# Alexander Economic Impact Assessment

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**The information contained in this report has been compiled with the utmost care and accuracy within the parameters specified in this document. Any decision based on the contents of this report is, however, the sole responsibility of the decision maker.**

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# EXECUTIVE SUMMARY

## PROJECT BRIEF

**DEMACON Market Studies** were requested by **Synergistics (SLR Consulting Africa)** to conduct an Economic Impact Assessment of the proposed Alexander mine.

The aim of this report is to provide an Economic Impact Assessment pertaining to the abovementioned proposed project, particularly the economic impacts of mining on the local economy, as well as the value of mining activities in comparison with agriculture.

The study will illustrate *inter alia*;

- the impacts of mining on the local economy
- the value of mining activities in comparison with the current (or proposed alternative) land use
- mitigation measures for high impact activity.

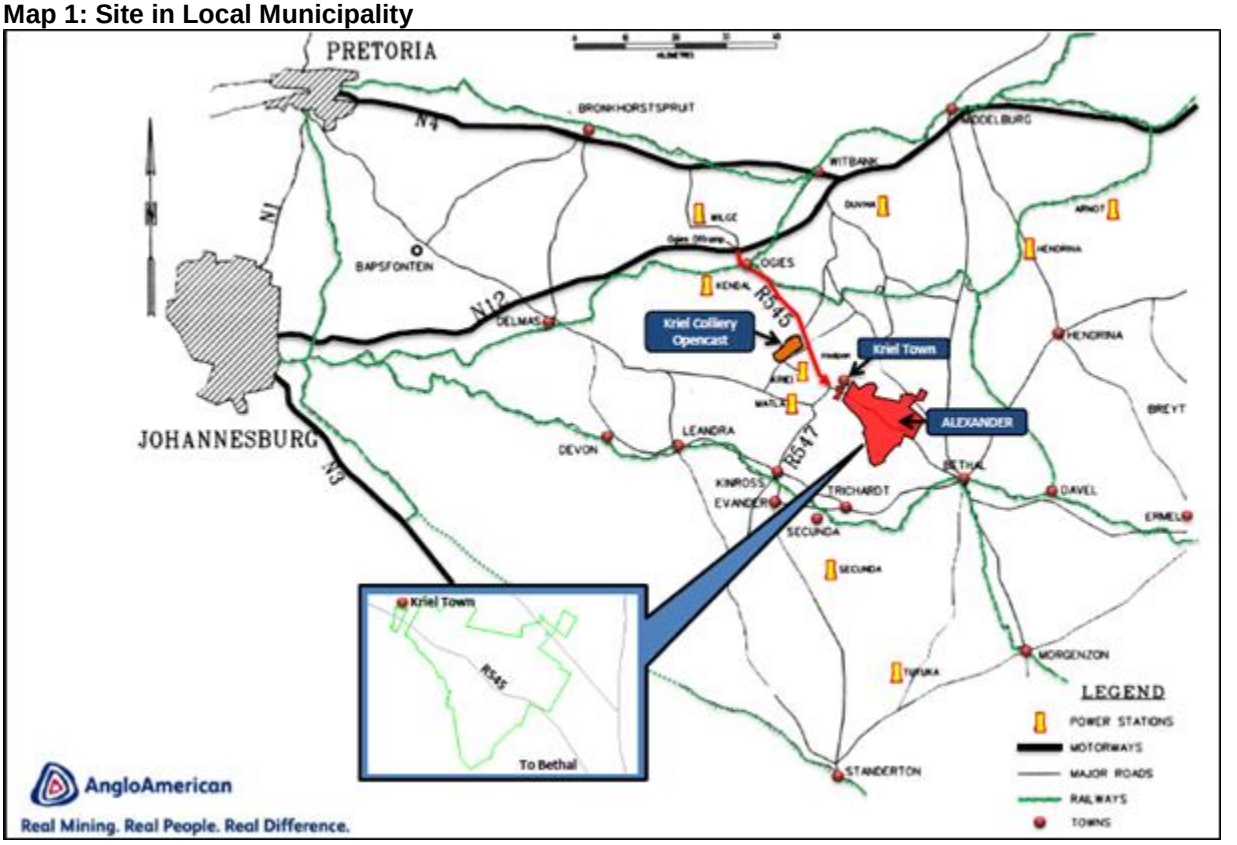
## PROJECT DESCRIPTION

Anglo American Inyosi Coal (Pty) Ltd (AAIC) is proposing to establish a new underground coal mine through the Alexander Project ('the project'). The Alexander coal resource lies within the current AAIC Kriel East and Elders Underground Extension prospecting right areas (proposed Alexander mining right area) and covers an area of approximately ~ **7,300ha**. The project will involve the development of surface and underground facilities. In broad terms the proposed Alexander Project will comprise an underground mine, a waste rock dump, topsoil stockpiles, mine related facilities such as workshops, stores and various support infrastructure and services. Further to this, the proposed project will require construction of an overland conveyor to transport run-of mine coal from the proposed Alexander incline shaft to the stockpile area at the Elders Colliery for beneficiation purposes.

The proposed project is located approximately 14 km northwest of Bethal and directly to the south and south-east of Kriel in the Mpumalanga Province. The Alexander resource lies between the R547 provincial road to the west and the R35 provincial road to the east, with the R545 provincial road bisecting the resource in a north-west to south-east direction.

Underground mining activities will be undertaken as part of the proposed Alexander Project which will be designed to process ~ 6 million tonnes per annum during steady state production. Although the No. 2, 3, 4 and 5 coal seams are all developed within the Alexander Project area, only the No. 4 seam is considered within this mining right application. The No. 4 seam is on average 4.90m thick and occurs at a depth of 63m below surface with the preferred quality situated in the lower two-thirds of the seam.

**Map 1: Site in Local Municipality**




## ECONOMIC OVERVIEW

The development area stretches over two municipalities: Emalahleni Local Municipality and Govan Mbeki Local Municipality. Both these municipalities were evaluated.

Although the area surrounding the development site is characterised by agricultural activities, mining and manufacturing are the dominant economic contributors in the local economies. Whereas manufacturing is concentrated in the main urban centres, mining is scattered throughout the regions and as such has historically been in competition for land with agricultural production. Given the location of coal deposits within the Mpumalanga region and the resultant large amount of coal mines, it is unsurprising that the local economies have been driven by the coal mining sector for a number of decades with continued strong growth and expansion evident.

The sectoral contribution of agriculture may appear relatively small, the strategic importance of the sector is underscored by the intensive downstream value chain (and the fact that further beneficiation occurs in the domestic economy, though beyond the study area boundaries) and secondly, maize is a dominant contributor to the local food basket.

Although economic growth for the long term (1998-2013) is slightly below the national growth of 3.4%, short term growth (2008-2013) is decelerating (but still positive), but not below the national average. The development of the Alexander coal mine will support mining activity in the region. The development will create long term employment and economic opportunities in the mining sector, at the expense of agriculture activity.

Employment growth increased up to 2007 in both economies, after that a decreasing trend can be seen. Since 2010 employment growth has started to increase again. One possible reason for the decrease in employment could be the mechanisation of the agriculture and manufacturing sectors – both of these sectors showed a deceleration in employment. The highly skilled employment sector has shown the highest growth, implicating a high number of highly skilled job opportunities being created in the economies as the area becomes more

developed. However, the semi- and unskilled labour force is still by far the largest sectors, forming nearly halve of the labour force in both economies.

## SOCIO-ECONOMIC OVERVIEW

Table 1 summarises the main characteristics of the primary trade area.

**Table 1: Socio-economic indicators for study area**

| Variable | Study Area |
|---|---|
| **Study Area Population (2016)** | ✓ 567 915 people<br>✓ 168 337 households |
| **Average household size** | ✓ 3.5 persons per household |
| **Level of education** | ✓ 10.8% - No schooling<br>✓ 28.6% - Grade 12<br>✓ 10.1% - Higher education |
| **Level of employment** | ✓ 63.8% - Economically active of which 74.6% is employed and 25.4% is unemployed |
| **Weighted Average Annual Household income (2016) - All LSM** | ✓ R149 370 per annum<br>✓ R12 447 per month |
| **LSM 1-3**<br>**LSM 4-10+** | ✓ 29.5%<br>✓ 70.5% |

### Socio-Economic Overview of the Study Area

The study area delineated for this project is defined by a 50km radius from the mining site, and includes the larger urban nodes of eMalahleni and Secunda as they represent the main nodes where the workforce resides. The study area has a large number of towns in its vicinity resulting in a high population total.

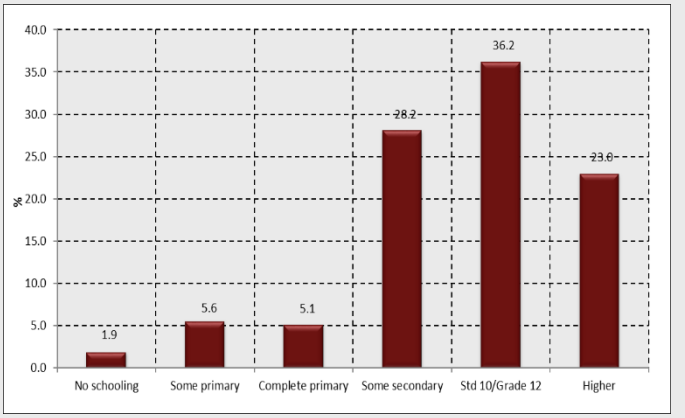
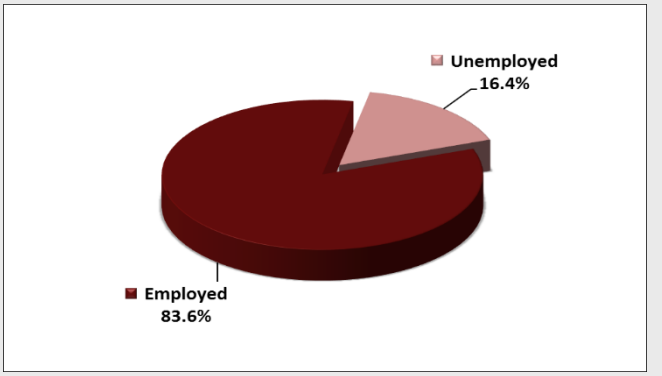
An estimated total of **567 915 people** and **168 337 households** are located within the study area during 2016. Household growth for this area is estimated at approximately 2.78% per annum which translates into an annual increase of approximately 4 310 households.

The education profile of the area indicates **high illiteracy levels** with 10.8% having no form of schooling. Based on the education level it is assumed that the majority of people will be employed in the semi-skilled and skilled occupations. The majority of permanent employment opportunities at the Alexander mine will be in the semi-skilled, skilled and highly skilled segments.

Local employment levels (74.6%) are on par with the national average of 75% while income levels indicate that households are predominantly middle income earners. The income level of a household has a direct impact on the demand for goods and services, and as a result given the local trends. The additional employment in the skilled and highly skilled segments from the mine development will strengthen the local market and increase demand for higher order goods and services.

Due to the proximity of the development site to Ga-Nala (Kriel), it is anticipated at this early stages that the greatest affect will be seen on Ga-Nala in terms of aspects such as employment, residential development, retail demand, etc. Therefore, Table 4.4 provides a brief summary of the main socio-economic characteristics of Ga-Nala.

**Table 2: Socio-economic indicators for Ga-Nala (Kriel)**

| Variable | Study Area |
|---|---|
| Study Area Population (2016) | ✓ 16 502 people<br>✓ 4 940 households |
| Average household size | ✓ 3.3 persons per household |
| Level of education |  |
| Level of employment | ✓ 62.1% are economically active of which 74.6% is employed and 25.4% is unemployed<br>  |
| Weighted Average Annual Household income (2016) - All LSM (only income earning households) | ✓ R324 971 per annum<br>✓ R27 081 per month |
| LSM 1-3<br>LSM 4-10+ | ✓ 19.9%<br>✓ 80.1% |

## ECONOMIC IMPACT ASSESSMENT

The multiplier effect indicates the impact that an increase or decrease in demand has for the three sectors affected by the mining development. The following table shows value and impact of each activity in the national economy. The subsequent table indicates the anticipated ***sustained economic impacts*** (direct, indirect and induced) that will result during the operational phase of the Alexander mine, until closure.

**Table 3: Summary of Multiplier Effect and Value within the National Economy**

| Description | Agriculture | | Closure of Elders Colliery | Mining at Alexander Mine |
|---|---|---|---|---|
| | Built up area (Best case scenario) | Total mining area (Worst case scenario) | | |
| Annual Sales | R8.6 million | R285.99 million | R113.8 million | R2.7 billion |
| Output/Sales | R11.3 million | R375.8 million | R145.9 million | R3.5 billion |
| Gross Geographic Product | R5.3 million | R174.8 million | R90.6 million | R2.2 billion |
| Labour Remuneration | Lower salaries/wages compared to coal mining | Lower salaries/wages compared to coal mining | Higher salaries/wages compared to agriculture | Higher salaries/wages compared to agriculture |
| Employment | 100 | 3 200 | 200 | 5 000 |
| Time frame of activity | In perpetuity | In perpetuity | 5 years | 35 years |

*Source: Demacon, 2016*

The value of mining in terms of output/sales, GGP and employment might be higher than agriculture, over the same time period. Mining production, is however, associated with a limited 35 year timeframe, compared with agriculture production, which could, for all intents and purposes, continue in perpetuity. Agriculture may have lower productive contribution but these contributions occur annually in perpetuity. To summarise, therefore:

- ✓ The **additional sales generated** by the mine for the 35 year period, totals R94.5 billion, whilst the total sales generated by agriculture (in perpetuity) amounts to R28.6 billion.
- ✓ The **output generated** by the mine totals R122.5 billion, whilst the total additional output generated by agriculture amounts to R37.6 billion.
- ✓ The **additional GGP created** by the mine totals R77.0 billion, whilst the total additional GGP created by agriculture amounts to R17.5 billion.

In the context of the above, it would be ideal to ensure that full rehabilitation of the mining site takes place. The relatively short term benefits associated with the life of mine, should furthermore accentuate the importance of agriculture as sustainable land use.

# CHAPTER 1: INTRODUCTION

## 1.1 PROJECT BRIEF

**DEMACON Market Studies** were requested by **Synergistics (SLR Consulting Africa)** to conduct an Economic Impact Assessment of the proposed Alexander mine.

The study will illustrate *inter alia*;

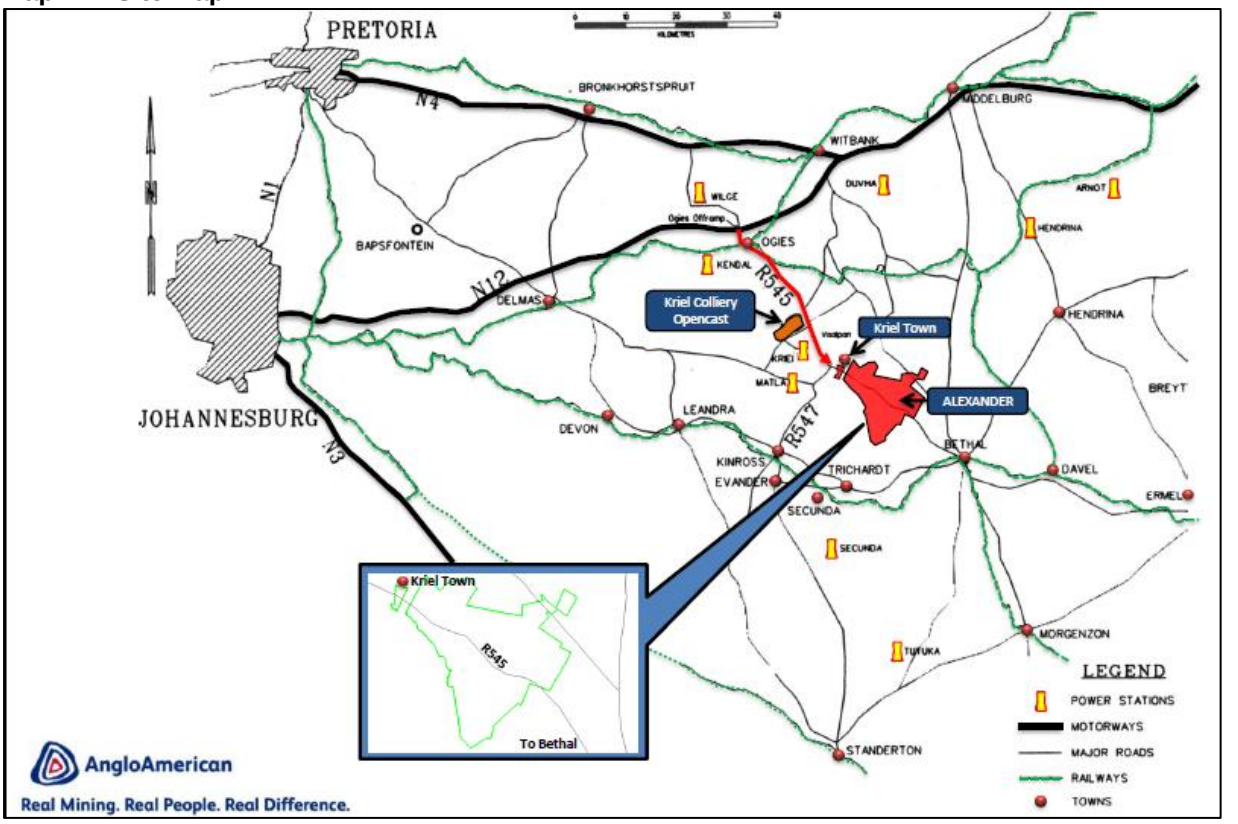
- An overview of regional and local development drivers
- Local economic trends
- Socio-economic overview
- The impacts of mining on the local economy
- The value of mining activities in comparison with the current (or proposed alternative) land use
- Mitigation measures for high impact activity.

## 1.2 LOCATION OF SITE

The site is situated in the Mpumalanga Province on the R545 south east of Kriel on route to Bethal. It is in close proximity to a number of towns, including Kriel, Bethal, Trichardt, Secunda, Leandra and Hendrina.

The development area stretches over two municipalities: Emalahleni Local Municipality and Govan Mbeki Local Municipality. Map 1.1 illustrates the location of the proposed Alexander project.

**Map 1.1: Site Map**



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## 1.4 REPORT OUTLINE

This report complies with the requirements of the NEMA and environmental impact assessment (EIA) regulations (GNR 982 of 2014). The table below provides a summary of the requirements, with cross references to the report sections where these requirements have been addressed.

**Table 1.1: Specialist report requirements in terms of Appendix 6 of the EIA Regulations (2014)**

| A specialist report prepared in terms of the Environmental Impact Regulations of 2014 must contain: | Relevant section in report |
|---|---|
| Details of the specialist who prepared the report | Page ii |
| The expertise of that person to compile a specialist report including curriculum vitae | Annexure A |
| A declaration that the person is independent in a form as may be specified by the competent authority | Annexure B |
| An indication of the scope of, and the purpose for which, the report was prepared | Section 1.4 |
| The date and season of the site investigation and the relevance of the season to the outcome of the assessment | n.a. |
| A description of the methodology adopted in preparing the report or carrying out the specialised process | Section 1.1 |
| The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure | n.a. |
| An identification of any areas to be avoided, including buffers | n.a. |
| A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers; | n.a. |
| A description of any assumptions made and any uncertainties or gaps in knowledge; | n.a. |
| A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment | Section 5 & Section 6 |

| | |
|---|---|
| Any mitigation measures for inclusion in the EMPr | Section 6.2 |
| Any conditions for inclusion in the environmental authorisation | n.a. |
| Any monitoring requirements for inclusion in the EMPr or environmental authorisation | n.a. |
| A reasoned opinion as to whether the proposed activity or portions thereof should be authorised and | Section 5.4 |
| If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan | Section 6.2 |
| A description of any consultation process that was undertaken during the course of carrying out the study | n.a. |
| A summary and copies if any comments that were received during any consultation process | n.a. |
| Any other information requested by the competent authority. | n.a. |

The remainder of the report is structured in terms of the following main headings:

Chapter 2: Development Initiative and Resource Base
Chapter 3: Economic Analysis
Chapter 4: Socio-Economic Overview
Chapter 5: Value Chain Assessment
Chapter 6: Economic Impact Assessment

# CHAPTER 2: DEVELOPMENT INITIATIVES AND RESOURCE BASE

## 2.1 REGIONAL OVERVIEW

The **Alexander Project** is located in the Mpumalanga Province immediately to the south and southeast of the town of Kriel within the Emalahleni and Govan Mbeki Municipalities. Both municipalities are located in close proximity to Gauteng and connected via major national roads to Gauteng and the rest of the Mpumalanga Province.

The Emalahleni Municipality is strategically located in terms of the provincial context and transport network. It is situated in close proximity to the City of Johannesburg, City of Tshwane and Ekurhuleni Metropolitan Municipalities in Gauteng, and is connected to these areas by the N4 and N12 freeways. These freeways converge at eMalahleni in Emalahleni, from where the N4 extends to Nelspruit, the provincial capital, and ultimately Maputo in Mozambique. The N4 freeway and the railway line which runs adjacent to the freeway from Gauteng to Mozambique constitute the Maputo Corridor. The corridor forms part of a transcontinental corridor initiative, aimed at linking Walvis Bay on the west coast of Africa with Maputo on the east coast, thereby creating strategic linkages for trade and tourism between Namibia, Botswana, South Africa and Mozambique.

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 will be 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.

**Govan Mbeki Municipality** is situated in the south-western part of Mpumalanga, abutting Gauteng, approximately 150km east of Johannesburg and approximately 300km southwest of Nelspruit. The area can be described as mostly agricultural/rural, with 3 urban conglomerations situated within it, namely Leandra/Lebohang 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.

As far as its regional context is concerned, Govan Mbeki is situated on the Gauteng/Richards Bay Corridor formed by the National Road N17 and the Richards Bay rail line running through the area in an east-west direction. Govan Mbeki has the most diversified economy within the Gert Sibande District, dominated by the petrochemical industry (the SASOL II and III complexes) and coal and gold mining. Govan Mbeki has the largest underground coal mining complex in the world which makes it an important strategic area within the national context.

## 2.2 SETTLEMENTS

The following hierarchy of settlements is put forward in the Nkangala District[1]:

- **Primary Service Centres**: eMalahleni and Middelburg – offering the highest order of goods and services.
- **Secondary Service Centres**: eMakhazeni and Delmas (existing), Siyabuswa and KwaMahlanga (evolving – growth should be stimulated).
- **Third Order Service Centres**: Dullstroom, Emawenya, Hendrina, Ga-Nala and eNtokozweni. These centres mainly serve the farming and mining communities in the rural areas. Service maintenance and local economic development initiatives are essential to ensure that the local economy and functionality of these centres are sustained.

[1] Nkangala District Spatial Development Framework

- **Fourth Order Service Centres**: proposed **Multi-Purpose Service Delivery Centres**. The development of these centres is proposed throughout the District, to ensure equitable access to community facilities for all communities, especially the marginalised communities in the rural areas. These centres should be a one stop service centre for basic services required on a regular basis, such as clinics, satellite municipal offices, post offices etc. These centres should also provide for retail, informal trade, residential uses, municipal commonage and LED project centres to stimulate local economic activities.

Due to close proximity of the proposed Alexander development to Ga-Nala (Kriel) the characteristics of the node are discussed.

The Emalahleni SDF (2010) indicates that Ga-Nala was established on the banks of the Steenkoolspruit. There are a number of smaller settlements and staff villages linked to collieries and power stations. Eskom established Ga-Nala in 1973 as a residential area for the workers at the Ga-Nala Power Station, which was constructed in 1975. The town experienced rapid growth during 1982 to 1989 and was declared as a municipality in 1990. Most of the residents in Ga-Nala and Thubelihle are employed at the power stations and the mines in the area, although the local businesses and farms also provide employment.

Ga-Nala has a fairly large business component comprising several banks, insurance companies and retail outlets, which include four modern business complexes and a medical centre, provide for the needs of the inhabitants.

Springbok Crescent was earmarked as activity street (between Road P120-2 and Mooi Avenue) with the intention to accommodate offices for professional disciplines in the existing residential structures. Mixed land use development has however occurred along this road, including retail, video stores, coffee shops and other uses. There are vacant, fully serviced business stands in Ga-Nala, but the demand for these is low.

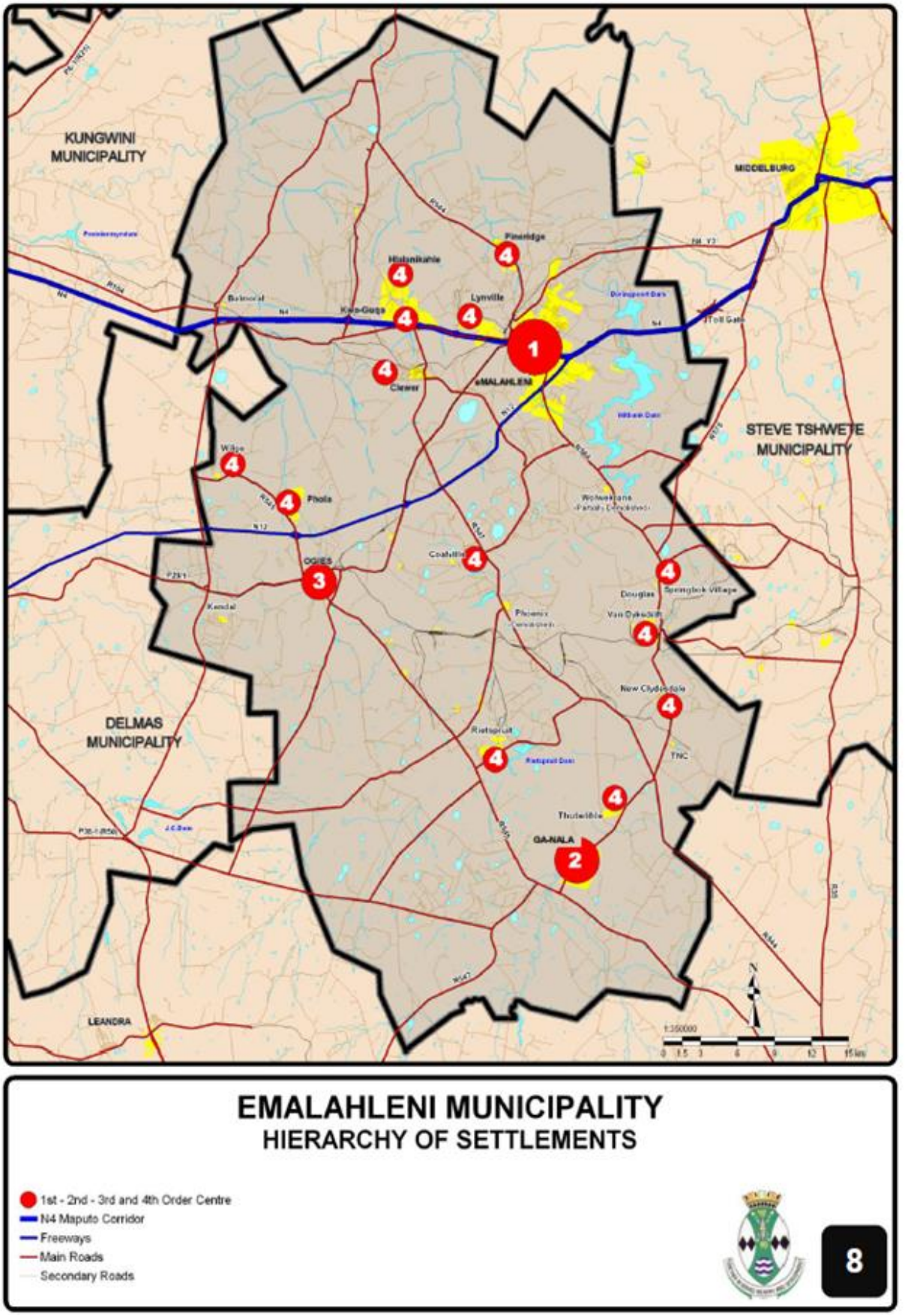
The current growth trend for Ga-Nala is in a **northern direction**, due to geological constraints. Limited residential expansion to the south and south-west is also currently encouraged, in an attempt to consolidate the southern areas and make optimal use of existing infrastructure. Development in this area will also minimise the need to construct bridges across the Steenkoolspruit. A further drawback is the fact that the waste water works are located close to the town, which limits expansion potential. An affordable housing development was recently constructed in the south of Ga-Nala (Ga-Nala extensions 9 and 10). There are large tracts of council-owned land and open space in Ga-Nala which are being considered for alienation, to limit the maintenance burden on the local authority.

Ga-Nala has lately experienced decline, due to the decline in the mining industry, which is evident from the poor maintenance of private properties and public infrastructure. Thubelihle is situated north of Ga-Nala and the two settlements are linked by route R547. The primary direction of expansion for Thubelihle is in a westerly direction towards Steenkoolspruit and in a southerly direction towards Ga-Nala.

A new industrial township, Ga-Nala Extension 17 is planned south of Thubelihle adjacent to Road 547.

Ga-Nala and Thubelihle receive water from the Department of Water Affairs and from the Ga-Nala Power Station from time to time. The mining towns and Eskom towns have private services, while the non-urban areas are self-reliant.

**Map 2.1: Emalahleni Hierarchy of Settlements**



## 2.3 REGIONAL & LOCAL DEVELOPMENT INITIATIVES

A number of projects and initiatives are planned for the region surrounding the Alexander site. This section will describe these initiatives driven by the national, provincial, district and local government institutions as well as private sector developments. Only those projects that will have an influence on the trade area are listed.

### 2.3.1 National Initiatives

- **Ermelo-Richards Bay Rail System Upgrade**

The rail system stretches 580km between Ermelo and Richards Bay and currently transports 72 million tons of coal per annum. The line was designed specifically to handle the majority of South Africa's coal exports and the line is currently being used at capacity. As a result, a total of R50-billion had been set aside for the Richards Bay coal corridor, including the opening up of export capacity from the coal-rich Waterberg region, in the Limpopo province.

The initial focus is on decongesting the Ermelo-Richards Bay line by investing in a general-freight link through Swaziland. Thereafter, a project would be implemented to bypass the Rustenburg/Brits area (where clay soil conditions would be an impediment to heavy-haul operations) so as to link the Waterberg miners with the coal corridor. It is anticipated that the Swaziland loop could be operational by 2015/16 and that the Rustenburg bypass should be completed during 2016/17 (Engineering News, April, 2012).

**Map 2.2: Rail System Upgrade**

- **Return-to-Service of Mothballed Coal Power Stations**

Eskom has invested to regenerate unused mothballed power stations that were decommissioned in the 1990's. This investment has led to the return-to-service of three power stations, two of which is in proximity to the study area and includes Camden, Komati and

Grootvlei Power Stations. This has increased the national electricity capacity by 3 800MW and created a total of approximately 500 new permanent employment opportunities.

### 2.3.2 Mpumalanga Province Initiatives[2]

The following projects are listed as priority Economic Infrastructure projects for relevant districts in the Mpumalanga Growth Path.

**Table 2.1: Mpumalanga Economic Infrastructure Projects**

| Economic Sector | Projects | Location |
|---|---|---|
| Tourism and Cultural Industries | Theme / Amusement park resort (Afro Disney Concept) | Nkangala |
| | Commercialisation of state reserve parks | All districts |
| Transport | Upgrading of the coal haulage | Nkangala, Gert Sibande |

*Source: Mpumalanga Economic Growth and Development Path, 2011*

#### ➢ Opportunities in the agricultural sector

According to the Mpumalanga Growth and Development Plan (2011) agriculture is one of the sectors that will receive special attention for development. The cultivars identified include summer grains, oil seeds, deciduous fruits and animal production.

#### ➢ Opportunities in the mining industry

Coal mining has been identified as one of the development drivers within the Mpumalanga Province. The commodities support the growth of the economy and create jobs within the Mpumalanga Province.

#### ➢ Opportunities in the energy industry

Eskom is in the processes of building new generation and transmission capacity. It is argued that South Africa would require additional 20 000 MW by 2020. The following initiatives taken by Eskom present opportunities for economic growth and job creation:

**The New Build Programme**

The New Build Programme involves two massive projects situated in Mpumalanga, namely, Medupi in Lephalale, and Kusile in Delmas. These projects will:

- ✓ Contribute to economic growth of the country and create employment opportunities
- ✓ Empower the industrial development
- ✓ Ensure the continuous supply of power in grid
- ✓ Build capacity and confidence for the future needs of the country
- ✓ Provide opportunities for new technologies in renewable energy

Kusile Power Station, formerly code-named “Project Bravo”, is South Africa’s largest construction project four times larger than Gautrain. This project is being built by Eskom as part of its multi-billion-rand expansion build programme with expected completion scheduled for 2017 is aimed at meeting South Africa’s surging power needs. The project is expected to cost an estimated R111 billion, though this figure has ballooned over the years. The last unit is expected to be commissioned in 2017.

#### ➢ Opportunities in the manufacturing sector

Given the mineral resources that the Province is endowed with, investment in the manufacturing sector could increase its current capacity and contribute to economic growth

[2] Source: Mpumalanga Economic Growth and Development Path, 2011

and job creation, particularly if more focus is given to beneficiation and agro-processing. In the ferrochrome industry, there is potential for a new smelter to be established in the Province which can create a number of job opportunities. This industry has readily available markets locally and internationally. The extension of the value chain into the Province will be encouraged as it will result to more jobs. The availability of critical inputs will support this.

The massive expansion and rejuvenation programmes of the largest manufacturing plants (Sasol, SAPPI) in the province provide an opportunity for jobs in the province. The manufacturing of packaging boxes to transport fruits and vegetables is another area of opportunity.

### 2.3.3 Nkangala District Initiatives in the Region[3]

- **Tourism Strategy:**

In addition to the existing tourism clusters in Nkangala District Municipality (NDM) the following potential clusters have been identified in order to improve the tourism spread within the NDM:

- ✓ Mining cluster (mining activities & mining tours around Emalahleni Town/Middelburg);
- ✓ Conference & Convention cluster (exploiting potential of conference market, logistically positioned around Middelburg/Emalahleni Town).

- **Catalytic Converter:**

The development of a catalytic converter component manufacturing plant would be a job-creating private investment within the automotive sub-industry. The catalytic converter component is part of the exhaust system of vehicles and has an outer shell made of stainless steel. Therefore the manufacturing plant should be located in immediate vicinity of steel mills around Nkangala. The Emalahleni/Middelburg region provides a favourable location for such a development. The facilitation role of local, District and Provincial Government in the identification, lobbying and establishment of the plant is critically important.

- **Truck port/Logistics Hub:**

The project aims to promote the development of a truck port including a distribution and logistics hub. By attracting the required investment to the region, distribution and logistics related services will be provided. With an integrated, sophisticated set of transportation, warehousing and distribution facilities including the necessary services access to marketplaces will be largely improved and linkages to the different modes of transport enhanced. The movement of goods into, out of and within the region with minimized delays and duplication processes can be achieved with a network structure at a strategic location. The N4 Maputo Corridor provides an excellent location for such a development. The area between Emalahleni and Middelburg is taken into consideration for this project.

- **Agro-processing:**

The NDM is one of the Districts throughout the country with high potential to produce the quality and quantity of crops that are needed for bio-fuel production. Considering the current National and Provincial initiatives bio-fuel focused local projects will have a major impact on the District economy. Through increased employment opportunities an improvement of income and poverty alleviation can be achieved. The proposed project involves cultivating, harvesting and processing essential oils in Nkangala District that will supplement the existing agricultural/agro-processing activities in the District. The proposed location of the project is Dr JS Moroka local municipality. The town of Middelburg has been selected to be home to one of

[3] Nkangala Integrated Development Plan, 2013-2014

the seven Ethanol factories to be erected. For commercial production, trial areas of approximately 200 plants each with selected cultivars to determine quality and yields before planting on a large scale will be identified. A total of 24 hectares will be established with these cultivars during the 2nd phase of the project.

- **International Convention Centre:**

With the proposed Nkangala Convention Centre the region aims to attract events of a larger scale and serve those that are beyond the capacity of the existing facilities. As a technically fully equipped conference centre the multi-use facility will be able to accommodate various activities beyond normal conferences and there-fore promote the cultural, economic and social development of the entire region likewise.

It is proposed that the centre be placed adjacent to the envisaged regional shopping complex to be developed north of the N4 highway. Thus, the location of the convention centre has been determined to be the Steve Tshwete local municipality.

*Although these initiatives were mentioned in the Nkangala IDP 2013/2014, no time of development and completion was yet confirmed.*

### 2.3.4 Development Implications

The development focus on the region from a national perspective is the improvement in transport connectivity for both road and rail, especially the increase of capacity to transport coal from the coal mine area of Mpumalanga to Richards Bay. This is an attempt to increase coal export capacity from Richards Bay. The return-to-service of a number of previously mothballed power stations in Mpumalanga is strategically done to improve the electricity capacity in the national economy. Given these trends the expansion of coal mining activity is expected to continue given the investment of national government in expanding electricity capacity through coal power stations.

The development focus on the region from a national and provincial perspective is on the agricultural, transport and mining sectors. The increased focus on transport will be of benefit to the Alexander Project, not only be improving the transport of coal, but also by improving access for employees to their work.

There is a renewed focus on the energy industry in order to answer the increasing demand from South African industries and households for energy. This will lead to a higher demand for coal.

Although there is emphasis on the tourism sector, the emphasis is on other parts of the province. No large tourism projects are planned in the immediate vicinity. Tourism in the trade area is more focused on business and possible conventions as a result of mining operations.

## 2.4 LOCAL RESOURCES AND DEVELOPMENT TRENDS

The majority of South Africa's coal reserves are situated in the Mpumalanga, Kwazulu-Natal and Limpopo Provinces. As a result of the large coal reserves within South Africa the utilisation of these resources for power generation took place. This was the logical decision as the abundance of coal meant that electricity could be generated locally and at a low cost. This has led to the development of coal powered power stations and various coal mines supplying them throughout South Africa but specifically in areas in close proximity to coal resources.

The Mpumalanga province is also an important agriculture region and contributes approximately 25%-30% of the national maize production per annum. A number of towns developed as a result of the agriculture activity.

In most instances the expansion of mining activity directly impacts on agriculture use. The aim is to ensure there is a balance between the two sectors as both has an important role to play in the local and national economy.

### 2.4.1 Mining Sector

Mpumalanga is endowed with precious metals (platinum, gold), precious stones (diamond, beryl, emerald), non-ferrous and base metals (copper, zinc, lead, cobalt, molybdenum, tungsten, tin), ferrous and related metals (chrome, iron, manganese, nickel, silicon, titanium, vanadium), energy minerals (coal, torbanite, uranium) and various industrial minerals (aggregate, alumino-silicates, asbestos, clay, corundum, dimension stone, fluorspar, graphite, limestone, magnesite, silica, talc).

This diversity of resources has contributed to the emergence of significant downstream linkages, most notably to the establishment of heavy industrial activities such as power stations, steelmaking operations, paper mills, and chemical plants. Such industries have been critical in facilitating additional linkage development by attracting related and supporting industries and hence, contributing to a greater role of secondary and tertiary activities in the Province.

The Emalahleni SDF (2010) indicates that mining is a very significant economic sector in the Emalahleni area, and it has also become a major form giving element in terms of development constraints due to shallow undermining. There is a conflict between the mining operations and settlement development, especially in terms of the hazards associated with past mining operations, such as underground fires in old mines, seepage from mines and communities mining coal from remaining coal pillars and old coal dumps.

According to the Emalahleni SDF (2010) the settlements and the railway infrastructure in the southern part of the Municipality were mainly constructed to serve the mining activities. Coal is predominantly used by local coal power stations to generate energy. The coal deposits are also exported via Richardsbay to the international market. Map 2.2 illustrates the current operational mines, new mines and closed mines within a 100km radius.

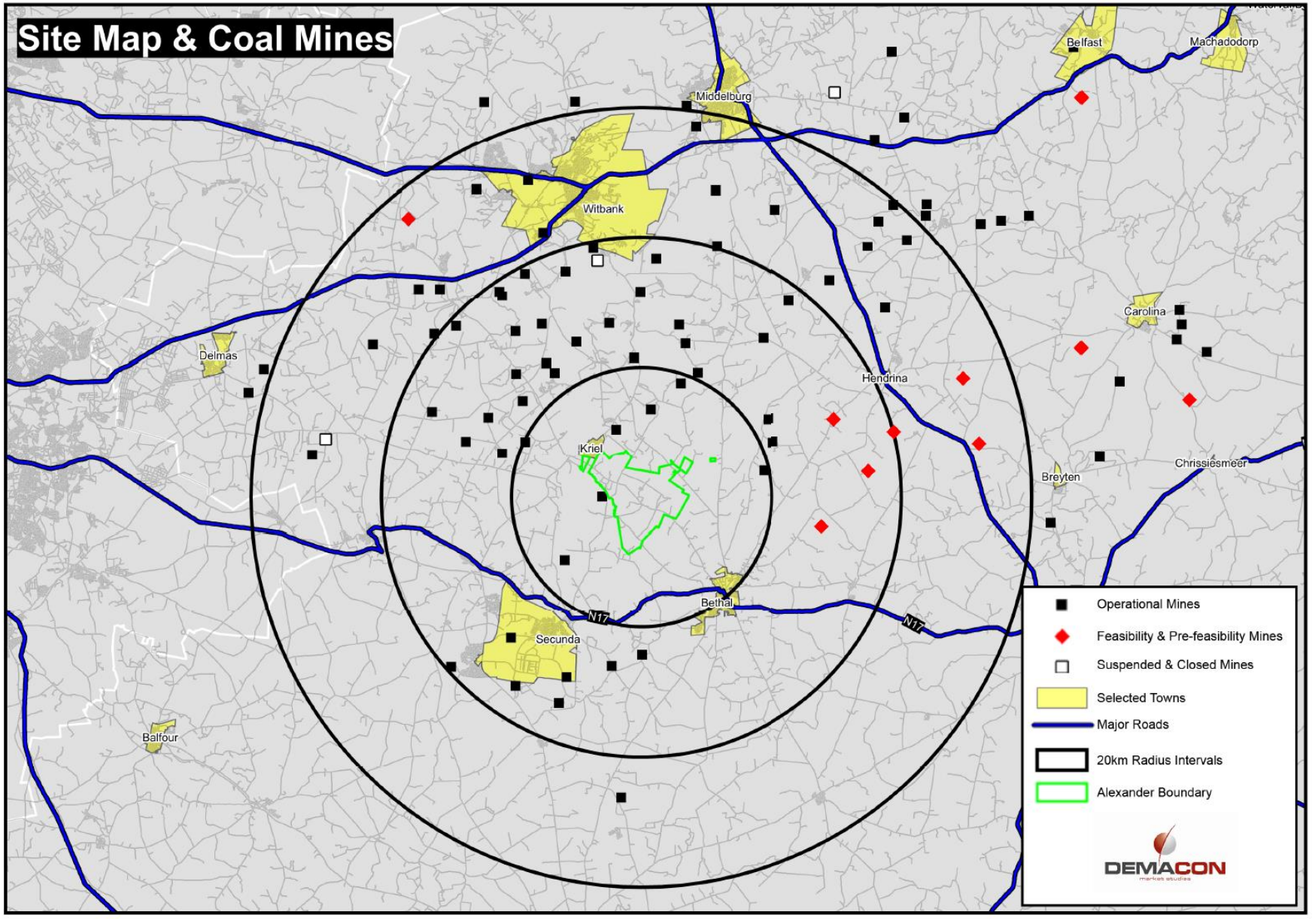
Given the location of coal deposits within the Mpumalanga region it is unsurprising that there are as much coal mines within the area. The local economy has been driven by the coal mining sector for a number of decades with continued strong growth and expansion evident.

It is evident from the map that the location of the Alexander site is in close proximity to existing mining activity. The majority of the mining activity takes place to the north of the site, together with a concentration surrounding Secunda.

The map also clearly highlights the new and planned mining activity within the region, with the majority of these mines located adjacent and to the east of the Alexander site. It seems as if mining activity is spreading and expanding from the eMalahleni, Middelburg area to the east near Hendrina, Breyton and Carolina. The expansion of the mining activity to the eastern areas is expected to have more or less a similar impact on the local economy as it had on the economies of eMalahleni and Middleburg due to increasing coal mining activity.

The expansion in coal mining can be ascribed to a renewed commitment by government to provide power for the national economy through coal powered electricity generation as well as an increase in international demand for coal and higher export prices.

**Map 2.3: Coal Mining Activity**



### 2.4.2 Power Stations

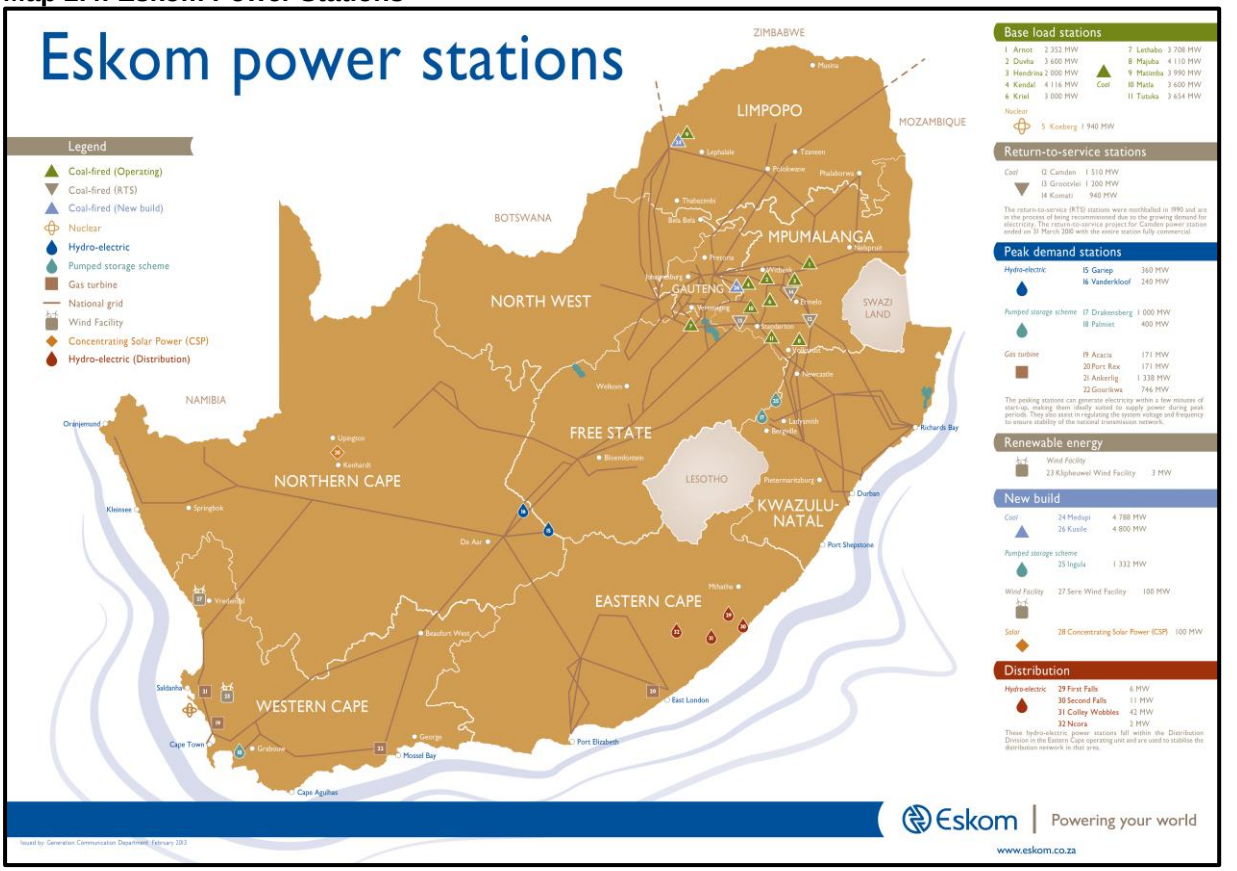
The majority of power stations and coal mines developed on the Highveld region between Vereeniging in the east and Ermelo in the west. As a consequence of the power stations development a number of small towns developed adjacent these stations accommodating mainly the power station employees. This led to the development of towns such as Pullens Hope, Kriel, Rietkuil and Komati.

The recent commitment from national government to invest in new coal power stations (one near eMalahleni and the other at Lephalale) has further increased the need for coal from these areas to provide the resources to generate power.

Map 2.4 gives an illustration of the existing, the return-to-service (i.e. mothballed power stations that were recently upgraded to return to service) and new power stations throughout South Africa.

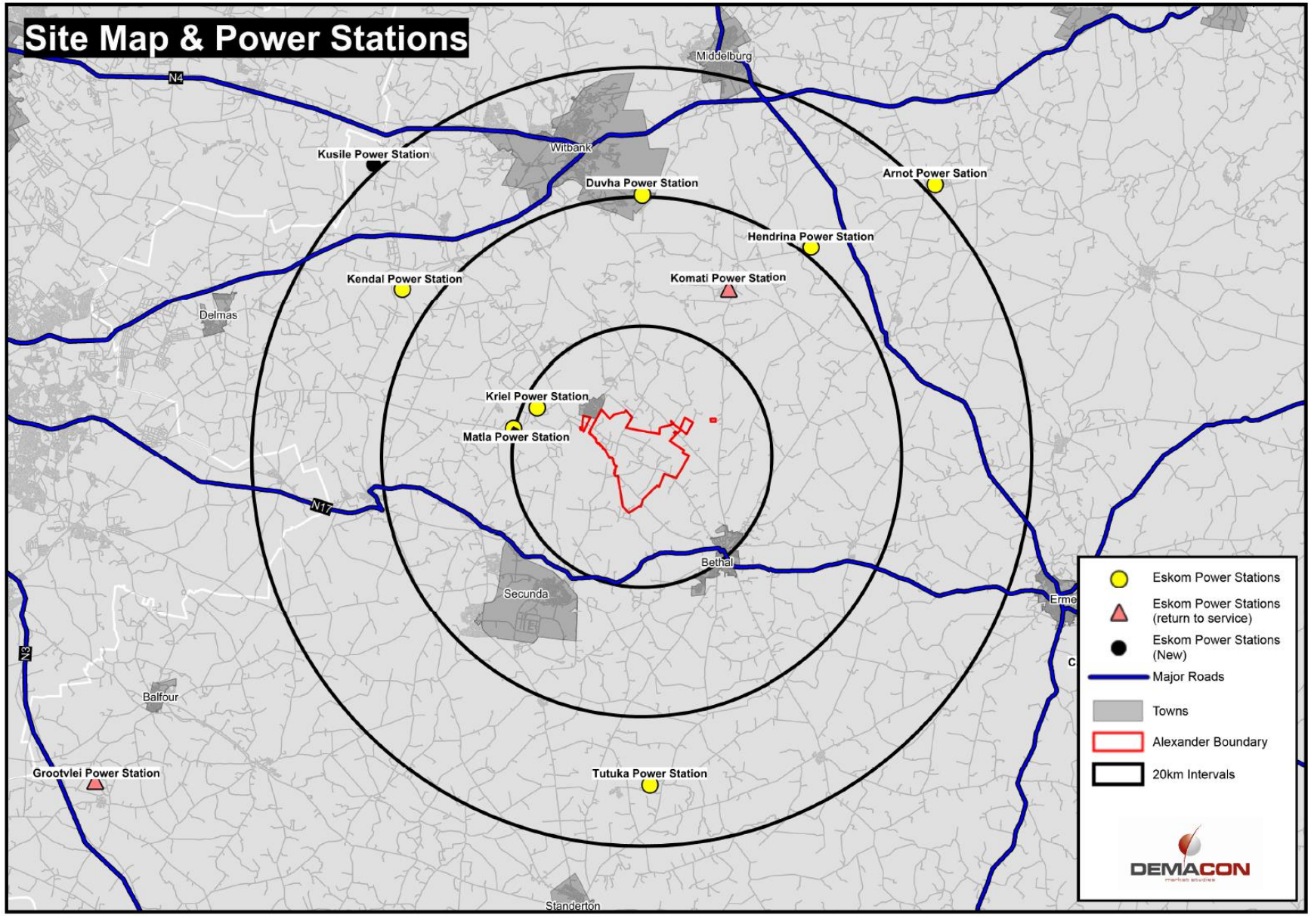
It is evident from the map that the majority of power stations are powered by coal and situated within the Mpumalanga province. A total of 11 coal power stations are located in the Mpumalanga province with a new one (Kusile) in development near eMalahleni. From this it is evident that Mpumalanga province, and specifically the western and central areas of the province can be regarded as the powerhouse of the South African economy, producing approximately 70% of the country's electricity supply.

**Map 2.4: Eskom Power Stations**




Map 2.5 illustrates the location of the existing power stations in correlation with the location of the proposed Alexander mining development. The site is located in close proximity to power stations, with Kriel and Matla Power stations both approximately 20km from the Alexander site. In total, there are eight power stations within a 60km radius from the site.

**Map 2.5: Power Stations in Close Proximity to the Alexander Site**



### 2.4.3 Agriculture

The agricultural sector is threatened by various internal and external constraints. Some of the constraints are the poor conditions of the rural road infrastructure, ownership of land, land reform failures, mining activities, urbanization, climate change, access to finances, water availability, lack of agro-processing and markets, human capacity, governance and marginal soils. The agriculture sector is an important economic activity in the Nkangala District which should be protected and promoted through the development of supplementary activities, such as agri-processing. [4]

In the southern regions of the District extensive farming, specifically in the form of crop farming is promoted by the Nkangala IDP (2013/2014). Extensive farming is also promoted in the northern regions, for cattle and game farming. Intensive agriculture is promoted along the N4 Maputo Corridor, to capitalise on the access to markets at local and regional level. Eco-tourism, agriculture and forestry are promoted in the eastern regions of the District, in support of the tourism sector.

According to the Nkangala IDP (2013/2014) the north western regions of the District are characterised by subsistence farming and rural residential uses. The initiation of community farming projects is necessary to enhance the agricultural sector in this area and to address the high poverty levels.

Although agricultural land around the settlements in the Emalahleni area is increasingly under threat, the agricultural land in Emalahleni is considered to have high production value and potential, and should be protected as a scarce resource. In this regard, the consolidation and integration of dispersed settlements (e.g. integration of Ga-Nala and Thubelihle) is proposed, as opposed to extension of the settlements into pristine agricultural areas.[5]

Map 2.7 illustrates that the whole area has a high frequency of cultivated land. Cultivation is dominated by dry-land cultivars with some higher intensity pivot-irrigation visible. The area surrounding the site is currently predominantly used for cultivation.

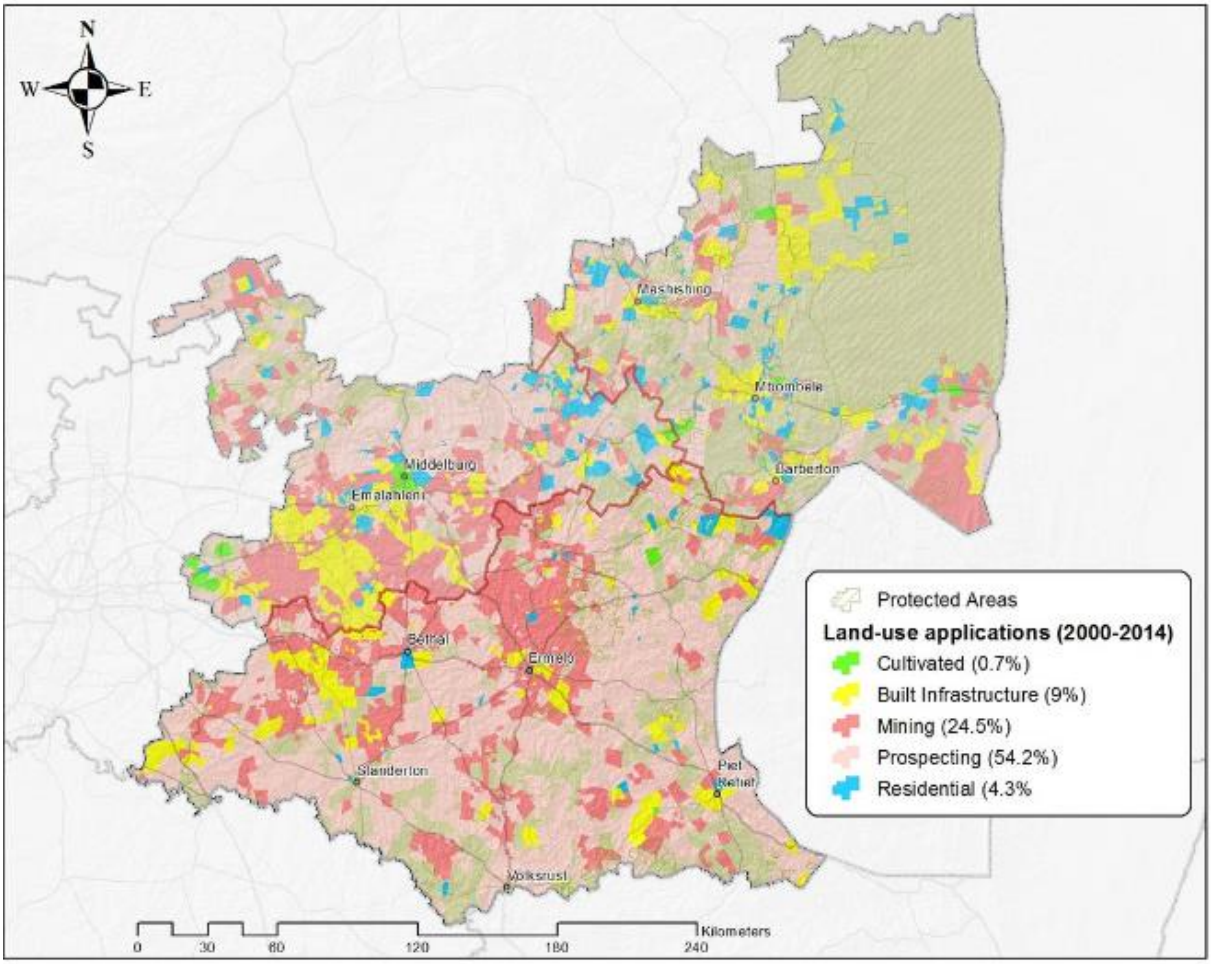
Sufficient agriculture production is needed in order to ensure food security, especially in South Africa where maize is one of the staple foods and mostly cultivated in this region.

The protection of high potential and productive agricultural land is necessary. The agricultural sector is competing with other land users for the same land. Most notably are the expansion of the mining industry and urbanization. This has serious implications on land reform and food security[6].

Map 2.6 below shows the serious extent to which mining is threatening agriculture in the Mpumalanga. The level of mining, which is already high, and prospecting applications combine to cover the greater majority of the land area thus putting agriculture and the environment to high risk.[7]

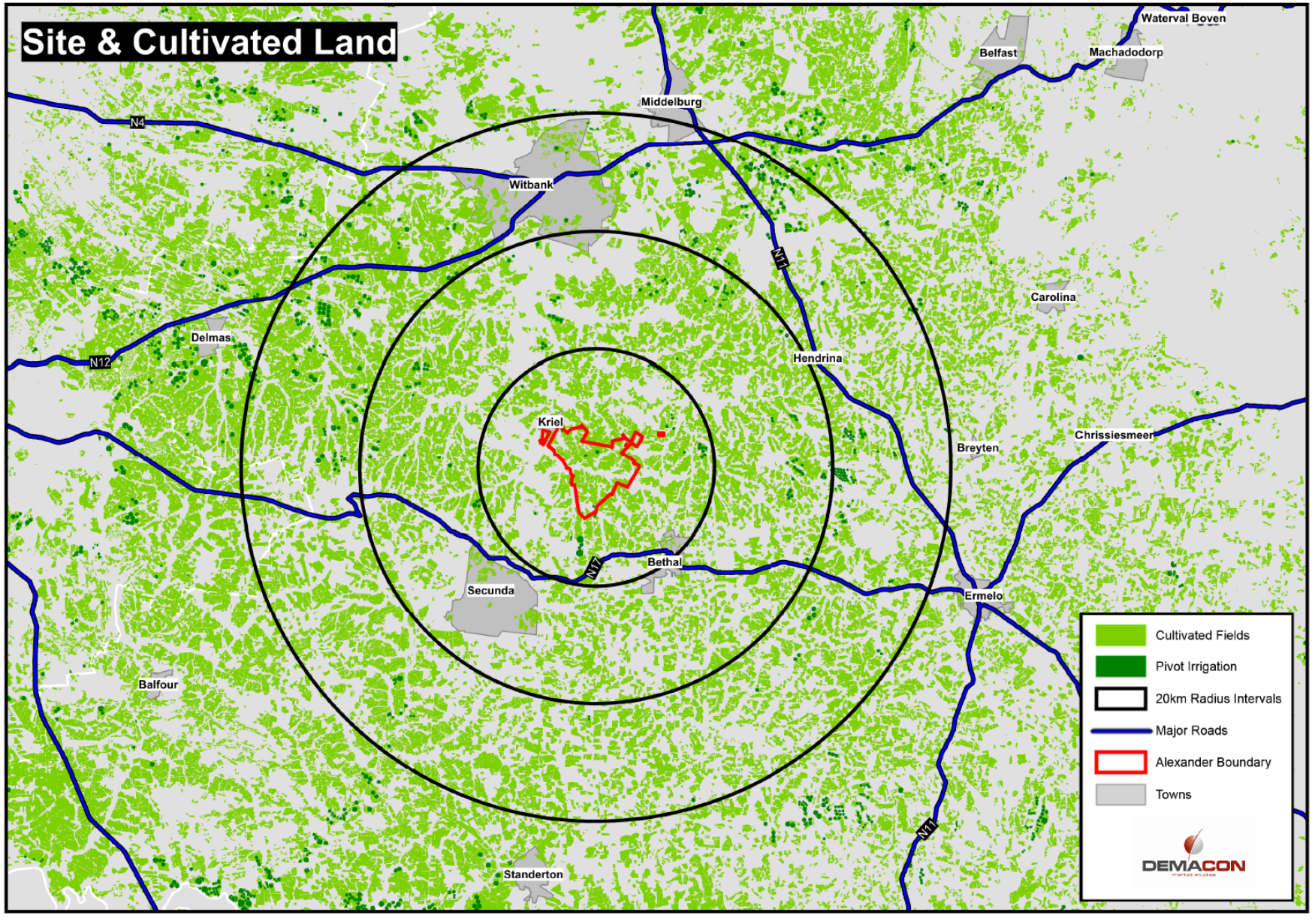
[4] Source: Nkangala Integrated Development Plan, 2013-2014
[5] Source: Emalahleni Spatial Development Framework, 2010
[6] Source: Emalahleni Spatial Development Framework, 2010
[7] Source: http://www.groundup.org.za/media/features/mpumalanga/mpumalanga_0002.html

**Map 2.6: Mining or Prospecting Applications**




*Source: http://www.groundup.org.za/media/features/mpumalanga/mpumalanga_0002.html*

**Map 2.7: Cultivated Land Map**



The following article refer to the importance of food security in the near future.

**70% increase in food production needed in 2050**

The Food and Agriculture Organisation (FAO) said feeding a global population of 9.15 billion people in 2050 requires an increase in total food production of some 70 per cent (nearly 100% in the developing countries). Giving the alert, the organisation said in its "long-term Outlook for Global Agriculture", the demand for cereals is projected to rise about 50 per cent by 2050 (+1 billion tonnes), up from some 2.1 billion tonnes.

FAO said demand for other food products with higher income responsiveness such as livestock products or vegetable oils is projected to grow well above the rates predicted for cereals, while meat production, for instance, will rise by over 200 million tonnes to 470 million tonnes while soybean production will rise even faster from 215 million tonnes to 515 million tonnes by 2050. Not included in these estimates is a potentially significant increase in demand from the (bio) energy sector.

According to FAO, high energy prices and/or government policies (mandates/subsidies) could create considerable extra demand for agricultural products and ultimately for natural resources such as land, water or genetic resources. Agriculture nonetheless has a pivotal role in reducing hunger and poverty. More than 70% of the poor live in rural areas and many of them rely on agriculture for their livelihoods. The most recent increase in hunger is not the consequence of poor global harvests but is caused by the world economic crisis that has resulted in lower incomes and increased unemployment. This has reduced access to food by the poor, the UN agency said.

"A dangerous mix of the global economic slowdown combined with stubbornly high food prices in many countries has pushed some 100 million more people than last year into chronic hunger and poverty," said FAO Director-General Jacques Diouf. "The silent hunger crisis — affecting one sixth of all of humanity — poses a serious risk for world peace and security. We urgently need to forge a broad consensus on the total and rapid eradication of hunger in the world and to take the necessary actions." "The present situation of world food insecurity cannot leave us indifferent," he added.

Poor countries, Diouf stressed, "must be given the development, economic and policy tools required to boost their agricultural production and productivity. Investment in agriculture must be increased because for the majority of poor countries a healthy agricultural sector is essential to overcome poverty and hunger and is a pre-requisite for overall economic growth."

"Many of the world's poor and hungry are smallholder farmers in developing countries. Yet they have the potential not only to meet their own needs but to boost food security and catalyse broader economic growth. To unleash this potential and reduce the number of hungry people in the world, governments, supported by the international community, need to protect core investments in agriculture so that smallholder farmers have access not only to seeds and fertilisers but to tailored technologies, infrastructure, rural finance, and markets," said Kanayo F. Nwanze, President of the International Fund for Agricultural Development (IFAD).

Source: http://thenationonlineng.net/web2/articles/50055/1/70--increase-in-food-production-needed-in-2050/

In order to ensure sustainable economic growth, it is important to have sufficient food supply. Within South Africa the National Development Plan (NDP), the Infrastructure Development Plan, the National Growth Path and the Industrial Policy Action Plan indicate the important strategic role for agriculture and agro-processing within the national economy. Increased development and growth in the national economy is dependent on the provision of sufficient food, with agriculture an important ingredient to economic growth as people need food.

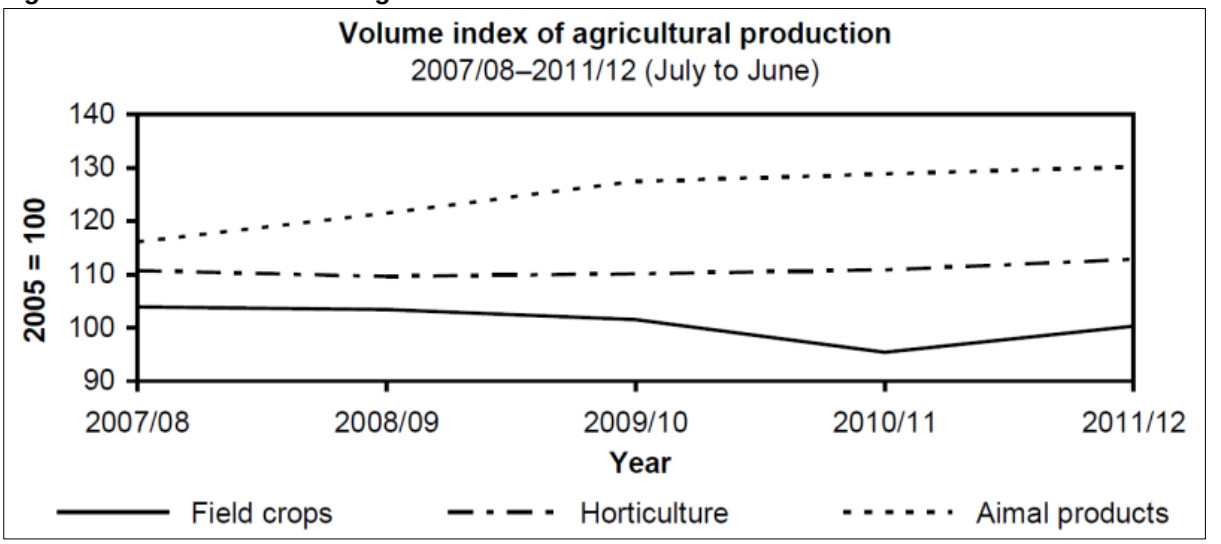
## *The importance of Agriculture for food*

### *Food security*

Food security in the world has reached its lowest level in over 50 years. Huge demand for cleaner energy pulls important food sources like maize and soybeans into the production of bio-fuels. SA is only now experiencing what food security means, after decades of solving food problems with cheap imports. The figure illustrates the volume of production over the past 5 years with the red line indicating the production volume in the year 2005. It is evident

that production in field crops is even with the volume it was in 2005, and that production volumes have not followed the increases in population growth (1.2% pa) in the national economy.

**Figure 2.1: Volume Index of Agricultural Production**




One of the biggest threats to food security in the future will be the availability and affordability of water. SA is heading for water shortages that will put enormous pressure on agriculture, which will bear the brunt of these shortages. Any future agricultural development that depends on water from irrigation schemes, rivers or dams, should be discouraged.

**Energy will also pose a serious threat** since the cost and availability of electricity, coal and fuel will become even more difficult. This however opens up a whole new opportunity in the production of renewable energy sources within agriculture like solar energy, methane gas and wind. Fast developing Asian countries are creating a shortage in most of the staple foods, and especially rice. They also gobble up resources and put enormous pressure on energy supply.

*Verdict: Sustainable agriculture offers the government the best way to establish food security. Agriculture will therefore need bigger support from government in future to ensure enough food is provided for its citizens.*

***Food prices***

As the supply of staple foods comes under pressure and demands for more luxury food increase, so will prices keep escalating. Food is becoming a serious political issue around the world, with both availability and cost of production offering quite a challenge. Communities in SA are taking to the streets to protest against food prices. Price control by government, however unlikely now, might be a reality in future. The highest food inflation happens outside the farm gate and farmers do not necessarily enjoy the benefit thereof. These price hikes are mostly driven by international prices, rather than local supply and demand. The more the primary producers become involved higher up in the supply chain, the more profitable they become.

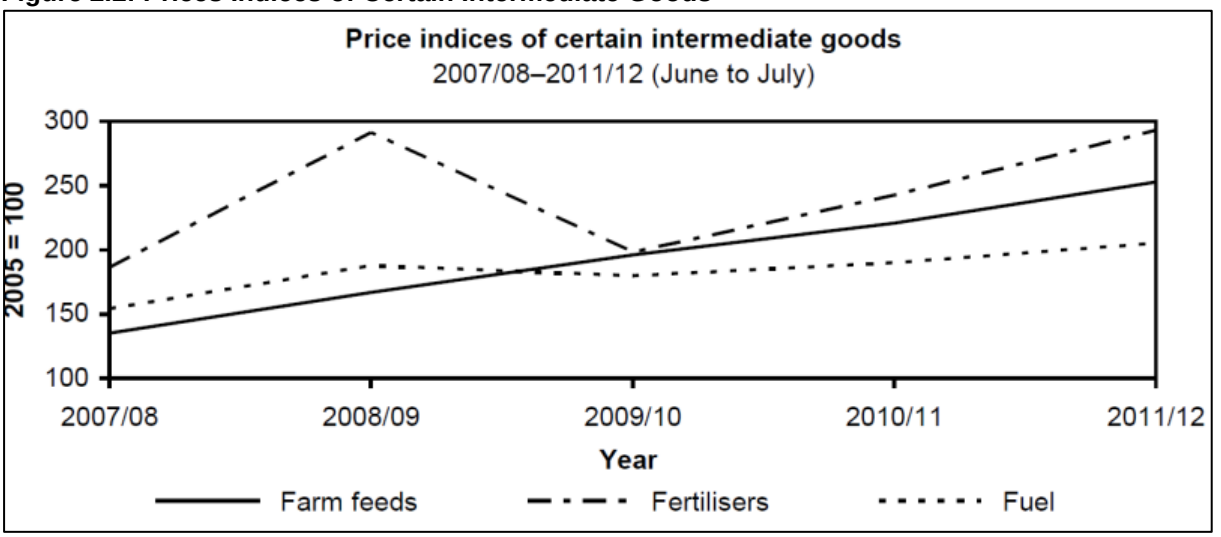
*Verdict: Good prices offer wonderful opportunity to producers as long as it does not force consumers to find alternatives to local farm produce. The relatively high global food prices (although unstable) offer good export opportunities. Farm operations should include basic processing where possible.*

### *Rise in input costs*

The main inputs that pose a threat to input costs are energy, fertiliser, machinery and high-tech equipment. High demand for energy and political unrest in oil producing countries leads to increased fuel cost that will stay high over the long term. Increased growth in countries such as China, India and Russia, leads to a shortage in the main fertiliser products, which in turn leads to price increases of between 100% and 500% in one year.

The figure illustrated the change in expenditure on some input costs compared to the year 2005. With the increase in the fuel price since March 2010 this is expected to increase input costs even more.

**Figure 2.2: Prices Indices of Certain Intermediate Goods**




Higher inflation will lead to higher salaries. High interest rates make it difficult to access credit for normal production. The instability of the exchange rate puts pressure on any imported inputs.

The above mentioned points contribute to more than 60% of the production costs of agricultural products. The reality is that it is becoming increasingly important to produce at a high level of efficiency.

*Verdict: Any operation that demands high inputs (especially if imported), will offer a risk that has to be managed. Farmers should keep their finger on the pulse of world trends, not to be caught wanting if prices or availability changes quickly.*

### *Role of Africa*

Africa is the continent with the biggest food production potential in the world. Africa will be the focus of the world for the future production of food and green fuels. A new “scramble for Africa” by the world powers is predicted. This time not for colonies, but for a share in the food producing capacity of the continent and the resources that will make this possible. Africa is waking up to take its rightful place in the world economy with slow, but sure, growth in the unleashing of its own potential.

*Verdict: Africa has the potential of unprecedented growth in agriculture in the immediate future*

### *Challenges and opportunities in Africa*

Africa has turned the corner as far as political stability and the growth of democracy goes. The continent in recent years has opened itself up to huge growth in inter-continental trade as

well as capital investments within Africa. There are former Zimbabwean and South African farmers in almost every African country where they mostly enjoy the extraordinary support of the local governments.

Africa offers not only production potential, but also a lucrative market. The growth in population and wealth, coupled with its remoteness from oversees competition, makes Africa a potential market for African producers that would rather sell locally within the continent, than to go through the hassle of exports overseas. Infrastructure, capital and the sustainable and constant availability of strategic inputs remain the biggest challenges.

### 2.4.4 Tourism

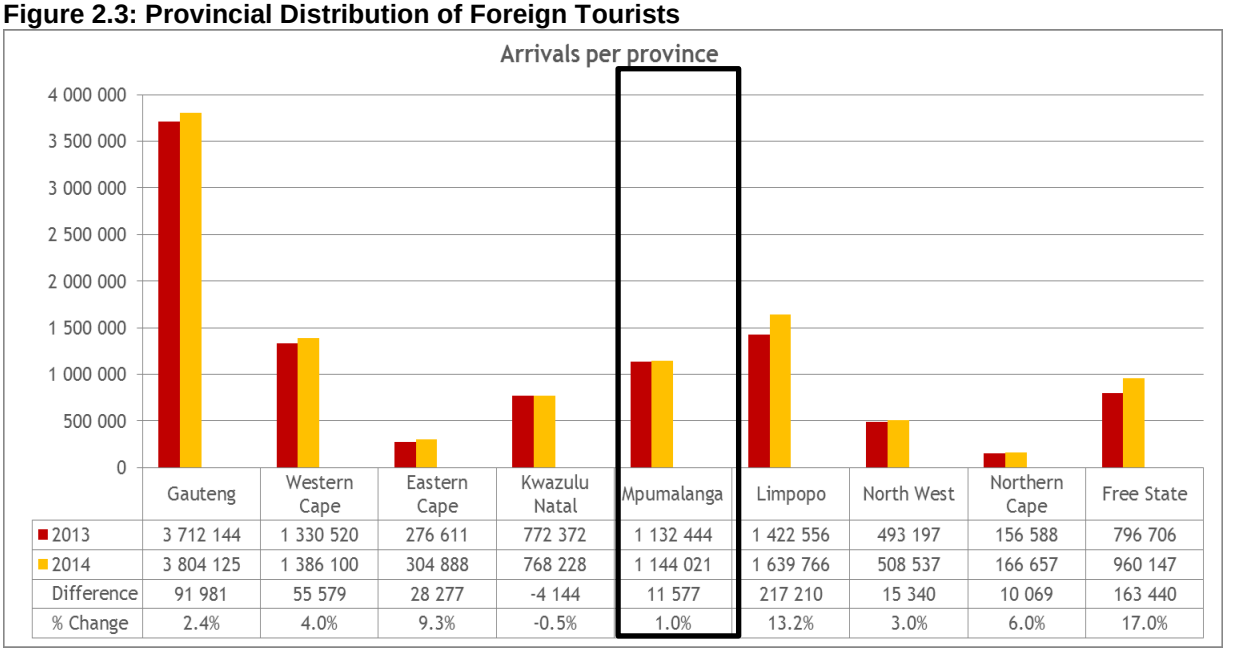
A number of tourism attractions is located within the province. These include the world famous Kruger National Park, the Dullstroom area for fly fishing, the Drakensberg escarpment with Bourke's Luck Potholes and the Blyde River Canyon and then the Chrissiesmeer region with the largest concentration of freshwater lakes in South Africa.

The importance of Mpumalanga as a tourism destination within the national context is illustrated in this section. International and domestic tourism trends and their preferences is an important contributor to the development of tourism activities and facilities in regions that are visited.

#### 2.4.4.1 Foreign Tourists

The following figure illustrates the provincial distribution of foreign tourist.

**Figure 2.3: Provincial Distribution of Foreign Tourists**



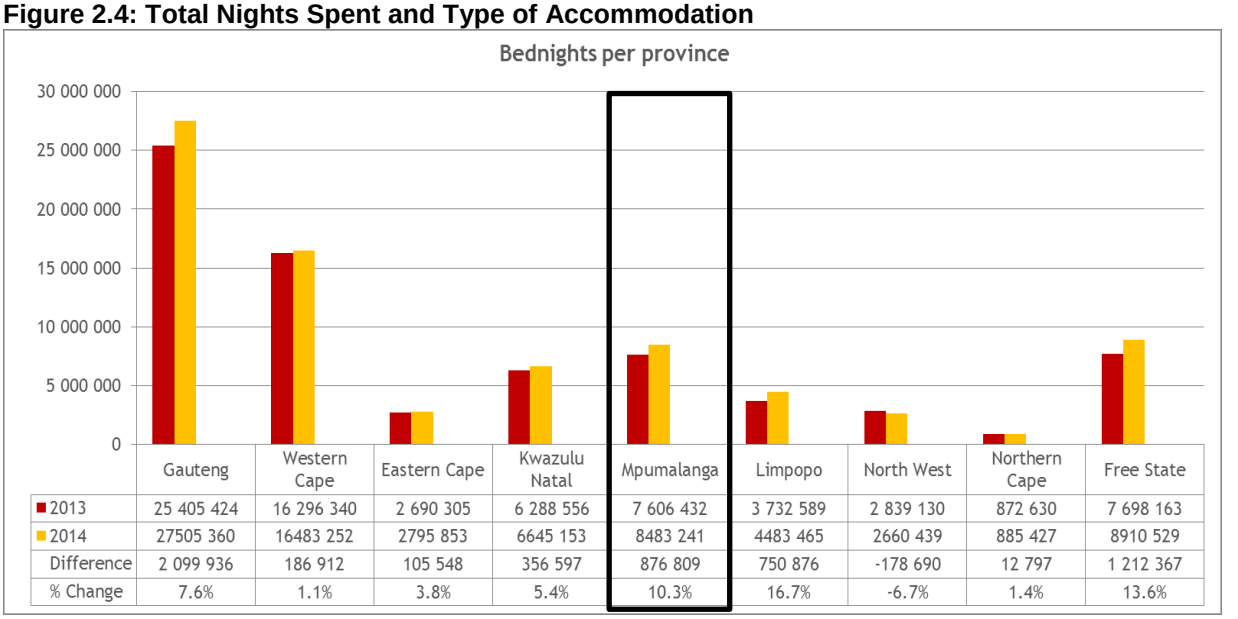

| | Gauteng | Western Cape | Eastern Cape | Kwazulu Natal | Mpumalanga | Limpopo | North West | Northern Cape | Free State |
|---|---|---|---|---|---|---|---|---|---|
| 2013 | 3 712 144 | 1 330 520 | 276 611 | 772 372 | 1 132 444 | 1 422 556 | 493 197 | 156 588 | 796 706 |
| 2014 | 3 804 125 | 1 386 100 | 304 888 | 768 228 | 1 144 021 | 1 639 766 | 508 537 | 166 657 | 960 147 |
| Difference | 91 981 | 55 579 | 28 277 | -4 144 | 11 577 | 217 210 | 15 340 | 10 069 | 163 440 |
| % Change | 2.4% | 4.0% | 9.3% | -0.5% | 1.0% | 13.2% | 3.0% | 6.0% | 17.0% |

*Source: Demacon ex Annual Tourism Report, 2016*

Mpumalanga is the fourth most visited province within South Africa and the number of visitors to the province shows a positive increase per annum since 2013. This trend indicates that the province is becoming an important foreign tourist destination and in terms of the tourist numbers almost level with the Western Cape.

Figure 2.4 illustrates the time spent per province (based on bed bights) and the type of accommodation used. Mpumalanga is fourth according to bed nights spend in the country.

**Figure 2.4: Total Nights Spent and Type of Accommodation**

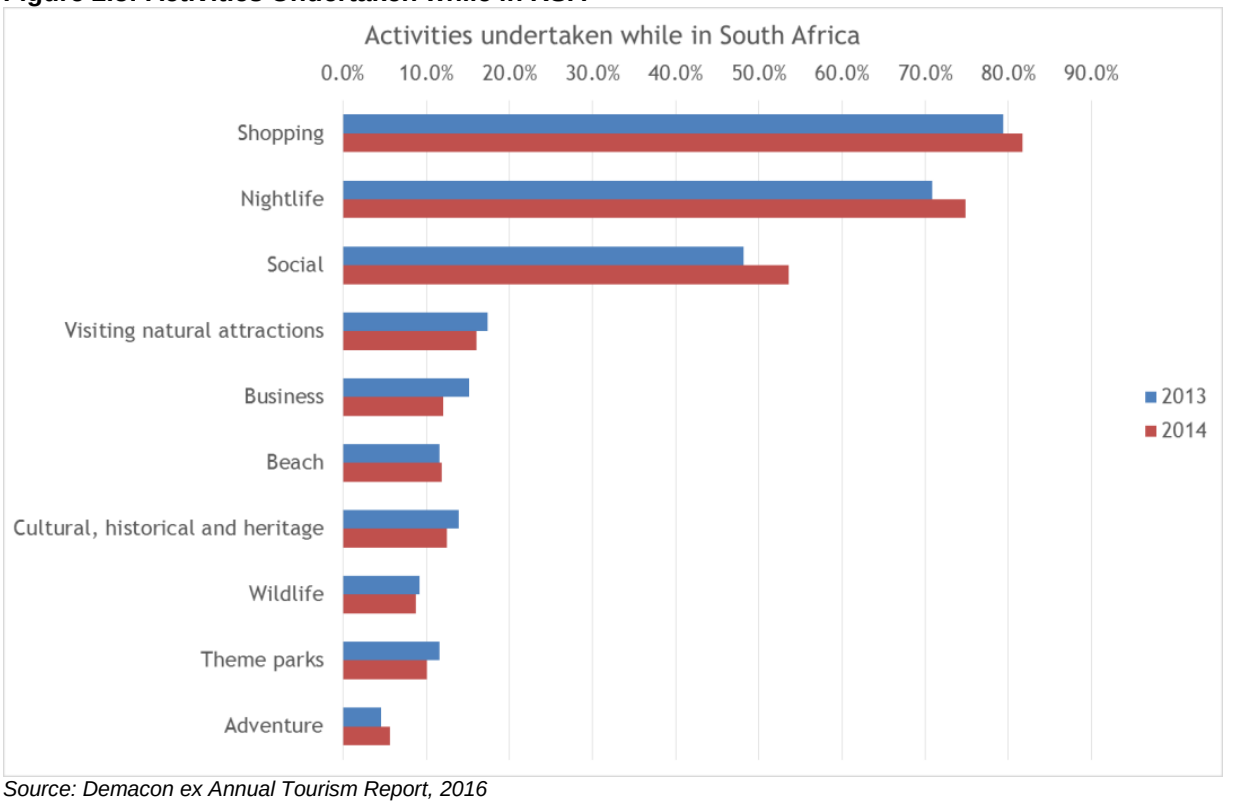



| | Gauteng | Western Cape | Eastern Cape | Kwazulu Natal | Mpumalanga | Limpopo | North West | Northern Cape | Free State |
|---|---|---|---|---|---|---|---|---|---|
| 2013 | 25 405 424 | 16 296 340 | 2 690 305 | 6 288 556 | 7 606 432 | 3 732 589 | 2 839 130 | 872 630 | 7 698 163 |
| 2014 | 27505 360 | 16483 252 | 2795 853 | 6645 153 | 8483 241 | 4483 465 | 2660 439 | 885 427 | 8910 529 |
| Difference | 2 099 936 | 186 912 | 105 548 | 356 597 | 876 809 | 750 876 | -178 690 | 12 797 | 1 212 367 |
| % Change | 7.6% | 1.1% | 3.8% | 5.4% | 10.3% | 16.7% | -6.7% | 1.4% | 13.6% |

*Source: Demacon ex Annual Tourism Report, 2016*

The main activities undertaken by foreign tourist when they visit South Africa is illustrated by Figure 2.5

**Figure 2.5: Activities Undertaken while in RSA**



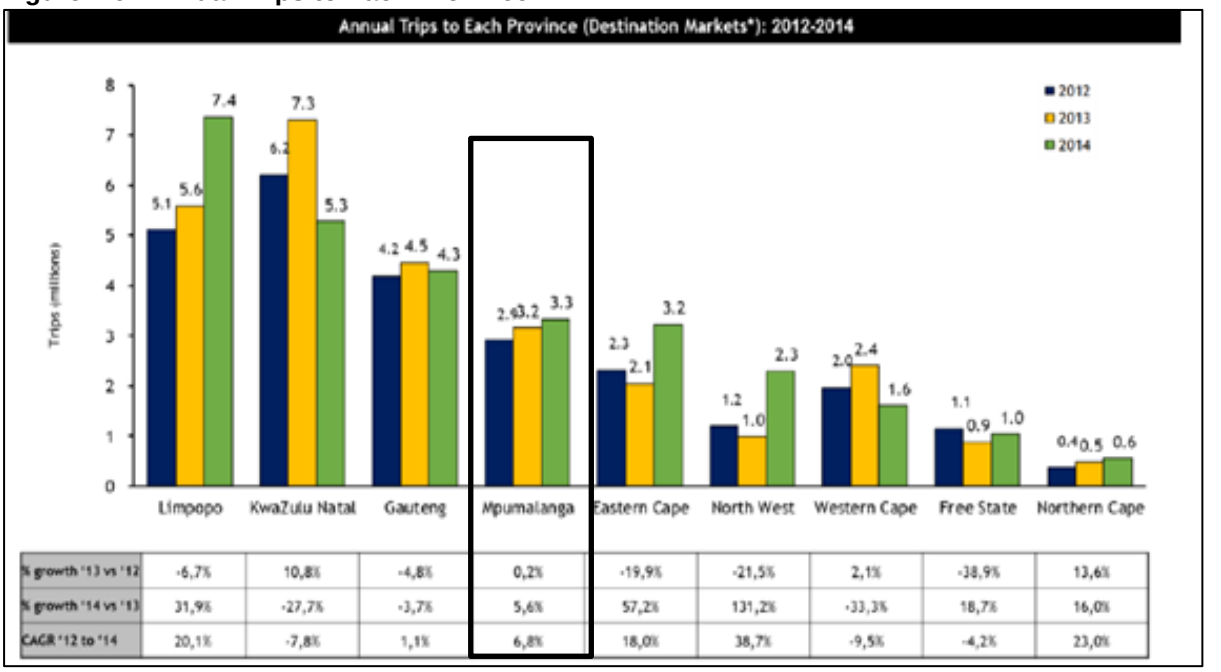

*Source: Demacon ex Annual Tourism Report, 2016*

Shopping and nightlife is the two activities that are mostly undertaken, this is followed by Adventure and visiting a casino.

### 2.4.4.2 Domestic Tourism

The following figure illustrates the number of trips to each province. This gives an indication of movement patterns and domestic tourism trends within the national economy.

**Figure 2.6: Annual Trips to Each Province**

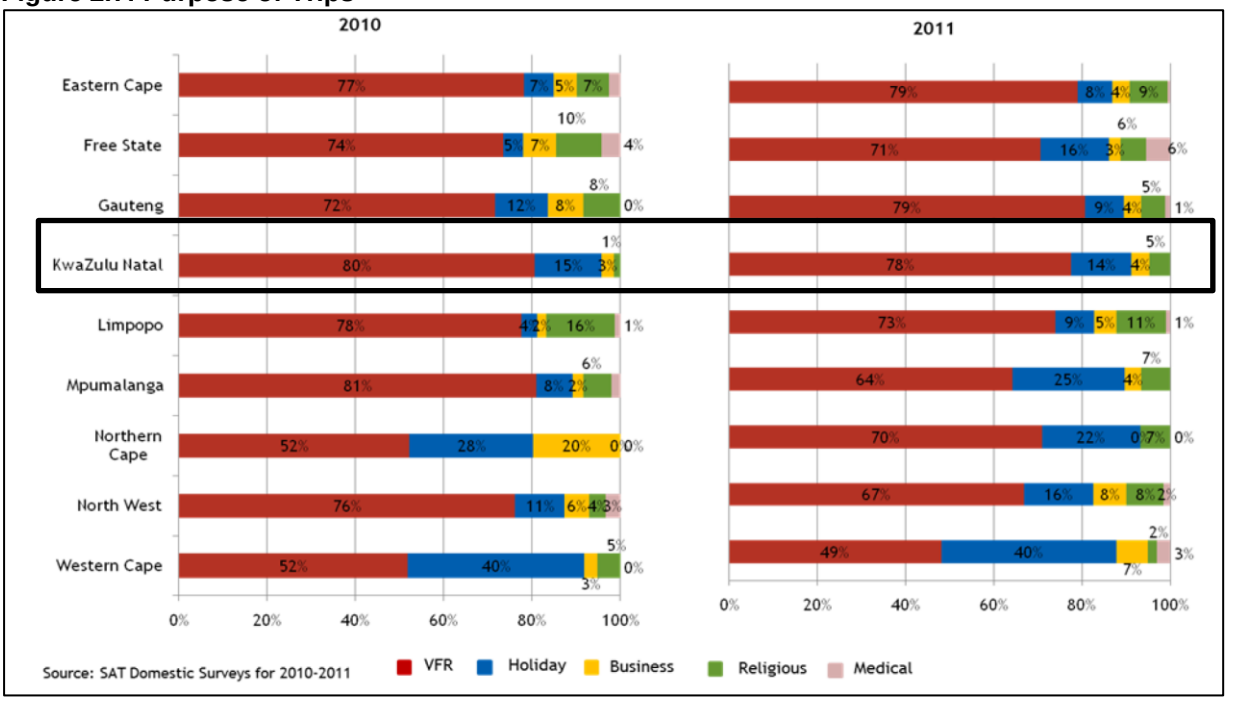



| | Limpopo | KwaZulu Natal | Gauteng | Mpumalanga | Eastern Cape | North West | Western Cape | Free State | Northern Cape |
|---|---|---|---|---|---|---|---|---|---|
| % growth '13 vs '12 | -6,7% | 10,8% | -4,8% | 0,2% | -19,9% | -21,5% | 2,1% | -38,9% | 13,6% |
| % growth '14 vs '13 | 31,9% | -27,7% | -3,7% | 5,6% | 57,2% | 131,2% | -33,3% | 18,7% | 16,0% |
| CAGR '12 to '14 | 20,1% | -7,8% | -1,1% | 0,8% | 18,0% | 38,7% | -9,5% | -4,2% | 23,0% |

*Source: Demacon ex Annual Tourism Report, 2016*

The Mpumalanga province received 3.3 million trips in 2014, the fourth highest. The main purpose for these visits is illustrated by Figure 2.7.

**Figure 2.7: Purpose of Trips**



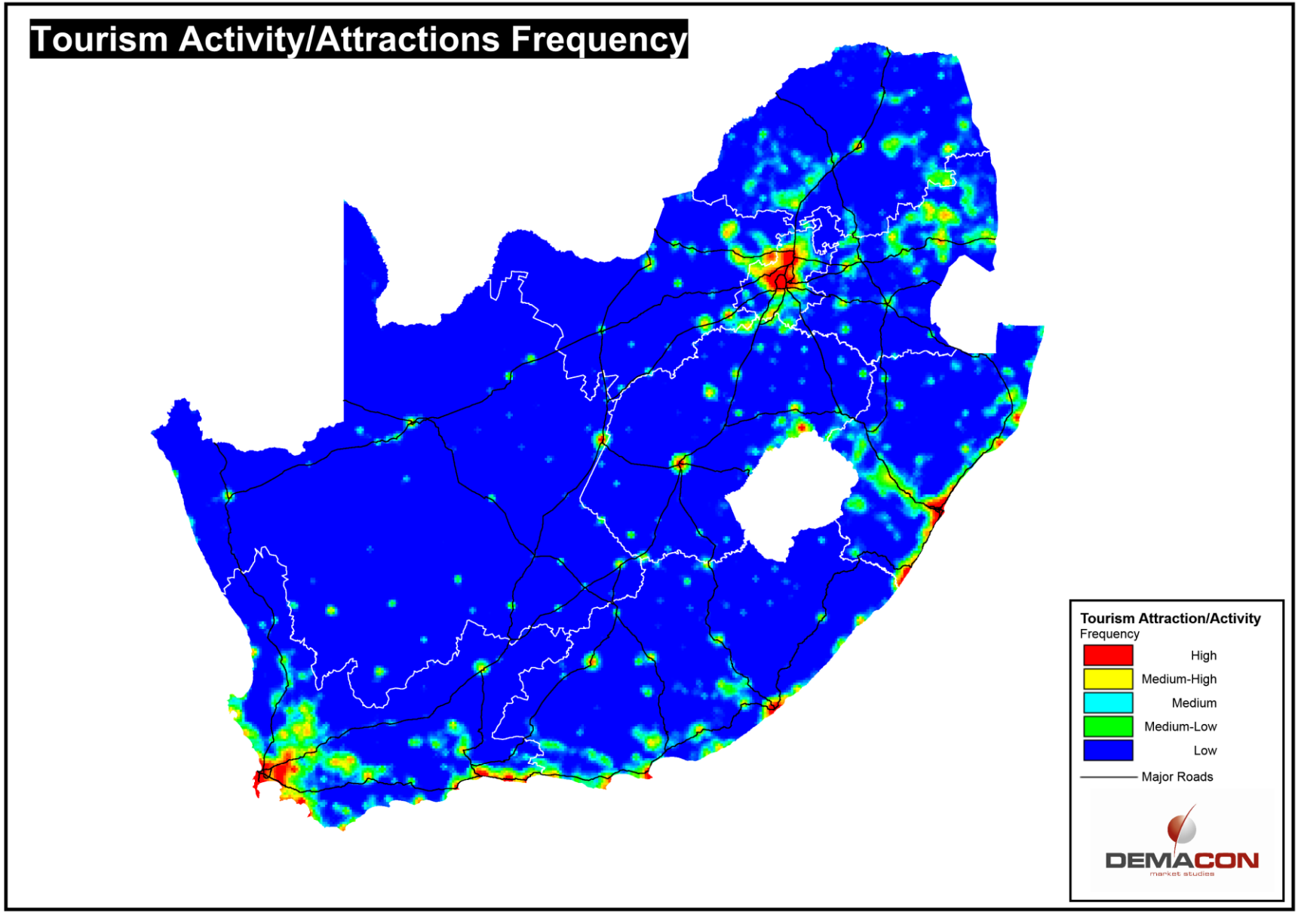

*Source: 2011 Annual Tourism Report*
*Note: VFR – Visiting Friends and Relatives*

Visits to the province is mainly to visit relatives and friends, additionally it is evident that visits to the province is also for holiday purposes (25% of trips). This increased drastically from the 2010 figures that only indicated an 8% holiday purpose.

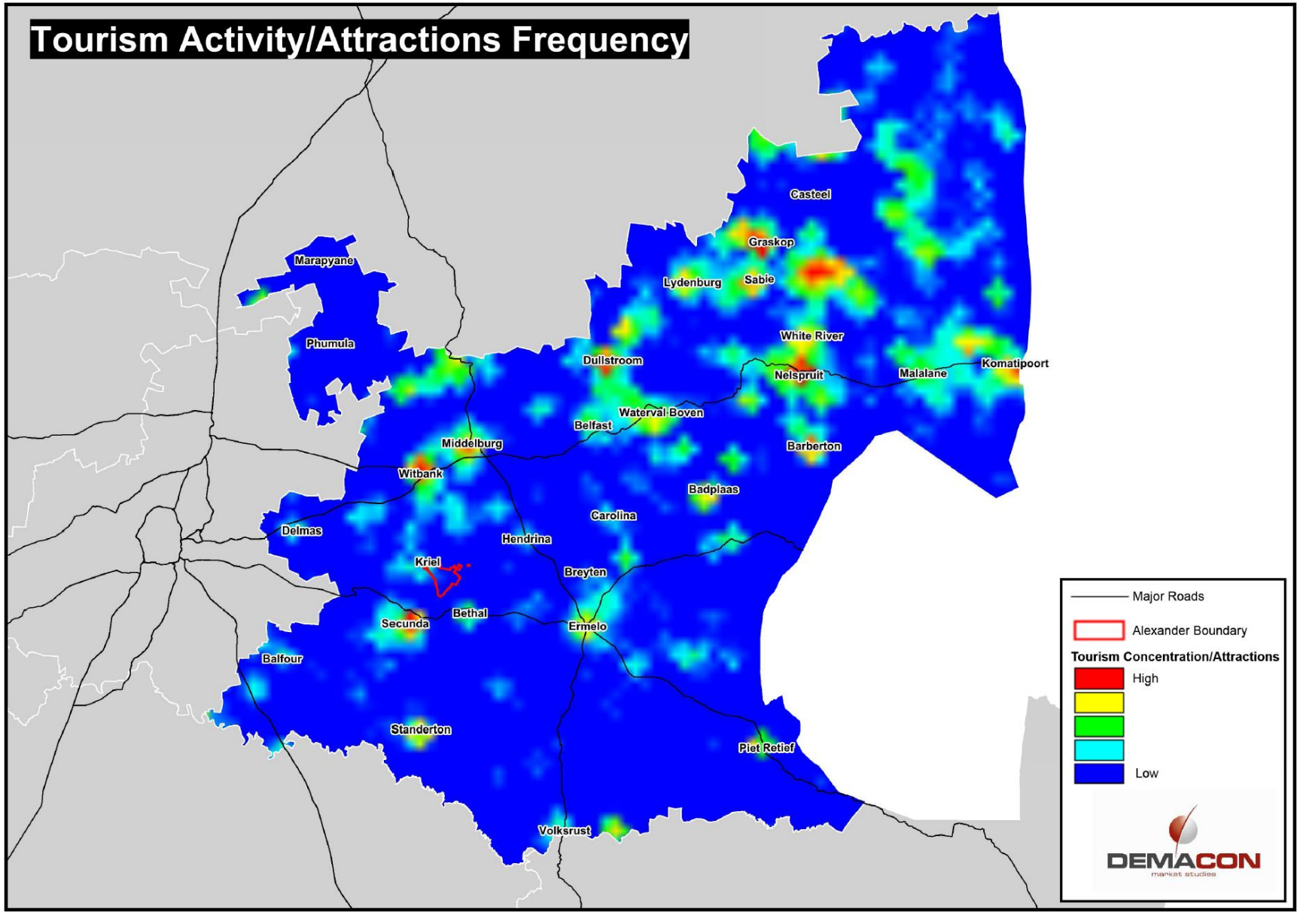
### 2.4.4.3 Tourism Activity/Facilities

The following map illustrates the number of tourism facilities throughout South Africa with areas of higher concentration/frequency.

**Map 2.8: Tourism Facilities/Attractions Frequency Map**



**Map 2.9: Mpumalanga Tourism Frequency Map**



The tourism sector encompasses a number of sectors within the national economy, however an indication of tourism activity can be based on various tourism related attractions and activity which is listed below.

| | | |
|---|---|---|
| Accommodation | Botanical Gardens | Dams |
| Parks & Recreation | Theatre | Resorts |
| Museum | Nightlife | Beach |
| Winery | Hiking | Horse Riding |
| Exhibition & Convention Centres | National Park | Adventure Trails |
| Amusement Park | Monuments | Battlefields |
| Water Sport | Casino | Ice Skating |
| Zoo | Mountain Bike | |

## Findings Map 2.8

The frequency of tourism activities within South Africa is mostly highest in large urban areas such as Johannesburg & Pretoria, Cape Town, Durban, etc. Other areas include:

- Various area along the South African coastline where these activities are higher such as George Knysna, Margate, East London, Port Elizabeth and Richards Bay.
- The N3 between Durban and the Drakensberg
- Clarens and surrounding areas in the eastern Free State
- In Mpumalanga, especially the areas of Graskop, Hazyview and Mbombela
- Bloemfontein and Kimberley in central region of South Africa

## Findings Map 2.9

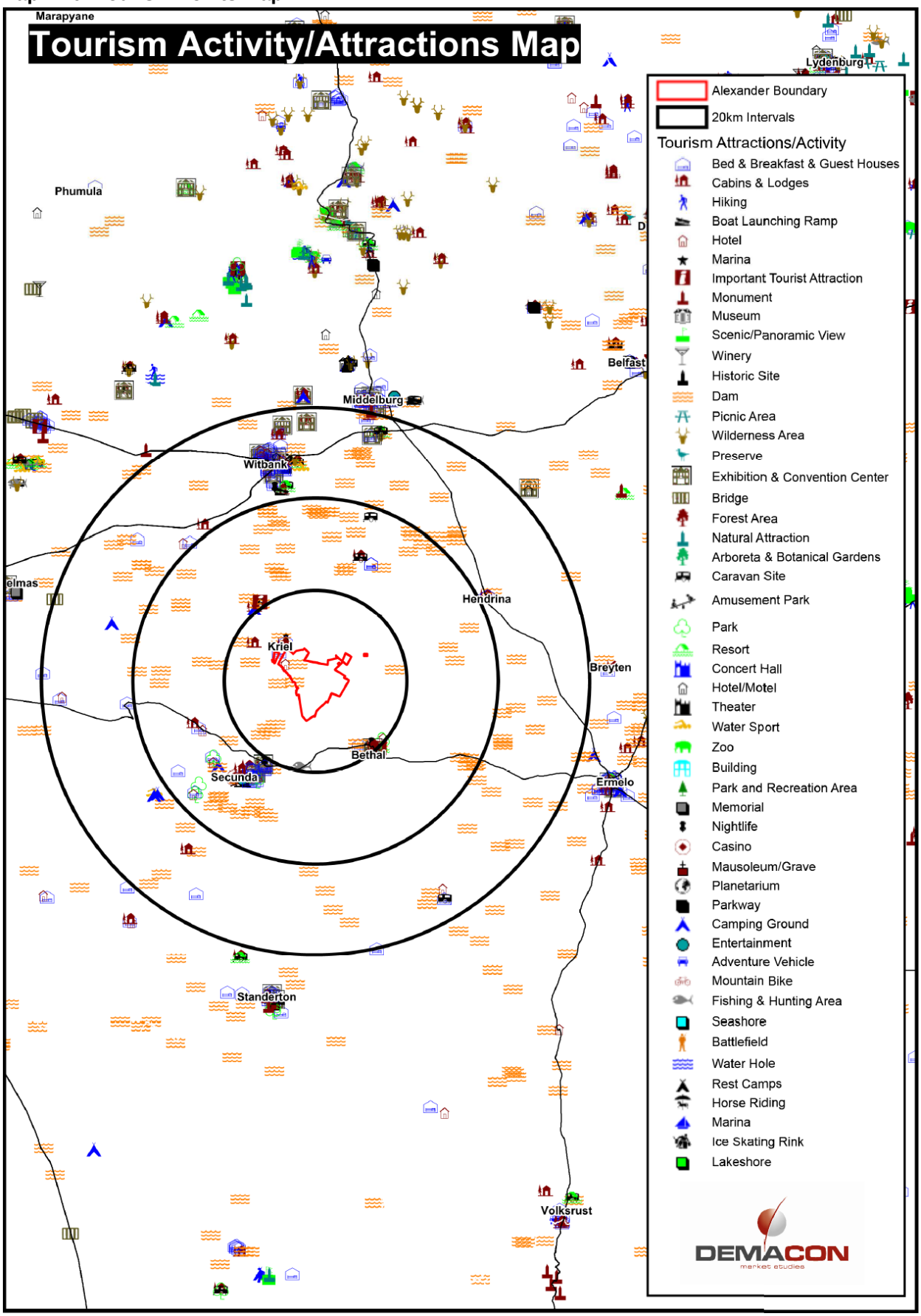
Within Mpumalanga it is evident that the eastern and northern areas of the province have the higher frequency of tourism activities. These areas include Dullstroom, Graskop, Sabie, Hazyview and Nelspruit. The area surrounding the site has a low density and frequency of tourism attractions/facilities while Secunda to the South and Emalahleni to the north are the closet tourism nodes to the site.

The location in relation to the large number of coal mines in the area can strengthen the business tourism. The increased mining activity and power stations will attract a large quantity of contractors, professionals, etc. to the area, seeking accommodation.

Map 2.10 illustrates the existing tourism attractions/facilities located in close proximity to the Alexander site.

The majority of accommodation establishment is located in eMalahleni, Middelburg and Secunda. The tourism activities in the immediate vicinity of the Alexander Project are limited. This may be due to the number of mines in the area that would make it an unfavourable tourist destination. Also, there are not a great number of natural features that would attract tourists to the area. North of Middelburg and eMalahleni, there are more tourist attractions and activities.

**Map 2.10: Tourism Points Map**



The Mpumalanga province is one of the most visited provinces by foreign visitors to South Africa. Compared to other provinces tourists tend to stay only a few nights in the province partaking in various activities i.e. shopping, night life, adventure etc. Domestic tourist visits to Mpumalanga is predominantly to visit friends and relative while an increasing number of people visit the province as a holiday destination.

The majority of tourism facilities/attractions are located within he Gauteng province and along the coastline of South Africa. The Mpumalanga province shows a high density of tourism attractions/facilities in the eastern and north eastern part of the province between Dulstroom in the west and the Kruger National Park in the east. It is evident that the central and southern part of the province has a lower density frequency of tourism activity.

## 2.5 SYNTHESIS

The location of the proposed Alexander mine has been contextualised within the regional and local environment. The main findings of the resource base and development trends are:

- The area is situated outside Kriel (Ga-Nala) in a coal rich area.
- The majority of South Africa's coal reserves are situated in the Mpumalanga, Kwazulu-Natal and Limpopo Provinces. As a result of the large coal reserves within South Africa the utilisation of these resources for power generation took place. This was the logical decision as the abundance of coal meant that electricity could be generated locally and at a low cost. This has led to the development of coal powered power stations and various coal mines supplying them throughout South Africa but specifically in areas in close proximity to coal resources.
- There is a large amount of operational mines in the area. A number of sites, especially to the east of the development site, have also been identified as feasibility or pre-feasibility mines.
- The whole area has a high frequency of cultivated land. Cultivation is dominated by dry-land cultivars with some higher intensity pivot-irrigation visible. The area surrounding the site is currently predominantly used for cultivation.
- Tourism activity is limited in the region, however, the increased mining activity and power stations will attract a large quantity of contractors, professionals, *etc*. to the area, seeking accommodation.
- There are no primary tourism attractions on or around the site, although power stations generate a degree of business tourism for maintenance and repair, technical staff, business meeting etc.
- The area is not primarily a leisure tourism area, the primary driver is agriculture, as such agriculture will serve as alternative use for mining.

# CHAPTER 3: ECONOMIC ANALYSIS

## 3.1 INTRODUCTION

The aim of this chapter is to identify the economic size and drivers of the study area. In order to determine the impact of a mining development, the local economy is studied in terms of its size and trends. This section does not provide a forecast of future opportunities. It is, rather, an examination of past trends.

## 3.2 ECONOMIC STRUCTURE AND PERFORMANCE OF THE STUDY AREA

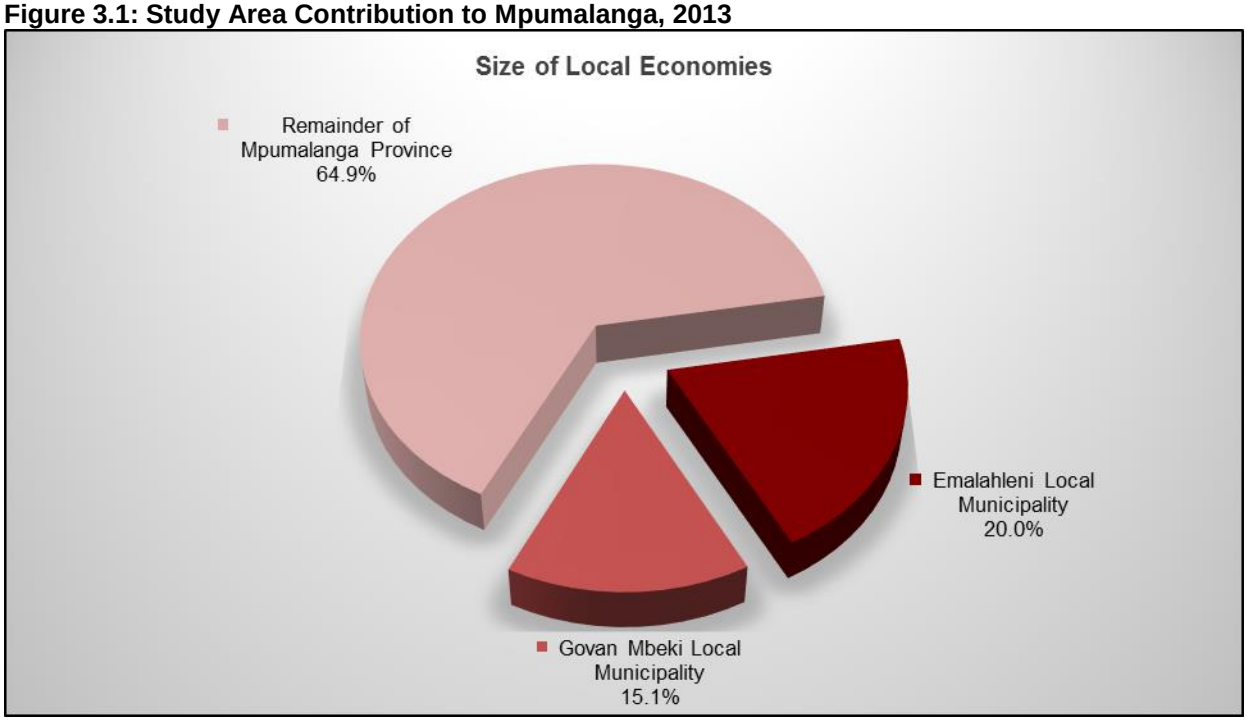
The purpose of this sub-section is to profile the structure and performance of the study area economy. Map 3.1 indicates the location of the proposed mine as well as the location of Emalahleni Local Municipality and Govan Mbeki Local Municipality. Due to the size and scope of the project, both these economies will be impacted by the development.

### 3.2.1 Economic Activity & Size

**Gross Value Added (GVA)** - The level of economic activities within a specific area. GVA is calculated as the difference between output and intermediate consumption in the economy. That is the difference between the value of goods and services produced and the cost of raw materials and other inputs, which are used up in production by all sectors of an economy.

The economic sizes of Emalahleni and Govan Mbeki are compared to the Mpumalanga province and illustrated in Figure 3.1.

**Figure 3.1: Study Area Contribution to Mpumalanga, 2013**




*Source: Demacon, 2016*

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Emalahleni LM contributes approximately 20.0% (R50.3 billion) to the total Mpumalanga economy. Govan Mbeki LM also contributes a substantial amount (R28.8 billion – 15.1%) to the total Mpumalanga economy. The main sectors that contribute to the study area economy are illustrated in Figure 3.2.

**Map 3.1: Study Area**

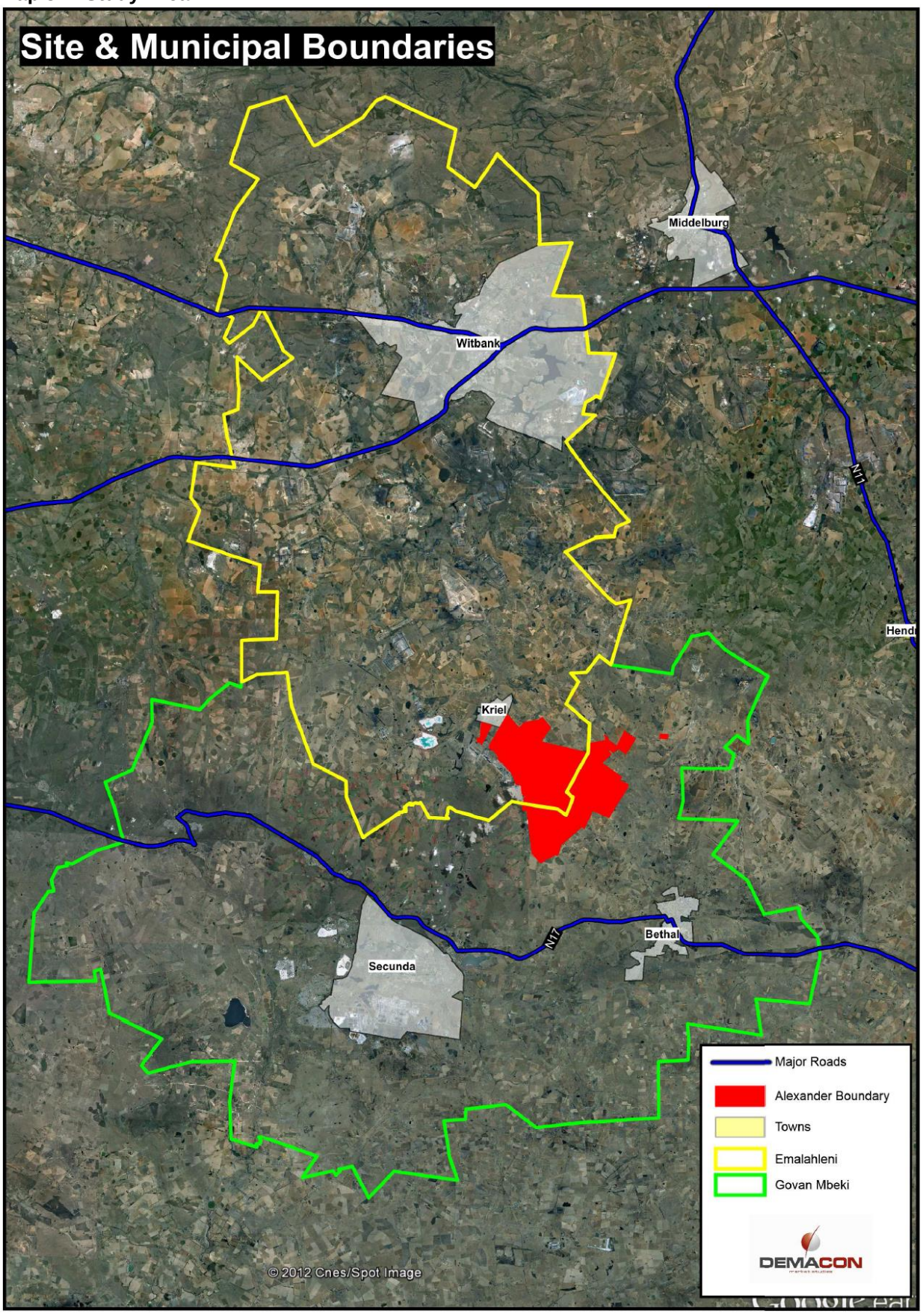
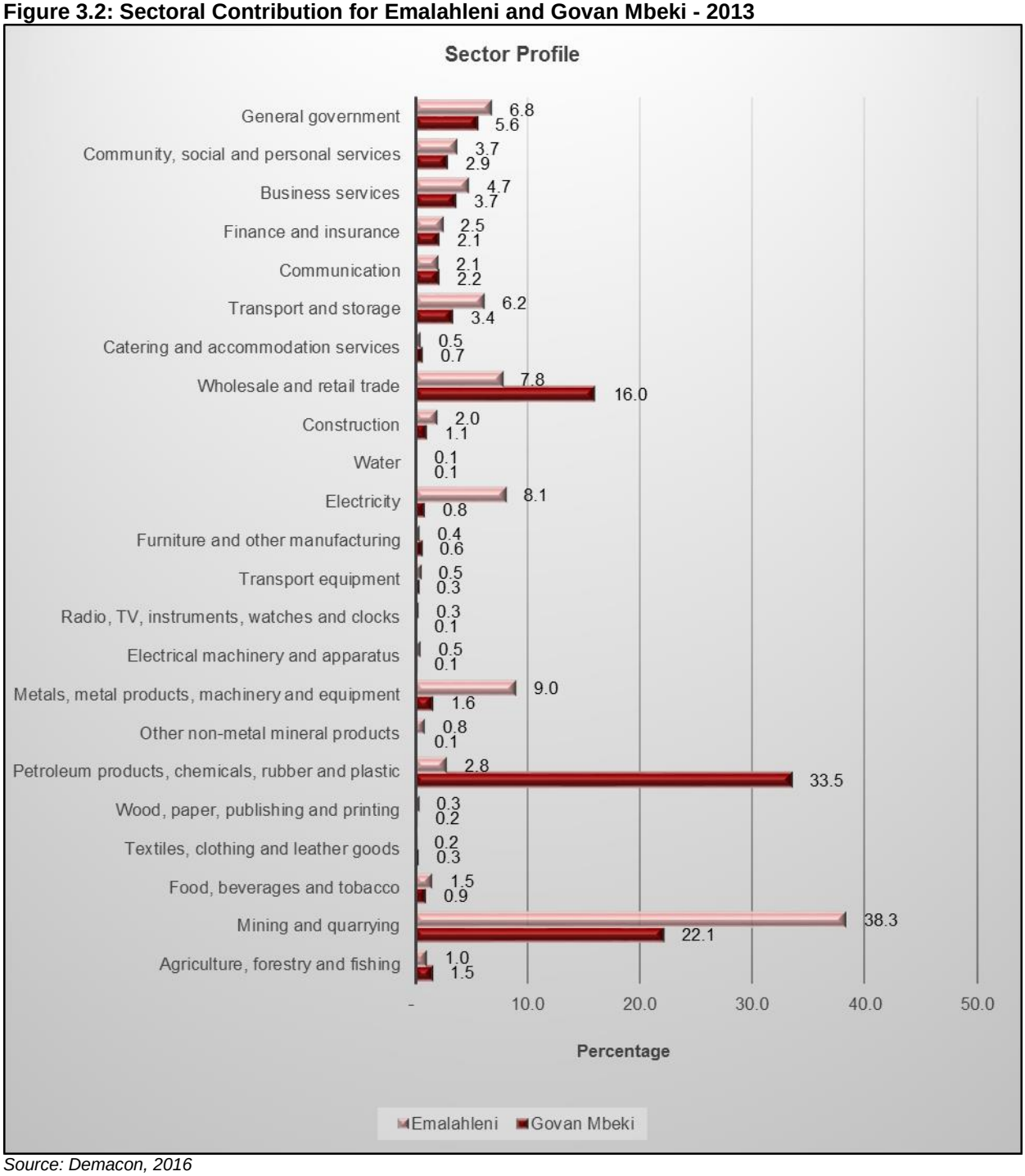


**Figure 3.2: Sectoral Contribution for Emalahleni and Govan Mbeki - 2013**




*Source: Demacon, 2016*

The major drivers in Emalahleni LM include:

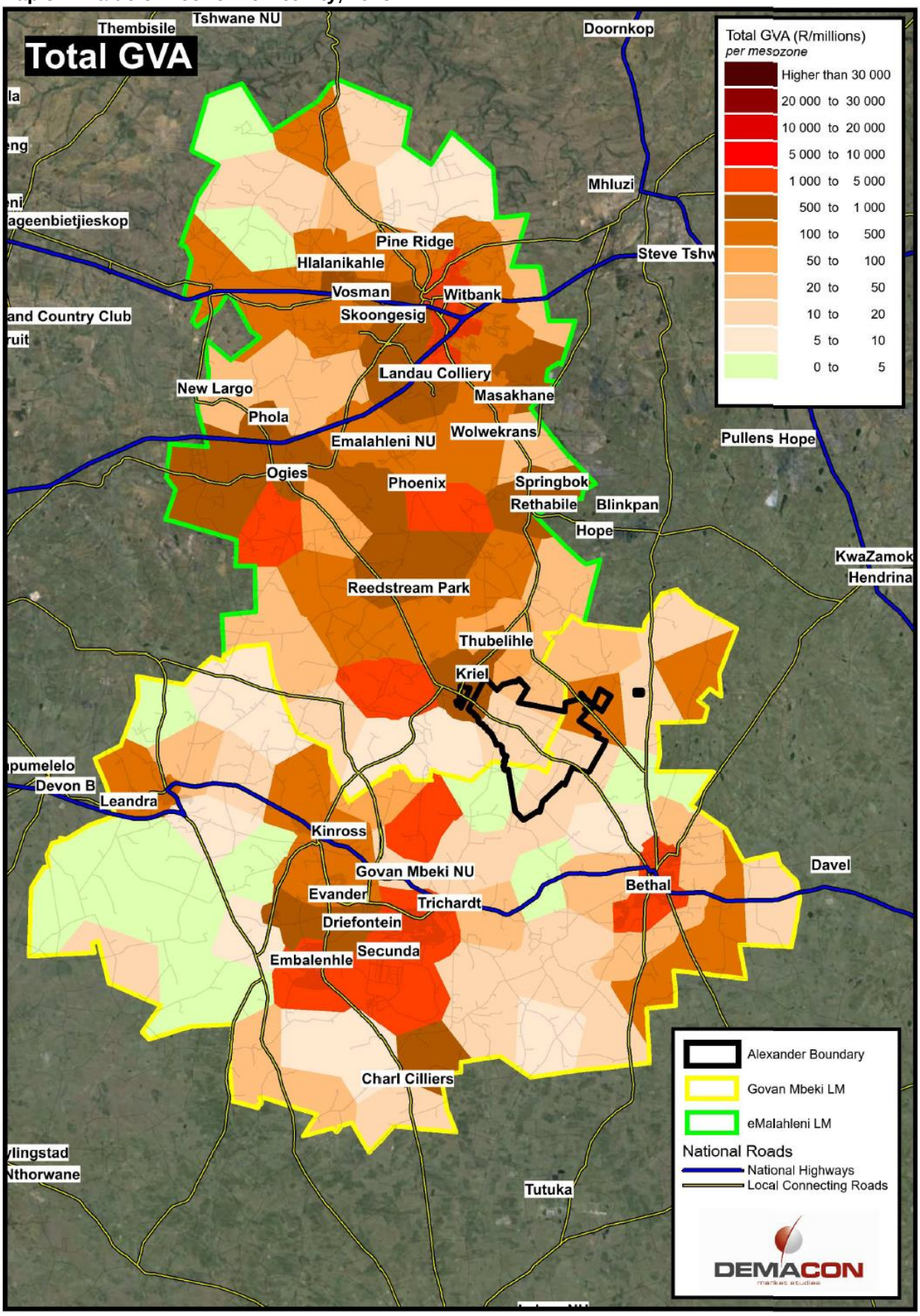
- ✓ Mining – 38.3%
- ✓ Manufacturing of metals, metal products, machinery and equipment – 9.0%

The major drivers in Govan Mbeki LM include:

- ✓ Manufacturing of petroleum products, chemicals, rubber and plastic – 33.5%
- ✓ Mining – 22.1%.

Map 3.2 provides an indication of the location and size of total economic activity in and around the study area. From the map, it can be seen that the large economic nodes are situated at Emalahleni and Secunda/Trichardt. Areas with high levels of mining are also large contributors to the total GVA, such as the areas surrounding Kriel and Ogies.

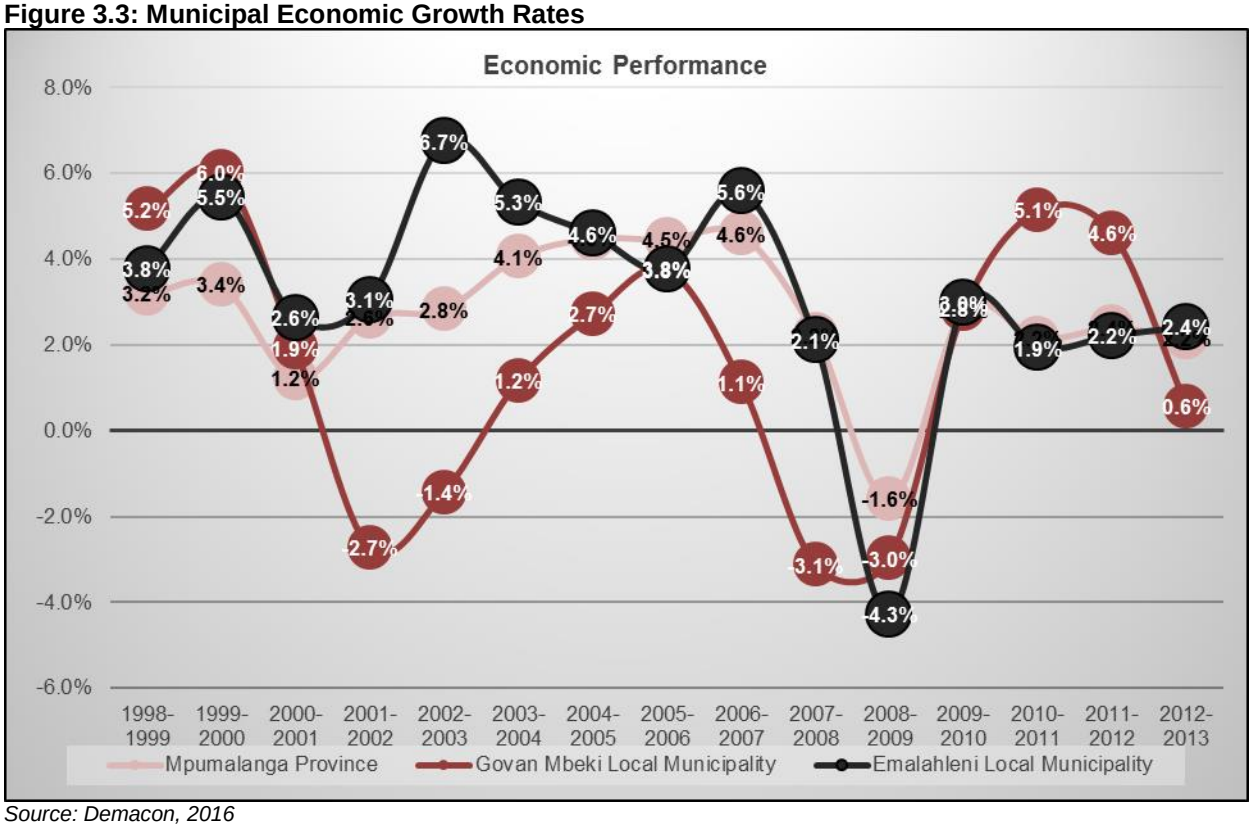
**Map 3.2: Value of Economic Activity, 2013**



### 3.2.2 Economic Growth

The economic growth rate for Emalahleni and Govan Mbeki is illustrated in Figure 3.3.

**Figure 3.3: Municipal Economic Growth Rates**




*Source: Demacon, 2016*

The Emalahleni LM economy peaked during 2002 to 2003 and again in 2006 to 2007. The Govan Mbeki LM economy peaked during 1999 to 2000 and again in 2010 to 2011. Both economies showed its lowest growth 2007 to 2009.

The Emalahleni LM showed an average growth of 3.2% per annum for this period. The Govan Mbeki LM showed a lower average growth rate, averaging at only 1.7% per annum. The table below indicates the growth rates for the past fifteen years.

**Table 3.1: Economic Growth**

| Period | Emalahleni DM | Govan Mbeki DM |
|---|---|---|
| 15 years | 3.2% | 1.7% |
| 10 years | 1.6% | 2.7% |
| 5 years | 2.0% | 1.0% |

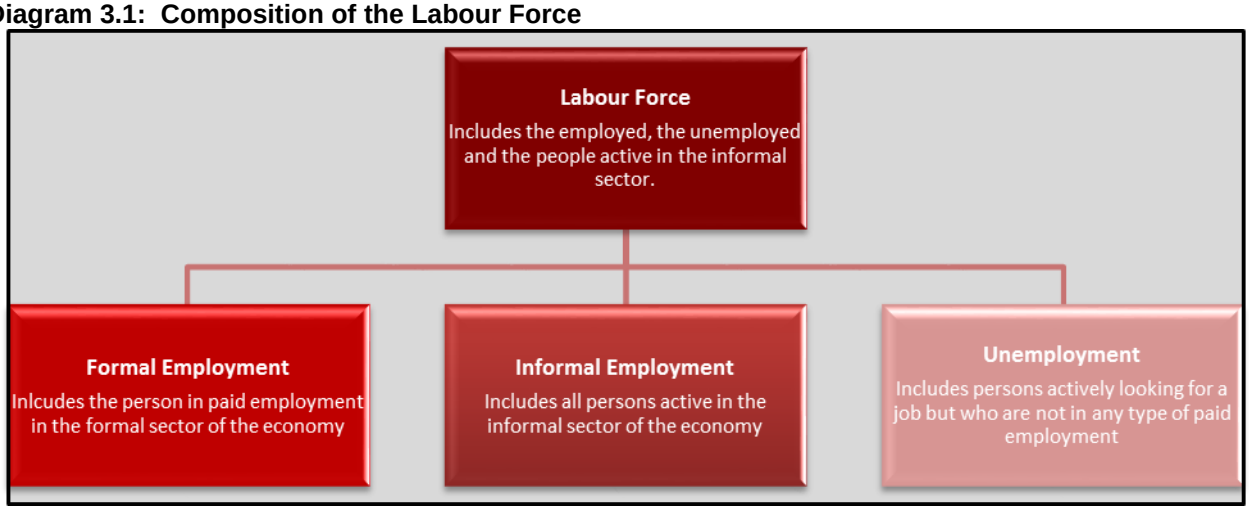
*Source: Demacon, 2013*

The economic growth for the last five years (2006-2011) has been slightly lower compared to the longer period. It is also lower than the national average of 3.4% for 2008 to 2013. The Alexander Project has the potential to support the economic growth of both of these local municipalities.

## 3.3 LABOUR AND EMPLOYMENT

**Labour and employment** also impacts on the effectiveness of a region's economy. In general, the labour force refers to those people who are available for employment in certain areas. There are a number of components linked to the labour force – refer to Diagram 3.1.

**Diagram 3.1: Composition of the Labour Force**

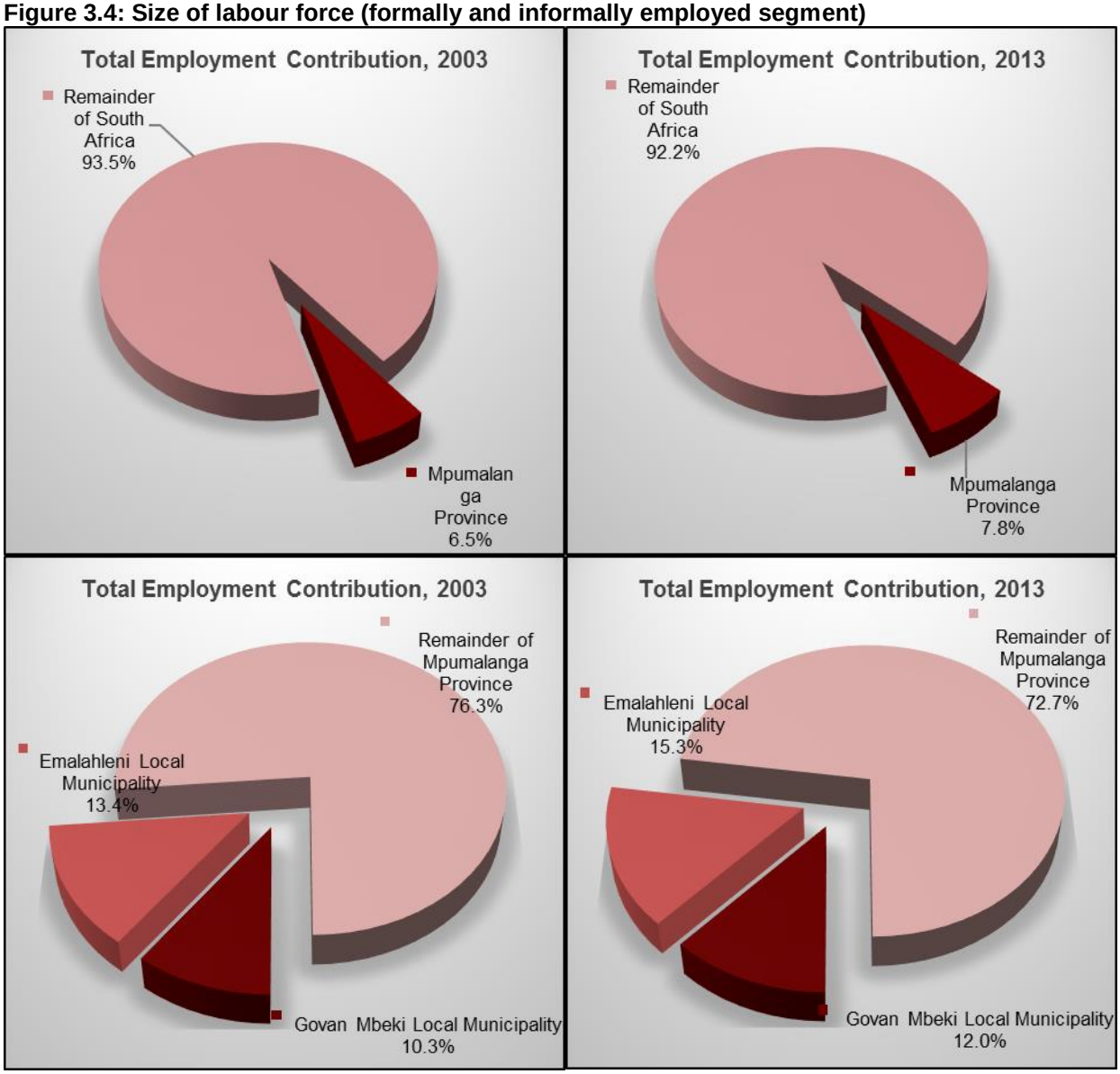



*Source: Demacon Ex. DBSA, 2001*

### 3.3.1 Size of the Labour Force

Figure 3.4 indicates the size of the labour force for 2003 and 2013.

**Figure 3.4: Size of labour force (formally and informally employed segment)**




*Source: Demacon, 2016*

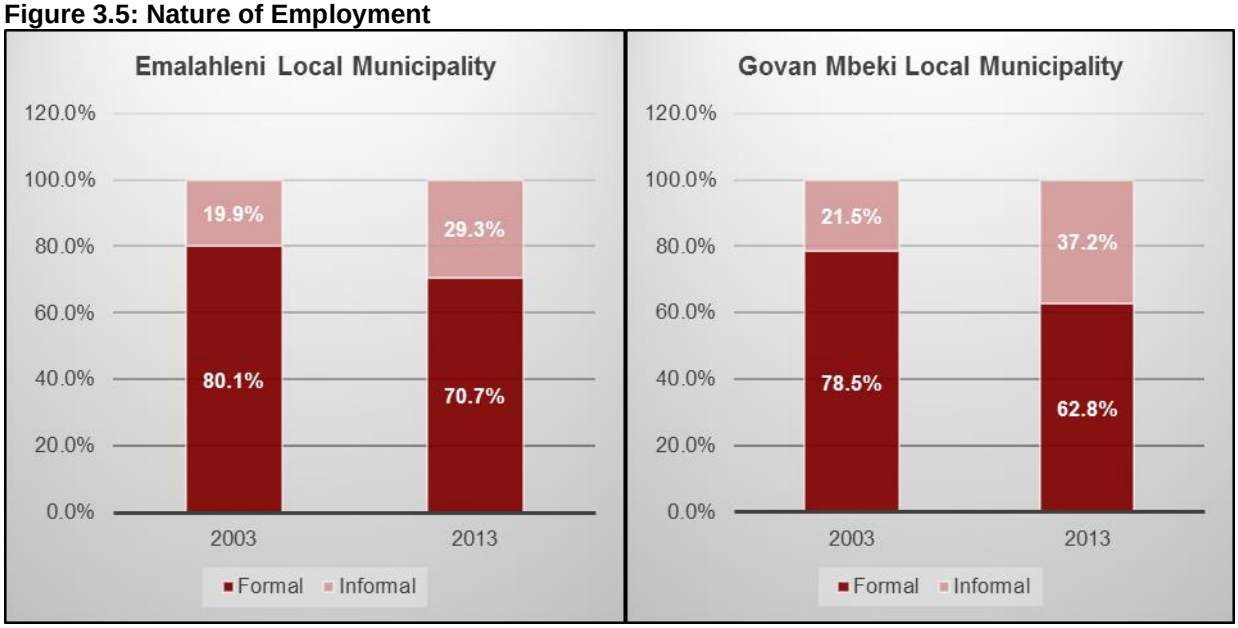
***Findings:***

- ✓ Mpumalanga contributes only 7.8% towards the national labour force. This share has increased over the past ten years.
- ✓ The Emalahleni economy contributes 15.3% towards the provincial labour force. Its market share increased slightly over the last ten years.
- ✓ The labour contribution of Govan Mbeki contributed 12.0% towards the provincial labour force. This share increased slightly from 2003.

### 3.3.2 Nature of Employment

Figure 3.5 indicates the nature of employment for the local municipalities.

**Figure 3.5: Nature of Employment**



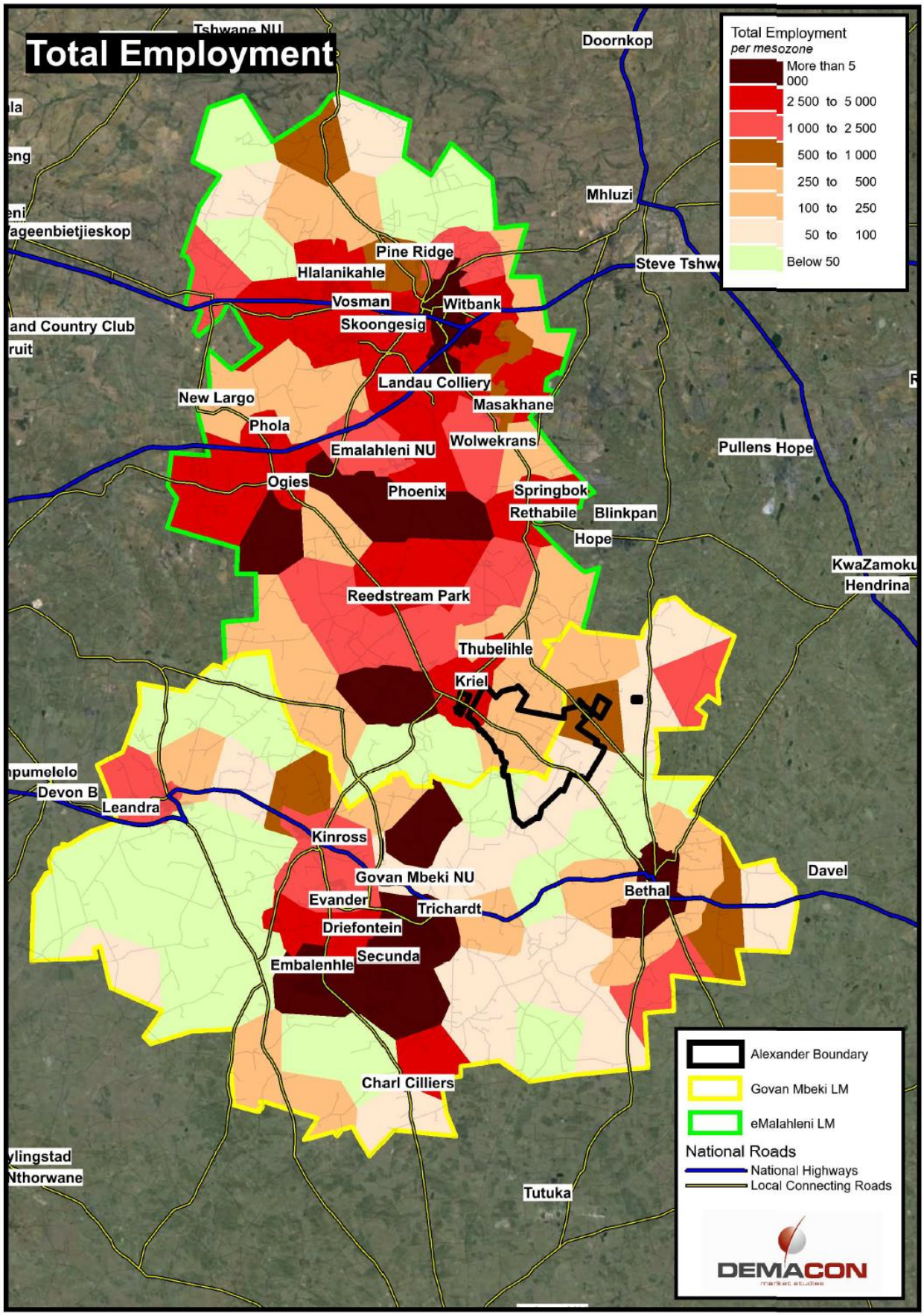

*Source: Demacon, 2016*

***Findings:***

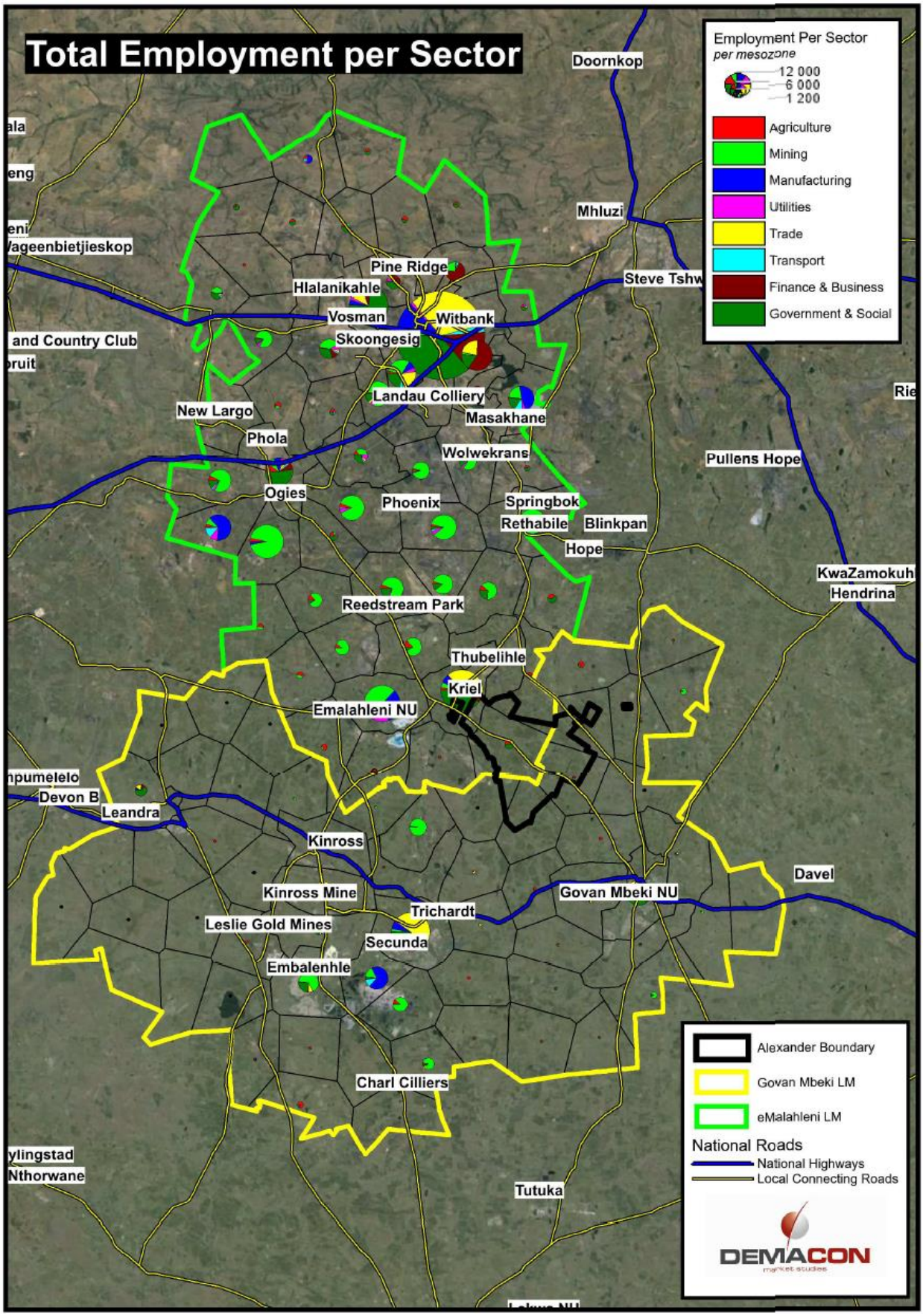
- ✓ The economies reflected a **predominant segment of formal employees**, opposed to informal employment.
- ✓ The Emalahleni and Govan Mbeki economies have a smaller percentage of formal employees in 2013, opposed to 2003.

Maps 3.3 and 3.4 illustrate the total employment per sector within the study area. The areas with the highest level of employment correspond with the contribution towards GVA – Emalahleni, Secunda/Trichardt, Kriel, Ogies and Bethal. Employment in the area surrounding the development site is mainly focused on mining, whilst the trade sector forms a more important "employer" in the urban nodes.

**Map 3.3: Employment within Emalahleni and Govan Mbeki, 2013**



**Map 3.4: Employment per Sector, 2013**

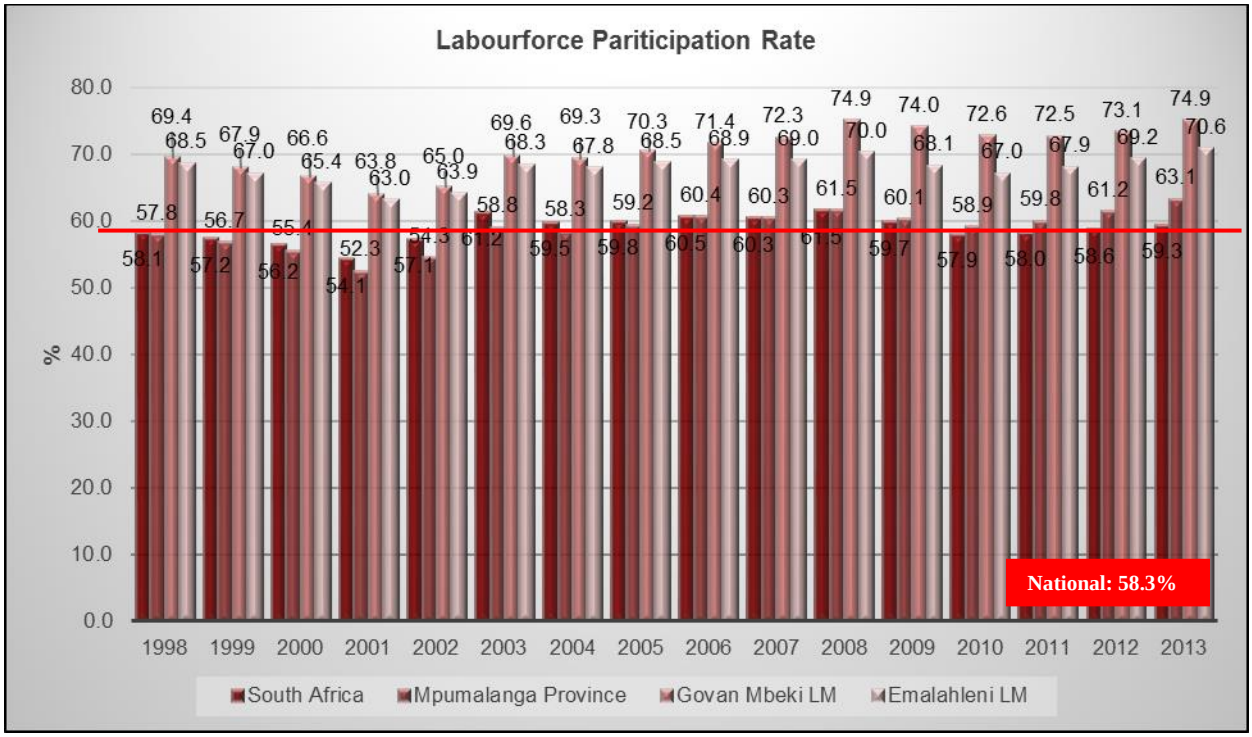


### 3.3.3 Labour Participation Rate

Obtaining the participation rates, involves calculating the labour force or the economically active population relative to potential labour force, (i.e. the population in the age group 15 to 64 years). These rates reflect the percentages of the said population that are actually economically active.

An increase in the participation rate can be the result of, for example, more women entering the labour market or the outflow of the potential economically active people of a region due to harsh economic conditions, which would 'artificially' increase the participation rate. A low participation rate in a region can be ascribed to the large number of male migrant workers moving out of the region or the proliferation of peripheral activities in the region.

**Figure 3.6: Labour Participation Rate, 1998 to 2013**




*Source: Demacon, 2016*

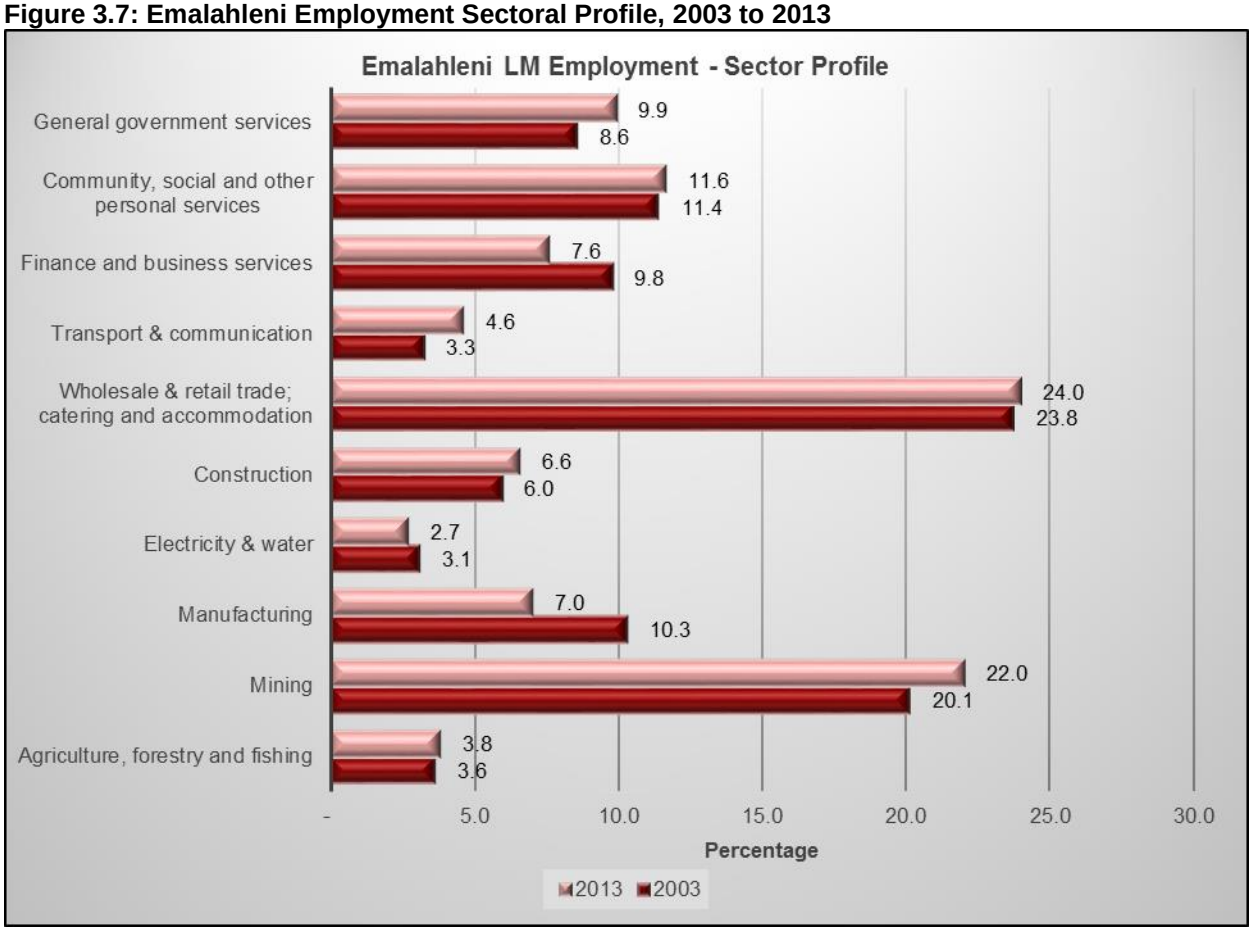
***Findings:***

- ✓ Labour participation rates showed an increase for the period 2001 to 2008; thereafter a slight decreasing trend can be seen up to 2012, with an increase in 2013.
- ✓ The labour force participation rate of Emalahleni (70.6%) and Govan Mbeki (74.9%) is considerably higher than the national average.

### 3.3.4 Sectoral Profile Employment

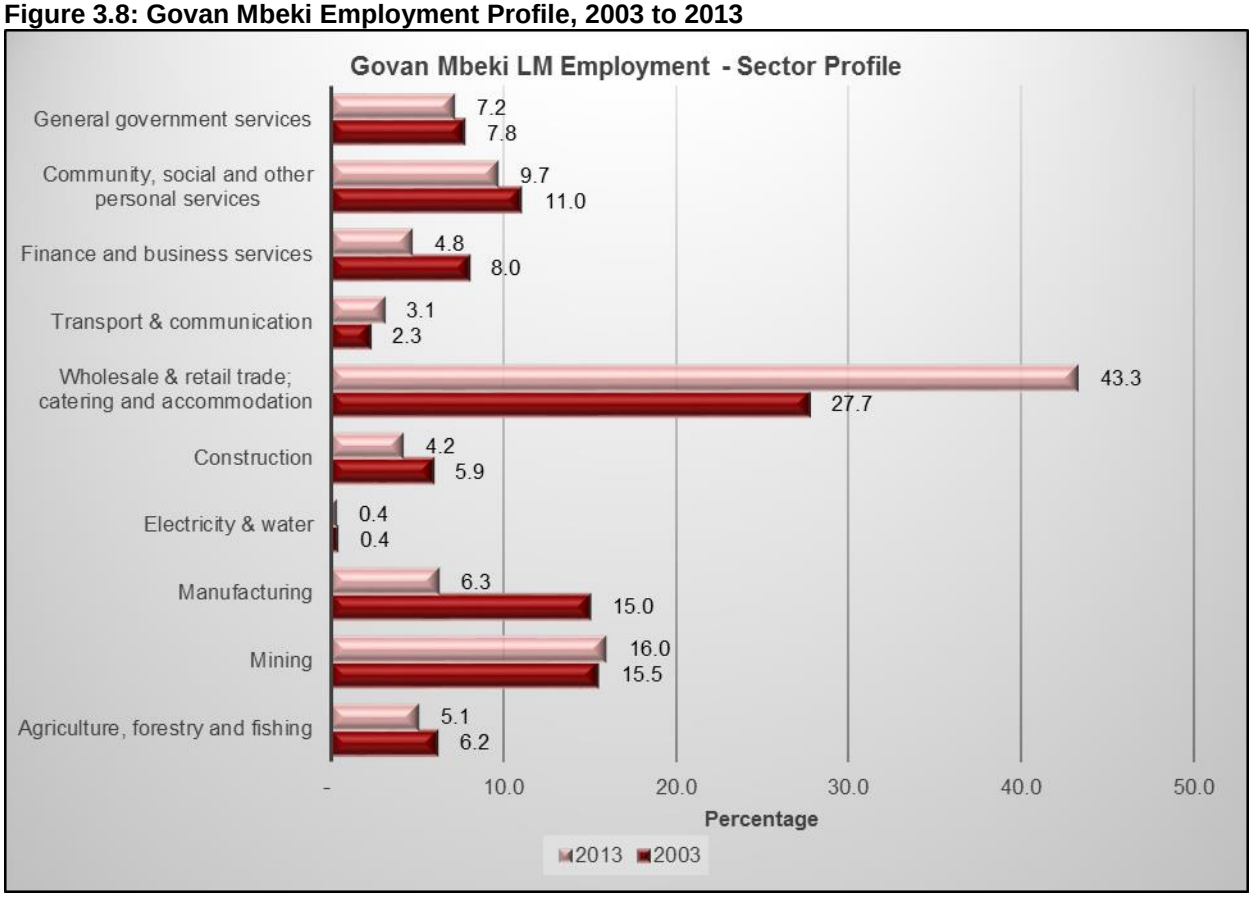
Figure 3.7 and Figure 3.8 indicate the employment per sector for Emalahleni and Govan Mbeki. Form the figures the most important sector in terms of employment can be seen as well as the growth share per sector.

**Figure 3.7: Emalahleni Employment Sectoral Profile, 2003 to 2013**




*Source: Demacon, 2016*

**Figure 3.8: Govan Mbeki Employment Profile, 2003 to 2013**




*Source: Demacon, 2016*

***Findings:***

- ✓ The employment pillars of the Emalahleni economy include: Mining, Trade; Community, Social and other Personal Services and General Government Services - contributing approximately **67.6% towards the local economy.**
- ✓ An increase can be seen in the mining sector employment of Emalahleni LM.
- ✓ The employment pillars of the Govan Mbeki economy include: Trade, Mining and Community, social and other personal services - contributing approximately **68.9% towards the local economy.**
- ✓ Sectors gaining market share include Trade and Mining.

### 3.3.5 Employment growth Trends

The assessment in the following sections serves to highlight sub-regional **employment growth trends** in the local economies with reference to the labour force.

**Figure 3.9: Employment Growth, 1998 to 2013 (GVA at basic prices)**


*Source: Demacon, 2016*

***Findings:***

- ✓ The economies reflected a similar growth trend pattern over the time period, both increasing until 2007/2008. After that a decreasing trend can be seen in employment.
- ✓ Employment growth is, however, portraying positive trends again. The average annual employment growth rate of Emalahleni amounted to 3.7% for the whole period. The average annual employment growth rate of Govan Mbeki amounted to a low 3.5% for the period.
- ✓ A lower growth rate can be seen for the last five years, with Emalahleni averaging 2.4% and Govan Mbeki averaging 2.6%.

### 3.3.6 Sectoral Employment Growth Trends

**Table 3.2: Sectoral Employment Growth Trends, 1998 to 2013**

| | 1998-1999 | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 | 2004-2005 | 2005-2006 | 2006-2007 | 2007-2008 | 2008-2009 | 2009-2010 | 2010-2011 | 2011-2012 | 2012-2013 | Average Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Emalahleni** | | | | | | | | | | | | | | | | |
| Agriculture | -3.6% | -4.4% | -5.2% | 22.2% | -0.1% | 14.1% | 5.0% | 30.9% | 3.7% | -12.1% | 2.8% | -6.4% | 1.6% | 15.5% | 13.0% | 5.1% |
| Mining | -5.6% | -2.6% | 6.9% | -0.3% | 3.4% | 2.4% | 0.1% | 1.7% | 27.9% | 19.9% | 6.9% | -2.4% | 5.6% | 3.9% | 3.7% | 4.8% |
| Manufacturing | -10.5% | -11.0% | -6.8% | -10.9% | 3.6% | 7.8% | 9.2% | 1.2% | -3.6% | -6.6% | -8.5% | 2.3% | 0.8% | 2.7% | 13.8% | -1.1% |
| Utilities | 9.1% | -0.8% | 9.4% | -20.0% | -17.1% | -17.0% | -2.2% | 0.7% | 13.3% | 9.7% | -2.6% | 39.6% | 20.5% | 5.9% | -14.6% | 2.3% |
| Construction | -13.6% | -6.3% | -16.7% | 1.8% | 0.4% | 20.0% | 15.7% | 17.4% | 7.1% | 2.4% | -6.6% | -9.0% | 3.1% | 10.2% | 10.8% | 2.5% |
| Trade | 8.1% | 0.3% | -9.9% | -4.3% | 13.5% | 5.6% | 7.0% | 5.5% | 15.5% | 25.2% | -1.6% | -7.4% | 2.6% | 5.4% | 3.1% | 4.6% |
| Transport & communication | -1.2% | -2.7% | -12.2% | -1.3% | 25.5% | 17.0% | 18.4% | 5.0% | 8.4% | 26.0% | -1.5% | -4.5% | 8.1% | 13.2% | 7.9% | 7.1% |
| Finance & business services | 4.3% | 4.4% | 11.8% | 6.9% | 6.0% | 3.4% | -0.5% | 9.1% | 7.5% | 18.9% | -8.7% | -4.0% | 0.8% | -0.8% | 7.0% | 4.4% |
| Community, social & personal services | 7.2% | 6.9% | 0.0% | -12.9% | 8.4% | 8.0% | 5.9% | 6.8% | 9.5% | 15.9% | 5.8% | -5.4% | 0.2% | 2.7% | 10.9% | 4.7% |
| General Government Services | 1.3% | 0.5% | -2.3% | -1.0% | 5.8% | 7.6% | 9.1% | 8.3% | 5.3% | 9.5% | 8.0% | 6.2% | 7.3% | 3.6% | 7.3% | 5.1% |
| **TOTAL** | **-0.7%** | **-1.5%** | **-2.5%** | **-3.5%** | **6.2%** | **6.3%** | **5.9%** | **6.8%** | **11.8%** | **14.7%** | **0.4%** | **-3.0%** | **3.9%** | **4.9%** | **6.0%** | **3.7%** |
| **Govan Mbeki** | | | | | | | | | | | | | | | | |
| Agriculture | -2.8% | -3.9% | -4.9% | 19.6% | -1.5% | 10.4% | 0.0% | 25.9% | 1.1% | -13.6% | 1.2% | -11.2% | -0.1% | 16.6% | 11.8% | 3.2% |
| Mining | -17.0% | -13.5% | -3.4% | -3.2% | 1.3% | -5.1% | -6.6% | 3.2% | 33.3% | 28.7% | 12.0% | -0.4% | 1.3% | 0.4% | 0.3% | 2.1% |
| Manufacturing | -5.6% | -6.1% | -6.7% | -15.4% | 2.6% | 0.2% | -0.1% | -6.7% | -12.3% | -13.3% | -18.6% | 12.0% | -2.5% | -2.6% | 18.4% | -3.8% |
| Utilities | 1.8% | -6.6% | 0.5% | -17.7% | -19.3% | -16.3% | -1.2% | 2.5% | 10.8% | 11.8% | -1.2% | 39.0% | 22.0% | 5.0% | -15.4% | 1.0% |
| Construction | -9.9% | -3.7% | -16.3% | -0.9% | -4.7% | 12.2% | 7.6% | 9.4% | 0.0% | -4.6% | -13.5% | -9.0% | 3.0% | 9.5% | 9.9% | -0.7% |
| Trade | 11.4% | 3.7% | -6.3% | 0.3% | 19.6% | 11.7% | 13.3% | 11.5% | 22.0% | 31.9% | 3.1% | -5.3% | 5.5% | 9.6% | 5.7% | 9.2% |
| Transport & communication | -5.9% | -6.7% | -15.1% | -3.3% | 23.7% | 16.5% | 18.4% | 5.2% | 8.3% | 26.0% | -1.5% | -5.6% | 5.4% | 12.5% | 7.7% | 5.7% |
| Finance & business services | 7.5% | 6.6% | 12.7% | 5.9% | 3.6% | 0.3% | -3.9% | 5.3% | 3.6% | 14.7% | -11.9% | -7.6% | 0.1% | -1.9% | 6.4% | 2.8% |
| Community, social & personal services | 8.5% | 7.6% | -0.1% | -13.9% | 6.6% | 5.6% | 3.3% | 4.2% | 7.0% | 13.4% | 3.6% | -5.2% | -0.4% | 2.1% | 10.3% | 3.5% |
| General Government Services | 2.6% | 1.2% | -2.2% | -2.0% | 4.1% | 5.3% | 6.5% | 5.6% | 2.8% | 7.0% | 5.8% | 3.3% | 5.0% | 1.4% | 6.0% | 3.5% |
| **TOTAL** | **-2.1%** | **-2.2%** | **-4.5%** | **-3.8%** | **6.8%** | **5.2%** | **4.5%** | **6.8%** | **11.5%** | **16.9%** | **1.2%** | **-3.3%** | **3.0%** | **5.6%** | **6.4%** | **3.5%** |

***Findings:***

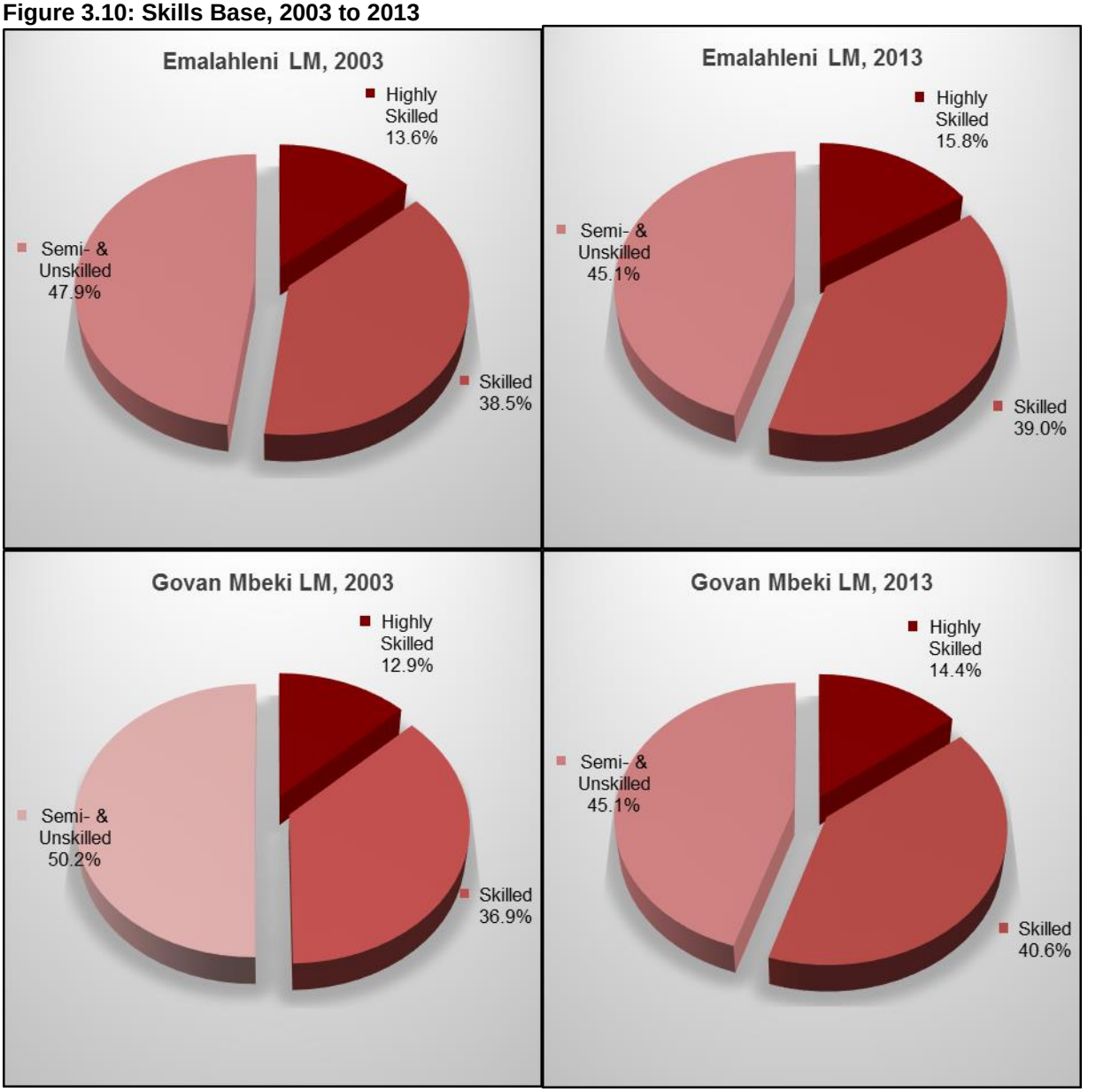
Given average annual growth between 1998 and 2013, the **dominant growth sectors** from an **employment perspective** include:

- ✓ **Emalahleni**:
  - Transport and Communication (7.1%)
  - Agriculture (5.1%)
  - General Government Services (5.1%)
  - Mining (4.8%)
- ✓ **Govan Mbeki**:
  - Trade (9.2%)
  - Transport and Communication (5.7%).

### 3.3.7 Skills Base

The employed market segment also reflected their various skill levels – the subsequent table and figures reflect these skill segments and their underlying growth trends.

**Figure 3.10: Skills Base, 2003 to 2013**




*Source: Demacon, 2016*

***Findings:***

- ✓ Both municipalities' skills base reflects a dominant segment of semi- & unskilled labour (Emalahleni – 45.1% and Govan Mbeki – 45.1%), followed by a nearly even sized skilled labour segment (Emalahleni, 39.0% and Govan Mbeki, 40.6%) and a smaller segment of highly skilled labour (Emalahleni, 15.8% and Govan Mbeki, 14.4%).

**Table 3.3: Emalahleni Employment Growth per Skill Level, 1998 to 2013**

| | Emalahleni Local Municipality | | | Govan Mbeki Local Municipality | | |
|---|---|---|---|---|---|---|
| | Highly Skilled | Skilled | Semi- & Unskilled | Highly Skilled | Skilled | Semi- & Unskilled |
| 1998-1999 | 1.6 | 1.2 | -3.9 | 0.5 | 0.7 | -7.3 |
| 1999-2000 | -0.2 | -0.8 | -2.6 | -0.2 | -0.9 | -5.2 |
| 2000-2001 | 2.7 | 3.8 | -1.7 | 0.5 | 2.2 | -5.3 |
| 2001-2002 | -0.3 | 0.8 | 0.0 | -0.6 | 0.5 | -0.8 |
| 2002-2003 | 2.2 | 1.6 | 0.6 | 4.7 | 2.7 | -0.5 |
| 2003-2004 | 5.4 | 4.3 | 3.4 | 5.9 | 4.8 | -0.7 |
| 2004-2005 | 6.5 | 5.5 | 3.2 | 4.7 | 5.6 | -1.6 |
| 2005-2006 | 8.0 | 7.6 | 7.1 | 6.5 | 8.1 | 6.4 |
| 2006-2007 | 9.0 | 10.4 | 11.4 | 6.0 | 9.5 | 9.8 |
| 2007-2008 | 8.9 | 7.9 | 7.4 | 7.0 | 7.6 | 7.3 |
| 2008-2009 | 1.8 | -1.3 | 0.3 | -0.7 | -2.3 | 1.0 |
| 2009-2010 | 4.5 | 0.1 | -3.1 | 3.2 | 0.4 | -2.9 |
| 2010-2011 | 6.7 | 4.2 | 2.3 | 3.5 | 3.0 | -0.5 |
| 2011-2012 | 4.7 | 3.4 | 3.2 | 3.1 | 3.6 | 1.9 |
| 2012-2013 | 4.5 | 3.0 | 2.8 | 5.8 | 3.4 | 2.4 |
| **Average** | **6.0** | **4.5** | **3.8** | **3.3** | **3.3** | **0.3** |

***Findings:***

- ✓ The highly skilled employment showed the highest growth rates with Emalahleni averaging 6.0% per annum and Govan Mbeki 3.3% per annum.
- ✓ The semi- & unskilled labour force showed the least growth, with Emalahleni averaging 3.8% per annum and Govan Mbeki averaging 0.3% per annum.

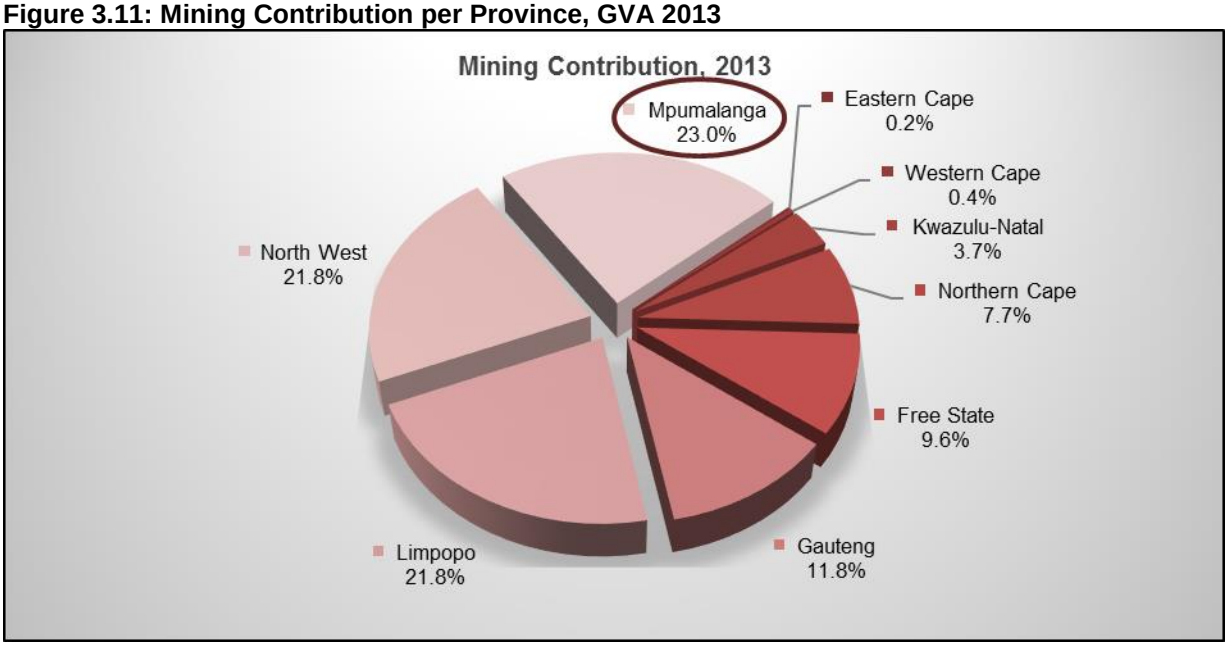
The following sub-section provides a more detailed analysis of the sectors that will be directly impacted by the proposed Alexander coal mine development. The main sectors identified include agriculture and mining while the tourism potential and existing activity will also be analysed.

## 3.4 MINING SECTOR

### National Trends

In terms of provincial contribution to national GVA, Mpumalanga occupied the highest position among the nine provinces in 2013, contributing approximately 23.0% to the national mining GVA.

**Figure 3.11: Mining Contribution per Province, GVA 2013**

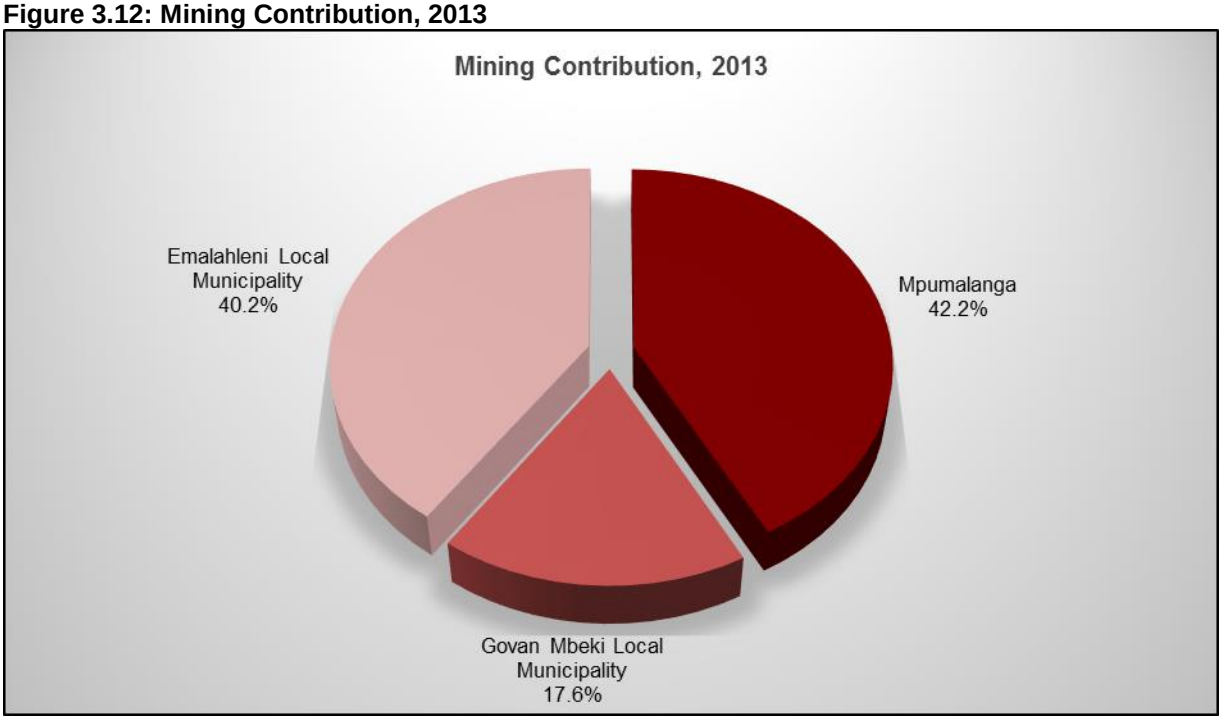



*Source: Demacon, 2016*

## Local Trends

In terms of the local contribution to the provincial GVA, Emalahleni LM contributed 40.2% and Govan Mbeki 17.6%. A total of 59.8% of the provincial mining GVA is contributed by the two local municipalities. This indicates the importance of the Emalahleni and Govan Mbeki Local Municipalities in terms of mining.

**Figure 3.12: Mining Contribution, 2013**




*Source: Demacon, 2016*

Map 3.5 indicates the mining GVA per mesozone. The highest GVA can be seen in the area stretching from eMalahleni to Ga-Nala, and around Secunda. The area in which the development site is situated is currently contributing less than R5 million.

**Map 3.5: Mining GVA, 2013**

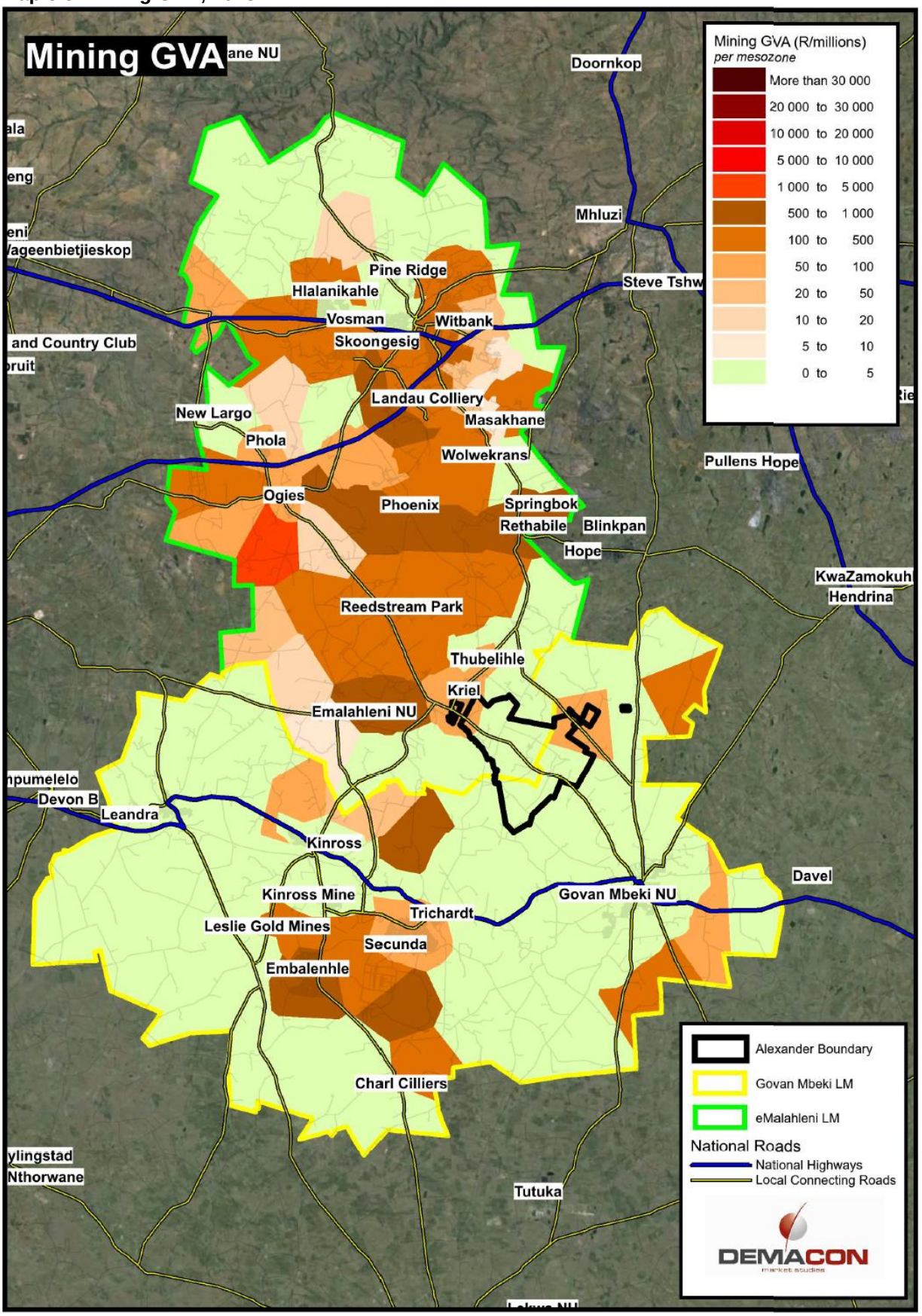
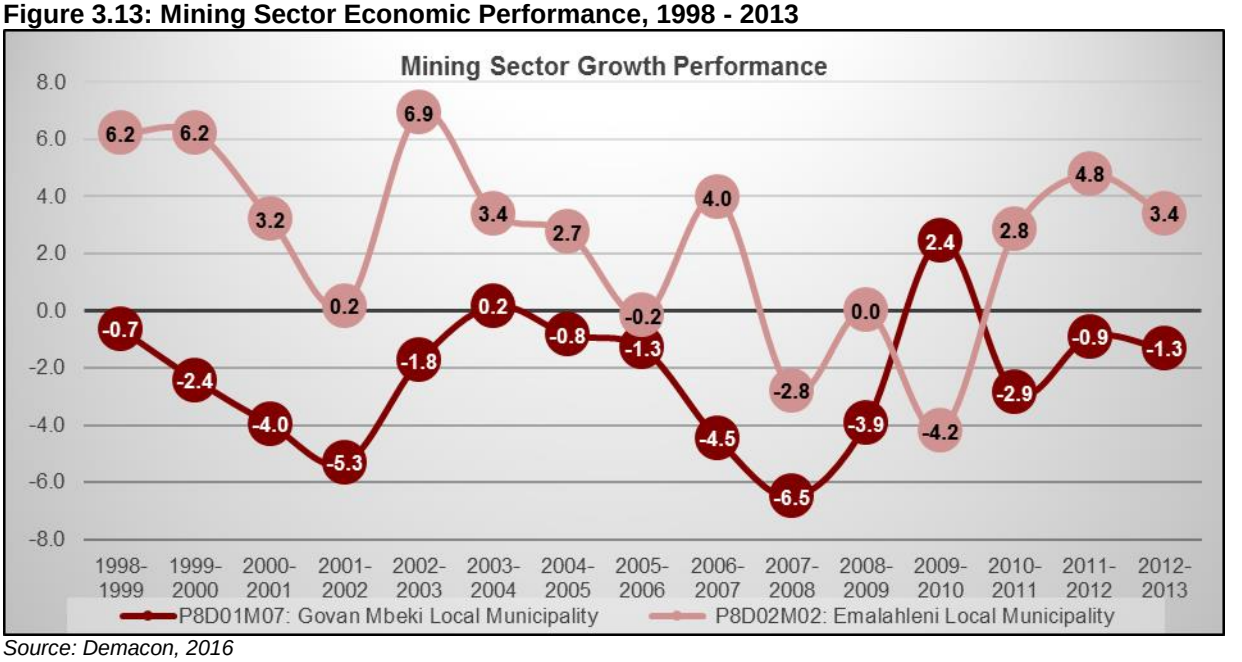


**Figure 3.13: Mining Sector Economic Performance, 1998 - 2013**



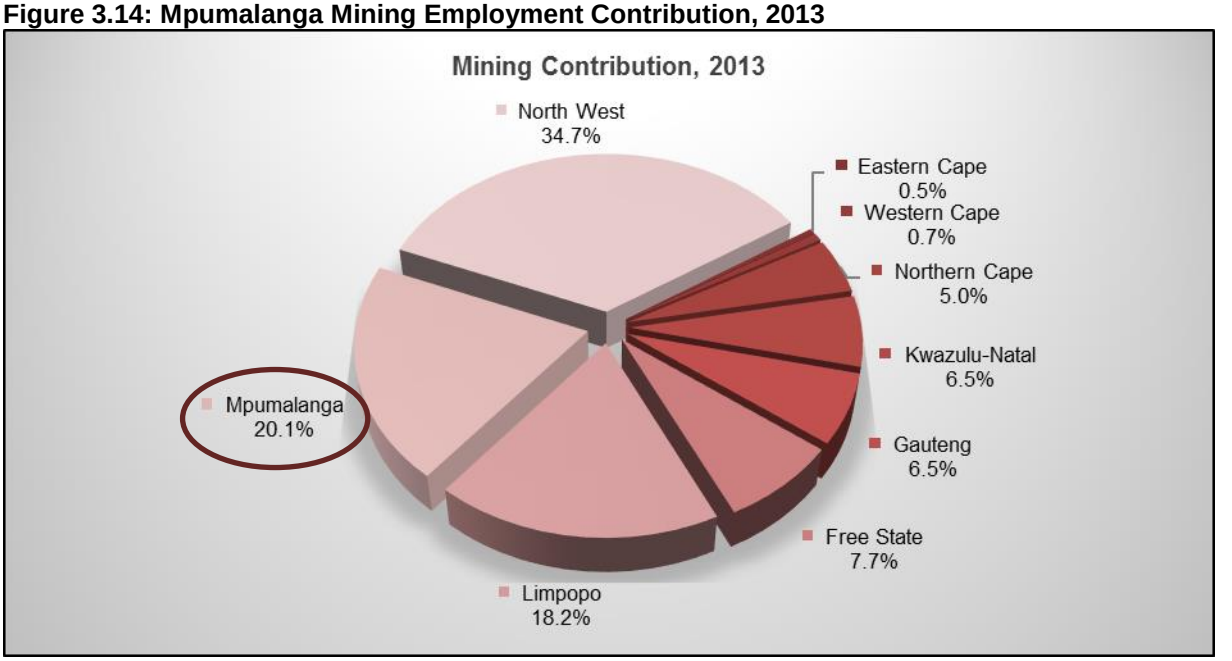

*Source: Demacon, 2016*

The average annual growth rate for the mining sector of Govan Mbeki Local Municipality amounted to approximately -2.2% over the long term (1998 to 2013) and -1.3% over the short term (2008 to 2013). The average annual growth rate for the mining sector of Emalahleni Local Municipality amounted to approximately 2.4% over the long term (1998 to 2013) and 1.4% over the short term (2008 to 2013).

## Employment in the sector

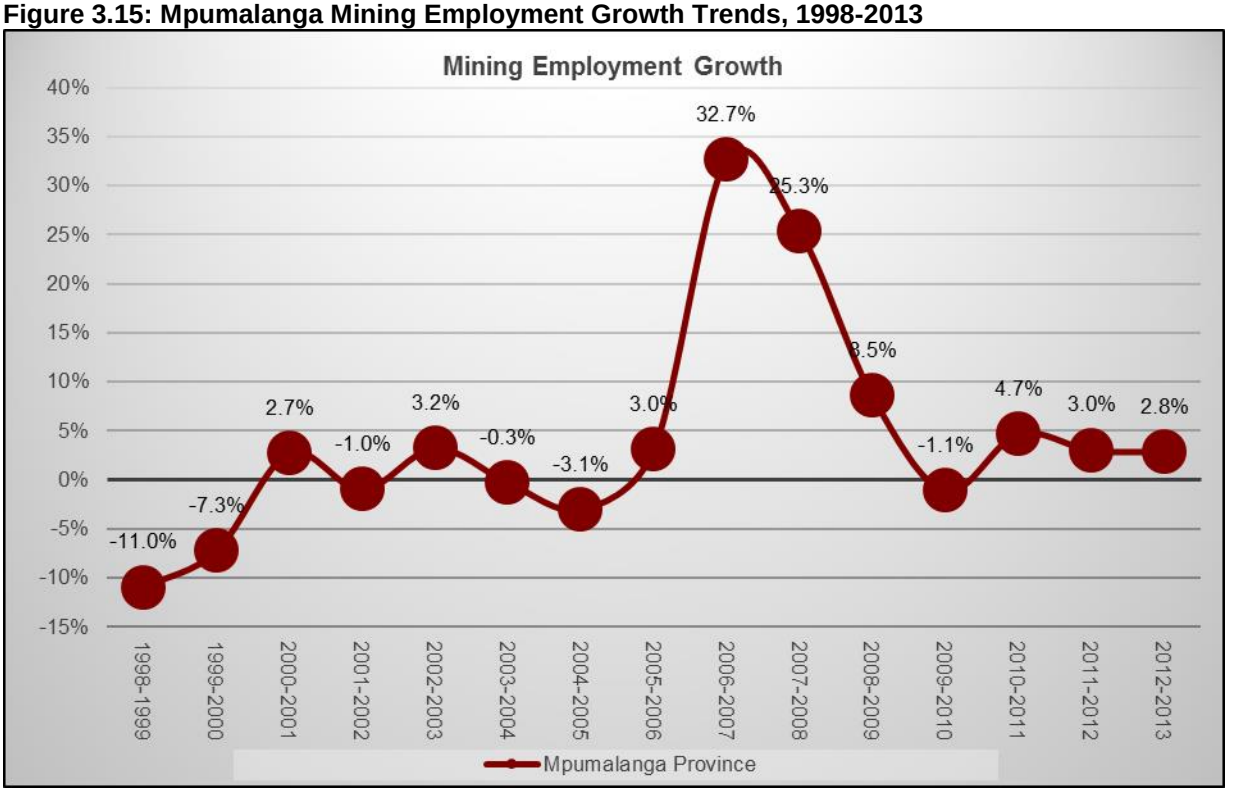
In terms of provincial contribution to national employment, Mpumalanga occupied the second place among the nine provinces in 2013. Although employment in the mining sector has increased, Figure 3.14 indicates that the growth in mining employment has decreased since 2006/2007 to 2009/2010. This might be because of a shift towards more capital intensive processes. However, as the demand for coal and other minerals in the province is set to remain strong in the near future, employment growth is bound to remain positive, as seen from 2010/2011 onwards.

**Figure 3.14: Mpumalanga Mining Employment Contribution, 2013**




*Source: Demacon, 2016*

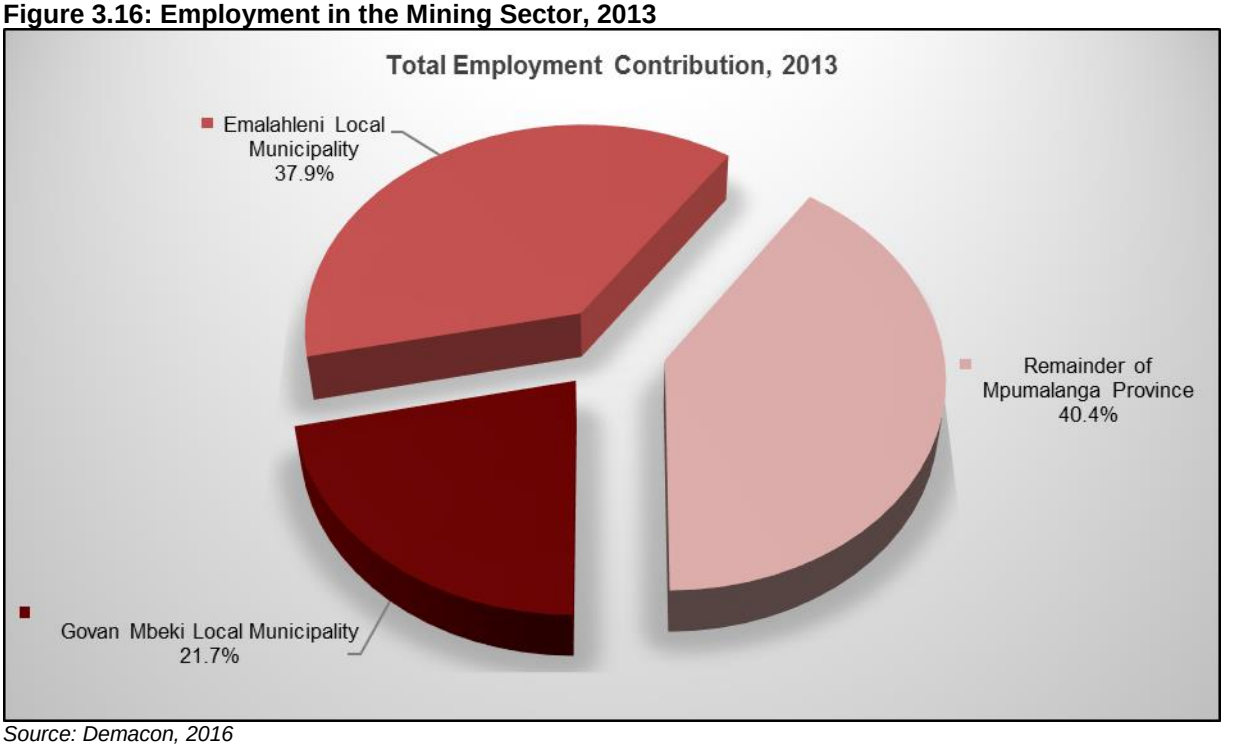
**Figure 3.15: Mpumalanga Mining Employment Growth Trends, 1998-2013**




*Source: Demacon, 2016*

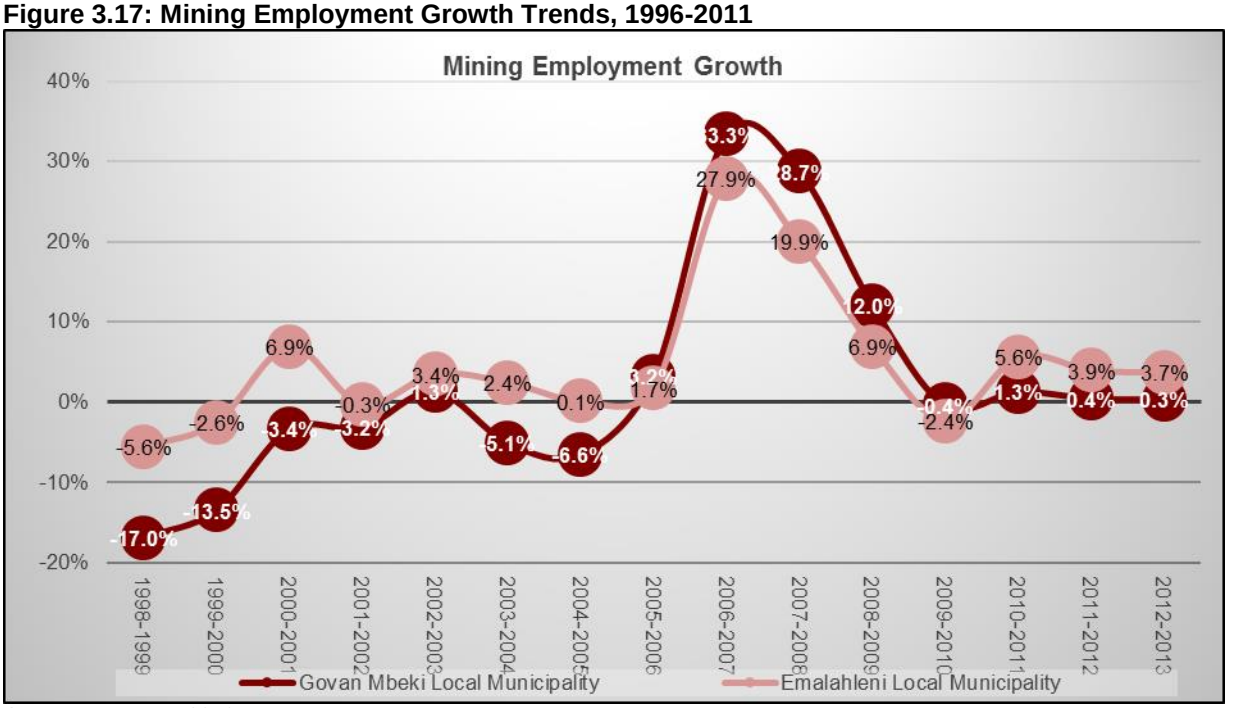
Employment in the mining sector is dominated by the Emalahleni and the Govan Mbeki municipal areas. These two municipal areas contribute 59.6% to total mining employment in the province. This illustrates the important role of the two local economies regarding mining activity.

**Figure 3.16: Employment in the Mining Sector, 2013**




*Source: Demacon, 2016*

**Figure 3.17: Mining Employment Growth Trends, 1996-2011**




*Source: Demacon, 2016*

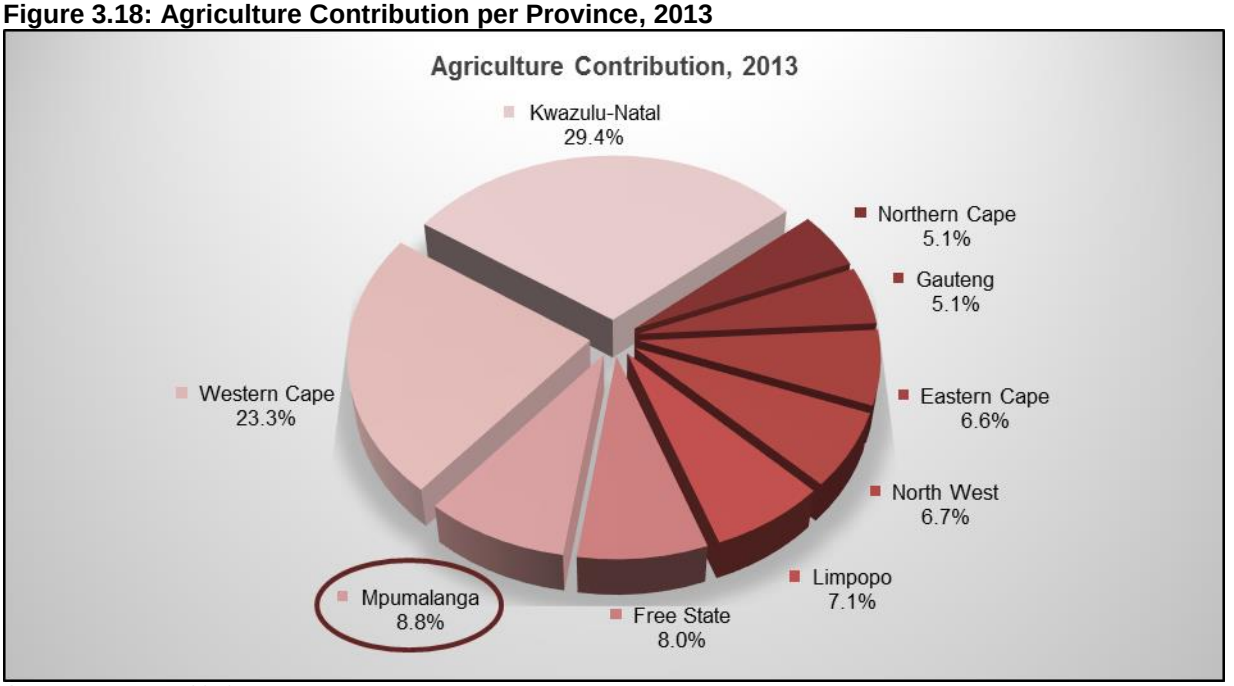
A deceleration in employment growth rates in the mining sector can be seen for both municipalities since 2006/2007. This has stabilised over the short term. The average growth rate for Emalahleni was 4.8% per annum, whilst Govan Mbeki showed a slower average annual growth rate of 2.1%.

## 3.5 AGRICULTURE SECTOR

### National Trends

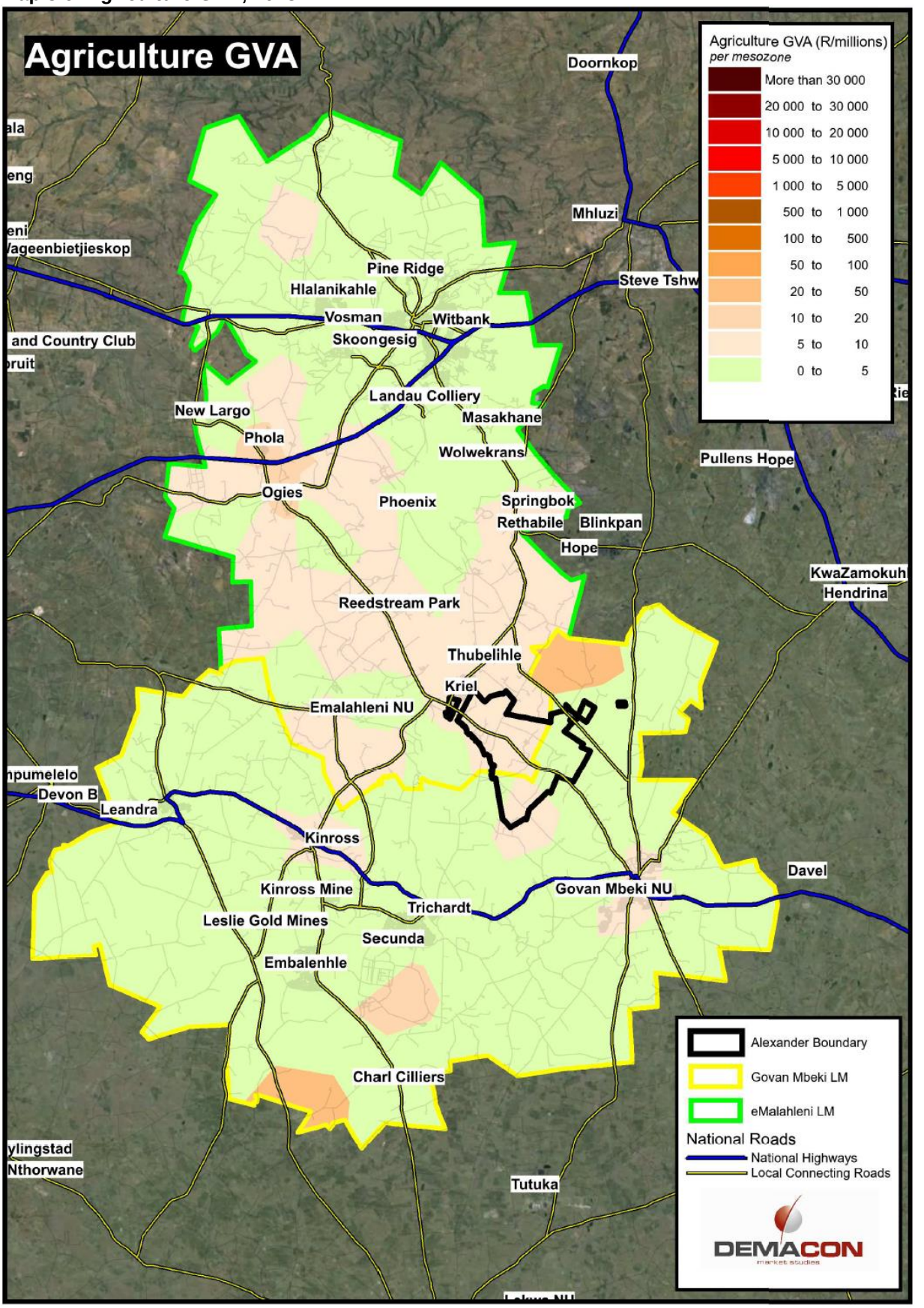
In terms of provincial contribution to national agriculture GVA, Mpumalanga (8.8%) occupied third place among the nine provinces in 2013. The provincial agriculture sector improved from the fourth to the third largest contributor to the national agriculture GVA between 1998 and 2013. However, the sector contributed only 3.4% to the total GVA of Mpumalanga in 2013.

**Figure 3.18: Agriculture Contribution per Province, 2013**




*Source: Demacon, 2016*

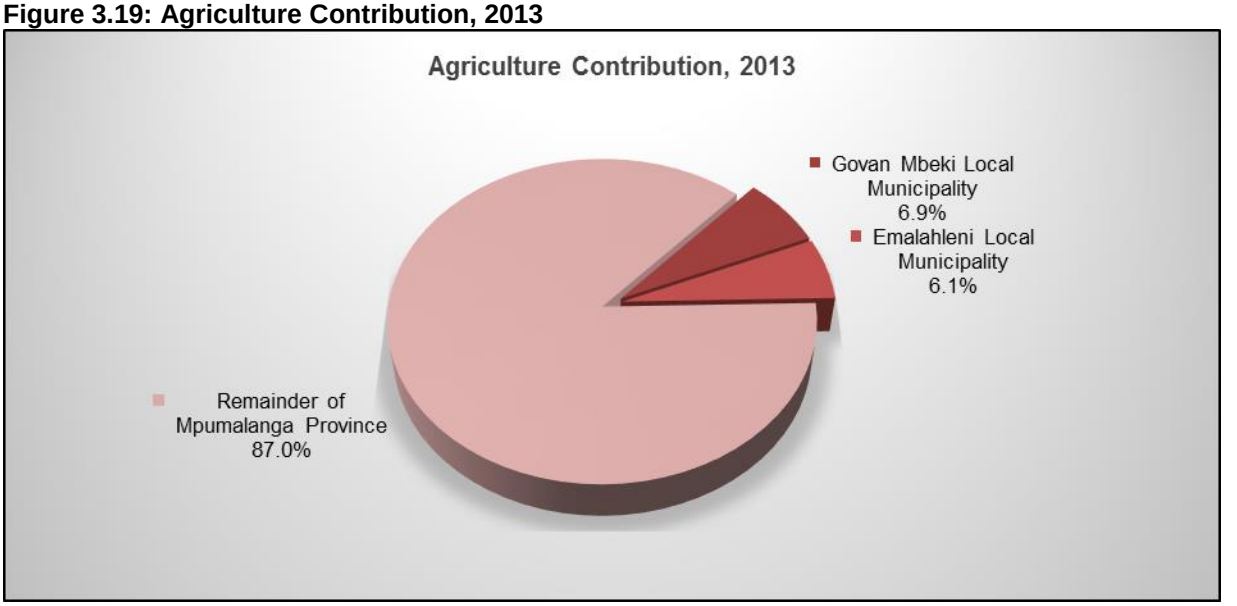
**Map 3.6: Agriculture GVA, 2013**



## Local Trends

The contribution of Govan Mbeki (6.9%) and Emalahleni (6.1%) to the provincial GVA is considerably smaller than the contribution of mining. It should, however, be taken into consideration that the GVA of mining is higher than that of agriculture. Mpumalanga is still a very important agricultural contributor to South Africa. Map 3.6 indicates that the GVA in terms of agriculture is relatively low for the whole area.

**Figure 3.19: Agriculture Contribution, 2013**

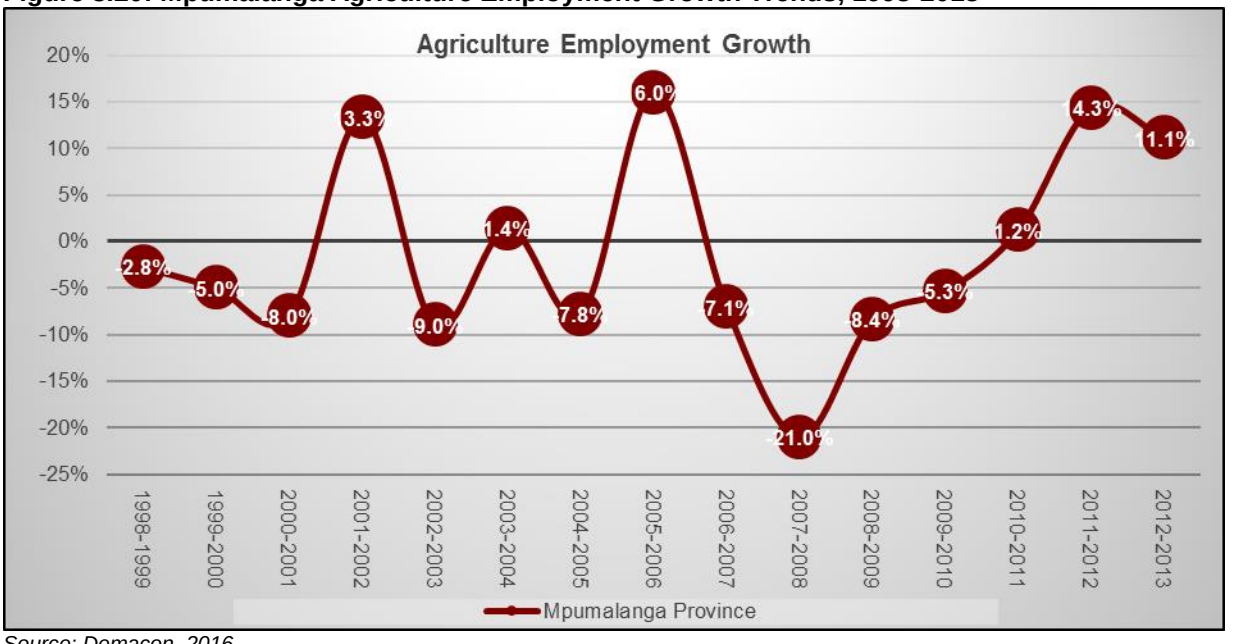



*Source: Demacon, 2013*

## Employment in the sector

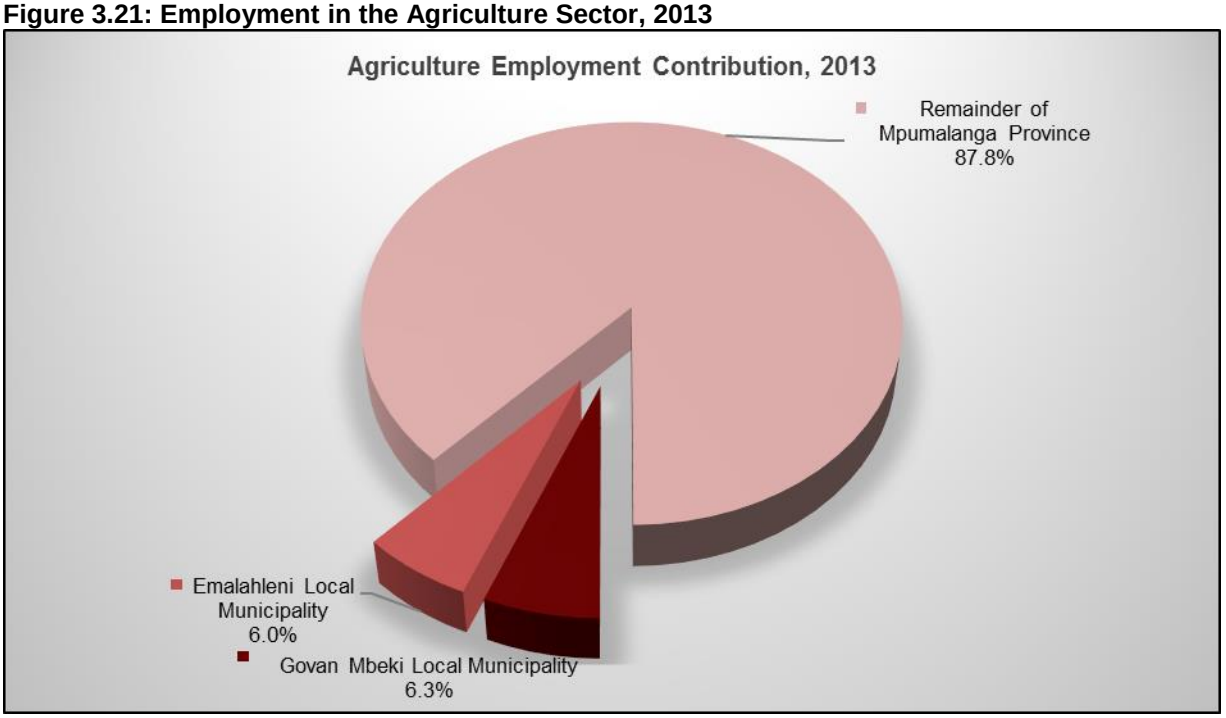
According to the Mpumalanga Economic Growth and Development Path (2011), the agriculture sector exhibited a high level of labour intensity, but low labour productivity. For agriculture to be an employment driver, interventions will need to change its employment elasticity from negative to positive. From figure 3.20 can be seen that employment in the agriculture sector exhibited a negative growth rate. This may be as a result of a number of factors of which mechanisation and more emphasis on mining in the province, are but a few possibilities.

**Figure 3.20: Mpumalanga Agriculture Employment Growth Trends, 1998-2013**




*Source: Demacon, 2016*

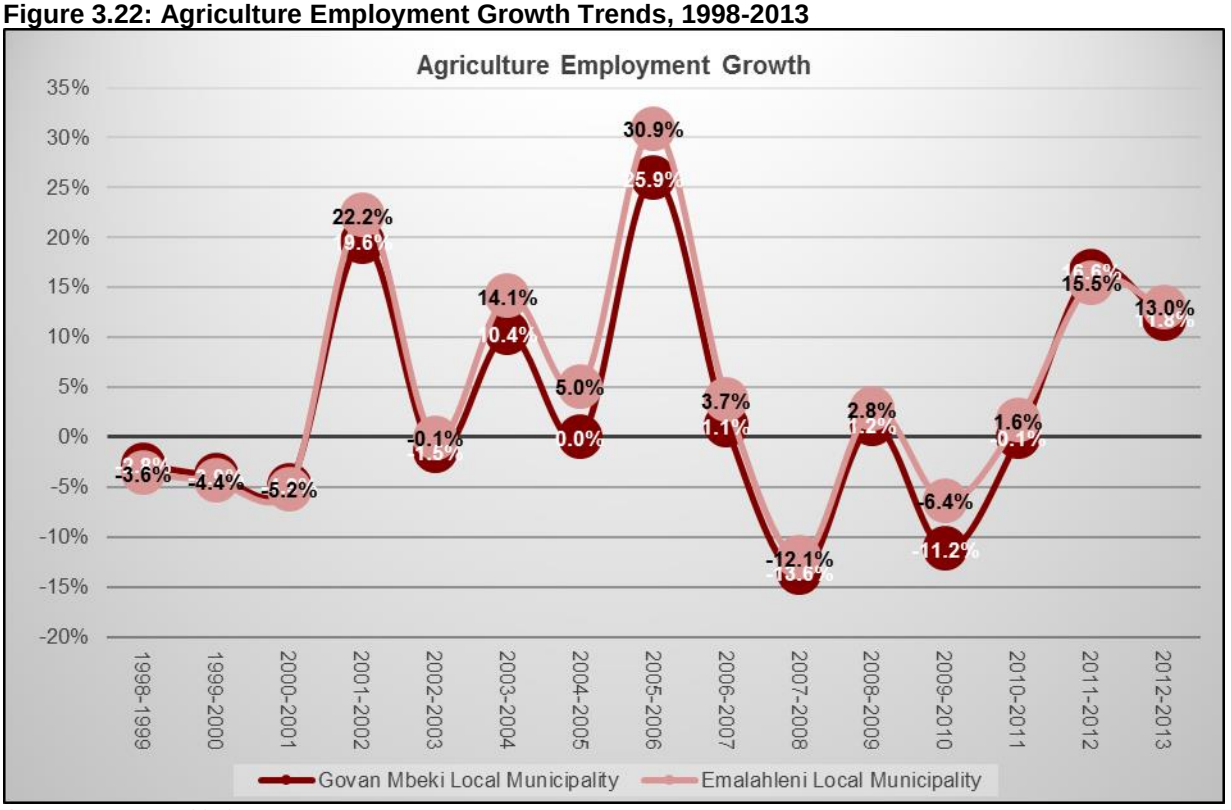
**Figure 3.21: Employment in the Agriculture Sector, 2013**




*Source: Demacon, 2016*

The agriculture employment in both local municipal areas averages around 6% of total agriculture employment in the province. This has changed from 3% to 4% in 2003, illustrating an annual increase in the number of people employed in this sector for the affected municipal areas.

**Figure 3.22: Agriculture Employment Growth Trends, 1998-2013**




*Source: Demacon, 2016*

A deceleration in employment growth rates in the agriculture sector can be seen for both municipalities since 2005/2006. The average growth rate for Emalahleni was -1.8% per annum, Govan Mbeki also showed a negative average annual growth rate of -3.2%.

## 3.6 ECONOMIC LANDSCAPE FINDINGS

The development area stretches over two municipalities: Emalahleni Local Municipality and Govan Mbeki Local Municipality. Both these municipalities were evaluated.

Although the area surrounding the development site is characterised by agricultural activities, mining and manufacturing are the dominant economic contributors in the local economies. Whereas manufacturing is concentrated in the main urban centres, mining is scattered throughout the regions and as such has historically been in competition for land with agricultural production. Given the location of coal deposits within the Mpumalanga region and the resultant large amount of coal mines, it is unsurprising that the local economies have been driven by the coal mining sector for a number of decades with continued strong growth and expansion evident.

The sectoral contribution of agriculture may appear relatively small, the strategic importance of the sector is underscored by the intensive downstream value chain (and the fact that further beneficiation occurs in the domestic economy, though beyond the study area boundaries) and secondly, maize is a dominant contributor to the local food basket.

Although economic growth for the long term (1998-2013) is slightly below the national growth of 3.4%, short term growth (2008-2013) is decelerating (but still positive), but not below the national average. The development of the Alexander coal mine will support mining activity in the region. The development will create long term employment and economic opportunities in the mining sector, at the expense of agriculture activity.

Employment growth increased up to 2007 in both economies, after that a decreasing trend can be seen. Since 2010 employment growth has started to increase again. One possible reason for the decrease in employment could be the mechanisation of the agriculture and manufacturing sectors – both of these sectors showed a deceleration in employment. The highly skilled employment sector has shown the highest growth, implicating a high number of highly skilled job opportunities being created in the economies as the area becomes more developed. However, the semi- and unskilled labour force is still by far the largest sectors, forming nearly halve of the labour force in both economies.

The following section provides an overview of the socio-economic characteristics of the area.

# CHAPTER 4: SOCIO-ECONOMIC OVERVIEW

## 4.1 INTRODUCTION

The purpose of this chapter is to provide a comprehensive socio-economic overview of the surrounding area. This information provides insight regarding the number of people employed, their household income and also the expected growth in the number of people in the area. This would highlight the significance and value of the affected local economies main socio-economic trends.

## 4.2 STUDY AREA DELINEATION

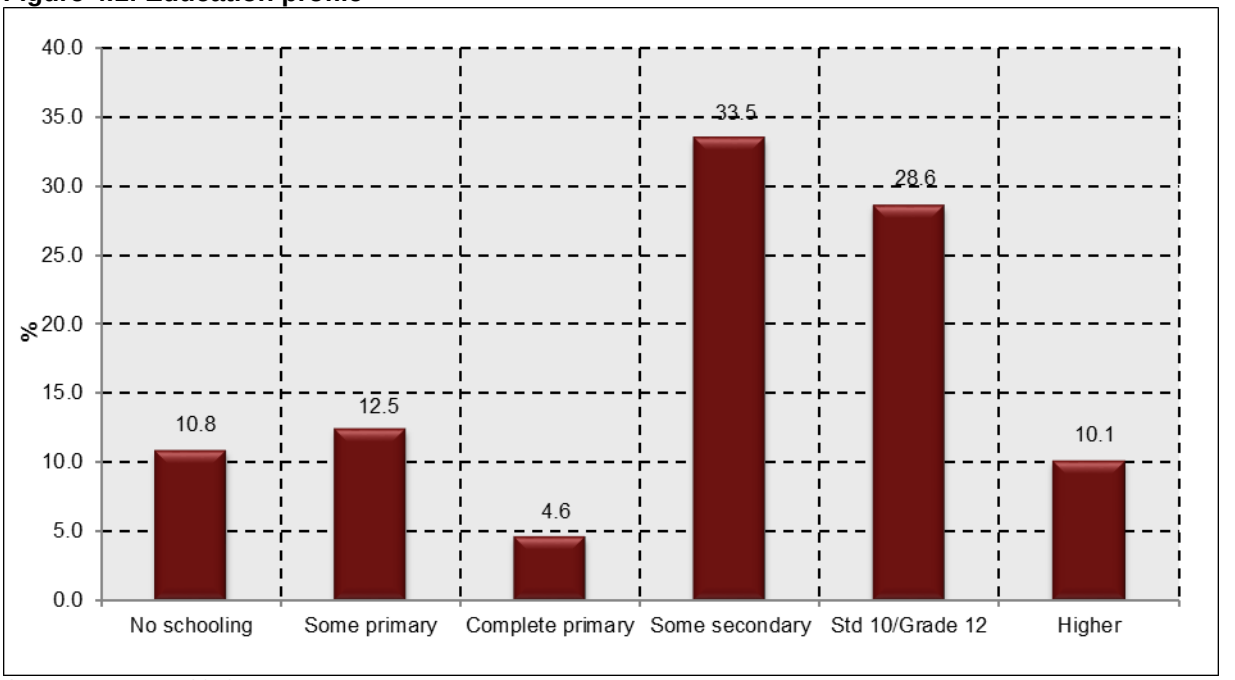
The study area for the socio-economic analysis is defined by an approximated 50km radius.

The study area has an estimated **567 915 people or 168 337 households** in 2016. The average household size amounts to approximately **3.4 members per household** and the population grew at an approximate rate of **1.6% per annum** and the household growth at **2.8% per annum**.

The main socio-economic characteristics of the study area are provided below.

## 4.3 EDUCATION PROFILE

**Figure 4.1: Education profile**




*Source: Demacon, 2016*

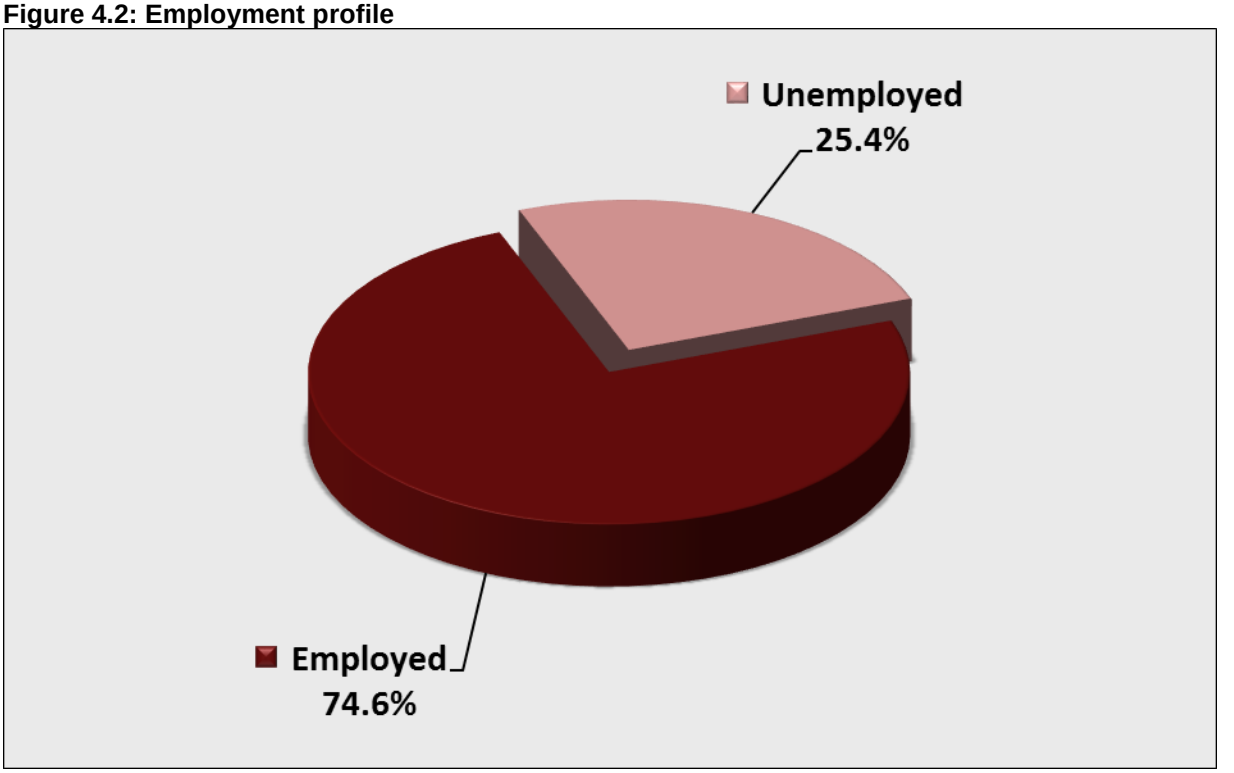
***Findings (Figure 4.1):***

- ✓ Figure 4.1 indicates that 38.7% of the market population has at least Grade 12 (28.6%) or obtained higher educational levels (10.1%).
- ✓ The largest segment of the market population (33.5%) has some level of secondary education, 4.6% has completed their primary education and 12.5% of the population has some form of primary education
- ✓ 10.8% of the population has no form of education.

The area has a high level of illiteracy with 10.8% having had no schooling (national average is 8.4%). The lower levels of education are most often compared to lower income types of work and people working in elementary occupations such as cleaners, gardening and unskilled mining labour. Higher education is comparable to higher income, white collar job opportunities such as managers, clerks and retail sales workers.

## 4.4 EMPLOYMENT PROFILE

**Figure 4.2: Employment profile**




*Source: Demacon, 2016*

***Findings (Figure 4.2):***

- ✓ The majority of the market population (63.8%) is economically active while evidently 36.2% are not economically active
- ✓ Of the 63.8% of the population that are economically active, **74.6% are employed** while 25.4% of the economically active population is unemployed.

The number of people not economically active increases the dependency ratios on those that do work and receive an income. This puts more pressure on breadwinners to support those who earn no income. The study area's level of unemployment is synonymous to the national economy (national average is between 25% and 30%). It should be noted that 29.3% of Emalahleni and 37.2% of Govan Mbeki Local Municipality is employed in the informal sector.

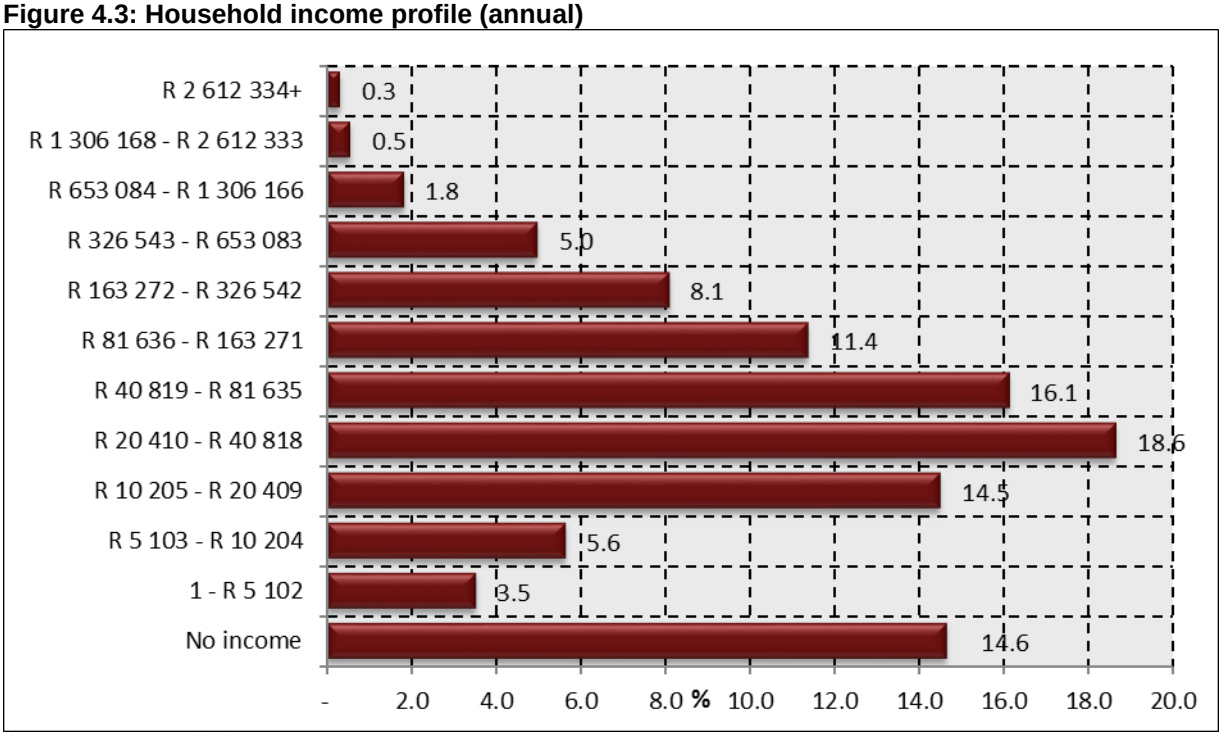
## 4.5 HOUSEHOLD INCOME PROFILE

***Findings (Figure 4.3):***

- ✓ A total of 14.6% households earn no income at all
- ✓ The majority of households within the market area (73.0%) earn below R40 818 per annum
- ✓ 18.6% of households within the market area earn an income between R20 410 and R40 818 per annum
- ✓ 27.0% earn more than R81 636 per annum

- ✓ Average annual household income for **LSM 1-10+** (only the income earning households) is at **R149 370 per annum** or **R12 447 per month** (calculated for 2016).

**Figure 4.3: Household income profile (annual)**




*Source: Demacon, 2016*

This indicates that the market area is located in a predominately *low to middle income earning* community, which indicates medium buying power. Subsequent paragraphs indicate the living standard measurement of the market.

## 4.6 LIVING STANDARD MEASUREMENT

The LSM index is an internationally recognised instrument designed to profile a market in terms of a continuum of progressively more developed and sophisticated market segments. The LSM system is based on a set of marketing differentiators, which group consumers according to their standard of living, using criteria such as degree of urbanisation and ownership of assets (predominantly luxury goods).

Essentially, the LSM system is a wealth measure based on standard of living, rather than income alone. The market segmentation continuum is divided into ten LSM segments, where LSM 1 signifies the lowest living standard and LSM 10+ signifies the highest living standard.

The LSM categories are defined and weighted in terms of the following 29 variables (refer to Table 4.1). It is important to note that the LSM system is widely applied internationally for marketing and branding purposes, and that it is therefore not an instrument developed locally to label or stereotype certain market segments.

**Table 4.1: Living Standard Measurement (LSM) Variables**

| | | | |
|---|---|---|---|
| 1 | Hot running water | 16 | Less than 2 radio sets/household |
| 2 | Fridge/freezer | 17 | Hi-Fi/music centre |
| 3 | Microwave oven | 18 | Rural outside |
| 4 | Flush toilet in/outside house | 19 | Built-in kitchen sink |
| 5 | No domestic in household | 20 | Home security service |
| 6 | VCR | 21 | Deep freezer |
| 7 | Vacuum cleaner/floor polisher | 22 | Water in home/plot |
| 8 | No cell phone in household | 23 | M-net/DSTV subscription |

| | | | |
|---|---|---|---|
| 9 | Traditional hut | 24 | Dishwasher |
| 10 | Washing machine | 25 | Electricity |
| 11 | PC in home | 26 | Sewing machine |
| 12 | Electric stove | 27 | DVD player |
| 13 | TV set | 28 | 1 cell phone per household |
| 14 | Tumble dryer | 29 | Motor vehicle in household |
| 15 | Home telephone | | |

Table 4.2 summarises the current status of the consumer market in terms of the LSM index. Essentially, the LSM index summarises the net result of market indicators discussed in preceding paragraphs.

The objective is to assess whether *minimum demand thresholds* can be met by households within the market area sustaining the market potential, taking due cognizance of demand potential and effective competitive supply of commercial activities.

**Table 4.2: Living Standard Measurement Indicator**

| Income category (R/month) | LSM Status | Market Area (% of households) |
|---|---|---|
| Up to R2 700 | LSM 1 – 3 | 29.5 |
| R2 700 to R3 700 | LSM 4 | 8.7 |
| R3 700 to R5 200 | LSM 5 | 5.6 |
| R5 200 to R7 800 | LSM 6 | 9.3 |
| R7 800 to R10 300 | LSM 7 LOW | 6.9 |
| R10 300 to R12 200 | LSM 7 HIGH | 9.7 |
| R12 200 to R14 000 | LSM 8 LOW | 3.2 |
| R14 000 to R16 400 | LSM 8 HIGH | 1.1 |
| R16 400 to R19 700 | LSM 9 LOW | 3.4 |
| R19 700 to R24 100 | LSM 9 HIGH | 5.7 |
| R24 100 to R30 000 | LSM 10 | 1.1 |
| R30 000+ | LSM 10+ | 15.7 |

*Source: Demacon calculations*

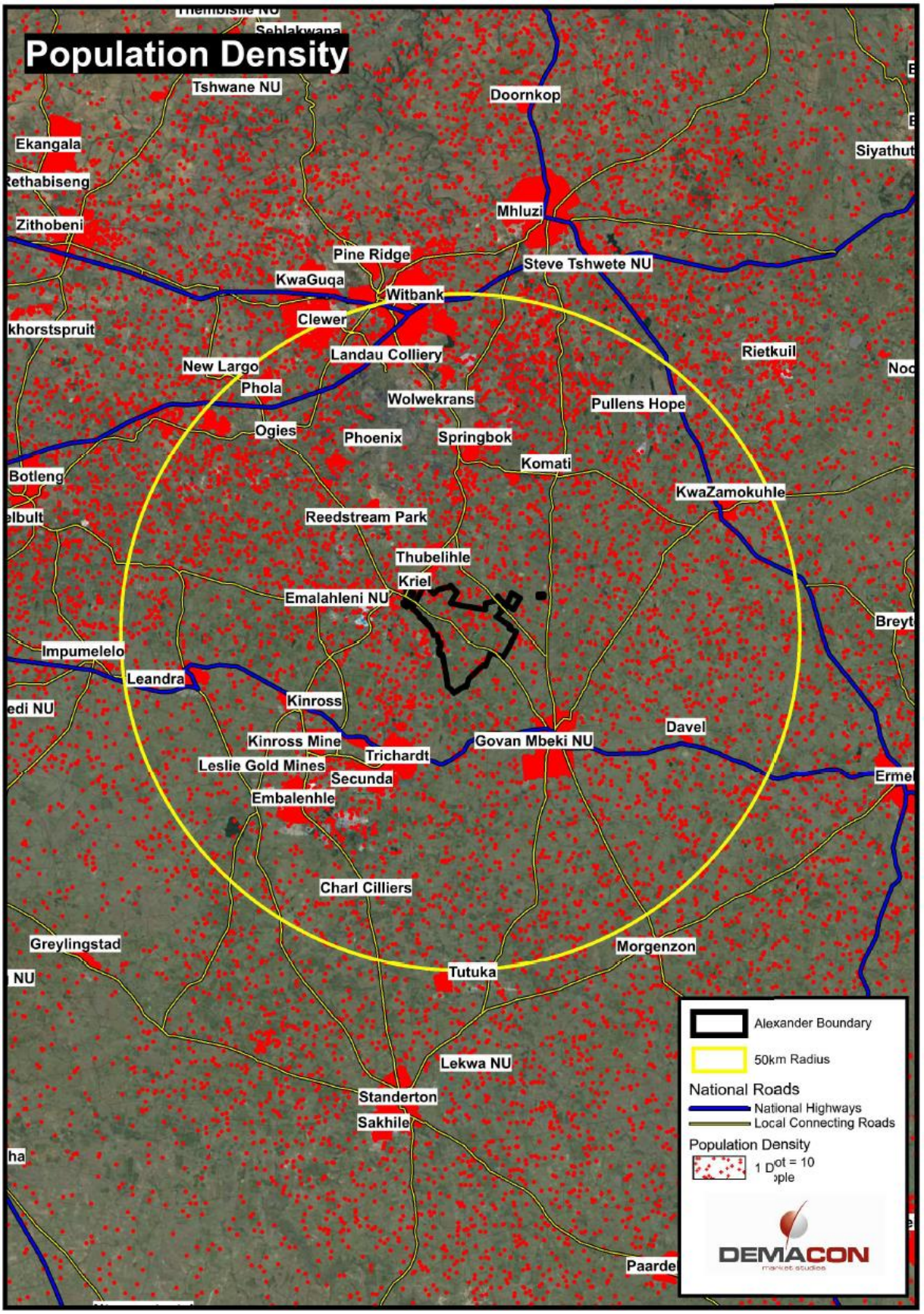
***Findings (Table 4.2):***

- ✓ The majority ***(29.5%)*** of the market falls within **LSM 1 – 3 grouping.**
- ✓ **LSM 4 – 10+** amounts to ***70.5%***.

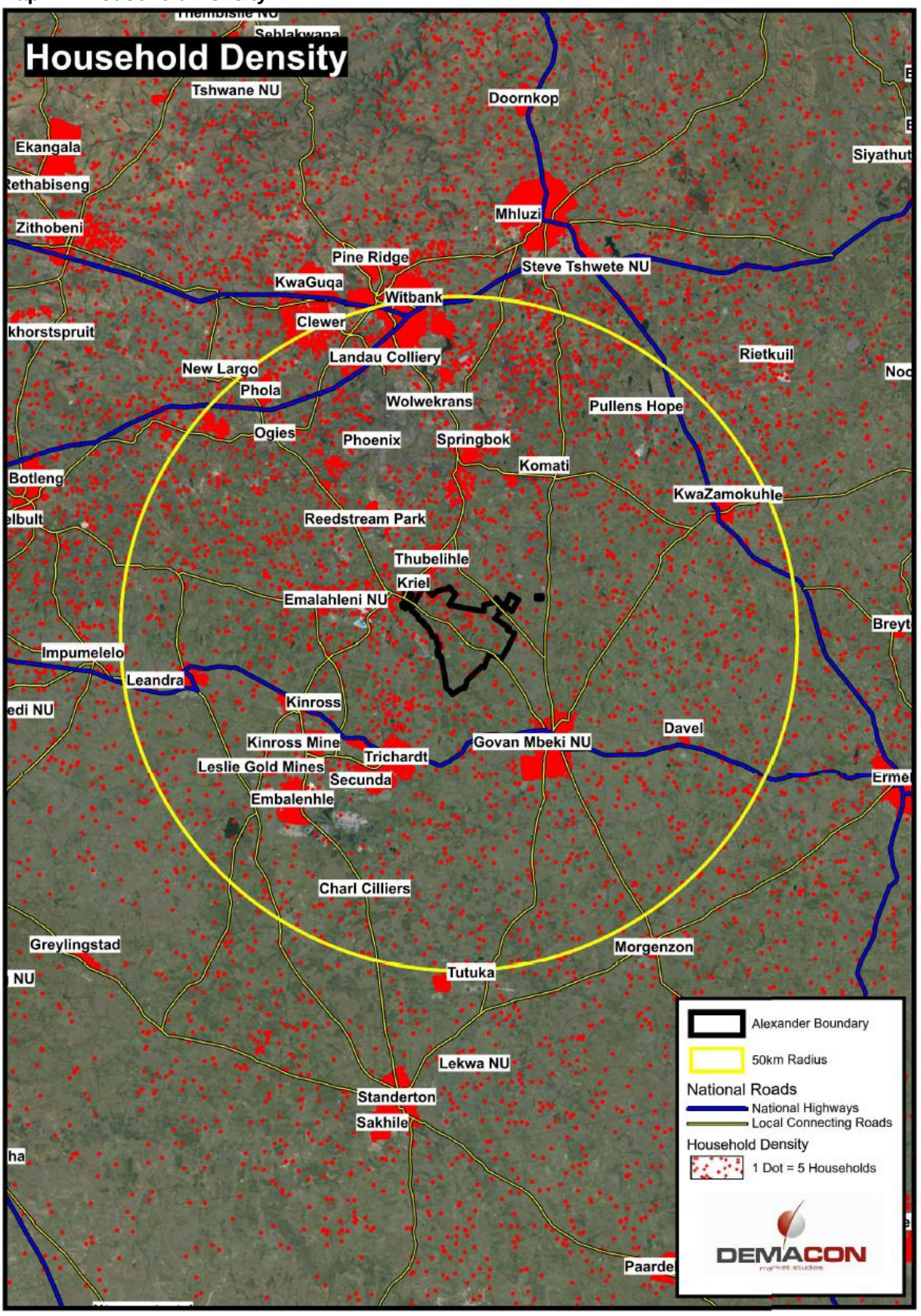
**Development implications**

The LSM levels are indicative of a predominantly medium to high income population. LSM 4 – 10 groups are characterized by ownership of durables, luxuries and some saving. LSM 1 – 3 predominantly only acquire basic goods and services as their living level is limited by their income.

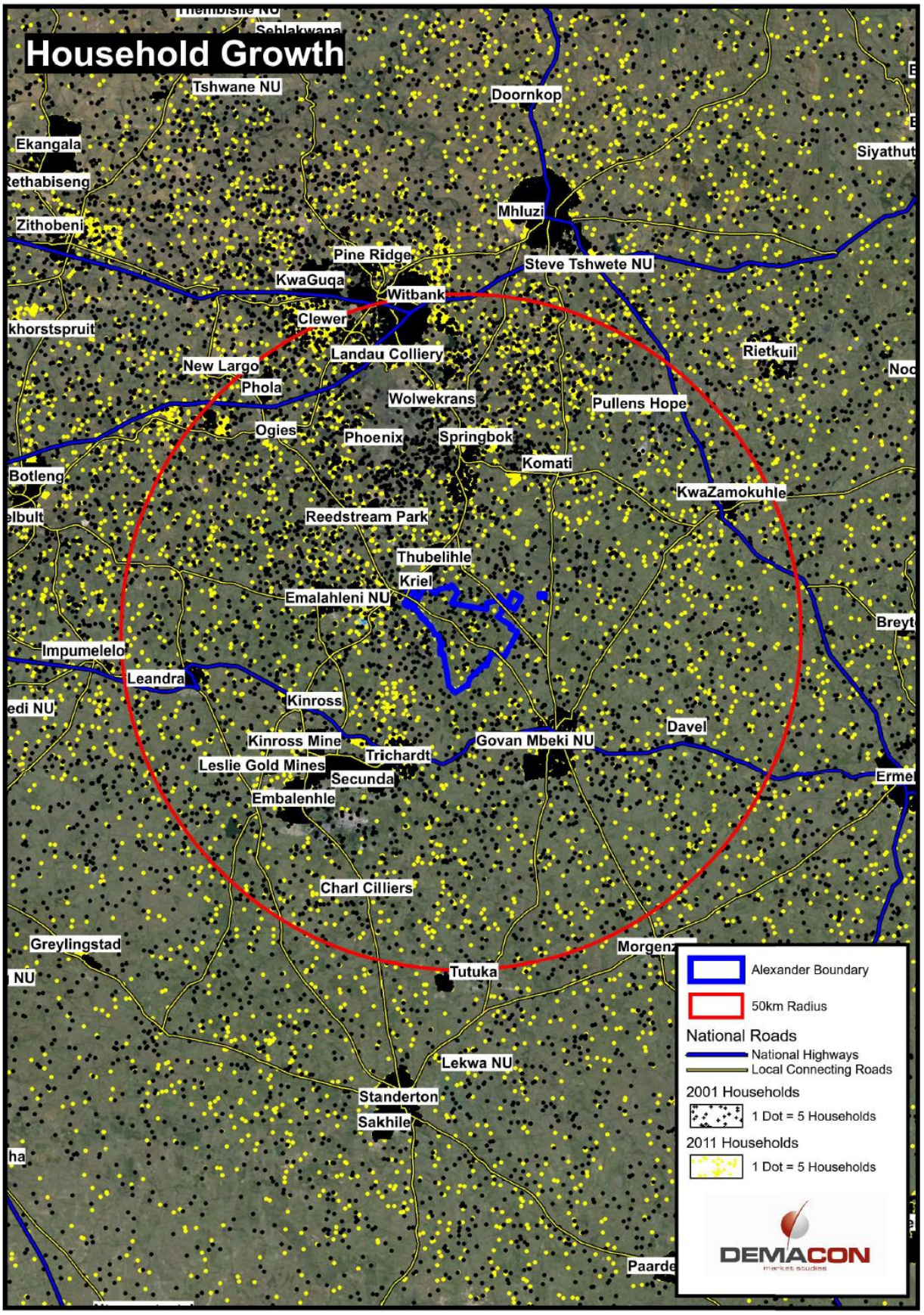
**Map 4.1: Population Density**



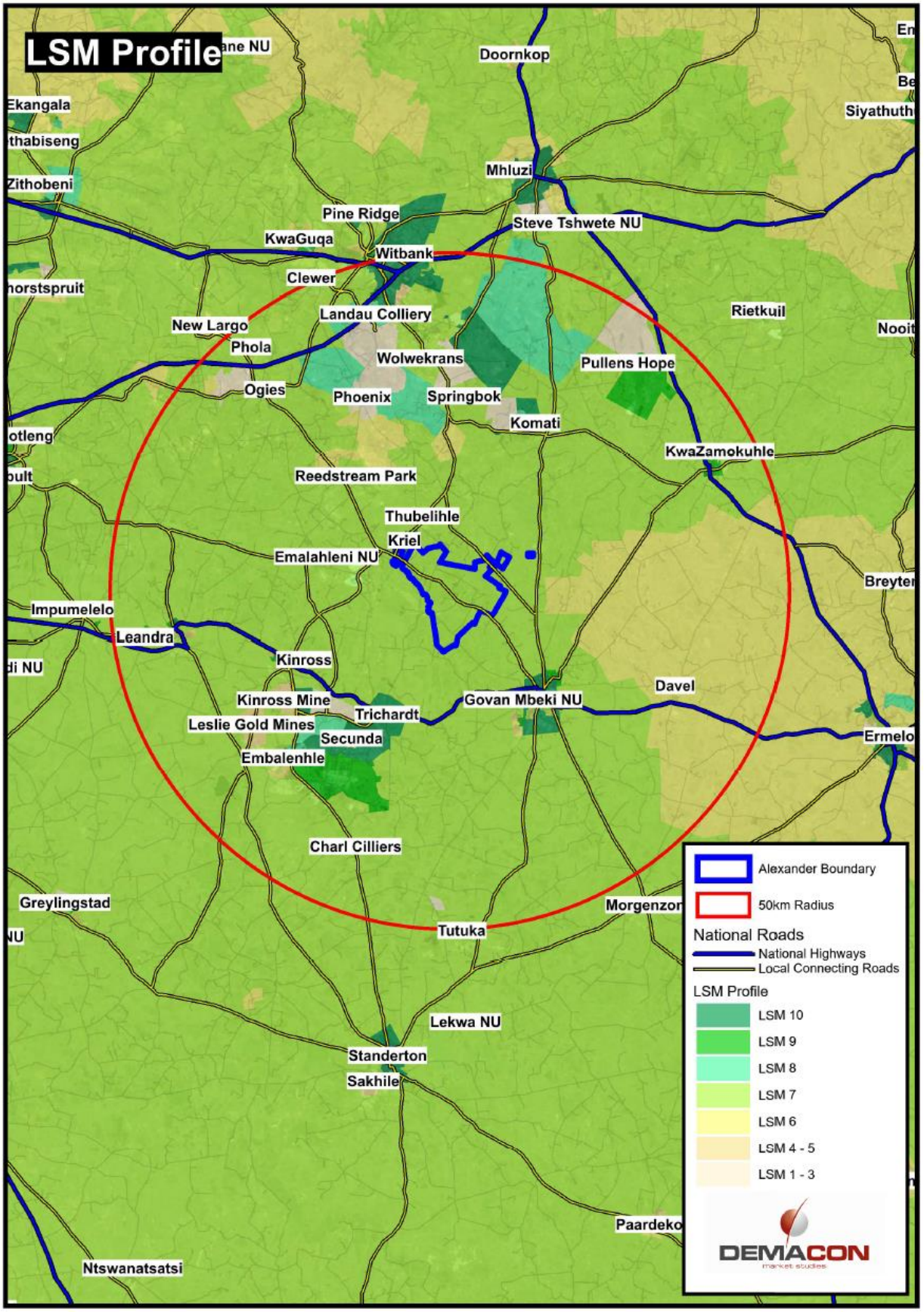
**Map 4.2: Household Density**



**Map 4.3: Household Growth**



**Map 4.4: LSM Profile**



## 4.7 SYNTHESIS

Table 4.3 illustrate the main socio-economic characteristics of the total number of people that resides in the study area.

**Table 4.3: Socio-economic indicators for study area**

| Variable | Study Area |
|---|---|
| **Study Area Population (2016)** | ✓ 567 915 people<br>✓ 168 337 households |
| **Average household size** | ✓ 3.5 persons per household |
| **Level of education** | ✓ 10.8% - No schooling<br>✓ 28.6% - Grade 12<br>✓ 10.1% - Higher education |
| **Level of employment** | ✓ 63.8% - Economically active of which 74.6% is employed and 25.4% is unemployed |
| **Weighted Average Annual Household income (2016) - All LSM (only income earning households)** | ✓ R149 370 per annum<br>✓ R12 447 per month |
| **LSM 1-3**<br>**LSM 4-10+** | ✓ 29.5%<br>✓ 70.5% |

### Socio-Economic Overview of the Study Area

The study area delineated for this project is defined by a 50km radius from the mining site, and includes the larger urban nodes of eMalahleni and Secunda as they represent the main nodes where the workforce resides. The study area has a large number of towns in its vicinity resulting in a high population total.

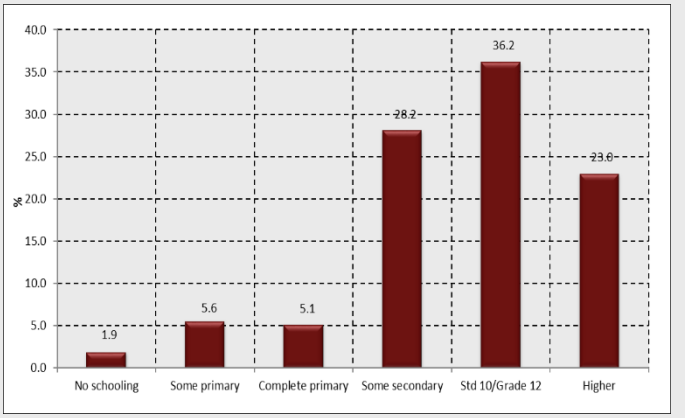
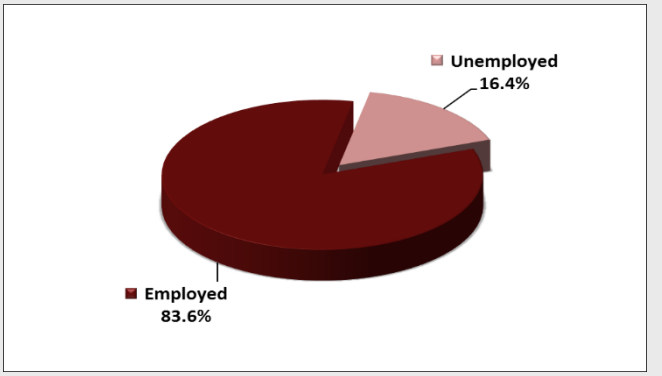
An estimated total of **567 915 people** and **168 337 households** are located within the study area during 2016. Household growth for this area is estimated at approximately 2.78% per annum which translates into an annual increase of approximately 4310 households.

The education profile of the area indicates **high illiteracy levels** with 10.8% having no form of schooling. Based on the education level it is assumed that the majority of people will be employed in the semi-skilled and skilled occupations. The majority of permanent employment opportunities by the Alexander mine will be in the semi-skilled, skilled and highly skilled segments.

Local employment levels (74.6%) are on par with the national average of 75% while income levels indicate that households are predominantly middle income earners. The income level of a household has a direct impact on the demand for goods and services, and as a result given the local trends. The additional employment in the skilled and highly skilled segments from the mine development will strengthen the local market and increase demand for higher order goods and services.

Due to the proximity of the development site to Ga-Nala (Kriel), it is anticipated at this early stages that the greatest affect will be seen on Ga-Nala in terms of aspects such as employment, residential development, retail demand, etc. Therefore, Table 4.4 provides a brief summary of the main socio-economic characteristics of Ga-Nala.

**Table 4.4: Socio-economic indicators for Ga-Nala (Kriel)**

| Variable | Study Area |
|---|---|
| Study Area Population (2016) | ✓ 16 502 people<br>✓ 4 940 households |
| Average household size | ✓ 3.3 persons per household |
| Level of education |  |
| Level of employment | ✓ 62.1% are economically active of which 74.6% is employed and 25.4% is unemployed<br>  |
| Weighted Average Annual Household income (2016) - All LSM (only income earning households) | ✓ R324 971 per annum<br>✓ R27 081 per month |
| LSM 1-3<br>LSM 4-10+ | ✓ 19.9%<br>✓ 80.1% |

# CHAPTER 5: VALUE CHAIN ASSESSMENT

## 5.1 INTRODUCTION

The purpose of this section is to provide a high level comparative economic impact assessment of the prosed mining activities in relation to respectively agricultural and tourism potential. The assessment illustrates the economic impact on an economy-wide level based on new (coal mining) and lost (agriculture & tourism) economic activity.

The impact assessment for the Alexander site is structured as follows, 1) the impact on the coal mining sector, 2) impact on the agriculture sector and 3) the tourism sector.

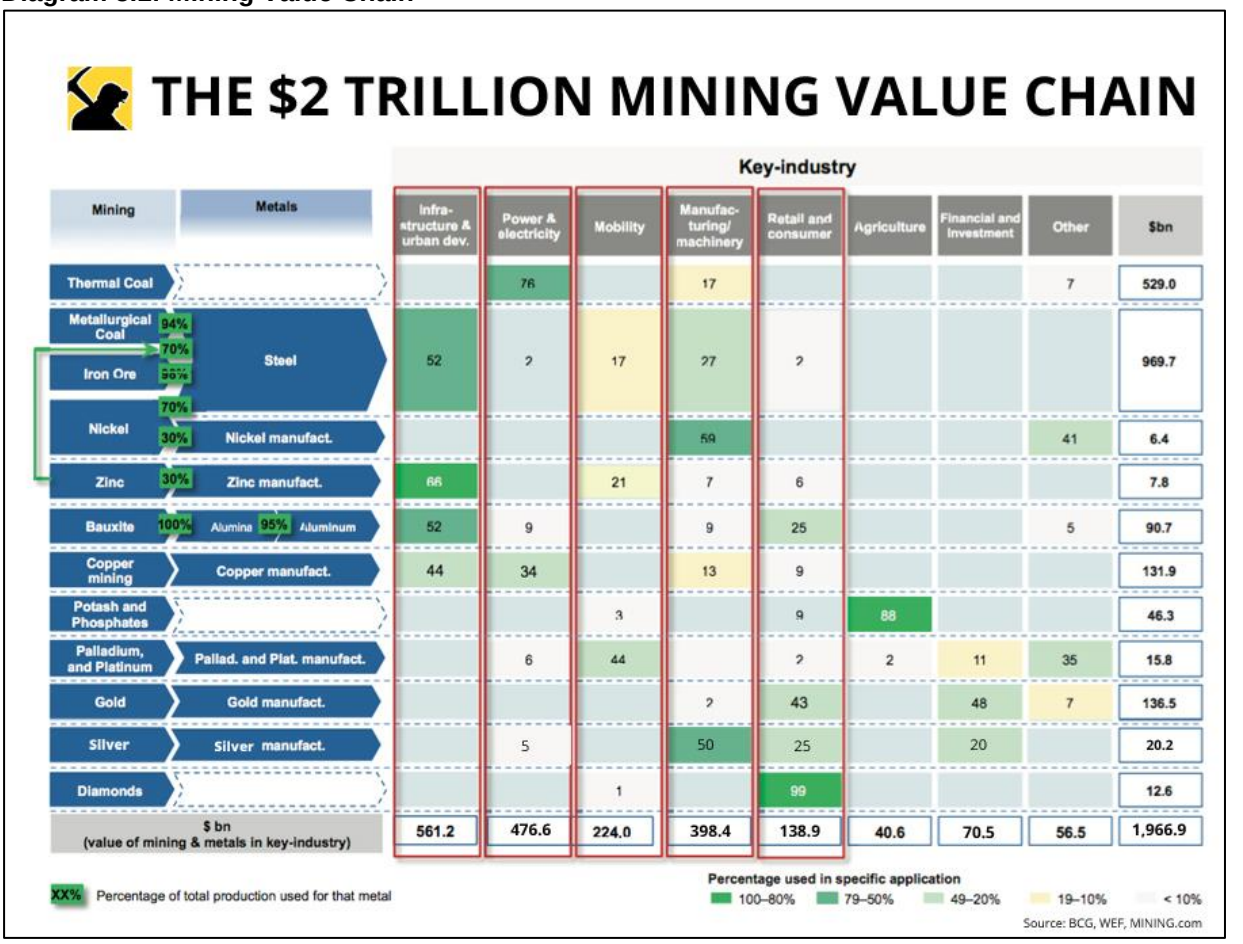
## 5.2 MINING ASSESSMENT

The Mpumalanga province has a competitive advantage in coal mining within the national economy. As a result, investment in this sector contributes to the growth and development of the sector in the local and regional context. The contribution of the mining sector in the local and regional economy is assessed based on the value chain of activity as a result of coal mining and the multiplier effect which is based on an increase or decrease in demand for coal.

### 5.2.1 Mining Value Chain

The following figure provides an overview of the world wide mining value chain. The thermal coal value chain is worth $529.0 billion (2015) and the steel value chain (metallurgical coal and iron ore) is worth $969.7 billion.

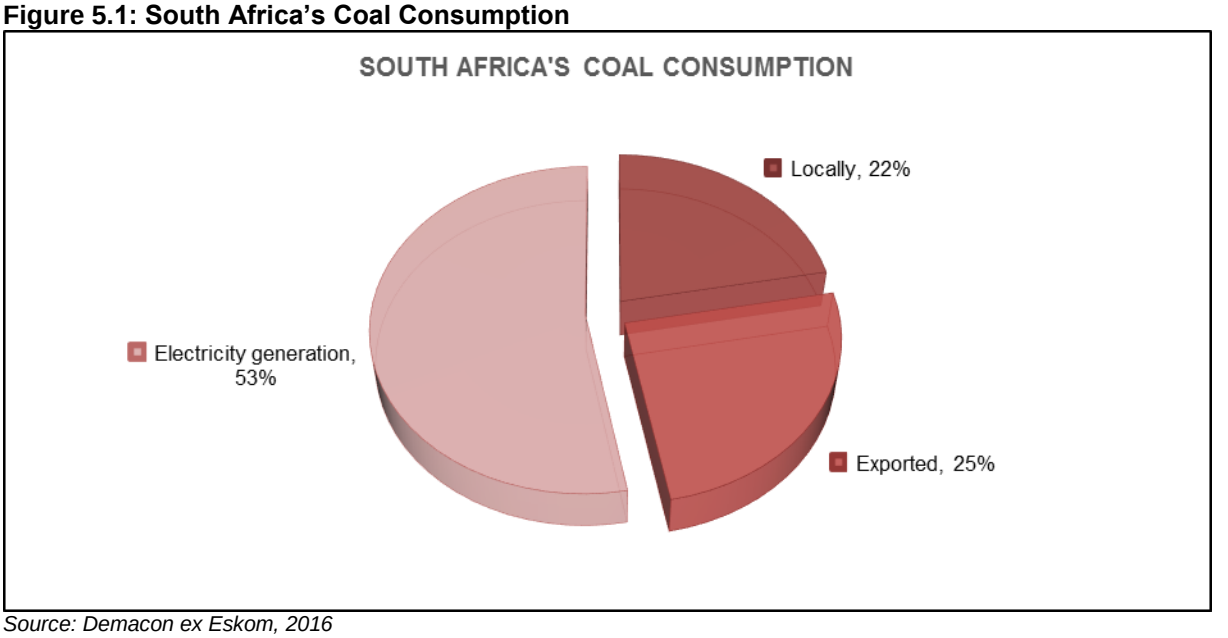
**Diagram 5.1: Mining Value Chain**




*Source: http://www.mining.com/the-2-trillion-mining-value-chain-at-a-glance/*

The Mpumalanga province is one of the main sources of coal within South Africa. The use of coal after it has been mined is illustrated in Figure 5.1. It is evident that the majority of local coal is used for local electricity generation (53%) while 25% is exported. These are national averages and depended on quality, the percentage to be exported from the Alexander colliery will be far greater.

**Figure 5.1: South Africa's Coal Consumption**

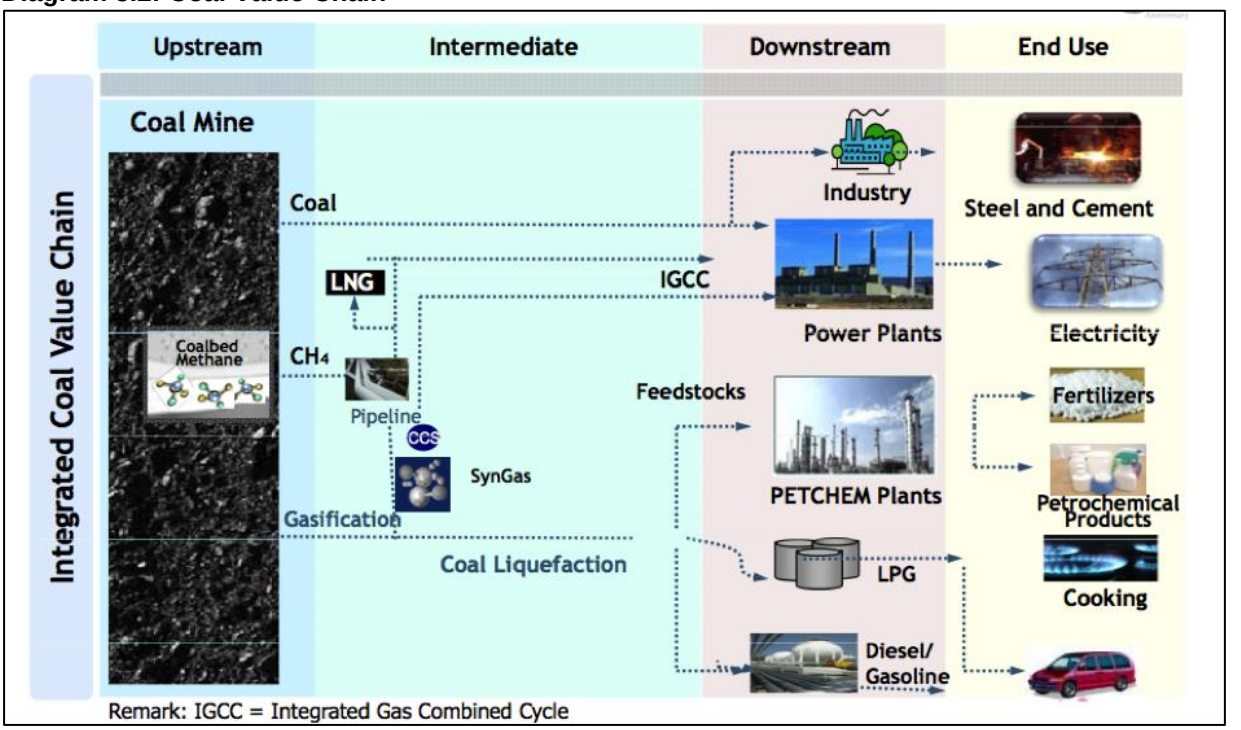



*Source: Demacon ex Eskom, 2016*

Due to the nature of coal, value adding is limited as coal in its natural/raw state is primarily used for electricity generation. A value chain of the coal mining industry is illustrated below.

It is evident from Diagram 5.2 that after production of coal there is transport of coal and then the end user of coal. This illustrates that the coal value chain is limited with power generation as its main purpose.

**Diagram 5.2: Coal Value Chain**




*Source: https://agusdaniel.wordpress.com/2013/07/30/rio-tinto-coal-australia-swot-analysis/*

The coal from the plant (which is situated on ESKOM property adjacent to the Power Station) will be conveyed from the stockpiles to the Power Station. No roads will be crossed.

ESKOM, if they deem it necessary, might export from the stockpiles to the neighbouring Power Stations in the event of problems in coal supply experienced at those Power Stations. This kind of thing is common and no increase in the current volume of road haulers is expected. The reason for this is due to the Alexander resource being a replacement area for the existing mine (not additional or over and above).

### 5.2.2 Multiplier Effect

The multiplier effect refers to the increase in final income arising from any new injection of demand and the opposite is also true with a withdrawal of demand will lead to a downward multiplier effect.

**Output/Sales:** For every R1 million in final demand from coal mining there is R1.41 million downstream variation in output/sales generated across the entire economy.

**Labour Remuneration:** Salaries and wages within the coal mining sector are on average higher than those in the agriculture sector. As a result, the economy wide impact is higher as workers earn more and can spend more money on goods and services than those in the agriculture sector. For every R1 million variation in final demand, labour remuneration either loses or gains R251 000.

**Employment:** A total of 1.9 employment opportunities are created within the formal and informal sectors across the entire economy due to a R1 million variation in coal demand. The reverse is also true, with a loss in 1.9 employment opportunities across the economy if there is a R1 million decrease in coal demand.

Table 5.1 summarises the multiplier effect of coal mining in the Mpumalanga province.

**Table 5.1: Multiplier effect for Coal Mining**

| Description | Economy Wide Impact |
|---|---|
| **Implication of R1 million demand** | |
| Output/Sales | Generates R1.41 million in sales |
| Labour Remuneration | Higher salaries/wages compared to agriculture |
| Employment | Create 1.9 employment opportunities |

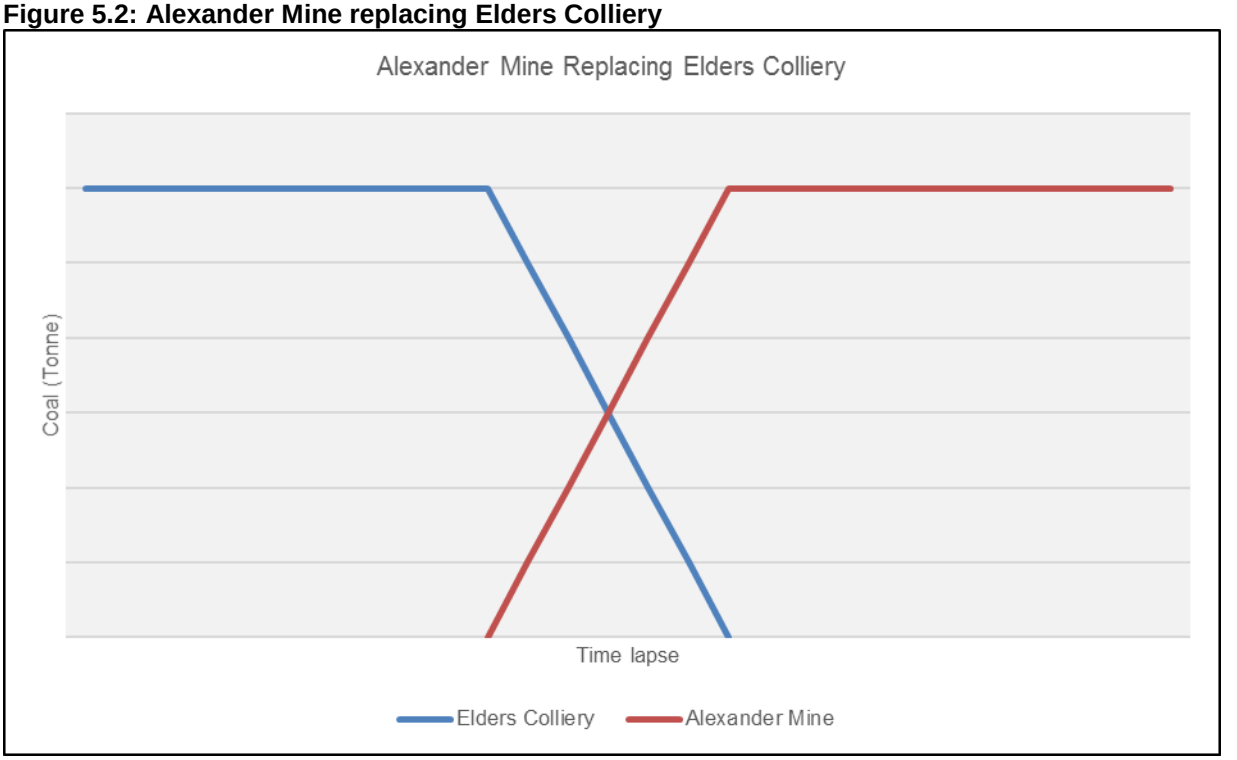
*Source: Quantec, South Africa Multipliers (SARB)*

The following table provides an illustration of the economy wide impact of the proposed Alexander mine development.

- **Project Specific Impact:**

Although Alexander Mine will only replace Elders Colliery, an impact will still be realised in the economy. The figure below indicates a time lapse of Alexander Mine replacing Elders Colliery.

**Figure 5.2: Alexander Mine replacing Elders Colliery**




*Source: Demacon, 2016*

The initial capital cost of the Alexander mine will amount to R2.4 billion. This figure represents the base inputs for the impact modelling exercise and is a once-off impact during the construction phase of the project.

*Closure of Elders Colliery*

**Table 5.2: Economic Impacts of Rehabilitation**

| VARIABLE | CAPITAL EXPENDITURE | TOTAL IMPACT |
|---|---|---|
| Additional Sales/Output | R113.8 million | R145.9 million |
| Additional GGP | | R90.6 million |
| Additional Employment | | 200 |

*Source: Demacon Economic Impact Model, 2013*

It is important to note that these impacts are ***once off and not sustained annual impacts***. The impacts will fade away after the construction of the mine. Total impact includes direct, indirect as well as induced effects.

*Construction Phase*

**Table 5.3: Economic Impacts of Capital Investment**

| VARIABLE | CAPITAL EXPENDITURE | TOTAL IMPACT |
|---|---|---|
| Additional Sales/Output | R2.4 billion | R3.0 billion |
| Additional GGP | | R1.9 billion |
| Additional Employment | | 4 400 |

*Source: Demacon Economic Impact Model, 2013*

It is important to note that these impacts are ***once off and not sustained annual impacts***. The impacts will fade away after the construction of the mine. Total impact includes direct, indirect as well as induced effects.

*Operational Phase*

The subsequent table indicates the anticipated ***sustained economic impacts*** (direct, indirect and induced) that will result during the operational phase of the Alexander mine, until closure. The economy wide impact by the sale of coal to the market is illustrated in Table 5.3.

**Table 5.4: Economic Impacts for Yearly Sales Potential**

| VARIABLE | YEARLY SALES POTENTIAL | TOTAL IMPACT |
|---|---|---|
| Additional Sales/Output | R2.7 billion | R3.5 billion |
| Additional GGP | | R2.2 billion |
| Additional Employment | | 5 000 |

*Source: Demacon Economic Impact Model, 2013*
*Note: The sales potential is based on the average coal mined per annum and the current international coal price*

Table 5.4 illustrates that the estimated annual sales value of R2.7 billion, could create an additional R3.5 billion in new business sales, R2.2 billion in additional GGP, as well as 5 000 sustained employment opportunities (during the life of mine). Total impact includes direct, indirect as well as induced effects.

## 5.3 AGRICULTURE ASSESSMENT

The Mpumalanga province has a competitive advantage in agriculture production and especially in maize production within the national economy. As a result, investment in this sector contributes to the growth and development of the sector in the local and regional context. The contribution of the agriculture sector in the local and regional economy is assessed based on the value chain of activity as a result of agriculture production and the multiplier effect which is based on an increase or decrease in demand for agriculture products.

The following section provides a more in-depth analysis of the national and local agriculture trends.

The review of the national agriculture sector performance for 2012 was sourced from the Department of Agriculture – *Economic Review of the South African Agriculture, 2012*[8].

### 5.3.1 Agriculture Value Chain

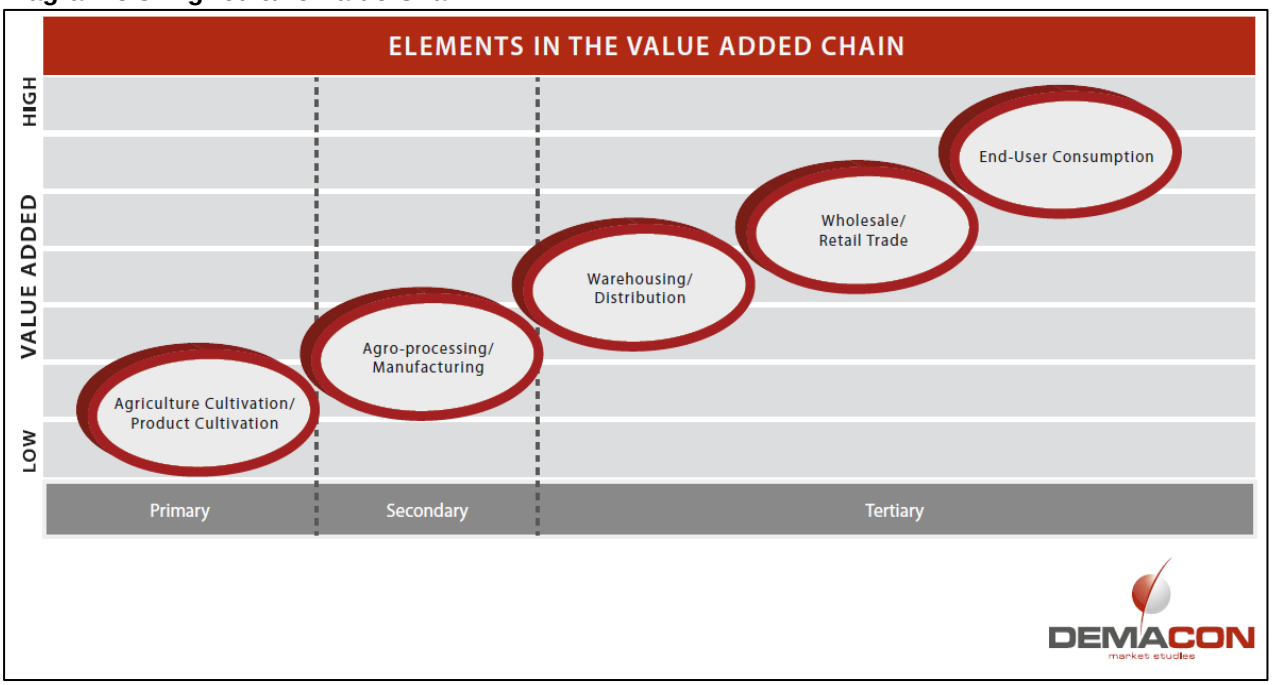
The value chain represents the process as products moves from the primary to secondary to tertiary market segments as value is added to the product. Value adding to agricultural products varies between basic and complex, depending on the end-user focus of the product. In general, the value chain for agriculture is more complex than coal mining.

Example:

Basic vegetable production centres on a primary, low value-added product during the **Agricultural Cultivation / Product Cultivation** stages of the value chain. As value is added by means of **Agro-processing / Manufacturing** processes, the product moves into the secondary economic sectors, which has greater multiplier potential. If further value is added to the product, it moves into the tertiary sectors, where **Warehousing / Distribution** and **Wholesale / Retail Trade** occur. This chain optimises access to **End-user Consumption markets.**

[8] *Source: Department of Agriculture, Forestry & Fisheries, 2013 (Selected extracts)*

**Diagram 5.3: Agriculture Value Chain**




### 5.3.1 Enterprise Margins

One of the most objective and accurate measures to calculate the value of agricultural production is by means of gross margin calculations. Gross margins provide the gross value of agricultural production after deduction of direct input costs. It is therefore a valuable indication of the profit potential of specific crops. Other costs also influencing profits in agriculture are the financial ability of the owner of the land or the amount of capital available and the overhead costs that have to be covered by the products that are produced.

The gross margins for selected agriculture activity are illustrated in Table 5.5.

**Table 5.5: Gross Margins Estimation**

| Activity | Yield[1] | Price (R per tonne) | Income per hectare | Expenses per hectare | Gross Margin |
|---|---|---|---|---|---|
| Maize | 9 | 4 354 | 39 177 | 10 098 | 29 079 |

*Source: Demacon Agriculture Evaluation, 2016*
1: Average yield for the area (tonne per hectare)

The current maize yield/ha for the affected area is more than double the national average of 4.3 tons/hectare.

Due to the opencast mining development an immediate impact in lost agriculture production will be felt as soon as construction of the mine starts. This negative impact on agriculture land is permanent, but limited to the affected mining area. The lost agricultural land would have a direct impact on the production of this sector.

In order to mitigate the loss in cultivated land it could be possible to keep the un-mined areas available for farming activity as long as possible. The reasoning behind this is that mining operations is implemented in phases and with this phasing, agricultural activity can still take place where mining has not yet been established.

**Opportunity Cost:**
The loss in production of one economic activity versus the gain brought about by an increase in production of another ***activity is defined as an opportunity cost. One activity is lost while the other is gained***. In this case the lost activity is dominated by agricultural production while the activity gained is coal production.

The land use or economic activities located within the mining area will be lost as mining activity expands over the long term. The ***income per unit*** is used as an indication of lost in agriculture activity.

Table 5.6 provides an illustration of the type, size and current seasonal value of agriculture activity that is located in the **lost Alexander site**. Two scenarios were modelled:

- **Best case scenario:** loss of agricultural activity on the built 220 ha
- **Worst case scenario:** loss of agricultural activity on the total 7 300ha

**Table 5.6: Activity and Value Estimate for Alexander (2016 values)**

| | Price | Tonne / ha | Total Area | Gross Income | Gross Cost | Gross Margin | Nett Income |
|---|---|---|---|---|---|---|---|
| Maize (Best case) | R4 353 | 9 | 220 | R8 618 940 | R2 221 646 | R29 079 | R6 397 294 |
| Maize (Worst case) | R4 353 | 9 | 7 300 | R285 992 100 | R73 718 238 | R29 079 | R212 273 862 |

*Source: Demacon Agricultural Evaluation, 2016*

The definite annual loss in gross income due to a loss in agricultural activity will be **R8.6 million** on the **220 ha**. A further **R285.99 million** in gross income could be lost, should it become impossible to continue agricultural activities on the total area (**7 300ha**).

### 5.3.2 Cumulative Loss in Agriculture Activity

The impact on agriculture was determined, should the mine start production in 2016. The following table indicates the cumulative impact of lost production from 2016 to 2051 (LOM = 35 years), assuming that all agricultural activity will cease to exist on the 220 ha that will be utilised for facilities above ground.

**Table 5.7: Cumulative Loss in Nett Income (Constant 2016 prices)**

| Area | Value of Lost Agriculture Activity | Total over a 35 year period | Total over a 100 year period |
|---|---|---|---|
| Built up area (220 ha) | R8 618 940 | R301 662 900 | R861 894 000 |
| Total area (7 300 ha) | R285 992 100 | R10 009 723 500 | R28 599 210 000 |

*Source: Demacon Agricultural Evaluation, 2016*

**Best case scenario:**

The total value (gross income) of lost economic activity totals **R301.7 million** over **35 years**, the timeframe for the mining activity. It should however be noted that if agriculture activities will not be able to restart after the mine closure, the long term impact will amount to approximately **R861.9 million.**

**Worst case scenario:**

It is understood from SLR consulting, that save from the 220 ha that will be utilised for above ground facilities, the balance of the remaining area will remain as productive agricultural land. It is therefore our understanding from this specialist, that neither the extent nor the productivity (including access to underground water to pivot irrigation) of agricultural activity

on the remaining 7 080 ha will be impacted negatively. There appears to be no independent specialist report in this regard. It may be necessary to obtain a specialist input in respect of *inter alia* the site specific implications of potential future land settlement on account of underground mining activity.

In the report by Bureau for Food and Agricultural Policy[9], Aken et al. (2005:6) states that: Subsidence (sinking or subsiding) is a problem that has not received adequate attention. The impacts of land subsidence have not been felt as originally predicted by models. Many board and pillar sections are between 50 and 60 years old and experience indicates that serious subsidence will only occur after between 100 and 120 years. As the old, closed sections age, mass subsidence may occur due to pillar runs and the collapse of whole areas. A truism is that all underground excavations will collapse over time and pillars will spall. Where these excavations are near surface, ratholing and subsidence will follow. Even where such excavations are not very shallow, as in Springs on the East Rand, sinkholes have propagated 65m up to surface (Stacey & Page, 1983).

On a broad based provincial level, the Bureau for Food and Agricultural Policy are therefore of the opinion that all land bought for mining purposes will eventually be "lost" to the agricultural sector on accounting of subsiding and related aspects / complications. In this context, subsiding might hold long term implications for the site which should ideally be better understood and addressed by an independent specialist. The following table provides the impact of lost production on the **7 300 ha.**

The total value (gross income) of lost economic activity totals **R10 billion** over **35 years**, the timeframe for the mining activity. It should however be noted that if agriculture activities will not be able to restart after the mine closure, the long term impact will amount to approximately **R28.6 billion.**

**Table 5.8: Cumulative Loss in Nett Income (Constant 2016 prices)**

| Year | Value of Lost Agriculture Activity (R per annum) | Value of Lost Agriculture Activity, in perpetuity |
|---|---|---|
| Total Mining Area (7 300 ha) | R285 992 100 | R2.2 billion to R3.6 billion |

*Source: Demacon Agricultural Evaluation, 2016*

In the event of such impacts, the worst case scenario would entail a loss of all productive faculties. Value of potential loss in agricultural value (gross income) could potentially range between R2.2 billion and R3.6 billion, capitalised in perpetuity.

### 5.3.2 Multiplier Effect

The multiplier effect refers to the increase in final income arising from any new injection of demand and the opposite is also true with a withdrawal of demand will lead to a downward multiplier effect.

**Output/Sales:** For every R1 million variation in final demand from agriculture there is R1.45 million downstream variation in output/sales generated across the entire economy.

**Labour Remuneration:** Salaries and wages within the agriculture sector are on average lower than those in the mining sector. As a result, the economy wide impact is lower as workers earn less and can spend less money on goods and services than those in the mining sector. For every R1 million variation in final demand, labour remuneration either loses or gains R170 000.

**Employment:** A total of 17.5 employment opportunities are created within the formal and informal sectors across the entire economy due to a R1 million demand in agriculture. The

[9] Evaluating the Impact of Coal Mining on Agriculture in the Delmas, Ogies and Leandra Districts – With a Specific Focus on Maize Production, 2012

reverse is also true, with a loss in 17.5 employment opportunities across the economy if there is a R1 million decrease in agriculture production.

Table 5.9 summarises the multiplier effect of agriculture in the Mpumalanga province.

**Table 5.9: Multiplier effect for Agriculture**

| Description | Economy Wide Impact |
|---|---|
| **Implication of R1 million demand** | |
| Output/Sales | Generates R1.45 million in sales |
| Labour Remuneration | Lower salaries/wages compared to coal mining |
| Employment | Create 17.5 employment opportunities |

*Source: Quantec, South Africa Multipliers (SARB)*

It is worthy to note that the R1.45 million generated in sales, are of the highest all of provinces in South Africa.

- **Project Specific Impact:**

The subsequent table indicates the anticipated economic impacts (direct, indirect and induced) that will be **lost** during the operational phase of the Alexander mine. This is a sustained impact for as long as no production can take place. The consequence of loss production will first be seen on the initial 220 ha. A phased impact might be seen on the remaining 7 080 ha, as the effect of mining increases over time.

*Operational Phase (Best case scenario)*

The economy wide impact by the loss in saleable goods from Agriculture on the 220 ha is illustrated in Table 5.10.

**Table 5.10: Economic Impacts for Yearly Production Loss (220 ha)**

| VARIABLE | YEARLY SALES LOSS | TOTAL IMPACT |
|---|---|---|
| Additional Sales/Output | R8.62 million | R12.5 million |
| Additional GGP | | R5.6 million |
| Additional Employment | | 100 |

*Source: Demacon Economic Impact Model, 2016*
*Note: The sales loss is calculated as the net farm income for the Alexander site*

Table 5.10 illustrates that the loss of an estimated annual sales value of R8.6 million, will result in a loss of R12.5 million new business sales, R5.6 million in additional GGP, as well as 100 sustained employment opportunities. Total impact includes direct, indirect as well as induced effects.

*Operational Phase (Worst case scenario)*

The economy wide impact by the loss in saleable goods from Agriculture on the 7 300 ha is illustrated in Table 5.11.

**Table 5.11: Economic Impacts for Yearly Production Loss (7 300 ha)**

| VARIABLE | YEARLY SALES LOSS | TOTAL IMPACT |
|---|---|---|
| Additional Sales/Output | R285.99 million | R375.8 million |
| Additional GGP | | R174.8 million |
| Additional Employment | | 3 200 |

*Source: Demacon Economic Impact Model, 2016*
*Note: The sales loss is calculated as the net farm income for the Alexander site*

Table 5.11 illustrates that the loss of an estimated annual sales value of R285.99 million, will result in a loss of R375.8 million new business sales, R174.8 million in additional GGP, as

well as 3 200 sustained employment opportunities. Total impact includes direct, indirect as well as induced effects.

## 5.4 SYNTHESIS

The multiplier effect indicates the impact that an increase or decrease in demand has for the three sectors affected by the mining development. The following table shows value and impact of each activity in the national economy. The subsequent table indicates the anticipated ***sustained economic impacts*** (direct, indirect and induced) that will result during the operational phase of the Alexander mine, until closure.

**Table 5.12: Summary of Multiplier Effect and Value within the National Economy**

| Description | Agriculture | | Closure of Elders Colliery | Mining at Alexander Mine |
|---|---|---|---|---|
| | Built up area (Best case scenario) | Total mining area (Worst case scenario) | | |
| Annual Sales | R8.6 million | R285.99 million | R113.8 million | R2.7 billion |
| Output/Sales | R11.3 million | R375.8 million | R145.9 million | R3.5 billion |
| Gross Geographic Product | R5.3 million | R174.8 million | R90.6 million | R2.2 billion |
| Labour Remuneration | Lower salaries/wages compared to coal mining | Lower salaries/wages compared to coal mining | Higher salaries/wages compared to agriculture | Higher salaries/wages compared to agriculture |
| Employment | 100 | 3 200 | 200 | 5 000 |
| Time frame of activity | Continued | In perpetuity | 5 years | 35 years |

*Source: Quantec, South Africa Multipliers (SARB)*

The value of mining to output/sales, GGP and employment is higher than agriculture, but this is an activity that is dependent on local resources and once the resources are depleted the activity seize. In contrast the agriculture has a lower economic contribution, but it has a longer life span. The following, therefore, summarises the total impact:

- ✓ The **sales generated** by the mine for the 35 year period, totals R94.5 billion, whilst the total sales generated by agriculture (in perpetuity) amounts to R28.6 billion.
- ✓ The **output generated** by the mine totals R122.5 billion, whilst the total additional output generated by agriculture amounts to R37.6 billion.
- ✓ The **additional GGP created** by the mine totals R77.0 billion, whilst the total additional GGP created by agriculture amounts to R17.5 billion.

# CHAPTER 6: QUALITATIVE IMPACT ASSESSMENT

## 6.1 INTRODUCTION

Based on the assessment of the Alexander mine a set of key impacts were identified, some positive and some negative, of which most cannot easily be evaluated in terms of quantitative measures. This section focuses on providing a qualitative assessment of these variables.

## 6.2 IMPACT ASSESSMENT TABLES

The evaluation of impacts is conducted in terms of the criteria detailed in Table 6.1 to Table 6.7. The various environmental impacts and benefits of this project will be discussed in terms of the status, extent, duration, probability, and magnitude of the impact. Finally, an accumulative impact and significance rating is applied to rate each identified impact in terms of its overall magnitude and significance (Table 6.8).

In order to adequately assess and evaluate the impacts and benefits associated with the project it was necessary to develop a methodology that would scientifically achieve this and to reduce the subjectivity involved in making such evaluations. For informed decision making it is necessary to assess all legal requirements and clearly defined criteria in order to accurately determine the significance of the predicted impact or benefit on the surrounding natural and social environment.

The nature or status of the impact is determined by the conditions of the environment prior to construction and operation. A discussion on the status of the impact will include a description of what causes the effect, what will be affected and how it will be affected. The status of the impact can be described as negative, positive or neutral.

**Table 6.1: Status of Impact**

| RATING | DESCRIPTION | QUANTITATIVE RATING |
|---|---|---|
| Positive | A benefit to the environment. | + |
| Neutral | No cost or benefit to the environment. | N |
| Negative | A cost to the environment. | - |

**Table 6.2: Extent of Impact**

| RATING | DESCRIPTION | QUANTITATIVE RATING |
|---|---|---|
| Low | Site Specific; Occurs within the site boundary. | 1 |
| Medium - Low | Local; Extends beyond the site boundary; extending only as far as local community or urban area | 2 |
| Medium | Provincial / Regional; Extends far beyond the site boundary; Widespread effect | 3 |
| Medium - High | National i.e. South Africa | 4 |
| Very High | Across International Borders | 5 |

The duration of the impact refers to the time scale of the impact or benefit.

**Table 6.3: Duration of Impact**

| RATING | DESCRIPTION | QUANTITATIVE RATING |
|---|---|---|
| Low | Immediate (less than a year) | 1 |
| Medium - Low | Short term (1-5 years) | 2 |
| Medium | Medium term (6-15 years) | 3 |
| Medium - High | Long term (the impact will cease after the operational life of the project) | 4 |
| High | Permanent (no mitigation measures of natural process will reduce the impact after construction) | 5 |

The magnitude or severity of the impact is indicated.

**Table 6.4: Magnitude of Impact**

| RATING | DESCRIPTION | QUANTITATIVE RATING |
|---|---|---|
| None | Where the aspect will have no impact on the environment | 0 |
| Minor | Where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected | 1 |
| Low | Where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected | 2 |
| Moderate | Where the impact affects the environment in such a way that natural, cultural and social functions and processes continue albeit in a modified way | 3 |
| High | Where the impact affects the environment in such a way that natural, cultural and social functions and processes are altered to the extent that it will temporarily cease | 4 |
| Very high / don't know | Where the impact affects the environment in such a way that natural, cultural and social functions and processes are altered to the extent that it will permanently cease | 5 |

The probability of the impact describes the likelihood of the impact actually occurring.

**Table 6.5: Probability of Impact**

| RATING | DESCRIPTION | QUANTITATIVE RATING |
|---|---|---|
| None | Impact will not occur | 0 |
| Improbable | The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures | 1 |
| Low Probability | There is a possibility that the impact will occur | 2 |
| Medium Probable | The impact may occur | 3 |
| Highly Probable | It is expected that the impact will occur; Chance of occurrence. | 4 |
| Definite | Impact will occur regardless of any prevention measures | 5 |

The impact of the development is considered together with additional developments of the same or similar nature and magnitude.

**Table 6.6: Cumulative Impact**

| RATING | DESCRIPTION | QUANTITATIVE RATING |
|---|---|---|
| Negligible | The net effect is the same as the single development | 1 |
| Marginal | The impact of two developments of a similar nature is less than twice the impact of a single development. This implies it is better to place the two developments in the same environment rather than in separate environments. | 2 |
| Compounding | The impact of two developments is more than twice the impact of two single developments. This implies that it is better to split the two developments into separate environments | 3 |

The impact magnitude and significance rating is utilised to rate each identified impact in terms of its overall magnitude and significance.

**Table 6.7: Impact Significance Rating**

| IMPACT | RATING | DESCRIPTION | QUANTITATIVE RATING |
|---|---|---|---|
| **Negligible** | No Impact | The impact has no impact or the impact is unknown | 0 |
| **Negative / Positive** | Low | The impact does not have a direct influence on the decision to develop the area | Up to 15 |
| | Low-Medium | The impact has an influence but the impact can be mitigated | 16 - 30 |
| | Medium | The impact could influence the decision to develop in the area unless it is effectively mitigated | 31 - 45 |
| | Medium-High | The impact will have a direct influence on the decision to develop but there are means of mitigating the impact although these may be difficult as well as expensive | 46 – 60 |
| | High | Where the impact must have an influence on the decision to proceed to develop in the area | Above 60 |

Table 6.8 summarises the findings of the qualitative impact assessment for the Alexander mine. Mining is a historic reality in the sub-region and the effect on property prices have been discounted. Since the area has an established mining as well as an agricultural sector, the new mine should not affect property prices in the area and as such the effect was not discussed below.

**Table 6.8: Impact Table – Alexander Mine**

| THEME | SPECIFIC IMPACT | STATUS OF IMPACT | IMPACT SIGNIFICANCE PRIOR TO MITIGATION | | | | | DESCRIPTION & MITIGATION MEASURES | IMPACT SIGNIFICANCE POST MITIGATION |
|---|---|---|---|---|---|---|---|---|---|
| | | | EXTENT | DURATION | MAGNITUDE | PROBABILITY | SIGNIFICANCE | | |
| **PRE-CONSTRUCTION (Planning and Site Establishment)** | | | | | | | | | |
| Mining | Employment | + | 2 | 2 | 2 | 4 | 20 (low-medium) | • Due to no to low personal income and a lack in housing supply, squatting might increase near the mine due to the perception of work. Demand for subsidy and low cost rentals is expected to increase within the local economy<br>• Construction activity is dominated by semi-and unskilled labour. The education level in the study area illustrate that there is abundant supply in semi-and unskilled employment. Local employment should as far possible be used for construction | Low – Medium |
| | Production | + | 2 | 2 | 3 | 5 | 16 (low-medium) | • The economic value of the mining construction is a temporary injection of economic activity in the construction sector<br>• Demand for goods and services that forms part of the construction process would increase (locally and regionally, depending on the suppliers)<br>• Goods and services should as far possible be procured locally | Medium |
| Agriculture | Employment | - | 2 | 2 | 2 | 4 | 40 (Medium) | • The impact on farmworkers will be minimal pre construction | Low |
| | Production | - | 2 | 2 | 2 | 4 | 35 (Medium) | • Agricultural activity will cease on the construction areas. The impacts will be localised within the site boundary | Low - Medium |
| **CONSTRUCTION PHASE** | | | | | | | | | |
| Mining | Employment | + | 3 | 2 | 2 | 5 | 40 (Medium) | • During the construction period of the expansion, new employment opportunities are created.<br>• The local workforce should be employed as far possible<br>• Construction activity will create new employment opportunities, albeit in the short term, within the local economy | Medium-High |
| | Production | + | 3 | 2 | 3 | 5 | 30 (Low-medium) | • The economic value of the mining construction is a temporary injection of economic activity in the construction sector | Medium-High |

| THEME | SPECIFIC IMPACT | STATUS OF IMPACT | IMPACT SIGNIFICANCE PRIOR TO MITIGATION | | | | | DESCRIPTION & MITIGATION MEASURES | IMPACT SIGNIFICANCE POST MITIGATION |
|---|---|---|---|---|---|---|---|---|---|
| | | | EXTENT | DURATION | MAGNITUDE | PROBABILITY | SIGNIFICANCE | | |
| | | | | | | | | • Demand for goods and services that forms part of the construction process would increase (locally and regionally, depending on the suppliers)<br>• Goods and services should as far possible be procured locally | |
| Agriculture | Employment | - | 2 | 2 | 2 | 4 | 40 (Medium) | • Farmworkers might decide to rather work in construction due to larger salaries | Low |
| | Production | - | 2 | 2 | 2 | 4 | 40 (Medium) | • Agricultural activity will cease on the construction areas. The impacts will be localised within the site boundary | Medium |
| **OPERATIONAL PHASE** | | | | | | | | | |
| Mining | Employment | N | 2 | 4 | 1 | 5 | 10 (Low) | • The development of Alexander mine is expected to employ no additional people. No mitigation needed | Medium-High |
| | Production | N | 1 | 4 | 1 | 5 | 10 (Low) | • The mine activity will create no additional GVA | Medium-High |
| Agriculture | Employment | - | 3 | 5 | 5 | 4 | 40 (Medium) | • Agricultural activity will cease on the built up areas and on the whole mine area on the long term. The impacts will be localised within the site boundary | Low |
| | Production | - | 3 | 5 | 5 | 4 | 50 (Medium-high) | • Agricultural activity will cease on the construction areas. The impacts will be localised within the site boundary | High |
| **DECOMMISSIONING PHASE** | | | | | | | | | |
| Mining | Employment | - | 3 | 3 | 4 | 5 | 55 (Medium-high) | • The decommissioning will have an impact on employment as people will have to find other work<br>• Efforts should be made to diversify the local economy to reduce the dependence on the mining sector. Once the mining operations are finished the sudden impact of employment loss from mining could be absorbed if the local economy diversify | Medium-High |
| | Production | + | 3 | 3 | 4 | 5 | 55 (Medium-high) | • The local economy is currently expanding with continued growth in demand for various land uses, mainly driven by the mining sector. Once the mining activities reduce with mine closures the impact is expected to be high. The | Medium-High |

| THEME | SPECIFIC IMPACT | STATUS OF IMPACT | IMPACT SIGNIFICANCE PRIOR TO MITIGATION | | | | | DESCRIPTION & MITIGATION MEASURES | IMPACT SIGNIFICANCE POST MITIGATION |
|---|---|---|---|---|---|---|---|---|---|
| | | | EXTENT | DURATION | MAGNITUDE | PROBABILITY | SIGNIFICANCE | | |
| | | | | | | | | local municipality should already be made aware of this possible impact and initiate local development initiatives to minimise the impact of mine closures. | |
| Agriculture | Employment | - | 3 | 3 | 3 | 4 | 40 (Medium) | • Agricultural activity will not be able to continue to the full extent as before and limited employment opportunities will be created | Low |
| | Production | - | 3 | 3 | 4 | 4 | 50 (Medium-high) | • Experience indicates that serious subsidence will only occur after between 100 and 120 years. As the old, closed sections age, mass subsidence may occur due to pillar runs and the collapse of whole areas. A truism is that all underground excavations will collapse over time and pillars will spall. Where these excavations are near surface, ratholing and subsidence will follow. | High |

*Source: Demacon, 2016*