustrates the changes in employment per standard industrial classification sector (SIC) between 1996 and 2011. All sectors, other than agriculture have grown – the decline in the energy sector may be an anomaly given this sector's contribution to GVA. While the mining and manufacturing sectors have grown substantially, the trade and hospitality sector has almost doubled as has the business and finance sector. Employment in the public services (public service, education and health) has also increased significantly.



**Figure 21: Emalahleni Local Municipality, Formal Employment per SIC. 1996 - 2011**



The leading industry in terms of employment in Emalahleni Municipality is Mining (representing 24.11% of job opportunities) followed closely by Manufacturing (16.75%). Energy is responsible for only 3.76% of the employment opportunities.

Table 13 compares the Gross Value Add (GVA) from 1996 to 2011 of the various industries to the employment and some interesting differences are evident:

- ✓ The proportional contribution of the energy sector to GVA is far higher than is the employment contribution and this is consistent from 1996 to 2011.
- ✓ While employment in agriculture has decreased by some 40%, the GVA contribution has dwindled from just over 1% to a little more than 0,4%.
- ✓ The contribution of mining to the city's GVA increased from 34% to 47% from 1996 to 2011, while employment has fluctuated between 21% and 24% of all the employment in the area. This is indicative of dependency on this sector both in terms of employment and GVA. In the light of increasing concerns regarding the extent of coal reserves, the high dependency of the economy on coal demand a post-coal development strategy.



**Table 13: Emalahleni Local Municipality, Comparison of percentage contribution to employment and labour of various economic sectors, 1996, 2001 and 2011**

SECTOR	1996		2001		2011	
	GVA	EMPLOYMENT	GVA	EMPLOYMENT	GVA	EMPLOYMENT
Agriculture/forestry	1.11%	4.62%	0.83%	4.75%	0.41%	2.73%
Mining	34.34%	23.31%	45.22%	21.38%	47.34%	24.11%
Manufacturing	7.34%	19.59%	5.45%	16.56%	3.23%	16.75%
Energy	21.25%	5.90%	14.75%	5.54%	15.09%	3.76%
Construction	2.21%	4.45%	1.39%	4.52%	3.15%	5.41%
Trade and hospitality	8.03%	10.70%	7.59%	13.00%	8.18%	13.82%
Transport/communication	7.62%	5.36%	7.54%	5.04%	5.61%	4.61%
Finance/real estate	8.27%	4.63%	8.33%	6.11%	7.93%	7.52%
Public services	8.02%	10.34%	7.16%	12.49%	7.56%	12.20%
Other services/households	1.81%	11.11%	1.74%	10.61%	1.50%	9.07%

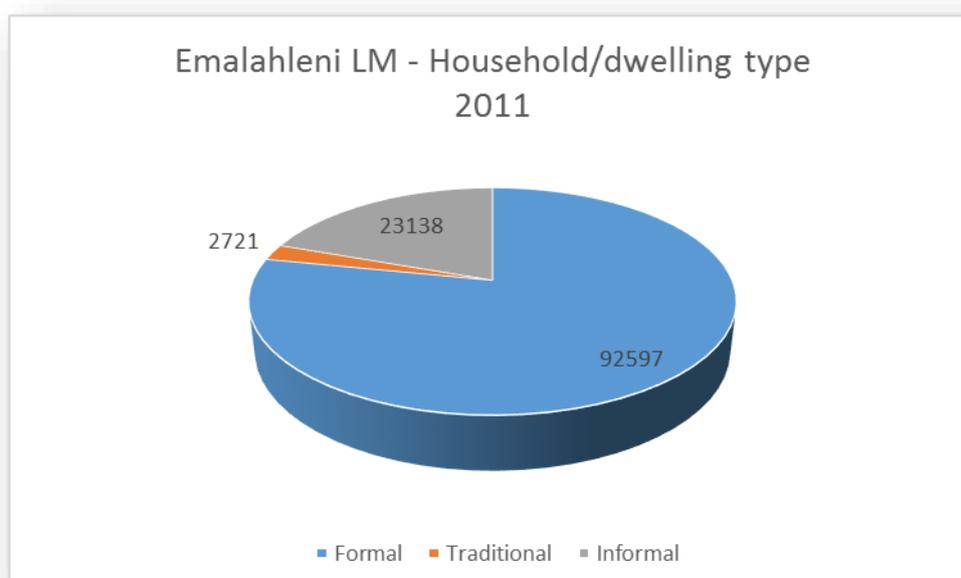
#### 4.2.1.4 Social Infrastructure Profile

Access to housing and basic infrastructure and services including energy, as well as water provision and sanitation may be considered as a general measure of well-being indicating households' level of living, as well as potential vulnerability status.

##### a) Housing

During 2011 a total of 78.19% of the households in Emalahleni Local Municipality lived in formal dwelling units, compared to 67.19% during 2001.

**Figure 22: Emalahleni Local Municipality, Households by dwelling type -2011**



**b) Household Infrastructure (Energy, Water, Sanitation & Refuse Removal)**

Table 14 below shows a slight increase in most levels of services for households in the Emalahleni municipal area, from 2001 to 2011 and thus also an increase in the general wellbeing of household for the same period.

**Table 14: Emalahleni Local Municipality, Households with services, 2001 – 2011**

	<b>Percentage 2001</b>	<b>Percentage 2011</b>
Flushed toilet connected to sewerage	71,6%	68.8%
Weekly refuse removal	64.2%	67.2%
Piped (tap) water inside dwelling	41.9%	54.9%
Electricity for lighting	70.3%	73,4%

**4.2.2 Victor Khanye Local Municipality**

4.2.2.1 History and Location of Victor Khanye Local Municipality

The Victor Khanye Local Municipality is situated on the western Highveld of Mpumalanga Province, covering a geographic area of approximately 1,567 square kilometres. The prominent towns and settlements in the Municipality include Abor, Argent, Delmas, and Brakfontein. The municipality is strategically located close to the metropolitan areas of Tshwane and Ekurhuleni to the west. The headquarters of the municipality are in Delmas (a French word meaning small farm). Victor Khanye is currently characterized by an increase in mining and related activities in the Leandra area.

The town of Delmas had its origins due to the need to construct a railway line between Apex on the East Rand and Witbank to transport coal. The railway line was opened in 1906 and the town was surveyed in 1907.

The Delmas [Victor Khanye] district was proclaimed in 1954 and used to be mainly agricultural. As early as 1909 the Delmas Estate and Colliery Co began mining coal in the district.

The most prominent natural feature of the Delmas [Victor Khanye] Local Municipal Area is the Skurweberg Mountain, so named for the ancient sandstone outcroppings that are a rare example of an ancient seabed from the Godwana period. This mountain stretches down the Hell’s Kloof Pass into the gorges and canyons cut by the Bankspruit, Elands and Komati Rivers.

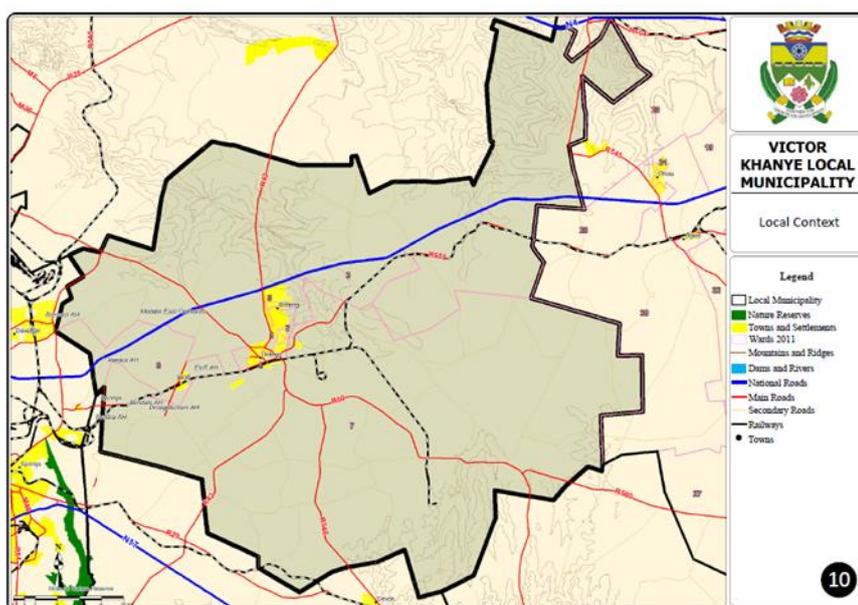
The Municipality is very rural in nature and is a major maize producing area. The spatial structure of Victor Khanye is characterised by the following prominent areas:

- Delmas and its extensions: including business and industrial area, and residential area for people in the middle and higher income levels;



- Botleng and its extensions: predominantly a residential area for people in the lower income levels;
- Delpark and its extensions: predominantly a residential area for people in the lower income levels;
- Eloff: predominantly an agricultural holding area; and
- Sundra: predominantly an agricultural holding area.

**Figure 23: Map of Victor Khanye Local Municipality**



4.2.2.2 Broad description of current land uses in Victor Khanye Local Municipality (Geographic profile)

o Transport network

Roads:

The N12 national toll road that links Johannesburg with Nelspruit runs from east to west through the northern part of the Victor Khanye Municipality. It also links the Victor Khanye Local Municipality to Ogies and eMalahleni (Witbank), and to the Maputo Development Corridor towards Maputo (Mozambique).

The major provincial roads in the municipal area are:

- R50 that links Tshwane with Standerton, via Delmas;
- R43 that links with Bronkhorstspuit;
- R555 that links Springs with eMalahleni, via Delmas, and runs parallel to the south of the N12 freeway;
- R548 that links with Balfour; and
- R42 that links Delmas, Bronkhorstspuit and Nigel.

Roads infrastructure in and around the VKLM area was originally designed for low volume traffic. However, the traffic volumes (and especially heavy vehicles) have increased significantly over the past few years due to the rapid growth within the industrial sector, specifically mining activities. As a



result, road surfaces in the VKLM are in urgent need of refurbishment and upgrade. It is estimated that 59% of roads in the VKLM are in a state of disrepair (VKLM IDP).

### Railway lines:

The major rail infrastructure in the Victor Khanye area includes the following:

- The railway line from Gauteng to Victor Khanye. This main line runs parallel to route R555, and continues eastward, through Nelspruit to the Maputo harbour :
- A southern branch that extends into the south of the Municipality where it terminates;
- From the main line two lines go south through Ermelo to the Richards Bay harbour (one from Victor Khanye and one from Entokozweni); and
- There is also a Railway line going north from Victor Khanye station, running parallel to Road P81-1 through Dullstroom towards Lydenburg.

### o Agriculture

The non-urban areas of the Victor Khanye Local Municipality consist mainly of farms and agricultural holdings. The agricultural holdings are mostly found on the periphery of the urban settlements. Many of these holdings are not used for agricultural activities, but for rural residential purposes or for operating service industries.

### o Mining

The entire eastern and southern extents of the VKLM is covered by mining license applications, while there are prospecting licence applications on almost the entire remainder of the LM.

The two predominant mining areas are around Delmas in the centre of the municipal area, and also in the far north-eastern corner of the municipal area. Mining activities in the VKLM are concentrated mainly on coal and silica.

### o Power stations

Construction of the Kusile power station in the north-eastern parts of the Municipality is far advanced and will add significantly to the amount of electricity generated from the Nkangala District as a whole. No new residential town is planned for this power station as it is expected that the workforce will reside in Delmas Town (VKLM), Phola, Wilge or eMalahleni City (in the neighbouring Emalahleni LM).

### o Watercourses

A number of rivers/ spruits traverse the municipal area with the Koffiespruit, Wilge, and Kromdraaispruit being the most prominent. These generally drain in a northerly direction. Regionally, the Municipality falls within the Upper Olifants sub-water management area.

The underground water in the VKLM is under pressure due to municipal use and irrigation purposes.



The Victor Khanye Municipality has numerous natural pans and wetlands and, as a result, is very scenic. The Bronkhorstspuit and various pans in the area exhibit abundant bird life.

o Industrial (Manufacturing)

Victor Khanye forms an extension of the industrial core of Ekurhuleni Metro (Gauteng) to the west, which, in turn, forms an extension of the Tshwane and Johannesburg Metros.

Industrial uses are concentrated in the following areas: Botleng Extension 14, Union Forests Plantation, Eloff surrounds, Rietkol Agricultural Holdings, Rietkol 237 – IR, Sundale, portions of Springs A.H. and Sundra A.H.

A cement grinding plant is being established just to the south of Delmas Town, on the Remainder of Portion 22 of the farm Witfontein 232. It will be the fly ash source for the Kendal Power Station situated some 35km to the west in Emalaheni LM. The milling plant will be accessed directly from route R50.

o Retail and wholesale trade

As mentioned, the developed urban areas (and business concentrations) in the VKLM are namely Delmas, Botleng and Eloff, of which Delmas functions as the primary node. The urban areas are mainly residential with supportive services such as business, social facilities etc.

o Community facilities

Most of the facilities are found in urban areas.

o Health

The public hospital in Delmas Town was recently upgraded and renovated. The renovation projects that were implemented include: an outpatient and casualty unit, a pharmacy, and a maternity and paediatric unit. Planned future upgrades of the hospital will comprise additional wards, living quarters for doctors and nursing staff, extensions to the mortuary and archives, and additional storage.

There are also three public health clinics in the Municipality: one in the FC Dumat Building in Delmas (includes a dental clinic), one in Botleng Proper and one in Botleng X3.

Furthermore, three mobile clinics are dispatched into the rural areas of the Municipality to cater for people who have difficulty getting to a clinic.

o Housing

According to the Mpumalanga Sustainable Human Settlement Master Plan the Victor Khanye Local Municipality had about 15 903 formal houses and 4643 informal houses in 2011. The 4643 informal houses comprised 521 traditional structures, 1150 backyard units, and 2973 structures in informal



settlements. It also projected incremental subsidized demand of 1000 units by 2032, and 5993 bonded units by the same time.

The residential settlements are consolidated in the central western parts of the LM, and informal settlement is primarily consolidated around Delmas Town.

o Spatial development (future land use)

Going forward, a major development is the construction of the Kusile Power Station which will have a significant impact on development in the area and subsequently lead to the future extension of mining activities and related residential demand around the existing urban core areas. As no new residential areas are planned to absorb the anticipated influx of labour for this development, a need for new housing will have to be accommodated in and around the existing urban core areas. The future extension of mining activities in response to the commissioning of the new Kusile Power Station will also have to be accommodated in these developments.

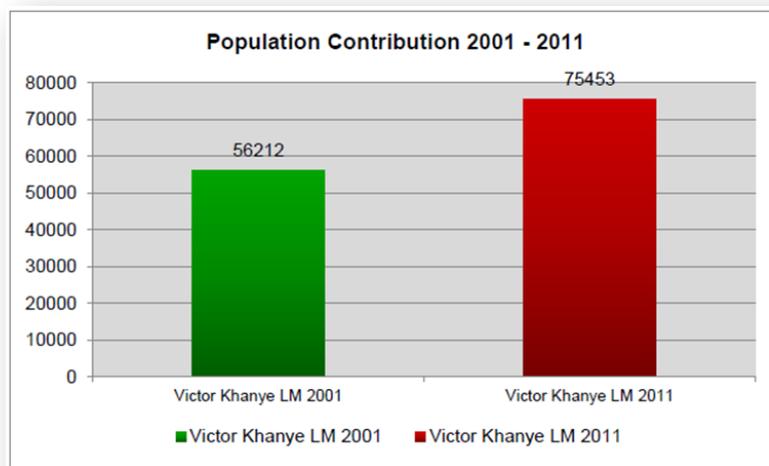
4.2.2.3 Demographic analysis/profile

**a) Population Size**

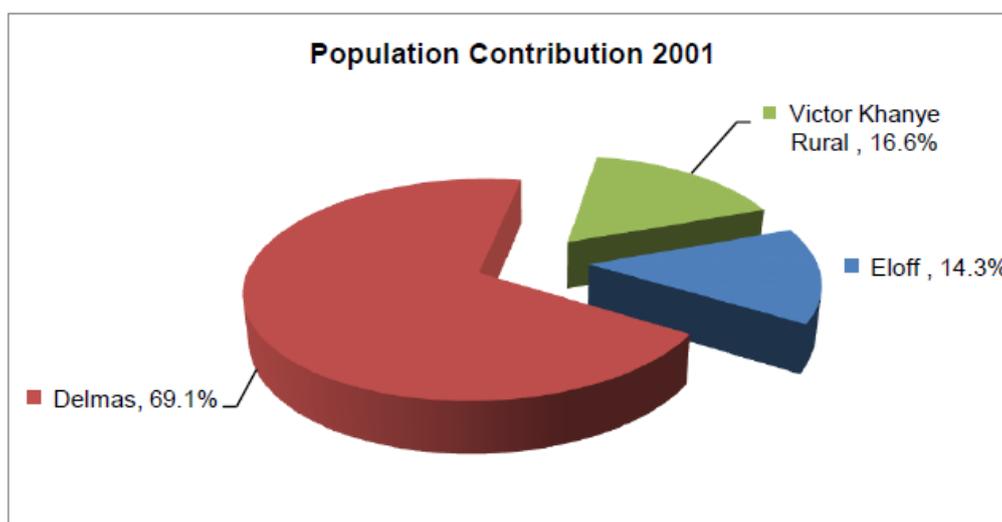
The following figures indicate the population profile of the Victor Khanye LM and the respective functional areas.

The Victor Khanye LM experienced a slight increase in the total population from 2001 to 2011 as shown in Figure 24. The population percentage increase calculated for the time period 2001 to 2011 is 25.5%, which translates into approximately 19 241 people, from 56 212 in 2001 to 75 453 in 2011. The total population of Victor Khanye contributed a mere 5.5% towards the total Nkangala Population.

**Figure 24: Victor Khanye Local Municipality Population Distribution**



**Figure 25: Victor Khanye Local Municipality Population Contribution**



From Figure 25 it is clear that most of the Victor Khanye's population is concentrated within the functional area of Delmas (69.1%), compared to Eloff (14.3%). The rural area of Victor Khanye accommodates approximately 16.6% of the total population of Victor Khanye.

**b) Gender Profile**

The gender structure of the population is one of the key determinants of population change and dynamics.

The census results reflect a shift in the ratio of males to females with the current balance now marginally in favour of males, representing 51% of the total.

**Table 15: Victor Khanye Local Municipality, Gender Profile, 1996, 2001 & 2011**

Gender	1996	2001	2011
Male	49.60%	49.24%	51.45%
Female	50.40%	50.76%	48.55%

Source: Victor Khanye LM Draft IDP, 2916/17

The above table indicates an increase of males and a decrease of females between 2001 and 2011. This is largely due to the nature of industries around the municipal area which tend to be more male oriented.

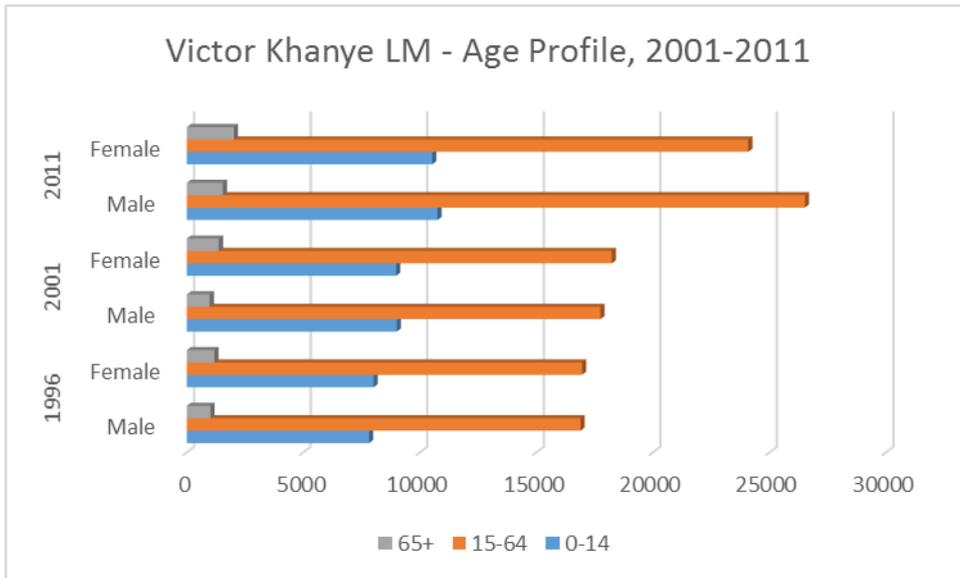
The increase of males can have an impact on issues of crime, prostitution and drug abuse.

**c) Age Profile**

Age distribution is an important indicator in terms of the development character and economic active aged segment of an area.



**Figure 26: Victor Khanye Local Municipality, Age Profile 2001& 2011**



As shown in Figure 26 the Victor Khanye Local Municipality is characterised by a strong economically active population segment, representing more than half (67%) of the total population. The Victor Khanye municipal area has a limited older population segment (aged 65+).

**d) Race Profile**

A split of the population by race reveals the following classification:

- Approximately 82% Africans
- 16% White
- 1% Coloured
- The balance Asian or others

The most prevalent language spoken is IsiNdebele, spoken by approximately (57%) of the population, followed by IsiZulu (33%) and Afrikaans (2%). The largest variety of spoken languages occurs in the non-urban area. The language preference by Ward is illustrated in the following table.



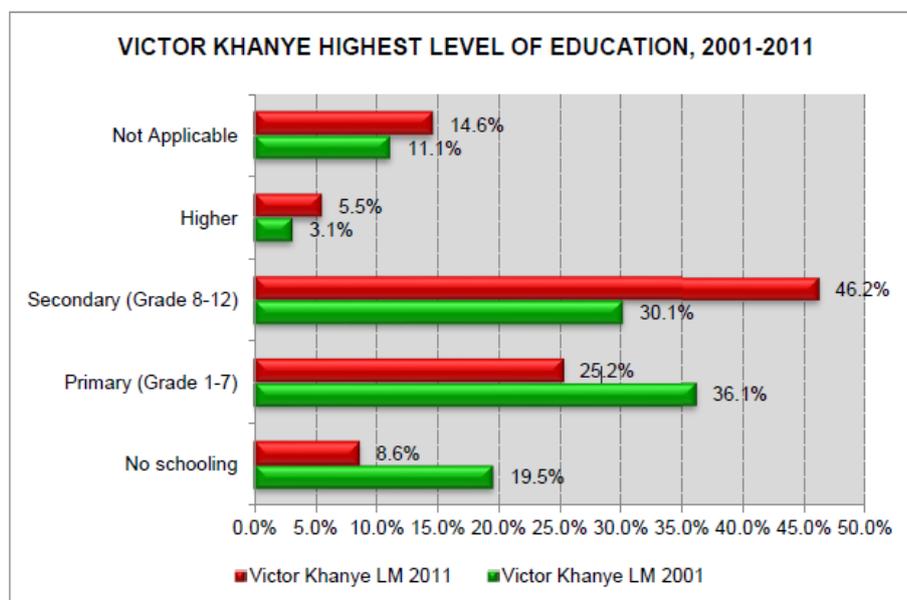
**Table 16: Victor Khanye Local Municipality, Language preference by ward**

	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Ward 7	Ward 8	Ward 9	Total
<b>Afrikaans</b>	122	138	141	27	82	872	3 268	3 459	3 738	11 847
<b>English</b>	184	184	272	80	149	350	568	472	445	2 704
<b>IsiNdebele</b>	2 158	1 635	3 496	2 096	2 452	1 717	1 910	276	3 232	18 972
<b>IsiXhosa</b>	212	204	570	255	280	215	350	110	285	2 481
<b>IsiZulu</b>	2 894	2 116	7 350	2 444	3 400	2 539	3 162	890	2 112	26 906
<b>Sepedi</b>	244	150	526	251	267	205	383	150	366	2 542
<b>Sesotho</b>	381	274	551	275	313	234	410	148	294	2 880
<b>Setswana</b>	236	241	283	100	101	103	212	91	176	1 543
<b>Sign language</b>	2	7	35	13	20	11	20	16	27	151
<b>SiSwati</b>	72	74	340	158	133	127	283	57	188	1 433
<b>Tshivenda</b>	16	41	65	25	16	28	70	52	117	431
<b>Xitsonga</b>	55	49	259	178	95	80	296	140	270	1 424
<b>Other</b>	29	34	145	120	160	73	276	219	347	1 402
<b>Unspecified</b>	-	-	-	-	-	-	-	-	-	-
<b>Not applicable</b>	-	104	-	-	-	91	114	-	428	737
<b>Grand Total</b>	6 606	5 251	14 033	6 022	7 469	6 644	11 322	6 080	12 024	75 452

**e) Educational Profile**

The education profile provides an indication of the literacy levels of the Local Municipality. Figures 26 and 27 illustrate the highest level of education for the Victor Khanye LM and the respective functional areas.

**Figure 27: Victor Khanye Local Municipality, Highest Level of Education, 2001 & 2011**

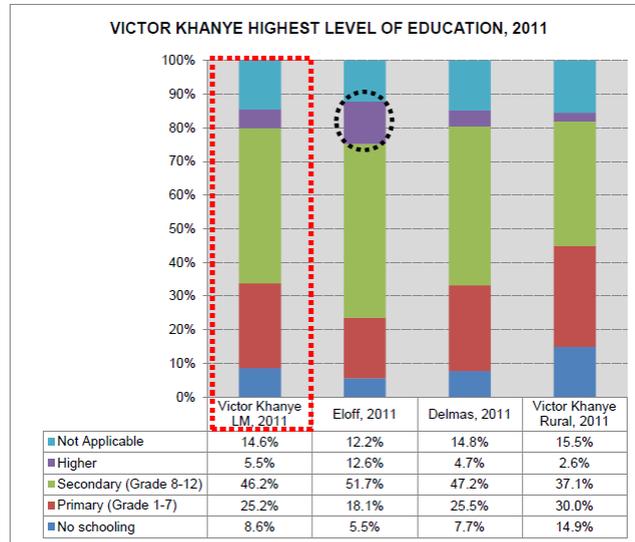


As indicated in Figure 27 (above), Victor Khanye Local Municipality experienced an increase in the highest level of education from 2001 to 2011 in the categories Secondary (Grade 8-12) (from 30.1% in 2001 to 46.2% in 2011) and Higher (3.1% in 2001 to 5.5% in 2011). For the same time period the



following education categories declines; Primary (grade 1-7) (from 35.1% in 2001 to 25.2% in 2011) and no Schooling (from 19.5% in 2001 to 8.6% in 2011).

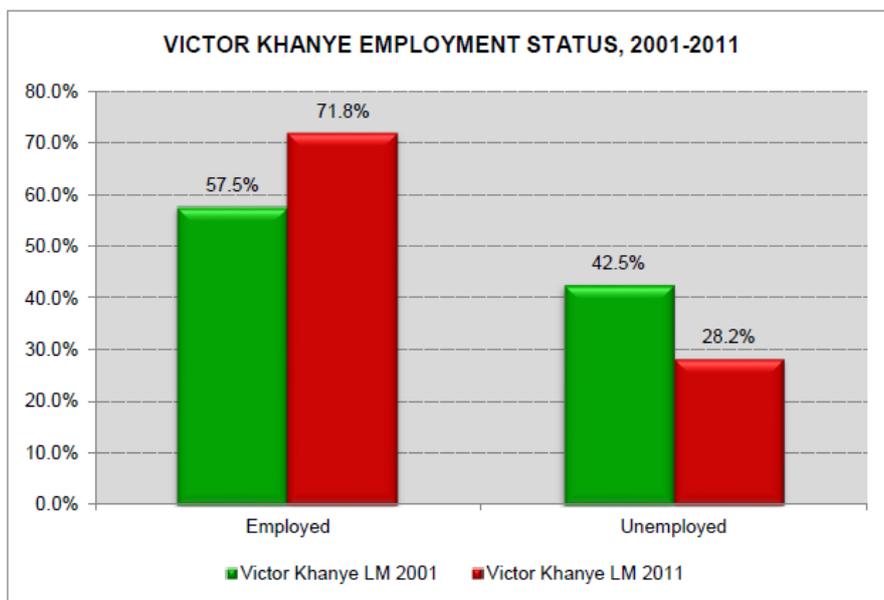
**Figure 28: Victor Khanye Local Municipality, Highest Level of Education, 2001 & 2011**



**f) Employment Status**

Employment status is a good indication of the economic environment of a Municipality. Figures 29 indicates the employment status of the Victor Khanye LM and respective functional areas.

**Figure 29: Victor Khanye Local Municipality, Employment Status 2001 & 2011**



The overall employment levels within the Local Municipality are relatively high (71.8%), of which the total employment increase by 14.3% from 57.5%



in 2001 to 71.8% in 2011. Similarly, unemployment decreased from 42.5% in 2001 to 28.2% in 2011. This is a good indication of a positive local economy.

It is important to note that Victor Khanye contributes 10% of the daily work force commuting between Mpumalanga and Gauteng. Of the commuting population, 75% work in the neighbouring Ekurhuleni Metro.

Table 17 indicates the 2011 employed segment and the economically active population (EAP) segment.

**Table 17: 2011 Employment segment and EAP segment**

<b>Area</b>	<b>Employed Segment</b>	<b>EAP Segment</b>
Victor Khanye LM	71.8%	59.7%
Eloff	85.6%	54.2%
Delmas	66.7%	60.9%
Victor Khanye Rural	78.8%	59.2%

The EAP segment of the Victor Khanye LM is approximately 59.7% of which 71.8% is employed. The Eloff has the lowest EAP segment of approximately 54.2% and the highest employment level (85.6%).

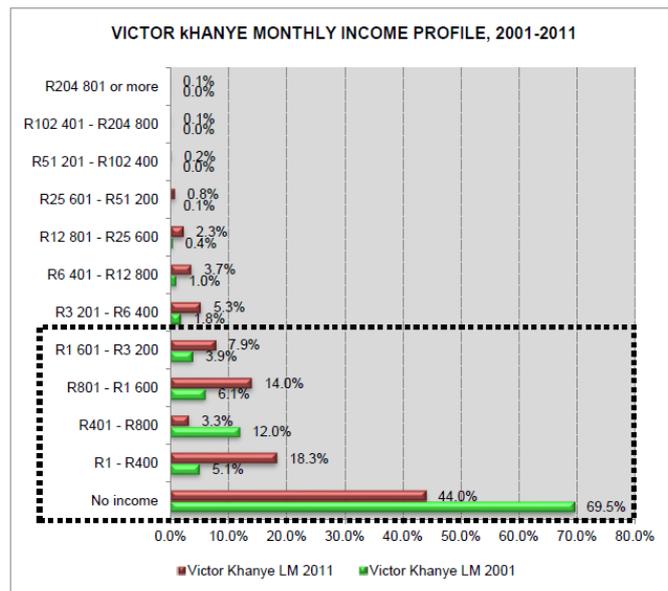
#### **g) Household Income**

Figures 30 and 31 indicate the monthly income of households within the Victor Khanye LM and the functional areas.

The monthly income per household increased significantly from 2001 to 2011. The total number of households earning no income decreased by 25.5%; from 69.5% in 2001 to 44.0% in 2011. Households earning a monthly income of R0-400 increased significantly from 5.1% in 2001 to 18.3% in 2011 and households earning R801-R1600 increased from 6.1% in 2001 to 14.0% in 2011.



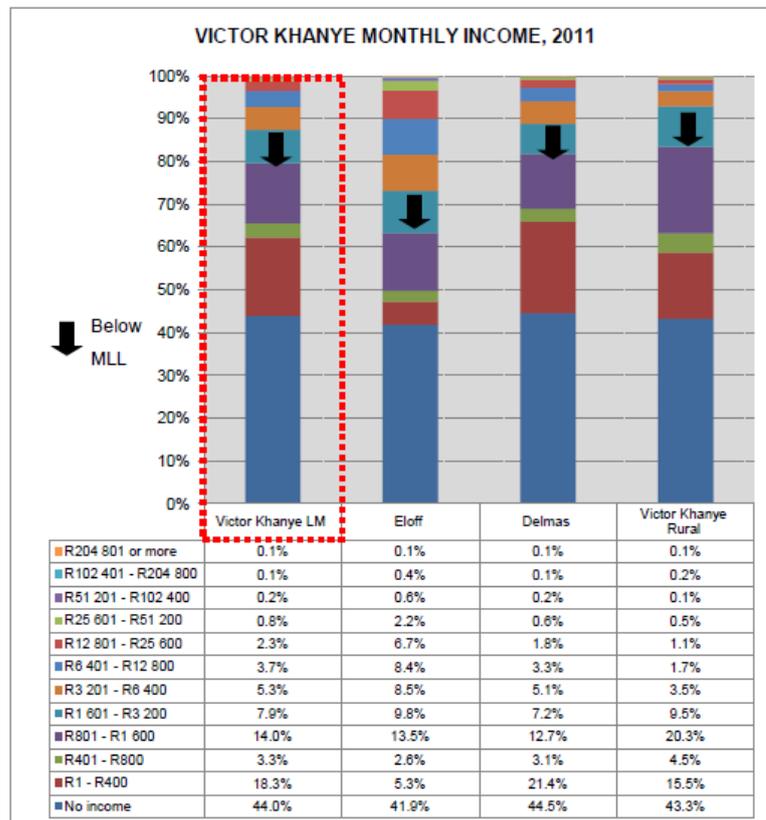
Figure 30: Victor Khanye LM Household Monthly Income Profile 2001-2011



The increase in monthly income is positive, although the overall level of monthly income is still well below the minimum living levels (MLL) estimated at R4 000 to R4 500 per month for 2014 (National Treasury). At minimum, 87.5% of households (for 2011) within Victor Khanye LM earned a monthly income well below the MLL. This indicates high dependency levels of households on government grants and services.

People that live below the poverty line in Victor Khanye are concentrated in the old apartheid proclaimed townships.

Figure 31: Victor Khanye LM Household Monthly Income Distribution 2001-2011

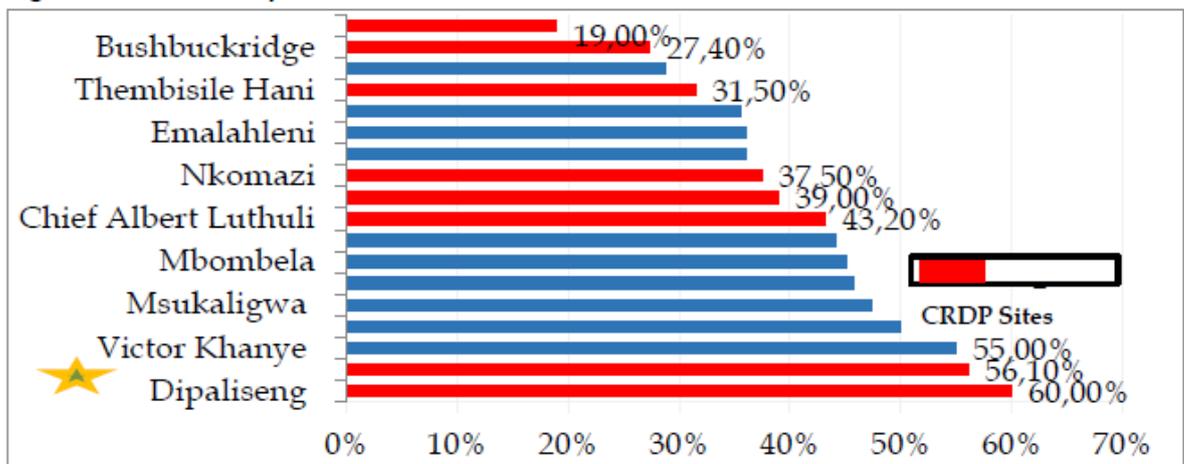


The Eloff functional areas have the highest number of households earning an income of between R3201 and R6400 (approximately 8.4% of the total population respectively). Overall the level of income is very low.

**h) Health Profile**

Mpumalanga is one of the three (3) Provinces with the highest infection rates of HIV/AIDS. Latest statistics for the Province reveal that Victor Khanye Local Municipality has an increased infection rate; as measured in pregnant women tested, of 55%, the 3rd highest in the province. With respect to HIV prevalence, excluding pregnant women, the trend reflected a decrease to 23.0%.

**Figure 32: Mpumalanga HIV/AIDS prevalence**



**i) Economic Indicators**

According to the Victor Khanye IDP (2016/17) the Municipality Gross Domestic Product (GDP) is forecast to grow by 3.4% per annum over up to and including 2016, although this is lower than the District and Province projections. The forecast is very optimistic if we consider that the historic growth rate in the period 1996-2011 remained relatively low at 2.0% per annum.

Agriculture, transport, community services, finance and mining will be the main contributors to the Victor Khanye Local Municipality economic growth in the period up to 2016. The municipality is a major maize producing area. Annual maize production is calculated at between 230 000 and 250 000 metric tons. Mining activities are concentrated on coal and silica. About 3 million metric tons of coal and 2 million metric tons of silica are mined annually in the municipal area.

With respect to Gross Value Added (GVA) - a measure in economic terms of the value of goods and services produced in an area, industry or sector of an economy - the Victor Khanye Local Municipality contribution to the Mpumalanga province is reflected at 2.0% in 2011 at an estimated value of 3,4 billion.

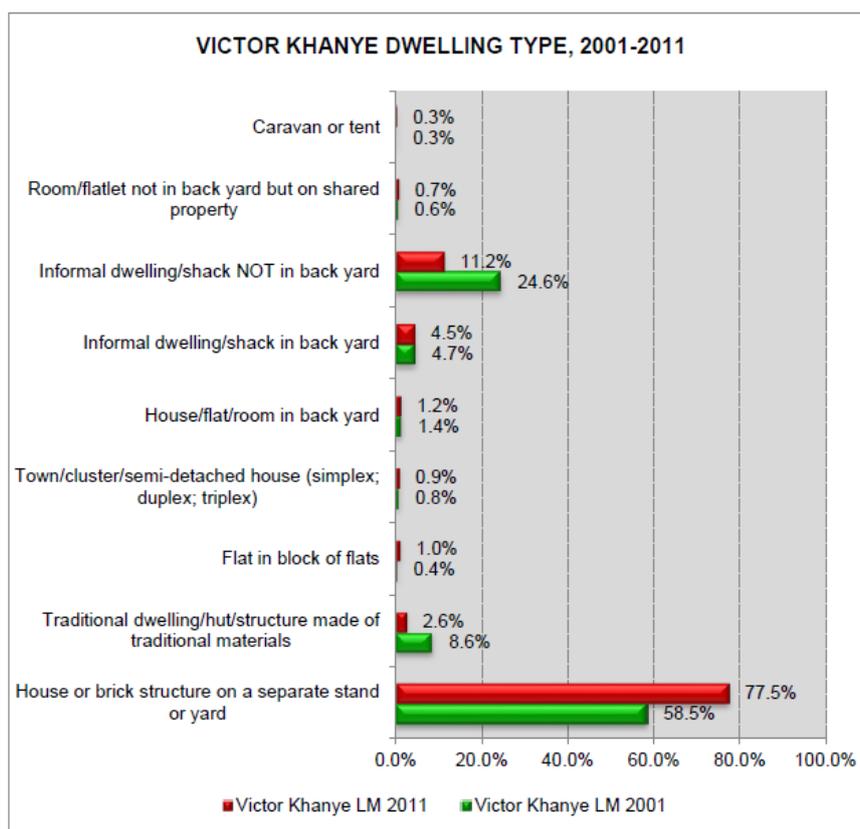


4.2.2.4 Social Infrastructure Profile

**a) Housing**

Dwelling type is a good indication of the residential character of a municipality. Figure 33 indicates the dwelling type distribution within the Victor Khanye LM and the respective functional areas.

**Figure 33: Victor Khanye LM Dwelling Type 2001-2011.**



The number of households residing in a house or brick structure on a separate stand or yard increased from 58.5% in 2001 to 77.5% in 2011. The number of households residing in an informal dwelling not in a back yard decreased from 24.6% in 2001 to 11.2% in 2011 and households residing in a traditional dwelling / hut / structure made of traditional materials decreased from 8.6% in 2001 to 2.8% in 2011.

**b) Household Infrastructure (Energy, Water, Sanitation & Refuse Removal)**

Table 18 below shows a slight increase in most levels of services for households in the Victor Khanye municipal area, from 2001 to 2011 and thus also an increase in the general wellbeing of household for the same period.



**Table 18: Victor Khanye Local Municipality, Households with services, 2001 – 2011**

	Percentage 2001	Percentage 2011
Flushed toilet connected to sewerage	68.1%	83.8%
Weekly refuse removal	63.3%	74.2%
Piped (tap) water inside dwelling	70.8%	83.2%
Electricity for lighting	64.9%	85.1%

## 5 POTENTIAL SOCIAL IMPACTS ASSOCIATED WITH THE BRAVO 4 PROJECT

The energy infrastructure project can potentially deliver many benefits in the long term for communities in the Victor Khanye, Govan Mbeki and Emalaheni Local Municipalities. Possible negative impacts are also anticipated in the short term, which can be reduced or avoided with management measures.

*Potential positive socio-economic impacts during the construction phase:*

- Positive economic impacts as the increase in new business sales, generation of additional Gross Value Adding (GVA), creation of new employment opportunities, and an increase in local government earnings as a result of the construction phase of the project.
- Creation of opportunities for skills development and on-site training.

*Potential positive socio-economic impacts during the construction phase:*

- The operational phase is expected to provide positive impacts such as improved supply of electricity to the project region, electrification of households in the rural areas and creation of additional employment for maintenance of the servitude.
- The improvement of the supply of electricity to the region would enable it to continue growing.
- Employment creation during the operational phase (such as for the maintenance of the servitude) will have a relatively low impact on the regional economy, however this will still provide much needed income for poor households. In cumulative terms, the significance of the positive economic impacts during operation is high.

*Potential negative socio-economic impacts*

- Impacts associated with the presence of construction workers on site.
- Impacts on health and social well-being
- Increased risk of stock theft, poaching and damage to farm infrastructure associated with presence of construction workers on the site.
- Increased risk of veld fires associated with construction-related activities.
- Threat to safety and security of farmers associated with the presence of construction workers on site.
- Impact of heavy vehicles, including damage to roads, safety, noise and dust.



- Impact on agricultural and irrigation activities.
- Impact on agricultural land use (loss of productive agricultural land).

The potential impacts that are expected to arise during the construction, operational and maintenance phases will be discussed in this section of the report.

## **5.1 IMPACTS ON SPATIAL DEVELOPMENT (FUTURE LAND USE)**

The proposed location of the transmission corridor is such that it does not traverse over any land parcels earmarked for future urban development in terms of the Local Municipality Spatial Development Frameworks, 2015/26.

## **5.2 MINING**

- Transmission power lines should avoid mining activities due to the possibility of slumping and underground fires. Also, towers pose a risk to mining activities in the form of towers falling over, with health and safety as well as economic impacts as a result.
- In turn, the mining activities might also pose a risk to the safety of the Transmission power line; if for example, blasting takes place at the mining operation.
- Mineral rights holders have rights to the surface area as well as far as they need the surface area to exercise their right to extract minerals. Therefore, any structures on the mineral rights surface areas have to be approved by the holders of these rights.
- Blasting takes place on a regular basis at open cast mining areas, as is associated with many of the mines in the area. Therefore mining operations could have a negative impact on the Transmission power line itself due to blasting (i.e. flying rocks that could potentially hit the Transmission power line, leading to breakdowns and an interruption in electricity supply).

At least six (6) existing (Stuart Colliery, Lakeside Collieries A & B, Leslie Gold Mine and 2 Unknown Shafts) and 1 proposed (Evander South Mine) mining operations have been identified within the study area.

**Table 19: Assessment of impact on mining activities**

<b>Nature:</b> Impact on mining activities		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION, OPERATION AND MAINTENANCE</b>		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Medium (3)	Medium (3)



<b>Extent</b>	Local (1)	Local (1)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Significance</b>	Low (24)	Low (24)
<b>Status</b>	Negative	Negative to neutral
<b>Reversibility</b>	N/a	
<b>Irreplaceable loss of resources?</b>	N/A	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation: Construction, operation and maintenance phases</b>	<ul style="list-style-type: none"> <li>• The location of the Transmission power line should be determined in consultation with mining companies.</li> <li>• It is preferable to avoid mining operations at these plants altogether.</li> </ul>	
<b>Cumulative impacts:</b>	N/A	
<b>Residual risks:</b>	Low	

### **5.3 PRESENCE OF THE TRANSMISSION POWER LINES**

#### **Construction phase**

Transmission lines and towers do not exist during this phase and no impacts are foreseen.

#### **Operation and maintenance phase**

The main social concerns which arise when considering the presence of a transmission power line close to human settlement and potential settlement in the servitude are potential health and safety related impacts, including risks are related to Electro and Magnetic Fields (EMF), electrocution, fire and collapse of structures.

- Scientific research has not demonstrated any significant impacts of EMF from conventional 30-40m high transmission lines. As household appliances and other electrical equipment also generate electric and magnetic fields (EMF), people are generally exposed to varying levels of EMF in their daily lives at work and at home.
- The Empetus (2006) study summarized the following in terms of present knowledge on the possible health effects of EMF on humans:
  - The main focus of research has been on a possible association between long term exposure to magnetic fields and childhood leukaemia.



- Based on the epidemiological findings, the risk of EMF being a health hazard is small.
- Based on current understanding of the topic, EMF is regarded a possible but not proven cause of cancer.
- The suggestion for this health outcome stems mainly from a fairly consistent pattern of the increased but small risk observed from some epidemiological studies. This finding has not been confirmed by (notably all) controlled laboratory studies.
- No evidence of a causal relationship between magnetic field exposure and childhood leukaemia has been found and no dose-response relationship has been shown to exist between EMF exposure and biological effects.
- A possible explanation for the epidemiological findings may be confounding (a factor other than EMF) or bias (subjects studied are not representative of the target population about which conclusions are drawn) which render the data inconclusive and prevent resolution of the inconsistencies in the epidemiologic data.
- Considering electrocution, transmission lines could pose a safety risk. Induced charges can build up on fence wires mounted on wood posts near power lines. This phenomenon is generally restricted to higher voltage lines (200 kV or greater). The magnitude of the build-up depends on a variety of factors:
  - The size of the power line;
  - The length of fence paralleling the line;
  - The distance between the line and the fence;
  - The amount of moisture in the fence posts and the ground; and
  - The presence of grounding devices such as metal fence posts or weeds growing next to the fence.
- A line could cause fatal/traumatic accidents because of collapse of a tower and/or lines because of mechanical failure, fire and mining activities.
- Fire can be caused by of electrical malfunction or human error.

**Table 20: Assessment of impact of the presence of transmission power lines**

<b>Nature:</b> Possible risks associated with the presence of transmission power lines.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>OPERATION AND MAINTENANCE PHASE</b>		
<b>Probability</b>	Probable (2)	Probable (2)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Local (1)	Local (1)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Significance</b>	Low (14)	Low (14)
<b>Status</b>	Negative	Negative



<b>Reversibility</b>	Yes, if transmission lines are removed
<b>Irreplaceable loss of resources?</b>	N/A
<b>Can impacts be mitigated?</b>	Yes
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>Scientific studies regarding this possible impact should be studied and the results must be communicated to community.</li> </ul>
<b>Residual Risks:</b>	Moderate

## 5.4 IMPACT ON WATERCOURSES

### Construction phase

Watercourses are considered rivers, streams, natural channels (perennial and seasonal), wetlands and dams. The construction of the line and upgrading or building of new access roads could cause the following social impacts:

- Waste generated during the construction phase may enter the environment through surface water runoff i.e. litter or pollution such as hydrocarbons can be washed into aquatic systems affecting those systems negatively.
- Storm-water flowing over the site will also mobilise loose sediments, which may enter the surface water environment affecting water quality.
- Contamination of surface water through sedimentation from instream works, silt laden runoff from disturbed areas, and improper practices (e.g. poor management of waste water and disposal of solid waste).
- Inadequate storm-water management on access roads.
- Damage to towers from major flood events.

### Operation and maintenance phase

- Waste generated during the maintenance of the servitude and transmission lines may enter the environment through surface water runoff i.e. litter or pollution such as hydrocarbons can be washed into aquatic systems affecting those systems negatively.

**Table 21: Assessment of impact watercourses during the construction phase**

<b>Nature:</b> Possible impact on watercourses.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Duration</b>	Short term (2)	Short term (2)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Moderate (6)	Low (2)
<b>Significance</b>	Low (14)	Low (14)
<b>Status</b>	Negative	Negative
<b>OPERATION AND MAINTENANCE</b>		



<b>Probability</b>	Probable (3)	Improbable (2)
<b>Duration</b>	Short term (2)	Short term (2)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Moderate (6)	Low (2)
<b>Significance</b>	Low (14)	Low (14)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes	
<b>Irreplaceable loss of resources?</b>	No	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Construction camps to be located not closer than 50m from the edge of riparian habitat / wetland buffer zone.</li> <li>• As far as possible, use existing bridge crossings as access roads.</li> <li>• Storm-water containing sediment can be discharged to grassland buffers to ensure sediments fall out prior to water entering surface water bodies. Care must be taken that storm-water containing hydrocarbons and other pollution sources are not discharged.</li> <li>• Implement suitable storm-water measures during construction to manage ingress of runoff into watercourses.</li> <li>• Ensure proper storage of material (including fuel, paint) that could cause water pollution.</li> <li>• Ensure proper storage and careful handling of hazardous substances with spill prevention materials at hand.</li> <li>• Ensure proper waste management and housekeeping.</li> <li>• Demarcated areas where waste can be safely contained and stored on a temporary basis during the construction phase should be provided.</li> <li>• When adequate volumes of waste (not more than 1 month) have accumulated, all waste is to be removed from site and disposed of at a licensed facility.</li> <li>• Waste is not to be buried on site.</li> </ul>	
<b>Residual Risks:</b>	Moderate	

## 5.5 ECONOMIC IMPACTS

From the demographic profile described under paragraph 4 it is clear that any employment opportunities (either directly or indirectly) created by the proposed project would serve to assist in alleviating unemployment and poverty in the area.



### **Construction phase**

#### Compensation for servitudes

- Eskom pays a once-off amount to landowners for right of way in the servitude of 55m per 400kV line. Compensation is also paid for the potential loss of livelihood as a result of the servitude.
- The impact of financial gain should be long-term, because although a once-off amount is paid, this amount is deemed to reflect the lifelong economic effect.
- Land owners are increasingly insisting on an annual access fee, which should be revised annually.
- People might deliberately move onto the servitude for the purpose of receiving compensation.
- Construction activities will create a number of temporary employment opportunities, for general workers, construction workers (private companies), administrative staff and technical workers (electricians and boilermakers).

#### Direct formal and/or informal employment opportunities for local individuals

- The project may also create indirect employment in the informal sector, for instance catering for construction workers.
- The families of those who secure work, will benefit as it will impact on their health and wellbeing for duration of the contract. This will amount to a significant number of people, taking into account that the average household size is between 3.6, 3.2 and 3.3 in the Victor Khanye, Emalahleni and Govan Mbeki municipalities respectively.
- During the construction phase of Eskom's projects both unskilled and semi-skilled labourers will receive formal and informal training and develop skills that will substantially improve their chances of finding new jobs. People keep the skills they acquire through formal and on-the-job training while working on Eskom projects.
- Although the impact on employment will be temporary, due to high levels of poverty and unemployment, 28.2% in Victor Khanye, 26.2% in Govan Mbeki and 27,3% in Emalahleni Local Municipality, any impact on job creation in this area will have a positive impact.
- Although the use of local labour usually results in a more positive attitude towards a project, some community members may be dissatisfied with the process to employ local labour through a third party labour broker.
- The required skills might not be available in the local area, which means that the appropriate skills might have to be 'imported', thereby causing a reduction in the job and income opportunities available to local residents.



- The local community may feel that temporary workers, who are not local enjoys favouritism and preferential treatment, because they are provided with accommodation as well as transport, while local labourers are responsible for their own transport.
- The construction industry does not lend itself to employment of women. In the construction phase, women will have less opportunities to become employed.

Indirect formal and /or informal business opportunities to local individuals.

- Another potential opportunity is the rental of land for the accommodation of the construction workers and storage of equipment in return for financial compensation, albeit confined to the landowner. Housing construction workers within local communities and the use of local contractors to supply material should be considered as this increases the economic investment into the affected area.
- Eskom has a policy of price-matching for local procurement in place whereby local BEE companies are given the opportunity to match the best price for tenders advertised. If they are able to match the best price, such local companies are given preference in the awarding of tenders.
- The use of local sub-contractors may have certain negative implications for the project:
  - Local sub-contractors may not be able to source material on time, and then the Eskom contractors have to supply materials to ensure that the work is completed within the set timeframes.
  - Local sub-contractors are not always able to complete their work on time, due to financial constraints and lack of project management skills.
- Local businesses benefit indirectly as a result of increase local spending by those that are employed which in turn contribute to health and wellbeing for those families.

***Operation and maintenance phase***

Compensation for servitudes

No compensation for servitudes is paid during this phase.

Direct formal and/or informal employment opportunities for local individuals

- Regular maintenance and emergency repairs of the transmission lines is a highly skilled job seeing as maintenance is normally carried out on live lines to prevent a disruption in the supply.



- It is unlikely that maintenance workers will be sourced from within the local community, due to the skilled nature of the job requirements and it is more likely that Eskom would employ a maintenance team that will cover the entire length of the transmission power lines instead of fragmented maintenance teams that only cover a certain section of these lines.
- However, some local individuals may be employed on servitude maintenance teams, but that would to a large extent depend on the appointed servitude maintenance contractor. The number of people involved in a maintenance team depends on the type of maintenance that has to be conducted.
- Due to the fact that local community members are unlikely to be employed as transmission power line maintenance team members, no tangible economic impacts are foreseen and where local community members are used as servitude maintenance workers, this could lead to an economic impact and local social upliftment.
- There will be short term employment.

Indirect formal and /or informal business opportunities to local individuals

No business opportunities are anticipated during the operational phase.

Electricity supply and economic growth

- Resources and infrastructure, such as electricity, water and fuel, enables normal economic growth as most economic activities are dependent on a sufficient and steady supply of electricity.
- Normal economic activities, e.g. industry and businesses, are affected when electricity is not available. The economic impact on such services increases the longer services such as electricity is unavailable.
- The proposed transmission power line would enhance the electricity supply to the local area, thereby stimulating economic growth through the establishment and/or expansion of businesses and industries. This in turn creates additional employment opportunities, which further enhances economic growth, permitting a positive economic impact to filter down to a more grassroots level

**Table 22: Assessment of Economic Impacts**

<b>Nature:</b> Economic impacts include:		
		<ul style="list-style-type: none"> <li>• Compensation for servitude</li> <li>• Direct formal and/or informal employment opportunities for local individuals, and</li> <li>• Indirect formal and /or informal business opportunities to local individuals.</li> <li>• Electricity supply and economic growth</li> </ul>
	<b>Without mitigation</b>	<b>With mitigation</b>



CONSTRUCTION PHASE		
<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Short term (2)	Short term (2)
<b>Extent</b>	Local – Regional (2) (Rated as 2 due to potential opportunities for local communities and businesses)	Local – Regional (3) (Rated as 2 due to potential opportunities for local communities and businesses)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Significance</b>	Medium (32)	Medium (36)
<b>Status</b>	Positive	Positive
OPERATION AND MAINTENANCE PHASE		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Short term (1)	Short term (1)
<b>Extent</b>	Local (1)	Local (1)
<b>Magnitude</b>	Minor(1)	Minor(1)
<b>Significance</b>	Low (9)	Low (9)
<b>Status</b>	Positive	Positive
<b>Reversibility</b>	N/A	
<b>Irreplaceable loss of resources?</b>	N/A	
<b>Can impacts be mitigated?</b>	YES	
<b>Mitigation:</b> <b>Construction phase</b>	<p><b>Compensation:</b></p> <ul style="list-style-type: none"> <li>• Appoint a land valuator with experience be experience.</li> <li>• The process should be conducted with the necessary respect, and the negotiator should be transparent about the process and expectations (do not engage in “empty promises”).</li> <li>• The negotiation should be done for the whole servitude and not part of the servitude.</li> <li>• Contracts should be reviewed by an independent body.</li> <li>• Land owners should be made aware that a pre- and post-evaluation of their land value is possible.</li> <li>• In the case of tribal authorities, Eskom should consider establishing a trust fund in consultation with the tribal authority (as a form of compensation) for the community that is jointly administrated by Eskom and the tribal authority. Community development projects can then be funded from the trust fund, which would aid sustainable development in the area.</li> </ul> <p><b>Employment:</b></p> <ul style="list-style-type: none"> <li>• Unskilled job opportunities should be afforded to the inhabitants of the communities closest to the proposed construction site. Means to achieve this are suggested below:</li> <li>• Identify types and levels of employment that the development can offer.</li> </ul>	



	<ul style="list-style-type: none"> <li>• Local individuals should be employed for work components that do not require a substantial amount of skill, e.g. foundation excavation, vegetation clearance, erection of gates, cleaning services, and security guards</li> <li>• Appoint a local labour broker. The process of procurement should be monitored by Eskom to ensure that the process was transparent and equal opportunities were afforded.</li> <li>• Refer contractors to jobseeker's databases kept by local community structures when sourcing local labour.</li> <li>• Individuals with the potential to develop their skills should be afforded training opportunities.</li> <li>• Identify targets for BEE and local employment.</li> <li>• Reserve agreed percentage of higher level positions for local employment.</li> <li>• Location of appropriate transport providers who would be available to assist contractors in transporting worker to and from these sites.</li> <li>• Younger people tend to have higher levels of education and may stand in line for higher levels of employment. Opportunities for the employment of younger people should be maximised.</li> <li>• Individuals with the potential to develop their skills should be afforded training opportunities.</li> <li>• Equal opportunities for employment should be created to ensure that the local female population also has access to these opportunities.</li> <li>• Through consultation with relevant key stakeholders, identify the segment that might benefit from informal indirect opportunities, and promote skills development and subsidisation initiatives that are sustainable.</li> <li>• Encourage, in consultation with key stakeholders, construction workers to use local services.</li> <li>• Mechanisms should be developed to provide alternative solutions for creating job security upon completion of the project.</li> <li>• Payment should comply with applicable Labour Law legislation in terms of minimum wages.</li> <li>• Where local labourers are employed on a more permanent basis, these labourers should be registered with the Unemployment Insurance Fund (UIF), Pay as You Earn or any other official bodies as required by law. This would enable the workers to claim UIF as a means of continuous financial support when the workers' positions during construction itself have become redundant or once the construction phase comes to an end.</li> </ul> <p><b>Business:</b></p>
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	<p>Make use of local suppliers of goods and services where possible. Means to achieve this are suggested below:</p> <ul style="list-style-type: none"> <li>• Engage with local businesses to assist with meeting requirements for tender processes and documentation.</li> <li>• Identify targets for BEE and local procurement</li> <li>• Communicate supply chain opportunities through the project's website and communication materials.</li> <li>• Communicate supply chain opportunities through local business networks.</li> <li>• Expedite process of registering local service providers on Eskom's procurement database.</li> <li>• Engage with local stakeholders to establish a local business forum to increase access to opportunities.</li> <li>• Provide information regarding the types of business opportunities and economic and economic spin-offs that may arise from the proposed development.</li> <li>• Participatory workshops in which interested members of local communities can be guided with regards to types of business opportunities that could arise.</li> <li>• Provide the local business network in advance of construction with a list of required goods and services as well as procurement tendering requirements.</li> <li>• Investigate ways of enabling potential sub-contractors from low-income areas to tender.</li> <li>• Set up linkages for small business loans, as well as small business skills training.</li> </ul>
<p><b>Mitigation:</b> <b>Operational and Maintenance phase</b></p>	<p><b>Employment:</b></p> <ul style="list-style-type: none"> <li>• Individuals with the potential to develop their skills should be afforded training opportunities. Eskom should be involved in this process.</li> <li>• Make use of local labour on unskilled maintenance components, such as servitude maintenance.</li> <li>• Where local labourers are employed on a more permanent basis, cognisance should be taken of the Labour Law in terms of registering the worker with the Unemployment Insurance Fund (UIF), Pay as you earn (PAYE), workman's compensation and all other official bodies as required by law. This would enable the worker to claim UIF as a means of continuous financial support when the worker's position on the construction team has either become redundant or once the construction phase comes to an end.</li> </ul> <p><b>Electricity supply and economic growth:</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul>



<b>Cumulative impacts:</b>	Opportunity to up-grade and improve skills levels, additional business and economic opportunities in the area. However, due to relatively small number of local employment opportunities this benefit is likely to be limited.
<b>Residual risks:</b>	Low

## **5.6 INFLUX OF CONSTRUCTION WORKERS**

### **Construction phase**

Given the specialists nature of transmission line construction, specialist contractor and subcontractor 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 lines and towers 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 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.

Where sourcing of local labour is not possible, “outsiders” will need to be employed in order to provide necessary skills. These employees may be accommodated in a construction camp. Historically, such camps created social changes by introducing new people to an area. These changes can be both positive and negative:

- Positive in that people exchange ideas and backgrounds, and outside workers provide a small stimulus to the local economy if accommodation for such workers could be procured locally, and
- Negative in terms of conflict that these differences may evoke. The construction camp may also attract women who may use the opportunity to generate income.

Two types of accommodation could be used by contractors coming from other areas, namely:

- Bulk accommodation, e.g. hostel housing or private houses, catering for groups of 15 to 60 people for general construction labourers, that only need a place to stay; and
- More formal accommodation, e.g. guesthouses, for management and administration that only come for short periods to render services to their companies.

Construction workers not sourced locally may contribute to creating numerous social problems and especially for the towns Kinross, Brendan Village and Embalenhle, situated 0.2km to 4.5km from the proposed corridor. These problems include:



- Potential conflict between outside workers and the local community, enhanced by a feeling of competition for scarce resources, e.g. much needed employment opportunities.
- The presence of construction workers from elsewhere could aggravate existing social problems, particularly alcohol and drug abuse.
- An influx of people with disposable income might lead to an increase in prostitution, which can impact on the HIV and unwanted pregnancy rate in the area. There can be a number of spin-offs like alcohol abuse, disintegration of families and sexually transmitted diseases (STD's).
- The community could feel that the construction workers from elsewhere pose a threat to their personal safety, because undesirable people will be attracted to the area, there will be strangers on farms servicing the power lines and fires could start as a result of the possible theft of conductors of transmission lines.
- 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.
- 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.

**Operation and maintenance phase**

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.

**Table 23: Assessment of Impact of Influx of Construction Workers**

<b>Nature:</b> Potential impacts on family structures and social networks associated with the presence of construction workers		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Short term for community as a whole (2) Long term-permanent for individuals who may	Short term for community as a whole (2) Long term-permanent for individuals who may be affected by STD's etc. (5)



	be affected by STD's etc. (5)	
<b>Extent</b>	Local (3) (Rated as 3 due to potential severity of impact on local communities)	Local (2) (Rated as 1 due to potential severity of impact on local communities)
<b>Magnitude</b>	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc. (10)	Low for the community as a whole (4) High-Very High for specific individuals who may be affected by STD's etc. (10)
<b>Significance</b>	Low for the community as a whole (27) Moderate-High for specific individuals who may be affected by STD's etc. (57)	Low for the community as a whole (24) Moderate-High for specific individuals who may be affected by STD's etc. (51)
<b>Status</b>	Negative	Negative
<b>OPERATION AND MAINTENANCE PHASE</b>		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Short term (1)	Short term (1)
<b>Extent</b>	Local (1)	Local (2)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Significance</b>	Medium (30)	Medium (30)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>		
	No in case of HIV and AIDS	
<b>Irreplaceable loss of resources?</b>	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods.	
<b>Can impacts be mitigated?</b>	Yes, to some degree. However, the risk cannot be eliminated.	
<b>Mitigation: Construction phase</b>	<ul style="list-style-type: none"> <li>• Raise awareness amongst construction workers about local traditions and practices.</li> <li>• Inform local businesses about the expected influx of construction workers so that they can plan for the extra demand.</li> <li>• 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.</li> <li>• Ensure that the local communities communicate their expectations of construction workers' behaviour.</li> </ul>	



	<ul style="list-style-type: none"> <li>• Conditions stipulated by property owners in terms of the construction activities should be implemented and monitored.</li> <li>• Maximise local employment to minimise the need for housing of temporary workers which could lead to social problems of integration with the local community.</li> <li>• All construction activities should be restricted to working areas.</li> <li>• Construction workers should wear name tags and clothing to ensure that they can be readily identified as belonging to the construction workforce. This should be applicable to all construction workers, including those locally recruited.</li> <li>• What workers bring on site should be monitored. The provision of catering on-site will reduce the chances that substances such as alcohol are brought on-site or used during working hours, reducing the likelihood of alcohol related conflict and disturbances.</li> <li>• Workers should receive fines if they do not adhere to the conditions, rules and regulations.</li> <li>• Workers should be made aware of property owners' concerns regarding construction work on their properties so that they are familiar with the sensitive issues.</li> <li>• 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.</li> </ul>
<p><b>Mitigation:</b> <b>Operational and maintenance phase</b></p>	<ul style="list-style-type: none"> <li>• Eskom personnel should preferably not access private properties without prior notification of the property owners.</li> <li>• Eskom maintenance personnel should be in possession of the required identification documents and clothing when undertaking maintenance work.</li> <li>• Vehicles used should be clearly marked.</li> <li>• Eskom personnel should behave properly at all times.</li> </ul>
<p><b>Cumulative impacts:</b></p>	<ul style="list-style-type: none"> <li>• Impacts on family and community relations that may, in some cases, persist for a long period of time. Also in cases where unplanned / unwanted pregnancies occur or members of the community are infected by an STD, specifically HIV and or AIDS, the impacts may be permanent and have long term to permanent cumulative impacts on the affected individuals and/or their families and the community.</li> <li>• Possible criminal activities undertaken on properties.</li> </ul>
<p><b>Residual risks:</b></p>	<ul style="list-style-type: none"> <li>• Medium</li> </ul>



## 5.7 INFLUX OF JOB SEEKERS

### **Construction phase**

As news regarding a proposed project spreads, expectations regarding possible employment opportunities may take root. Consequently the areas surrounding the site could experience an influx of job seekers. It is not possible to accurately predict the amount of job seekers that would flood to the area, which could range from a single job seeker to hundreds and thousands of job seekers.

The study area has a high unemployment level and competition over scarce employment opportunities may give rise to conflict between local residents and newcomers.

The influx of job seekers into the environment will lead to an increased demand on local services and will not necessarily lead to a boost in the local economy, seeing as these job seekers are mostly unemployed.

It is likely that the influx of job seekers could lead to the expansion of informal settlements, as these people have no resources and therefore aim to settle as close to the construction site, as possible.

The more an informal settlement continues to grow, the more socio-economic conditions will continue to deteriorate (with more people trying to access the same amount of limited resources), and the more the quality of life of other local (neighbouring) residents will be affected. However, restricting the influx of job seekers and the associated expansion of existing informal settlements is a mammoth task and often beyond the contractors' control.

As the proposed transmission corridor is situated next to the town Embalenhle and within 4,5km from Kinross and Brendan Village, the main influx of jobseekers from these towns/settlements can be expected.

### **Operation and maintenance phase**

Regular maintenance and emergency repairs of the substation and transmission lines would be conducted by specialised teams of permanent Eskom personnel and no new job opportunities will be created, which would make the inflow of jobseekers negligible.

No mitigation measures are thus proposed.

**Table 24: Assessment of Impact of the possible Influx of Unemployed job seekers and temporary workers.**

<b>Nature:</b> Possible influx of unemployed job seekers and temporary workers		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<b>Probability</b>	Highly probable (4)	Probable (3)
<b>Duration</b>	Short term (2)	Short term (2)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Low (5)	Low (4)
<b>Significance</b>	Medium (45)	Low (24)



<b>Status</b>	Negative	Negative
<b>OPERATION AND MAINTENANCE</b>		
<b>Probability</b>	Very improbable (1)	Very improbable (1)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (3)	Regional (3)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Significance</b>	Low (9)	Low (9)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>		
	N/A	
<b>Irreplaceable loss of resources?</b>		
	N/A	
<b>Can impacts be mitigated?</b>		
	Yes	
<b>Mitigation: Construction phase</b>	<ul style="list-style-type: none"> <li>• Maximise local employment according to strategies outlined previously.</li> <li>• The number of job opportunities available as part of the proposed project and the recruitment process should be clearly communicated.</li> <li>• The communication strategy should ensure that unrealistic employment expectations are not created.</li> <li>• Access to the construction site should be controlled.</li> <li>• Have clear rules and regulations for access to the construction camp to control loitering.</li> <li>• The use of local labour should be maximised through contractual conditions set for the sub-contractors.</li> <li>• Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company.</li> <li>• Construction workers must also be provided with identification tags.</li> </ul>	
<b>Mitigation: Operation and maintenance phase</b>	<ul style="list-style-type: none"> <li>• None</li> </ul>	
<b>Cumulative impacts:</b>	<ul style="list-style-type: none"> <li>• The influx of job seekers or temporary workers could lead to the expansion of informal settlements. The more an informal settlement continues to grow, the more socio-economic conditions will continue to deteriorate and the more the quality of life of other local (neighbouring) residents will be affected.</li> <li>• 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.</li> </ul>	
<b>Residual risks:</b>	<ul style="list-style-type: none"> <li>• Medium</li> </ul>	

## 5.8 RELOCATION OF HOUSEHOLDS

### Construction phase

Although, at present, there is no settlement within the proposed servitude, the western portion of the town Embalehne is situated just east of the proposed transmission corridor (approximately 130m) and in a few cases there are



scattered households within very close proximity to the proposed corridor. It is not foreseen that these households would necessarily have to be resettled, although the proposed project may have an impact on their sense of place.

It is important to note that even if the proposed transmission power line is aligned in such a manner that it does not traverse any inhabited areas, the possibility cannot be ruled out that some areas will not be inhabited by the time construction commences. Incidences occurred in the past where households had deliberately settled in an area that is known to be earmarked as a servitude. Such households then claimed to have been living in that area for an extended period of time and then claimed compensation from Eskom for having to be resettled.

**Operation and maintenance**

The development of informal settlements near or in servitude areas will not only obstruct access of Eskom to their servitudes for routine maintenance or an emergency (malfunctioning) on the line and causing delays, but people settling within the servitude would also impact on their own health and safety.

Relocation will then be necessary and the impact of relocation depends on the level of attachment to a place, which in turn is informed by variables such as age and number of years spent in that particular area. It is believed that if the servitude is inspected for settlement on a regular basis, Eskom would be able to remove people and/or households from the servitude without causing severe negative impacts. The sooner that people are removed from the servitude, the less likely it becomes that they have become attached to the area, as they have only been living there for a short space of time. The impact is therefore not viewed as purely negative due to the fact that Eskom would have unrestricted access to their servitude in case of emergency. The safety of the relocated party would also be enhanced if they are removed from the servitude.

**Table 25: Assessment of impact of the possible relocation of people**

<b>Nature:</b> Relocation of existing and new households and/or population segments		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Moderate (5)	Low (4)
<b>Significance</b>	Medium (36)	Low (22)
<b>Status</b>	Positive	Positive
<b>OPERATION AND MAINTENANCE</b>		
<b>Probability</b>	Probable (3)	Improbable (2)
<b>Duration</b>	Permanent (5)	Permanent (5)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Moderate (5)	Low (4)
<b>Significance</b>	Medium (36)	Low (22)
<b>Status</b>	Positive	Positive
<b>Reversibility</b>	Low	



<b>Irreplaceable loss of resources?</b>	N/A
<b>Can impacts be mitigated?</b>	Yes
<b>Mitigation: Construction, operation and maintenance phases</b>	<ul style="list-style-type: none"> <li>• Avoid the resettlement and/or displacement of households as far as possible.</li> <li>• If resettlement is unavoidable, residents should be sufficiently compensated and assisted with the relocation process.</li> <li>• A form of compensation should also be granted to individuals who are residing in informal settlements within the servitude.</li> <li>• A formal grievance procedure should be implemented and communicated to landowners to ensure a fair and transparent process.</li> <li>• Eskom (or its appointed contractor) should monitor areas where people gather in the field on a regular basis as this is normally the first indication that settlement might take place in the area. These people should be removed in co-operation with the local SAPS to prevent the formation and/or expansion of informal settlements in such an area, especially if it encroaches upon the servitude.</li> <li>• The servitude should be inspected on a regular basis to determine whether any settlement has taken place, either within the servitude, or encroaching upon the servitude.</li> <li>• Households that encroach upon or settle within the servitude have to be relocated as soon as possible.</li> <li>• Eskom or its appointed contractors should assist these households with the relocation process.</li> <li>• Educate surrounding communities about the dangers of living in the servitude.</li> <li>• A form of signage on the towers should also indicate that it is dangerous.</li> <li>• In some way, a barrier (psychological and/or physical) should indicate that no structures should be built in the servitude.</li> <li>• One way of achieving such a barrier is to educate community leaders on the health and safety aspects of the servitude, who then in turn can ensure that settlement does not take place within the servitude.</li> </ul>
<b>Cumulative impacts:</b>	<ul style="list-style-type: none"> <li>• Households may deliberately settle in a servitude area then claimed compensation from Eskom for having to be resettled.</li> </ul>
<b>Residual risks:</b>	<ul style="list-style-type: none"> <li>• Medium</li> </ul>

## **5.9 IMPACT ON FARMING ACTIVITIES**

### **Construction phase**

- Farms throughout the study area are used for crop production and grazing. 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.
- 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.
- A temporary loss of cultivated land can be expected during the construction of the proposed transmission power line due to the physical space needed for these construction activities. This would mean that a farmer would not have access to a part of his/her land for the cultivation and/or harvesting of crops for the duration of the construction activities, which in turn would result in a temporary loss of income for that portion of the land. Where crops are cleared for the servitude, this would have an economic impact on the farmer as a result of a reduced harvest.
- As is the case with cultivated land, a temporary loss of grazing land can also be expected during the construction phase due to the physical space needed for the construction activities. This would mean that a farmer would not have access to a part of his/her grazing land for the duration of the construction activities, which might have planning and economic implications.
- In terms of crop irrigation, it is preferable that 400kV lines do not cross centre pivots, because of the proximity of the water to the Transmission power line. Also, the towers might interfere with sub surface irrigation pipes, and the space needed for the centre pivot. No centre pivots are located in the proposed transmission corridor servitude or within a distance of 1km away way from the alignment.
- Tower positions could limit the area/extent of land used for the cultivation of crops and could have a long term impact on the productivity of agricultural land.



- Normally the loss of cultivated land is considered during the negotiation process and included in the compensation amount payable to the landowner.

**Operational and maintenance phase**

- 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, although there will be a permanent loss of portions of crop lands due to the occupation of towers.
- The presence of towers and Transmission power lines on grazing land pose fewer problems, as livestock can move around towers and therefore less land is lost. The portion of land that was used for construction activities is handed back to the landowner upon completion of these activities. Livestock can move freely under Transmission power lines and around towers to graze. The permanent loss of grazing land is therefore not regarded as significant.
- 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.

**Table 26: Assessment of impact on farming activities**

<b>Nature: Impact on farming activities</b>		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<b>Probability</b>	Highly probable (4)	Probable (3)
<b>Duration</b>	Long term-permanent if disturbed areas are not rehabilitated (5)	Short term if damaged areas are rehabilitated (1)
<b>Extent</b>	Local (2)	Local (1)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Significance</b>	Medium (44)	Low (12)
<b>Status</b>	Negative	Negative
<b>OPERATION AND MAINTENANCE</b>		
<b>Probability</b>	Very improbable (1)	Very improbable (1)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (3)	Regional (3)
<b>Magnitude</b>	Minor (2)	Minor (2)
<b>Significance</b>	Low (9)	Low (9)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes, but long period required	
<b>Irreplaceable loss of resources?</b>	No. Affected land can be restored, provided appropriate rehabilitation is implemented.	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation: Construction phase</b>	<ul style="list-style-type: none"> <li>• The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised.</li> </ul>	



	<ul style="list-style-type: none"> <li>• Initial servitude clearing on the farmland should take place after the harvesting season, as far as possible. Landowners should be compensated for the loss of cultivated land.</li> <li>• Compensation for the temporary loss of cultivated land should be included in the negotiation process with the landowner.</li> <li>• Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area).</li> <li>• Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction.</li> <li>• An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.</li> <li>• All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc. should be rehabilitated at the end of the construction phase.</li> <li>• Eskom should discuss the construction schedule and activities with the affected farmers to enable them to plan their farming activities and animal movement accordingly.</li> <li>• The location of the construction camps where workers would be housed should be carefully considered to limit any possible negative social impacts.</li> <li>• The construction camp should be located near support services, and ideally not in the vicinity of residential dwellings.</li> <li>• Eskom must liaise with the farmers' associations and a protocol for gaining access to farms should be established and distributed to all parties involved. The impact of careless conduct on the side of contractors must be acknowledged and the contractors should receive an induction in terms of the relevant code of conduct to which they should adhere.</li> <li>• Access to the construction site should be controlled.</li> <li>• Have clear rules and regulations for access to the construction camp to control loitering.</li> <li>• Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company.</li> <li>• Construction workers must also be provided with identification tags.</li> </ul>
<p><b>Mitigation: Operation and maintenance phase</b></p>	<ul style="list-style-type: none"> <li>• Eskom or its appointed contractor(s) should assist with the relocation of livestock back to their original grazing area once construction in an area is completed</li> <li>• Grazing areas should be rehabilitated to their original grazing conditions to ensure that cattle can continue to graze in the area once they are returned to that area.</li> </ul>



	<ul style="list-style-type: none"> <li>Where the area cannot be rehabilitated to its original condition within a reasonable period of time, Eskom or its appointed contractor(s) should provide funding to obtain alternative food sources to the farmer for the time period required for natural rehabilitation to occur within the grazing area.</li> <li>The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up the Environmental Consultants appointed to undertake the EIA.</li> <li>The implementation of the Rehabilitation Programme should be monitored by the ECO.</li> </ul>
<b>Cumulative impacts:</b>	<ul style="list-style-type: none"> <li>The impacts would occur on land not currently affected by similar impacts. No cumulative impacts are therefore associated with the development.</li> </ul>
<b>Residual risks:</b>	<ul style="list-style-type: none"> <li>Medium</li> </ul>

## 5.10 SOCIAL CONFLICTS/DISPUTES

### Construction phase

The treatment of workers on-site by labour brokers and contractors could lead to disputes. These could include:

- Labour brokers could take large percentages of wages that would be paid to workers. Local labour brokers, having a closer relationship with the community, could provide the same service and charge significantly less, thus leaving a more significant portion.
- The handling of labour disputes could be perceived as racism.

### Operation and Maintenance phase

Only specialised teams of permanent Eskom personnel are involved during the operational phase and social conflict and disputes are not anticipated.

**Table 27: Assessment of impact of possible disputes**

<b>Nature:</b> Possible disputes between workers, contractors and labour-brokers		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<b>Probability</b>	Highly probable (4)	Probable (3)
<b>Duration</b>	Short term (2)	Short term (2)
<b>Extent</b>	Local (2)	Local (2)
<b>Magnitude</b>	Low (5)	Low (4)
<b>Significance</b>	Medium (45)	Low (24)
<b>Status</b>	Negative	Negative
<b>OPERATION AND MAINTENANCE PHASE</b>		
<b>Probability</b>		
<b>Duration</b>		



<b>Extent</b>	N/A	N/A
<b>Magnitude</b>		
<b>Significance</b>		
<b>Status</b>		
<b>Reversibility</b>		
<b>Irreplaceable loss of resources?</b>	N/A	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation: Construction phase</b>	<ul style="list-style-type: none"> <li>• Establish a community stakeholders' forum where labour related issues can be addressed in consultation with local community representatives on a regular basis, to improve relationships and build trust.</li> <li>• Make use of local labour brokers.</li> <li>• Ensure utmost sensitivity in the treatment of workers on-site, particularly regarding potential racial issues that may be implicated. This also applies to the manner on which labour disputes, when they occur, are handled by contractors and, when necessary, Eskom Project Managers.</li> </ul>	
<b>Cumulative impacts:</b>	May lead to strikes and the project may not be finished in time.	
<b>Residual risk:</b>	Low	

## **5.11 IMPACT ON COMMUNITY HEALTH**

### **Construction phase**

- Dust Emission - During the construction period the construction works and traffic increase may cause temporary and limited dust pollution and may sometimes result respiratory problem on construction workers and local communities.
- Noise - Noise pollution due to the construction of the transmission lines and access road is temporary and limited.
- Sexually Transmitted Infections (STIs) - The major impacts on health and safety are related to the work force engaged in the construction and operation of the transmission line. Communicable diseases like sexually transmitted infections (e.g. HIV/AIDS, Hepatitis, etc.) and malaria can be spread around and in the construction areas. The influx of labour to the construction areas and their inter action with the locals can cause opportunities for the spread of communicable disease in the area and an increase in STIs resulting from the project is inevitable.
- Other Infectious Diseases - Some diseases like intestinal cases, hepatitis, respiratory cases, and respiratory cases including TB case may occur in situations where a large work force is not provided with proper sanitary and work place facilities.



- Alcohol abuse among construction workers may be a problem, especially after workers had received payment. Except for the obvious health risks associated with alcohol abuse, issues also relate to alcohol's effect on behaviour – sometimes causing irresponsible behaviour that could escalate to violence or conflict between individuals or groups.

**Operation and maintenance phase**

Construction workers form part of a significant section of the population known as migratory workers. Due to their unique situation, construction workers engage in behaviour that makes them vulnerable, such as risky sexual behaviour (e.g. unprotected sex) and destructive behaviour (e.g. alcohol abuse, damaging the environment), which could be explained by their migratory status.

When they are separated from their homes, they are also distanced from traditional norms, prevailing cultural traditions and support systems that normally regulate behaviour within a stable community.

In addition, it might also be that construction workers who are faced with dangerous working conditions and the risk of physical injury might be more preoccupied by immediate (direct) risks and therefore tend to disregard salient (more indirect) risks, such as HIV infection. Again, it is likely that HIV transmission occurs, as the local population might be uneducated about the risk and transmission of HIV and would therefore more easily engage in risky behaviour as a result of ignorance.

Construction workers' situations seem to make them vulnerable to high-risk sexual behaviour. There are ample research results to indicate that there is a direct link between temporary migration and HIV infection.

The spread of STI and HIV is a matter of great concern, in view of the fact that construction workers move out of the area into another area where the spread of these STI and HIV continues.

**Table 28: Assessment of impact of on community and workers' health**

<b>Nature:</b> Impact on community and workers' health, including effects of dust, noise, sexually Transmitted Infections (STIs) and other infectious diseases		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<b>Probability</b>	Highly probable (4)	Probable (3)
<b>Duration</b>	Long term to permanent (5)	Long term to permanent (4)
<b>Extent</b>	National (5)	National (5)
<b>Magnitude</b>	Moderate (6)	Moderate (5)
<b>Significance</b>	High (64)	Medium (42)
<b>Status</b>	Negative	Negative
<b>OPERATION AND MAINTENANCE</b>		
<b>Probability</b>	Highly probable (4)	Probable (3)
<b>Duration</b>	Long term to permanent (5)	Long term to permanent (5)
<b>Extent</b>	National (5)	National (5)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Significance</b>	High (64)	Medium (42)



<b>Status</b>	Negative	Negative
<b>Reversibility</b>	N/A	
<b>Irreplaceable loss of resources?</b>	N/A	
<b>Can impacts be mitigated?</b>	For some health issues, yes	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• The impact of dust can be limited through taking proper dust abatement measures like watering of roads and control of traffic speed limit. The contractors will be required to incorporate such issue in to the management plan and submit with their contract proposals</li> <li>• Noise pollution beyond the stated limits, can be minimized by the provision and use of proper hearing equipment for construction workers and working time should be limited in order not to affect the local communities in the vicinities.</li> <li>• An aggressive STI and HIV/AIDS awareness campaign should be launched, which is not only directed at the construction workers, but also at the community as a whole.</li> <li>• Condoms should be distributed by placing them at centrally located points and by ensuring that construction workers and community members area aware of the availability and locality of condoms.</li> <li>• Access to the construction site should be controlled to prevent sex workers from either visiting and/or loitering at the site.</li> <li>• Local women should be empowered. This could be achieved by employing them to work on the project, which in turn would decrease their (financial) vulnerability.</li> <li>• Regular leave should be given to contractors.</li> <li>• Provide entertainment to workers.</li> <li>• The construction work camps shall be maintained in a clean and healthy condition as prescribed by international standards.</li> </ul>	
<b>Cumulative impacts:</b>	As construction workers migrate, infectious disease can spread easily to their families and regionally.	
<b>Residual risks:</b>	Negative	

## **5.12 INCREASE IN TRAFFIC AND IMPACT ON ACCESS**

### **Construction phase**

- The use of the road network will play a large role in delivering materials and resources to the construction camp during construction.
- Increase traffic can result in the disruption of daily movement patterns. Depending on access routes that are used, construction vehicles could impact on the safety and daily movement patterns of residents in the surrounding communities.



- A small portion of the proposed transmission corridor is situated in close proximity to Brendan Village and Embalenhle and access to the construction sites near these townships may affect residential areas. During the construction of the remainder of the transmission line, contractors will need access over farm portions and landowners might experience a feeling that their privacy is invaded with the construction of the transmission power lines.
- The road infrastructure may not be adequate to accommodate heavy vehicles and the increase in traffic volumes. Tower steel is usually delivered on a 24-ton truck to their required position in the field. An 8-ton crane truck is generally used to erect the structures.
- Given servitudes and legal requirements regarding the distances these structures must be from each other, farmers may be concerned about the number of roads running across their farms and how it would compromise physical farming. In livestock farming, gates must be closed to keep the animals in specific areas and away from roads. Farmers may be concerned that gates will be left open when construction vehicles access their farms.
- The movement of heavy construction vehicles during the construction phase has the potential to damage roads and create noise, dust and negative safety impacts for other road users and local communities in the area.
- Heavy machinery is often required for construction works. This machinery contributes to a tremendous amount of noise. Such noise elevations affect the environment by:
  - Sonically vibrating structures, and
  - Presenting a danger to human welfare. Even when it is not perceived consciously, the noise elevations can affect human welfare in varying degrees, both physiologically and psychologically. It becomes a source of annoyance, creating communication problems and leading to elevated stress levels as well as associated behavioural and health effects.

The extent of this potential impact is localized to the adjacent landowners (farms & erven) and those using the farm roads during the construction of the proposed power lines.

**Operation and maintenance phase**

During the maintenance of the transmission line, contractors will need access over farm portions and through the residential areas of nearby towns. Farm owners might experience a feeling that their privacy is invaded during the maintenance of the transmission power lines.

**Table 29: Assessment of the impacts associated with the increase in traffic**

<b>Nature:</b> Impact of the increase in traffic, including construction vehicles – access routes, dust, noise		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<b>Probability</b>	Highly probable (4)	Probable (3)



<b>Duration</b>	Short term (2)	Short term (2)
<b>Extent</b>	Local (2)	Local (1)
<b>Magnitude</b>	Low (4)	Minor (2)
<b>Significance</b>	Low (24)	Low (15)
<b>Status</b>	Negative	Negative
<b>OPERATION AND MAINTENANCE</b>		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Short term (1)	Short term (1)
<b>Extent</b>	Local (1)	Local (1)
<b>Magnitude</b>	Minor (2)	Low (1)
<b>Significance</b>	Low (12)	Low (9)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>		
	N/A	
<b>Irreplaceable loss of resources?</b>		
	N/A	
<b>Can impacts be mitigated?</b>		
	Yes	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Construction activities should be planned to minimise added disruption of traffic, especially during peak hours.</li> <li>• The closing of gates, especially in livestock farming areas must be reiterated.</li> <li>• Land owners should be informed in advance of any planned maintenance activities.</li> </ul>	
<b>Cumulative impacts:</b>	If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were no responsible for the damage.	
<b>Residual risks:</b>	Low	

## 5.13 SAFETY AND SECURITY

### Construction phase

- Construction activities will result in increased traffic in the area, particularly from heavy vehicles, as well as disruptions to traffic flow along affected roads. This increase in traffic together with construction activities such as open trenches will lead to an increase in safety risks for local residents, motorists and passengers.
- Heavy vehicle movement during the project construction may cause road accidents, mainly on local residents who are not accustomed to heavy traffic and heavy vehicles.
- During construction period, some work accidents (e.g., fall from above, hit by object, car accidents, etc.) may also occur mainly due to lack of safety precautions.



- People may pretend to be construction workers and to be looking for job opportunities, using the access roads over farms to construction sites. This and additional traffic on the farm roads may increase the risk of the personal safety of farmers and also of theft. The extent of this potential impact is localized and may potentially only affect landowners adjacent to the proposed development.
- Farm murders are a reality in the South African society. Farmers do not feel safe on their own farms, and any strangers are met with suspicion. The idea of construction teams working on their farms and technical teams fixing the power lines is not welcomed by many farmers.

**Operation and maintenance phase**

Only specialised teams of permanent Eskom personnel are involved during the operational phase and they need access over privately owned land, therefore concerns may still exist for personal safety.

**Table 30: Assessment of impacts associated with security and safety risks**

<i>Nature:</i> Assessment of possible security and safety risks.		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<i>Probability</i>	Probable (3)	Improbable (2)
<i>Duration</i>	Short term (2)	Short term (2)
<i>Extent</i>	Local (2)	Local (2)
<i>Magnitude</i>	High (8)	Low (4)
<i>Significance</i>	Medium (36)	Low (16)
<i>Status</i>	Negative	Negative
<b>OPERATION AND MAINTENANCE PHASE</b>		
<i>Probability</i>	Probable (3)	Improbable (2)
<i>Duration</i>	Short term (2)	Short term (2)
<i>Extent</i>	Local (2)	Local (2)
<i>Magnitude</i>	Moderate (6)	Low (4)
<i>Significance</i>	Medium (30)	Low (16)
<i>Status</i>	Negative	Negative
<i>Reversibility</i>	N/A	
<i>Irreplaceable loss of resources?</i>	N/A	
<i>Can impacts be mitigated?</i>	Yes	
<i>Mitigation:</i> <i>Construction phase:</i>	<ul style="list-style-type: none"> <li>• Construction workers should be clearly identifiable. Overalls should have the logo of the construction company on it and construction workers should wear identification cards.</li> <li>• Construction sites should be fenced and access should be controlled.</li> <li>• Loitering of outsiders at the either the construction site or at the construction village should not be allowed. Loiterers at the site should be removed in cooperation with the</li> </ul>	



	<p>local branch of the South African Police Service (SAPS).</p> <ul style="list-style-type: none"> <li>Contractors should regularly provide adequate safety equipment and orientation to his employees.</li> <li>Project related vehicles will be required to abide by good driving conducts, obey speed limits and follow the rules of safe driving.</li> </ul>
<b>Mitigation: Operation and maintenance phase:</b>	<ul style="list-style-type: none"> <li>Construction workers should be clearly identifiable. Overalls should have the logo of the construction company on it and construction workers should wear identification cards.</li> </ul>
<b>Cumulative impacts:</b>	No, provided losses are compensated for.
<b>Residual risk:</b>	Negative

## 5.14 VISUAL IMPACT SENSE OF PLACE

### **Construction phase**

During this 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 are temporary and will thus have a limited temporary negative visual impact.

### **Operation and maintenance phase:**

The assessment of sense of place from a social perspective relates to people's perception of the project in relation to the area. Typically a study area such as this one can consist of three distinct (public) interest groups:

- People living in poverty who are often unemployed;
- Residents of Brendan Village and Embalenhle which are adjacent to the proposed Bravo 4 corridor; and
- Upper middle-class to wealthier landowners on farms surrounding the project site.

These groups are all affected in different ways by the project and therefore it follows that their interest in the project would differ, hence their sense of place would be affected in different ways. This can be explained by the following examples:

- People living in poverty who are unemployed would expect positive impacts from the project (that of being employed) – often with little to no regard for the longer term impacts (visual impacts, air pollution, presence of the power



station, etc.). For this group of people the placement of a substation or transmission lines close to their area of residence would in all likelihood be regarded as a positive impact on their sense of place as it could create a sense of development in their areas that could improve their quality of life, and at the same time enable them to easily access perceived job opportunities.

- Private landowners on farms surrounding the site are more aware of the potential negative impacts that the proposed power station might have on their quality of life (e.g. impacts on agricultural land, property values, etc.). This implies that their sense of place will be negatively affected as they are accustomed to a different way of life, which is often described as “pristine” and “unique” with a greater sense of preserving natural resources for future generations.
- Residents of other towns/villages in Victor Khanye, Emalahleni and Govan Mbeki Local Municipalities not in close proximity of the proposed project might be more indifferent to the project in general and therefore their sense of place might not be adversely affected one way or the other.
- Research on the psychological experience of sense of place suggests that people rapidly discount a landscape as soon as the first scar occurs, rather like a stain ruining a favourite garment (Petrich 1993). Thereafter, any additional impacts on the landscape have a correspondingly smaller effect. The aesthetic impact of placing a transmission line in a landscape that already bears the marks of development would be less than that of placing it in a relatively unspoilt environment. The study area is characterised by energy related land-uses, for example existing transmission lines, power stations, coal mines, etc. and the proposed transmission line will have a smaller impact on the sense of place.

**Table 31: Assessment of impacts associated with sense of place**

<i>Nature:</i> Visual impact and impact on sense of place		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>CONSTRUCTION PHASE</b>		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Short (2)	Short (2)
<b>Extent</b>	Local (1)	Local (1)
<b>Magnitude</b>	Low (4)	Low (4)
<b>Significance</b>	Low (21)	Low (21)
<b>Status</b>	Negative	Negative
<b>OPERATION AND MAINTENANCE PHASE</b>		
<b>Probability</b>	Probable (3)	Probable (3)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Local (1)	Local (1)
<b>Magnitude</b>	Moderate (6)	Moderate (4)
<b>Significance</b>	Medium (33)	Low (27)



<i>Status</i>	Negative	Negative to Neutral
<b>Reversibility</b>	Yes, transmission lines and substations can be removed.	
<b>Irreplaceable loss of resources?</b>	N/A	
<b>Can impacts be mitigated?</b>	Yes	
<b>Mitigation:</b>	<ul style="list-style-type: none"> <li>• Develop and implement a Community Engagement and Interaction policy to create protocols and positive interactions with the local community in particular neighbouring landowners.</li> <li>• New infrastructure should be located in close proximity to existing infrastructure of a similar nature, as far as possible.</li> <li>• Rehabilitation of land to its previous condition should take place as soon as a pipeline is removed from a property.</li> <li>• Inform neighbouring property owners when construction will take place, including information on the nature and timeframe of the construction activities.</li> </ul>	
<b>Cumulative impacts:</b>	Potential impact on current rural sense of place.	
<b>Residual risks:</b>	Negative	

## 6 ASSESSMENT OF A NO-DEVELOPMENT OPTION

Doing nothing would have a major impact on the economics of the region, as no new customers or load increase would be able to be accommodated by the network. This approach will also severely limit the evacuation capacity of energy from a new power station.

On a positive note this would reduce the impact on the aesthetic value of the natural environment, because the introduction of power lines into the landscape changes the sense of place.

However, the need for electricity is a national concern and not increasing the capacity to generate electricity could potentially stunt economic growth both in Mpumalanga and in South Africa in general. Considering the need for a steady supply of electricity in the province and country in general, this option was considered unrealistic. The no-development option will result in the loss of the benefits have no impact as it maintains the current status quo. However, the potential opportunity costs in terms of the loss of employment, skills and development training would be lost which would also represent a negative impact.

**Table 32: Assessment of no-development option**

<b>Nature:</b> Impact of no-development option		
	<b>Without mitigation</b>	<b>With mitigation</b>
<b>OPERATION AND MAINTENANCE</b>		



<b>Probability</b>	Highly probable (4)	Highly probable (4)
<b>Duration</b>	Long term (4)	Long term (4)
<b>Extent</b>	Regional (4)	Regional (4)
<b>Magnitude</b>	Moderate (6)	Moderate (6)
<b>Significance</b>	Medium (56)	Medium (56)
<b>Status</b>	Negative	Negative
<b>Reversibility</b>	Yes, transmission lines and substations can be developed.	
<b>Irreplaceable loss of resources?</b>	N/A	
<b>Can impacts be mitigated?</b>	N/A	

## 7. CONCLUSION

The significance of the majority of potential negative impacts during the construction phase with mitigation was assessed to be of **Low** significance. The majority of the potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented.

The positive economic impact, e.g. job creation was assessed to be of **Medium** significance.

However, the negative impact on individuals e.g. construction workers and members of the community, that will be infected by HIV/ AIDS, was assessed to be of **Medium-High** significance. At a community level the potential risk posed by construction workers and or job seekers was found to be low. This will be if the majority of the construction force be sourced locally. The potential risk to local family structures and social networks is therefore likely to be low. Table 25 summarises the significance of the impacts associated with the construction phase.

The majority negative impacts during the operation and maintenance phase were assessed to be of **Low** significance with the implementation of mitigation measures.

The impact of the no-development option is negative and assessed to be of **Medium** significance. The no-development option also represents a lost opportunity in terms of the employment and business opportunities (construction phase) this also represents a negative social cost.

**Table 33: Summary of the significance impacts associated with the Bravo 4 project.**

CONSTRUCTION PHASE		
Impact	Significance No mitigation	Significance With mitigation
On mining activities	Low (24)	Low (24)
Possible risks associated with the presence of transmission power lines	n/a	n/a



On watercourses	Low (14)	Low (14)
Economic impacts including: <ul style="list-style-type: none"> <li>• Compensation for servitude</li> <li>• Direct formal and/or informal employment opportunities for local individuals, and</li> <li>• Indirect formal and /or informal business opportunities to local individuals.</li> <li>• Electricity supply and economic growth.</li> </ul>	Medium (32)	Medium (36)
On family structures and social networks associated with the presence of construction workers.	Low for the community as a whole (27) Moderate-High for specific individuals who may be affected by STD's etc. (57)	Low for the community as a whole (24) Moderate-High for specific individuals who may be affected by STD's etc. (51)
Possible influx of unemployed job seekers and temporary workers.	Medium (45)	Low (24)
Relocation of existing and new households and/or population segments.	Medium (36)	Low (22)
On farming activities	Medium (44)	Low (12)
Possible disputes between workers, contractors and labour-brokers.	Medium (45)	Low (24)
On community and workers' health, including effects of dust, noise, sexually Transmitted Infections (STIs) and other infectious diseases.	High (64)	Medium (42)
Impact of the increase in traffic, including construction vehicles – access routes, dust, noise.	Low (24)	Low (15)
Possible security and safety risks.	Medium (36)	Low (16)
Visual impact and impact on sense of place.	Low (21)	Low (21)
Impact of no-development option	n/a	n/a
<b>OPERATIONAL AND MAINTENANCE PHASE</b>		
On mining activities	Low (24)	Low (24)
Possible risks associated with the presence of transmission power lines.	Low (14)	Low (14)
On watercourses	Low (14)	Low (14)
Economic impacts including: <ul style="list-style-type: none"> <li>• Compensation for servitude</li> <li>• Direct formal and/or informal employment opportunities for local individuals, and</li> <li>• Indirect formal and /or informal business opportunities to local individuals.</li> <li>• Electricity supply and economic growth.</li> </ul>	Low (9)	Low (9)
On family structures and social networks associated with the presence of construction workers.	Medium (30)	Medium (30)



Possible influx of unemployed job seekers and temporary workers.	Low (9)	Low (9)
Relocation of existing and new households and/or population segments.	Medium (36)	Low (22)
On farming activities	Low (9)	Low (9)
Possible disputes between workers, contractors and labour-brokers.	n/a	n/a
On community and workers' health, including effects of dust, noise, sexually Transmitted Infections (STIs) and other infectious diseases.	High (64)	Medium (42)
Impact of the increase in traffic, including construction vehicles – access routes, dust, noise.	Low (12)	Low (9)
Possible security and safety risks.	Medium (30)	Low (16)
Visual impact and impact on sense of place.	Medium (33)	Low (27)
Impact of no-development option	Medium (56)	Medium (56)

## 8 RECOMMENDATION

The increase in electricity supply is much needed, not only on local lever, but also on a regional and national level and will be beneficial to the socio-economic development of the region as a whole. Fortunately, the communities within the study area will ultimately benefit from the construction of the new transmission line, known as Bravo 4 (Phase 4).

Based on the findings of this Social Impact Assessment it is recommended that the facility as proposed be supported, subject to the implementation of the recommended mitigation measures and management actions contained in the report.

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