



**ENVIRONMENTAL IMPACT ASSESSMENT
FOR THE PROPOSED PALMIETKUILEN
MINING PROJECT NEAR SPRINGS,
GAUTENG**

ECONOMIC IMPACT STUDY

FINAL REPORT

FEBRUARY 2017



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ACRONYMS AND ABBREVIATIONS

DM	District Municipality
DTI	Department of Trade and Industry
EIA	Economic Impact Assessment
GDP	Gross Domestic Product
GDP-R	Gross Domestic Product per Region
GDS	Growth and Development Strategy
GEGDS	Gauteng Employment and Growth and Development Strategy
IDC	Industrial Development Corporation
IDP	Integrated Development Plan
IPAP	Industrial Policy Action Plan
IRP	Integrated Resource Plan
KPA	Key Performance Area
LED	Local Economic Development
LM	Local Municipality
MW	Mega Watts
NDP	National Development Plan
NGP	New Growth Path
SDF	Spatial Development Framework
SLP	Social and Labour Plan

1 INTRODUCTION

This document is prepared by Urban-Econ Development Economists, in request by Digby Wells Environmental (Pty) Ltd on behalf of Canyon Coal (Pty) Ltd to undertake an Economic Impact Study for the proposed Palmietkuilen Mining Project near Springs. The Economic Impact Study is conducted as part of the Environmental Impact Assessment (EIA) process managed by Digby Wells Environmental (Pty) Ltd.

1.1 Brief Description of the Project

The establishment of a new open-pit coal mining operation is proposed. The lifespan of the coal mine is estimated to be for a period of 53 years. It is envisaged that 2 400 000 tonnes of coal will be produced annually to supply to domestic and international markets. The mine will comprise of the following site infrastructure:

- Access and haul roads
- Office blocks
- Workshops
- A coal processing plant including a filter press
- Stockpile areas
- Pollution control dam
- Slurry dams
- Storm water trenches and berms and
- A future development area (to be confirmed)

The development of the open pit will result in the establishment of topsoil, subsoil and overburden stockpiles. The succeeding process includes the storage of the extracted coal on a Run of Mine (ROM) stockpile before being inserted into a processing plant on site, which will crush and screen the coal. The coal product will then be stockpiled on the product stockpile and thereafter, transported by truck to the Welgedacht Siding located approximately 2km from the proposed project area. The Welgedacht Siding is connected to the major rail networks in the area and coal will be transported from there to the relevant markets. A pollution control dam will also be constructed for mine affected water; in addition, a slurry dam is planned to be added to a Filter Press Plant to extract coal fines to convert into coal “cakes”, which will also be sold as product.

Map 1-1 indicates the location for the planned open pit coal mine. The proposed coal mine is located on Farm Palmietkuilen 241, Portions 1, 2, 4, 9, 13 & 19. It falls within the Lesedi Local Municipality (LM),

which is a part of the Sedibeng District Municipality (DM) in the Gauteng Province. The proposed project area also borders with the Ekurhuleni Metropolitan Municipality in Gauteng and with the Victor Khanye Local Municipality located in the Mpumalanga Province.



Map 1-1: Palmietkuilen Coal Mine Site Locality Map

1.2 Scope and Purpose of the Study

The economic impact assessment contains information that together with other specialists, allows assessment of the project from a sustainable development perspective and assists in identifying “the most practicable environmental option” that provides the “most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society”, in the long-term and the short-term. In light of the above and in line with the Environmental Impact Assessment (EIA) Regulations of 2014, the purpose of the socio-economic impact assessment is to assess the need and desirability of the project. It specifically aims to ensure that the project, if approved, provides for justifiable economic development outcomes. As such, it aims to:

- identify, predict and evaluate geographical and economic aspects of the environment that may be affected by the project activities and associated infrastructure
- advise on the alternatives that best avoid negative impacts or allow to manage and minimise them to acceptable levels, while optimising positive effects

The specific objectives of the study include:

- Engage with the environmental practitioner, other specialists on the team, and the client to gain necessary background on the project

- Delineate the zone of influence taking cognisance of the potential environmental affects determined by other specialists on the team
- Determine the affected communities and economies located in the zone of influence and identify sensitive receptors within the delineated study area, i.e. land uses and economic activities that could be directly or indirectly negatively affected by the proposed project or benefit from it
- Review secondary data and assess data gaps
- Collect primary economic data of the parties that may be directly or indirectly be affected (positively or negatively) by the proposed project to address data gaps
- Identify, predict and evaluate the potential positive and negative economic impacts associated with the project following the environmental specialist's methodology
- Develop a mitigation plan by proposing mitigation measures for the predicted negative economic effects and enhancement measures for positive economic impacts

1.3 Methodology

The following methodology was followed in completing the study:

1. **Orientation:** The study started with gaining an understanding of the proposed project during various stages of its lifecycle and potentially affected environment. A review of various data and maps provided for the project, as well as discussions with the environmental specialist, informed the delineation of the potential zone of influence associated with each component of the project. The delineated zone of influence defined the spatial boundaries of the area to be included in the assessment and assisted in identifying likely impacted and benefitting economic activities, as well as other stakeholders of the project.
2. **Policy alignment review:** Relevant government policies and other strategic documents were gathered and reviewed to determine the alignment of the proposed project with the strategic plans of various government spheres and highlight any potential red flags, if such existed.
3. **Baseline profiling:** Following the policy review, primary and secondary data were gathered to create the socio-economic profile of the delineated zone of influence. The baseline profile assisted in gaining an understanding of the communities and economic activities to be likely affected or benefit from the proposed project. This included description of the study area's composition and locational factors and economic and labour profiles. Specific attention was paid to the economic composition of the area affected by the project's footprint and its potential environmental effects, i.e. visual, noise, air pollution, etc.
4. **Impact analysis and evaluation:** Derived from the review of the project, potential sensitive receptors, and beneficiaries is the list of various negative and positive economic impacts that could ensue as a result of the proposed activity during various stages of its life cycle. All identified economic impacts were analysed, assessed, and categorised in line with the rating provided by the environmental specialist (refer to Annexure A).
5. **Formulation of mitigation and enhancement measures:** Following the analysis and ranking of impacts, mitigation and enhancement measures, where applicable, were formulated whereby

recommendations to reduce or eliminate the potential negative effects on the affected parties and enhance positive impacts were provided.

1.4 Data gathering and consultation process

The project made use of both secondary and primary data.

Secondary data gathering

Secondary data was sourced from the following databases and documents:

- Stats SA Census, 2011
- Quantec Research Standardised Regional Data, 1995-2015
- StatsSA Labour Force Survey, 2014
- Integrated Development Plans (IDP):
 - Sedibeng District Municipality Integrated Development Plan 2016/17
 - Lesedi Local Municipality Draft Integrated Development Plan 2016
 - Nkangala District Municipality Integrated Development Plan 2016/17- 2020/2021
 - Victor Khanye Local Municipality Integrated Development Plan 2011/12 – 2016/17
- Spatial Development Frameworks (SDF):
 - Sedibeng District Municipality Spatial Development Framework 2015
 - Lesedi Local Municipality Review of the Spatial Development Framework 2016
- Provincial strategic documents:
 - The Gauteng Employment Growth and Development Strategy 2009
 - The Gauteng Spatial Development Framework 2011

Primary data gathering

The main purpose of the primary data collection exercise was to gain insight into the economic characteristics of the parties owning and leasing properties on and near the proposed project, as well as gather feedback from municipal officials and real estate agents operating in the area. The primary data gathering exercise focused on engaging with Interested and Affected Parties (I&APs) by means of personal interviews, telephone and e-mail. The data collection took place between 18 October 2016 and 22 November 2016. The following I&APs were interviewed:

Table 1-1: Interviewed IAPs

I&AP	Reason for contacting	Contact person	Means and date of data collection (2016)
Lesedi Local Municipality	Municipal Town Planner- Knowledgeable about SDF	Phiwe Mhlola	In person interview 18 October 2016
Portion 2 and 19 of Farm Palmietkuilen 241	Directly Affected landowner	Brent Parrot	Email interview 19 October 2016
Portion 13 of Farm Palmietkuilen 241	Directly Affected landowner	Brent Parrot	Email interview 19 October 2016
Portion 9 and 10 of Farm Palmietkuilen 241	Directly Affected landowner	Carrol Bouah	Email interview 22 November 2016
Portion 2,5,6 and 8 of Farm Vischkuil 274	Adjacent Property landowners	Naude Rossouw and Chris Rossouw Johan Minaar (Lawyer representing the land owner)	Email interview 20 October 2016; telephonic conversation with Johan Minaar
Portion 26, 33, 39 and 31 of Farm Droogfontein 242	Adjacent Property	Johan Minaar (Lawyer representing the land owner)	Email interview 24 October 2016
Portion 17 of Farm Grootvaly 124	Adjacent Property	Jackie Jacobs and Phyl Jacobs	Telephonic Interview 20 October 2016
Remainder of Farm Daggafontein 125	Adjacent Property	Brent Parrot	Email interview 19 October 2016
Remainder of Rietfontein	Adjacent Property	Mr Harrison	Telephonic Interview 07 November 2016
Portion 21 and 22 of Farm Grootvaly 124	Adjacent Property	Liza Mills	Telephonic Interview 07 November
Real Estate Agents	Property Values Insights	Tobie Truter (Vischkuil) Angela Nish (Endicott) Nici van Wyk (Endicott) Simon Sehlakgwe (Welgedacht)	Telephonic Interview 15 November 2016

1.5 Assumptions, limitations and gaps in knowledge

The following section outlines the key assumptions that form the basis of the assessment and discussions of the study.

- Project-related information supplied by the environmental practitioner and the client for the purpose of the analysis is assumed to be reasonably accurate.
- The secondary data sources used to compile the economic baseline (dynamics of the economy, labour force) although not exhaustive, can be viewed as being indicative of broad trends within the study area.

- Possible impacts, as well as stakeholder responses to these impacts, cannot be predicted with complete accuracy, even when circumstances are similar and these predictions are based on research and years of experience, taking the specific set of circumstance into account.
- It is believed that the data gathered from various I&APs is sufficient to confidently predict the potential economic impacts of the proposed project and objectively evaluate their significance. This is assuming that:
 - Questions asked during the interviews were answered accurately and truthfully by respondents and to the best of their abilities and knowledge.
 - That the attitudes of the respondents towards the project will remain reasonably stable over the short- to medium-term.
- The focus on the primary data collection was on those parties that were perceived to be most sensitive to the proposed project. As such, it is believed that the study was able to identify the most significant impacts and assess the most pertinent issues. However, the following adjacent landowners could not be reached for various reasons stated below.

Table 1-2: IAPs not reached due to various reasons

Farm Portion	Contact Status
Portion 3, 4 and 7 of Farm Vischkuil 274	No contact Information
Portion 1, 4, 6, 25 and 34 of Farm Strydpan 243	Incorrect details provided online
Portion 24 and 25 of Farm Droogfontein 242	Incorrect details provided online
Portion 36 of Farm Droogfontein 242	No contact Information
Portion 10 of Farm Geigerle 238	No contact Information
Portion 32 of Farm Grootvaly 124	No contact Information

Most of the contact details for affected and adjacent landowners were supplied by the environmental specialist. Where contact details were not provided, an online search of the companies and the request of contact details from neighbouring landowners were pursued over a period of two months; however, it resulted in limited success. Where information about the specific land portion was not possible to gather from primary data, other methods to determine the land uses and economic activities undertaken on the specific land portion were employed; these included google earth imagery observations, local community farming data collection from secondary sources, and desktop research.

- It should be noted that details concerning the pertinent adjacent chicken/egg farming activities were not possible to gather due to the fact that their owners, through the appointed lawyer, were not willing to disclose requested information. In order to overcome this data gap, an estimation approach has therefore been applied to approximate the scale of chicken and egg farming taking place on the selected properties. In this context, the following assumptions were made and were used as the basis of the estimated findings:
 - The following farm portions were identified to include chicken/egg farming activities located in the zone of influence of the proposed project:
 - Portion 2 of Farm Vischkuil 274
 - Portion 5 and 6 of Farm Vischkuil 274
 - Portion 8 of Farm Vischkuil 274
 - Portion 39 of Farm Droogfontein 242
 - Portion 33 of Farm Droogfontein 242
 - Google Earth Imagery dated December 2016 were used to determine the number of chicken houses located on each property in question.
 - The rectangular farm structures/buildings observed on each farm on Google Earth are assumed to be layer facilities.
 - It is assumed that layer cage systems are used within each facility, and the production activity conforms to the space requirements for commercial layer type birds kept in cages.
 - Stock density in each building is 22 chickens/m² (SAPA, 2012).
 - Each hen lays one egg per day in a production cycle, which is 72 weeks.
 - Producer price for cage eggs is R13.10/dozen (SAPA, 2016).
 - Employment:
 - Worker: 1 worker per 3 490 to 4 436 hens
 - Supervisor: 1 supervisor per 32 189 to 41 943 hens
 - Manager: 1 manager per 56 836 to 74 100 hens

2 POLICY REVIEW

A policy review plays an integral role in the early stages of a project. The review provides a high-level indication of whether a project is aligned with the goals and aspirations of the developmental policy within a country and at local level. Furthermore, the analysis indicates any red-flag or developmental concerns that could jeopardise the development of the project. This assists in amending and preventing costly and unnecessary delays.

The following government strategic documents applicable to the delineated study areas were examined:

- National (South Africa):
 - New Growth Path Framework (NGPF) (2011)
 - Integrated Resource Plan for Electricity (IRP) 2010-2030: Update Report 2013
 - National Development Plan (NDP) 2030 (2011 – 2030)
 - Industrial Policy Action Plan (IPAP2) (2014/15-2016/17)
 - A Beneficiation Strategy for the Minerals Industry of South Africa 2011
- Regional:
 - The Gauteng Employment Growth and Development Strategy 2009
 - Gauteng Spatial Development Framework 2011
- Local:
 - Sedibeng District Municipality Integrated Development Plan 2016/17
 - Sedibeng District Municipality Spatial Development Framework 2015
 - Sedibeng District Municipality Growth and Development Strategy 2012
 - Lesedi Local Municipality Draft Integrated Development Plan 2016
 - Lesedi Local Municipality Local Economic Development Strategy 2014
 - Lesedi Local Municipality Review of the Spatial Development Framework 2016
 - Nkangala District Municipality Integrated Development Plan 2016/17- 2020/2021
 - Victor Khanye Local Municipality Integrated Development Plan 2011/12 – 2016/17

2.1 Alignment with national and provincial government economic priorities

The National Development Plan 2030 (2011)

The National Development Plan (NDP) 2030 aims to address poverty and exclusion whilst simultaneously nurturing economic growth. To achieve this dual goal, the NDP has noted that government ought to establish an enabling environment for higher levels of public and private investment to create jobs and ensure increasing income levels (National Planning Commission, 2011). In line with these aims, the target for 2030 is an economy that is close to full employment. Particularly, 11 million jobs are targeted to be created by 2030 through raising exports and competitiveness. In the short-term, the economy is expected to create jobs specifically for young and low-skilled South Africans, who dominate the unemployed.

The South African economy has large global shares in group metals, gold, diamonds, manganese, coal, iron ore and uranium. In addition, mining, minerals and secondary beneficiated products account for almost 60% of export revenue. Yet, over the past decade, the mining sector has not been able to match the global growth trend in mineral exports due to poor infrastructure and regulatory and policy frameworks that hinder investment. The NDP thus, proposes to increase mining exports by giving clear certainty over property rights and increasing rail, water, and energy capacity in the country (National Planning Commission, 2011). Lastly, mining companies are explicitly required to participate in local development by means of a Social and Labour Plan (SLP) (National Planning Commission, 2011).

From the above, and considering the knowledge of the proposed mining development, the proposed Palmietkuilen Mining Project is in alignment with the focus areas of the NDP. At the same time, however, the mining sector is perceived as a sector faced with numerous challenges, which hamper it from performing to its optimal potential. The NDP sought to address this.

The New Growth Path Framework (2011)

The vision of the New Growth Path Framework (NGPF) is to ensure that jobs and decent work are at the centre of economic policy (Department of Economic Development, 2011). The key problem issues are mass joblessness, poverty, and inequality. The NGPF, unlike the NDP 2030, views mining as a job creating sector. In fact, one of the job drivers' strategies is to target more labour-absorbing activities across the main economic sectors, of which one is the mining value chain. In line with the strategy, a priority effort is to support employment creation in the mining value chain, towards which the proposed project will be directly contributing. The framework aims to create five million new jobs by 2020. Projections by the Industrial Development Corporation (IDC) suggest that mining can add 140 000 additional jobs by 2020 and 200 000 jobs by 2030, excluding the multiplier effects (Department of Economic Development, 2011). The opportunities for the creation of mining jobs are said to be in coal exports. The proposed project will be supplying coal to the domestic coal-fired power station, and its likely contribution would be to offset some of the jobs that are lost in the coal mines that are currently nearing their lifespan as well as creating additional employment opportunities.

Industrial Policy Action Plan 2016/17-2017/18

As stated in the Industrial Policy and Action Plan (IPAP), 85% of our electricity is generated by coal fired power plants (Department of Trade and Industry, 2016). This indicates high carbon intensity in the South African economy due to the heavy reliance on coal used to generate electricity. The IPAP suggests a carbon tax, to curb coal dependence. The carbon tax aims to change consumer and producer behaviour in an economy. This denotes a reduction in coal consumption as a percentage of total energy consumption. The disadvantage is that a new carbon tax on coal-based electricity would immediately increase Eskom's operating costs, resulting in further increased electricity prices for customers and municipalities once the carbon tax is imposed. The aim of IPAP in its quest to support green industries is to reduce the dependence on coal for electricity generation (Department of Trade and Industry, 2016).

One theme is to strengthen the important economic linkages between the primary agriculture, mining and manufacturing sectors to secure much greater downstream beneficiation and maximise upstream linkages. Along with the Mining Phakisa, ensure that 'Mining cluster' programmes are carried forward expeditiously (Department of Trade and Industry, 2016)

The Integrated Resource Plan for Electricity 2010-2030 (2011)

The Integrated Resource Plan for Electricity (IRP) promulgated in 2011 makes a call for an analysis of the potential extension of Eskom's existing fleet (DoE, 2013). The alternatives considered for this extension include the establishment of new and more efficient coal-fired generation capacities with lower emission rates. In addition, non-emitting alternatives under more aggressive climate mitigation objectives will be considered. By the end of 2030, the life extension would have retained the existing coal fleet at 36 230MW, while new coal would contribute 2 450MW of electricity generating capacity. Moreover, a new set of fluidised bed combustion coal generators are proposed to be launched for a total of 1 000 to 1 500MW capacity (DoE, 2013). The recommendation is for these to be based on discard coal. From the IRP 2011, it can be deduced that the relevance of coal will continue and is key for future planned electricity generation.

The plan has been revised and is currently undergoing public comment and review by the Parliament before it is promulgated. The IRP 2016 released on 25 November 2016 suggests that coal will continue to play a role in providing energy in the future and specifically for generation of electricity. And although coal-based power plants' contribution towards electricity generation capacity in the country is expected to slowly diminish towards 2050, it can be argued that the coal-fired power station will remain to be significant contributors to the generation of electricity in the country and will therefore still require sustainable supply of coal, towards which the proposed project will also contribute. Thus, it can be suggested that the proposed project is still in alignment with the IRP.

A Beneficiation Strategy for the Minerals Industry of South Africa (2011)

The strategy serves to provide a framework that will enable an orderly development of the country's mineral value chains (Department of Mineral Resources, 2011). Although coal is not a mineral (minerals are inorganic, while coal is made of organic matter), the role of energy in poverty alleviation is noted. The strategy further notes that the world currently relies on coal for 40% of its electricity, while 60% of steel production is dependent on coal. Similar to the South African Coal Roadmap, the strategy argues that coal will continue to play a significant role in meeting energy demand worldwide. Thus, the interventions developed for the optimal value creation of coal are:

- Policy support for the clean and efficient use of coal in power generation
- Policy support for technology transfer
- Investment into research, development and demonstration of new technologies

Gauteng Employment Growth and Development Strategy (2009)

The crux of the economic agenda of the Gauteng Employment and Growth and Development Strategy (GEGDS) is to create decent work through an inclusive growing economy (DED, 2009). The strategy outlines several challenges that are relevant for the proposed coal mine. The economic growth analysis has highlighted that the mining and agricultural sectors are declining. The mining industry singularly shed a third of jobs in the province in 2009. In addition, the GEGDS makes a case that the traditional mining and agriculture can no longer be relied on for sustainable growth in the future.

The GEGDS projects a green economy, where investment in green processes and products takes place and existing resources are utilised in a more efficient and sustainable manner. The outcome perceived is the reduction of the carbon footprint.

Concluding remarks

The above provided review of national and provincial economic development policies and relevant strategies suggests that at a national scale the project is largely in alignment with the strategic government priorities. To ensure energy security in the long-term, a sustainable supply of coal will be required and this will in turn imply development of new coal mines that would allow securing the required coal supply contracts. Furthermore, development of the coal mining industry is one of the means of creating new employment opportunities and offsetting thousands of jobs that have already been lost in the mining sector, particularly in the Gauteng Province. However, the need to reduce carbon intensity of the domestic economy and the provincial economy creates a need to reduce the reliance of economic activities on coal as a primary energy input, and prioritise gas and renewable energy sources to meet the increasing demand of the local industries and economic activities. While that need is pertinent, coal mines will remain to be part of the energy value chain in South Africa for many decades to come. However, any decision to establish a mine would need to be carefully considered and assessed in terms of the needs and desirability of that mine in a specific locality versus its possible establishment somewhere else.

2.2 Alignment with local government economic priorities

Sedibeng District Municipality 2030 Growth and Development Strategy (2012)

The Sedibeng District Municipality 2030 Growth and Development Strategy (GDS) views successful cities as those that demonstrate environmental sustainability and manage environmental impacts cautiously (Sedibeng District Municipality, 2012). This is in line with the understanding that economic success increasingly becomes linked to poor environmental quality. The Sedibeng DM faces serious environmental challenges and thus has placed emphasis on addressing these through its planning and development.

One of the Lekgotla outcomes is the creation of decent employment through inclusive economic growth. In addition, an efficient, competitive and responsive economic infrastructure network is a goal for the district (Sedibeng District Municipality, 2012). In the envisioned growth of the Sedibeng DM, no mention of the mining industry is made. It can be concluded that the proposed mining development is not in the future plans of the DM, however this does not entail that the GDS supports or opposes the development.

Sedibeng Integrated Development Plan 2016-2017 (2016)

According to the Sedibeng Integrated Development Plan (IDP), mining and industrial activities in Springs are major contributing factors to the current state of surface and ground water deterioration. The main pressures on the quality of surface and groundwater resources in the Sedibeng District are mining activities, including physical mining practices and mining effluent released from mine dumps (Sedibeng DM, 2016). Evidently, mining activity is a factor contributing to diminishing water quality in the District Municipality, and is not in the planned future land uses in Sedibeng. At the same time, the IDP emphasises the promotion and development of the agriculture sector (Sedibeng DM, 2016).

Lesedi Local Municipality Integrated Development Plan 2016/17

The Lesedi Local Municipality has the vision that “by 2030, Lesedi Municipality will be a smart, innovative, efficient, people-centred and performance driven municipality providing a safe and healthy living environment and high quality municipal services for its communities” (Lesedi Local Municipality, 2016). The proposed ways to create decent employment and inclusive growth are:

- Faster and sustainable inclusive growth
- More labour-absorbing growth strategy
- Increase competitiveness to raise net exports and grow trade

Mining is said to be a strong productive industry and is one of the sectors that employs the most people. Parallel to the Sedibeng District Municipality's environmental stance, one Key Performance Area (KPA) in the Lesedi LM is the revival of the environment to a green region. The purpose is to promote a healthy and safe environment which supports and creates an environmentally conscious society. The plan further states that development in ecologically sensitive areas is prohibited such as along water courses, water bodies and wetlands. Within the proposed project area, a water body is present and in this light a conflict with the IDP is evident.

Lesedi Local Municipality Local Economic Development Strategy 2014

From a regional economic scale, mining is described as a strong productive industry, as well as agriculture and manufacturing. These industries are said to be extremely important for driving economic growth and development in the entire economy. Nonetheless, there is no development plan for mining in the municipality. Instead, one of the five Development Pillars is Agriculture and Agro-processing (Urban Econ, 2014).

Concluding remarks

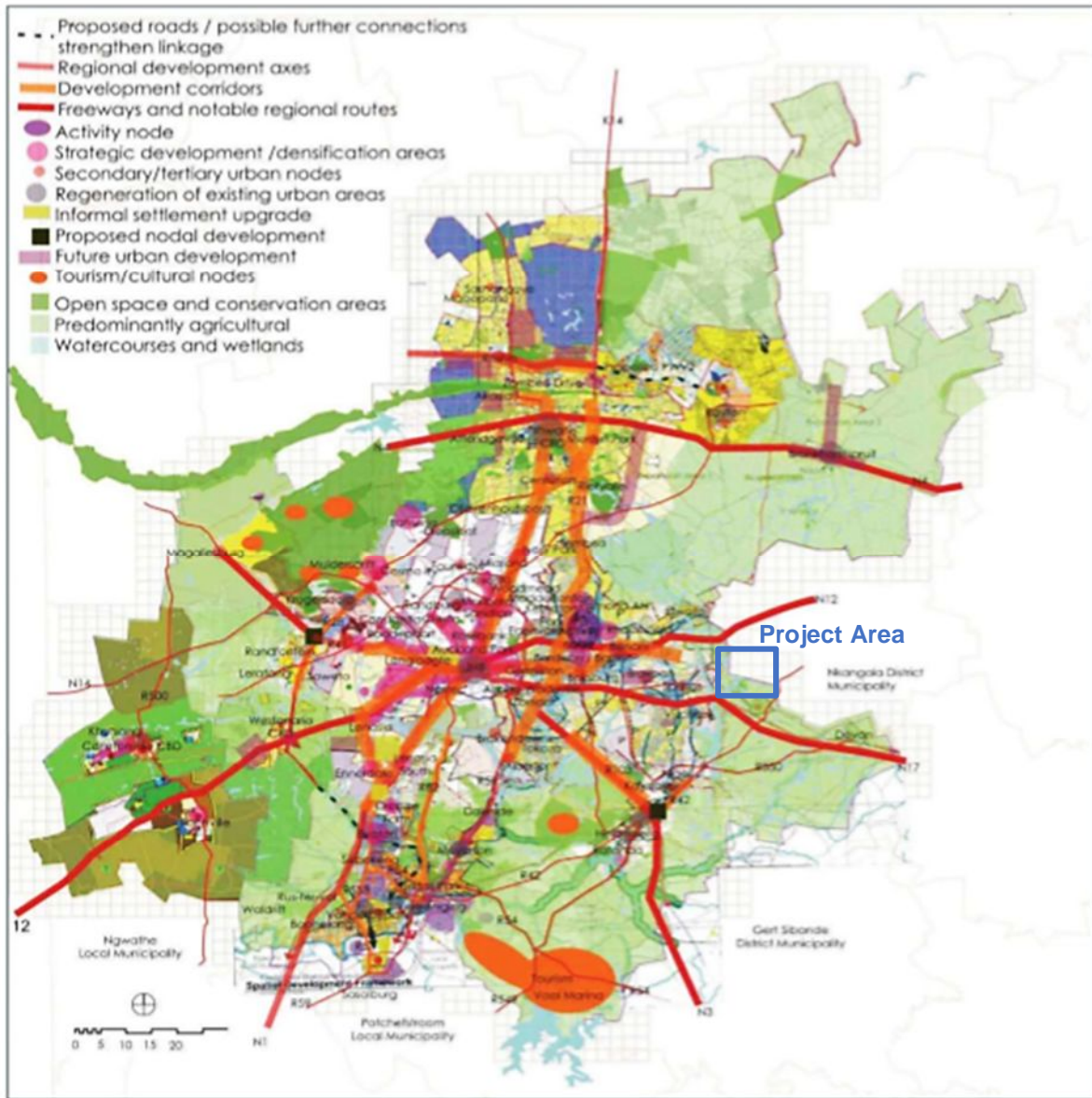
The local government policy review reveals that mining is acknowledged as imperative for growth and development and is a strong sector in terms of production. Yet, none of the local policies and strategies have designated interventions in the mining sector. Instead, strong emphasis is placed on environmental sustainability. The mining sector in this regard is viewed as the contributor to environmental degradation, particularly in terms of water quality.

2.3 Alignment with spatial development visions

Gauteng Spatial Development Framework (2011)

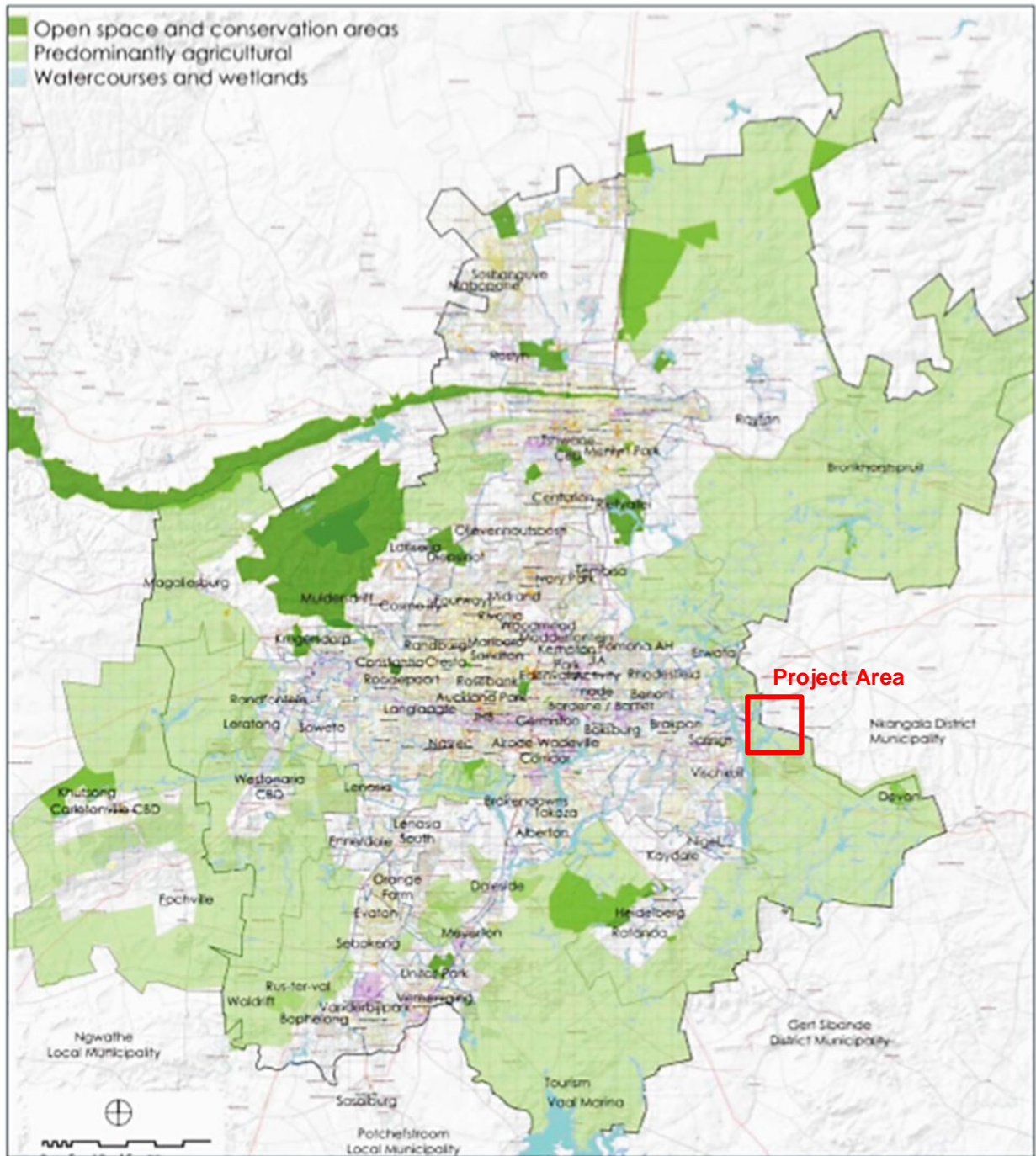
The Gauteng Spatial Development Framework serves as an overarching framework incorporating all local SDFs. The Gauteng City Region aims to develop as a major emerging conurbation based on sustainable principles. The most relevant principle for the proposed coal mine is “significantly reducing present rates of non-renewable energy usage”. This implies that a shift from non-renewable to renewable energy will be spearheaded strongly. Additionally, Gauteng is a mining economic hub. This status may continue as most of the Gauteng provincial extent is to be retained as rural for purposes of agriculture, mining, nature and conservation, water management and recreation.

Map 2-1 indicates that the project area is designated as an open space and is a conservation area.



Map 2-1: Amalgamated Gauteng Local Municipalities' Spatial Development Frameworks (Gauteng SDF, 2011)

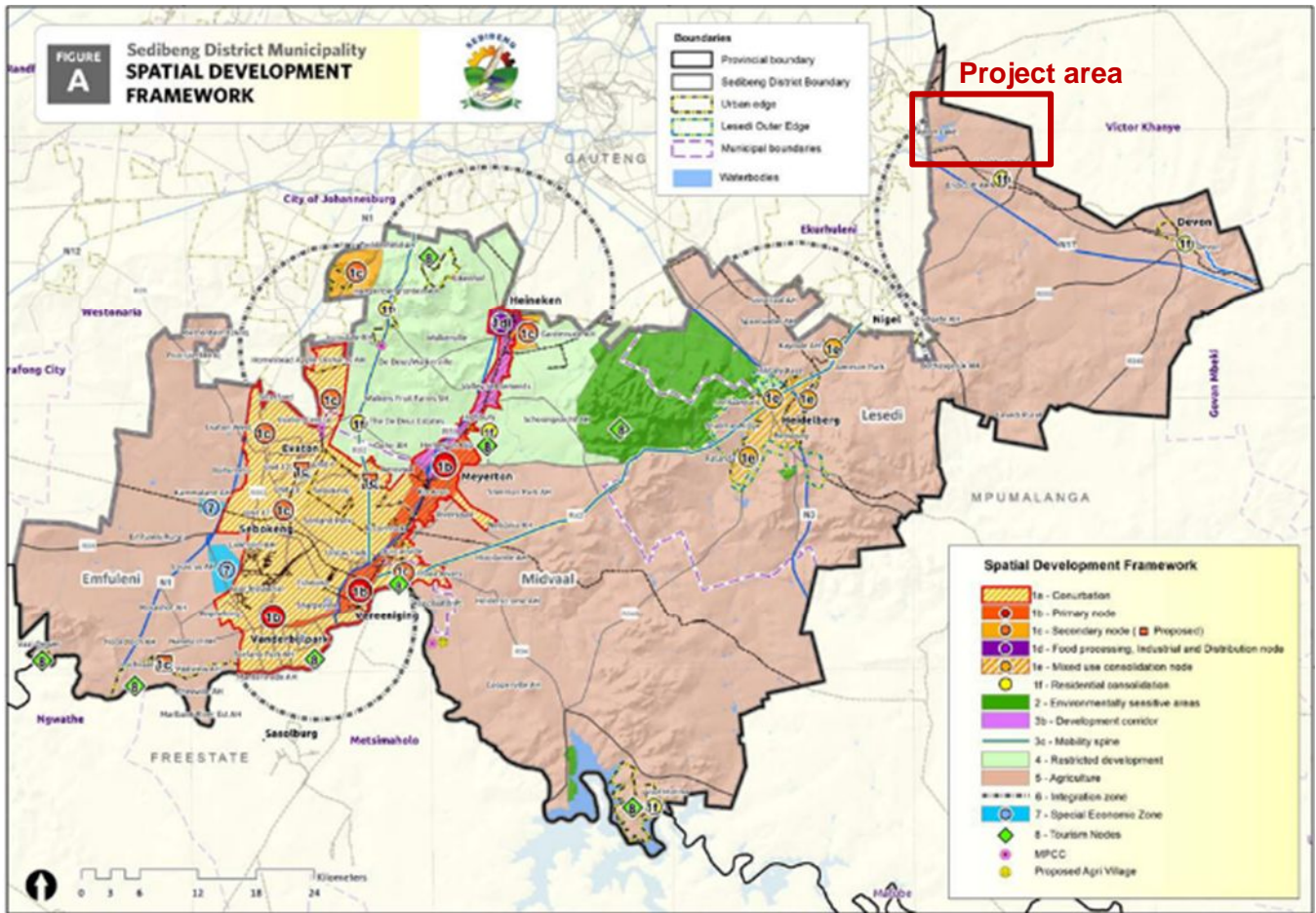
Map 2-2 shows that the project area is predominantly allocated for agricultural activity.



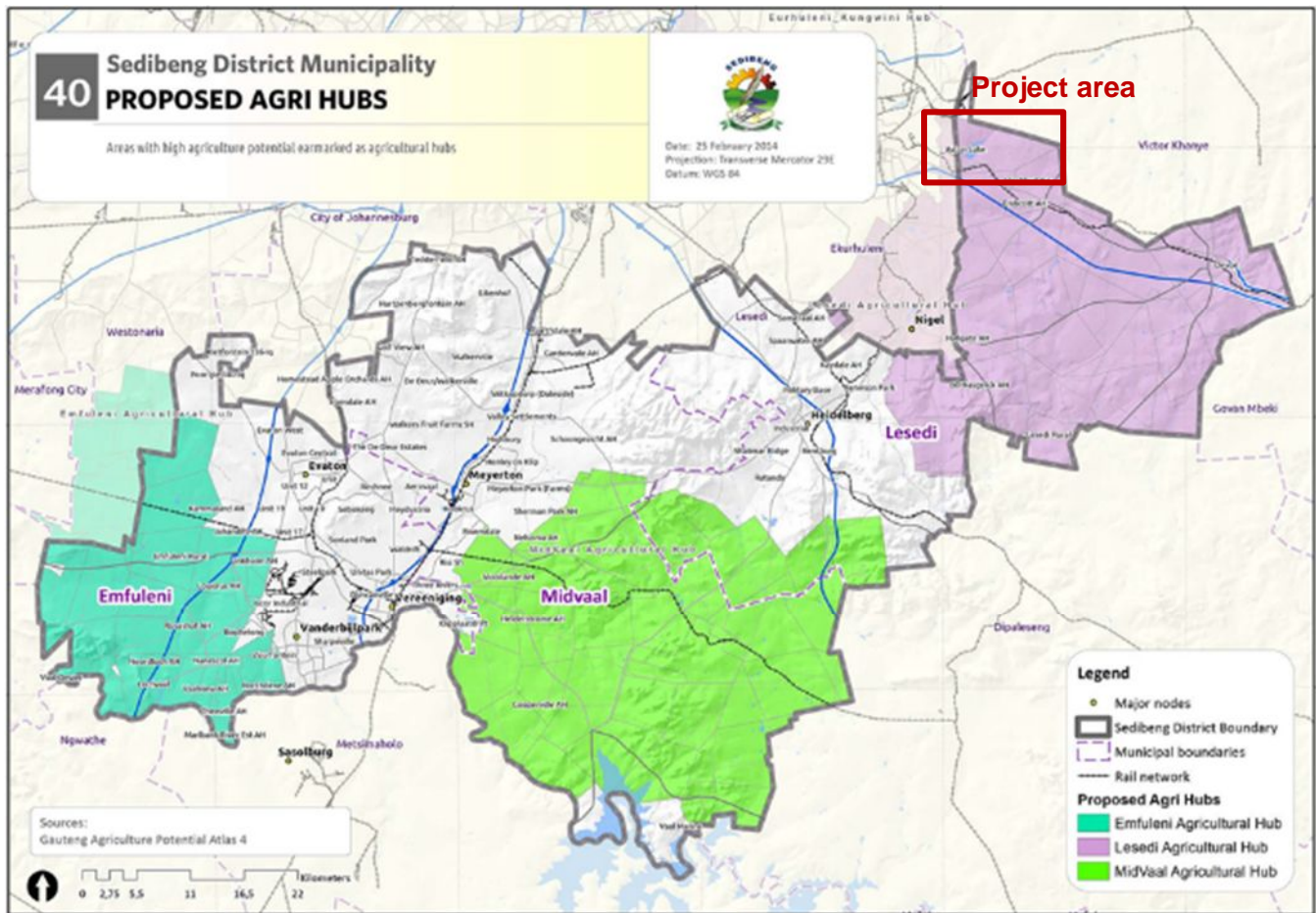
Map 2-2: Amalgamated Gauteng SDF's on Open and Green Spaces (Gauteng SDF, 2011)

Sedibeng District Municipality Spatial Development Framework 2015

The Sedibeng DM is described to be “transitional in nature with isolated towns and wide expanses of agricultural and environmentally sensitive land” (Sedibeng DM, 2016). As illustrated on Map 2-3 below, the area where the proposed project is planned to be located is zoned for agricultural uses. Moreover, as illustrated on Map 2-4, the project site area is situated within the proposed Lesedi Agri-Hub.



Map 2-3: Sedibeng District Municipality Spatial Development Framework (Sedibeng DM, 2016)



Map 2-4: Proposed Agri Hubs (Sedibeng DM, 2016)

The Sedibeng DM Spatial Development Framework states that the purpose of the designated agricultural land is to conserve the high potential agricultural areas and to promote food security. The SDF is clear that the supported land uses in the project area include agriculture, agricultural product beneficiation, agricultural schools, agro-processing, farmers market, commercial farming and related activities. On the contrary, land uses that are not supported are all uses that are incompatible with agricultural activities, which include among others, mining. The proposed coal mine therefore, conflicts with the current objectives of the SDF for the site where the mine is proposed to be developed.

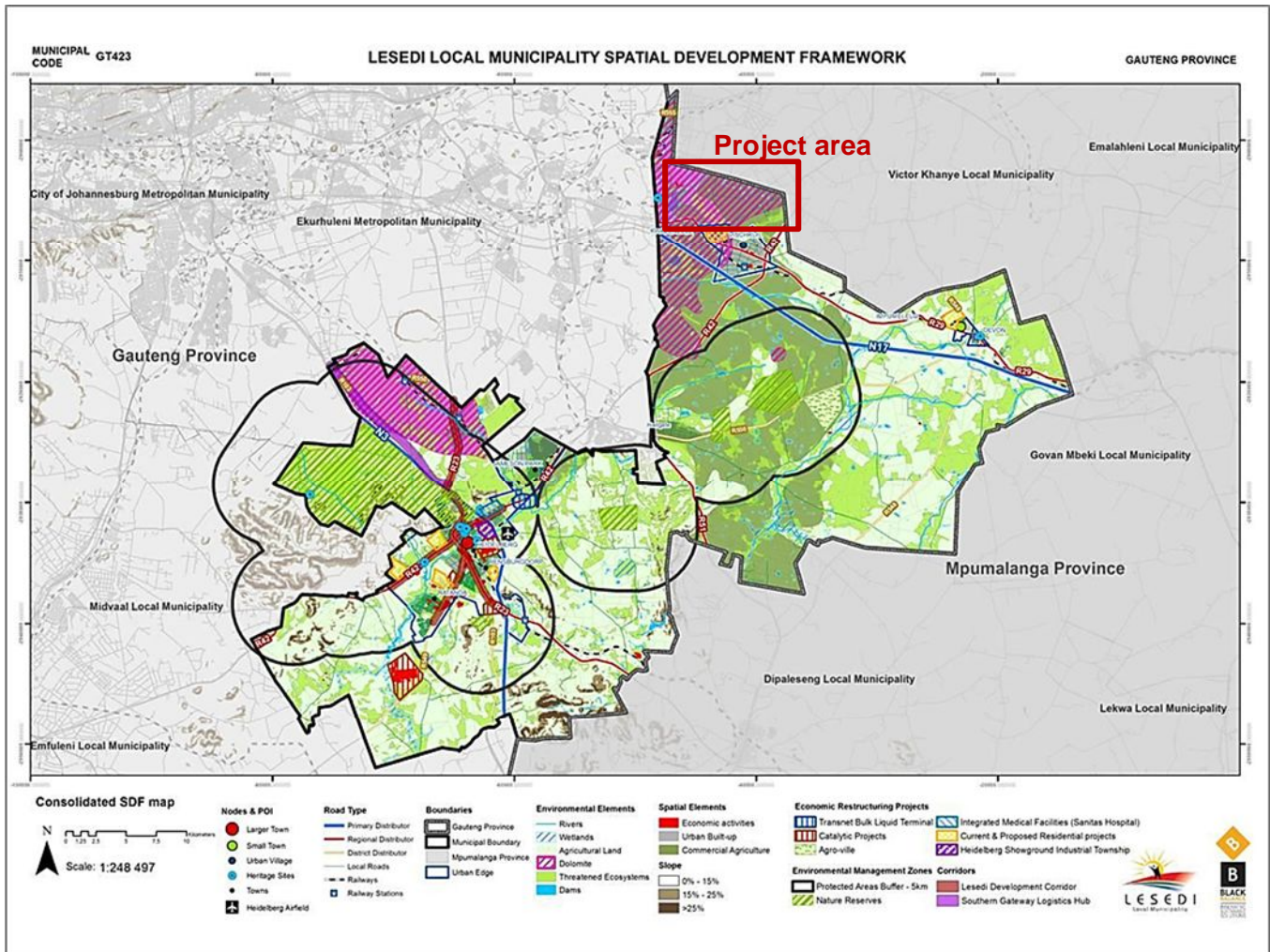
Lesedi Local Municipality Spatial Development Framework 2016

According to the Lesedi Local Municipality SDF, the municipality is primarily a rural area. About 95% of Lesedi's land area is constituted of commercial agricultural land (Black Balance, 2016). At a provincial scale, the LM is a significant food production resource for the Gauteng Province. The LM previously housed gold mining, which was discontinued due to the uneconomic nature of the remaining resources.

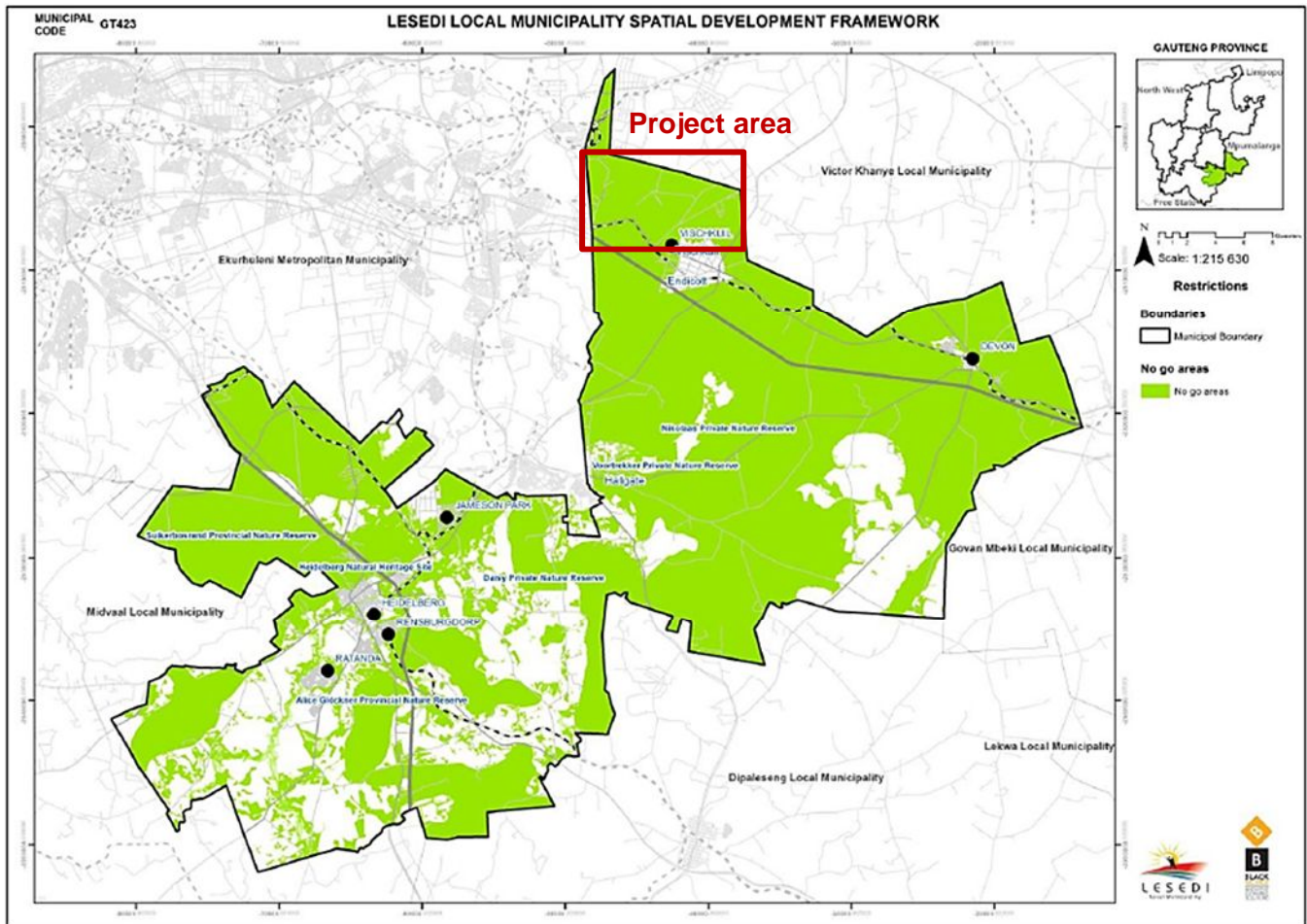
In future, the SDF states that planning and socio-economic development must not be undertaken at the detriment of environmental protection, conservation and management (Black Balance, 2016). The rationale for this is that in the case of Lesedi, the natural environment produces resources, which are the basic inputs to its economic activities.

The project area is situated in a dolomitic area and a portion of the land is zoned for the residential use. The Vischkuil area, less than 2km away from the project area has been earmarked as a densification and nodal area. The future plans for the area are to enhance the business activity and densify through residential and mixed land use development. Nonetheless, agricultural activity will continue to be the key land use promoted in the area under analysis.

As illustrated on Map 2-6, the specific area where the proposed mine is to be established is located in the “no go area”, which is defined as the area within the municipality “that must be carefully considered for any future developmental purposes” (Black Balance, 2016). The main reason for the area being delineated as a “no go area”, is the high potential agricultural land that the project site endowed with (refer to Map 2-7).



Map 2-5: Consolidated SDF for Lesedi (Black Balance, 2016)

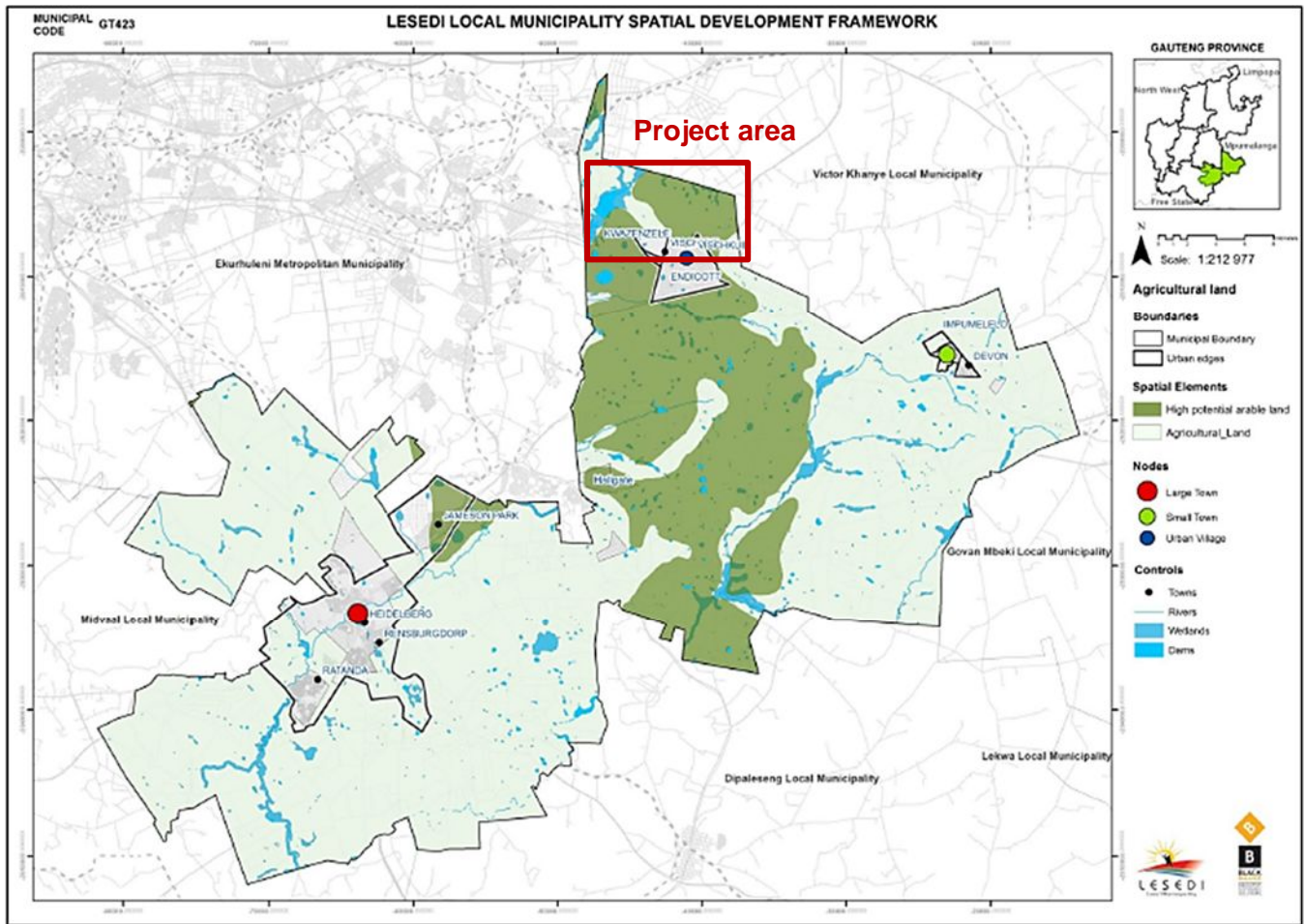


Map 2-6: No go areas in the Lesedi LM as per Lesedi SDF (Black Balance, 2016)

The Lesedi SDF states the following:

“Agricultural land designated as “High Potential Agricultural Land” to be reserved, preferably for large and medium scale commercial agriculture. Any form of land use that does not promote agricultural development or may have negative effect on the productivity of this land should be discouraged within this area, any development with cumulative negative impacts should be discouraged, and management of this area should also be done in accordance with the Land Use Management Guidelines”.

The above suggests that the proposed mining activity is not supported on the site, where the project proposed to be established. It contradicts the designated land use for the area, which is earmarked only for commercial agricultural activities due to its high agricultural land potential, and specifically the availability of high potential arable land on the site.

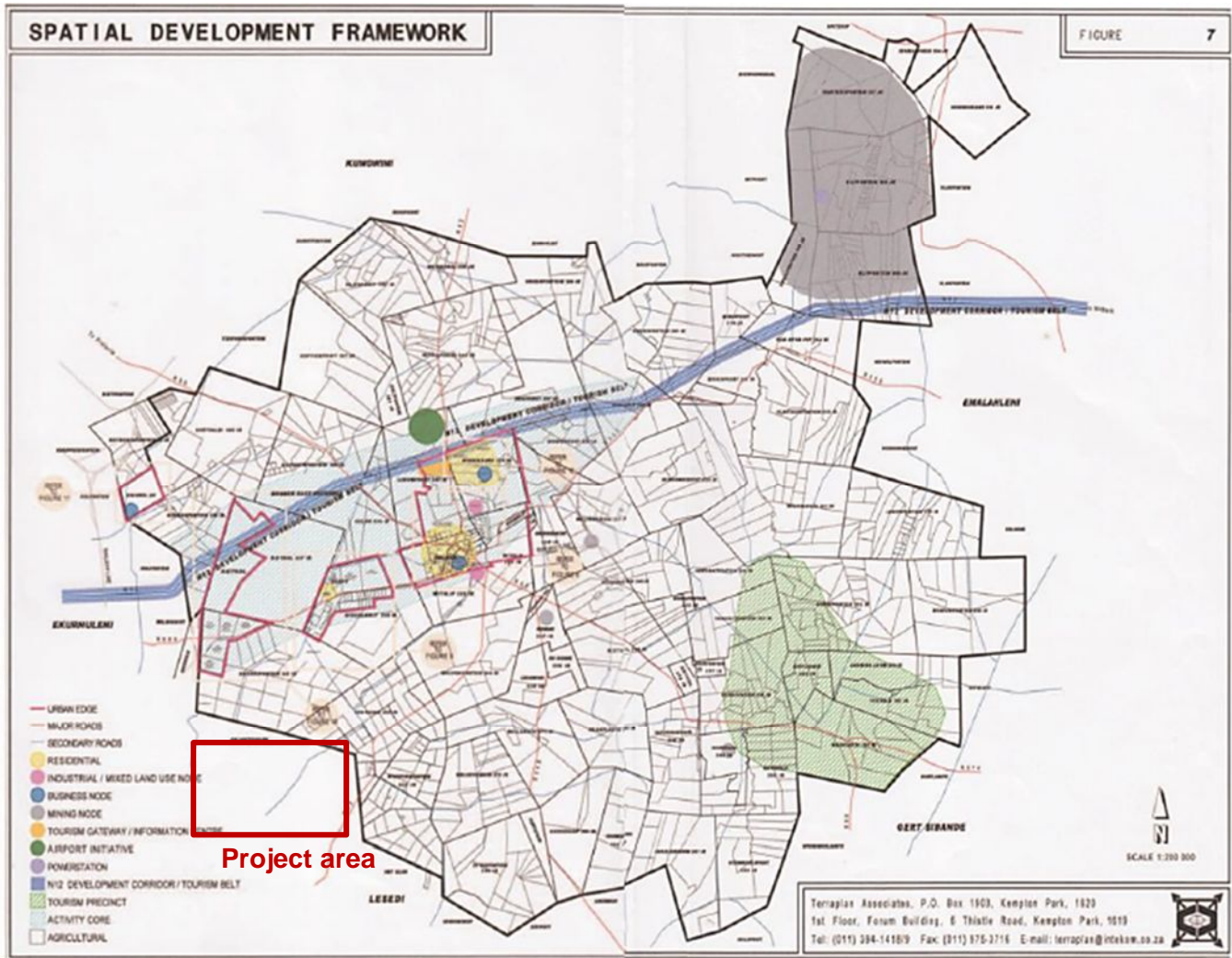


Map 2-7: Agricultural land (Black Balance, 2016)

Victor Khanye Local Municipality Spatial Development Framework

The proposed project site is located at the boundary of two municipalities – Lesedi and Victor Khanye - which are in turn situated in different districts and provinces. The Victor Khanye Local Municipality is part of the Nkangala District Municipality in the Mpumalanga Province (Victor Khanye Local Municipality, 2015). Due to the fact that the mine may exert potential negative environmental impacts in terms of noise, air and visual pollutions, it is important to understand the spatial vision of the area that is located just across the project site on the Victor Kahanye LM’s side.

From the map below, it can be deduced that the area directly adjacent to the project area is designated for agricultural activity. At a larger scale, the Nkangala District Municipality indicates the intention to utilise the area for agricultural activity (Nkangala District Municipality, 2016).



Map 2-8: Spatial Development Framework for Victor Khanye Local Municipality (Victor Khanye LM, 2015)

Concluding remarks

The spatial manifestations of the Integrated Development Plans, which attempt to be coordinated with numerous policies, are reflected in the spatial development frameworks. From the SDFs, it can be concluded that the proposed project contravenes the land use plans envisioned for the project site area. Both the Sedibeng DM and Nkangala DM designated the area, where the mine is proposed to be developed, for agricultural activity; they also emphasise that any activity that will not be able to coincide with the agricultural land uses are not desirable and should be discouraged.

The application for rezoning will need to occur with a strong justification for the requested change in land use. The negative impacts such as environmental degradation and loss of agricultural land will need to be off set. In addition, community buy-in will be salient.

3 BASELINE INFORMATION

This chapter examines the key economic characteristics of the study area. This is essential as it provides both qualitative and quantitative data related to the economies under observation, creating a baseline against which the impacts can be assessed.

3.1 Economic profile of the Lesedi LM

Lesedi economy and its dynamics

Interpretation of economic impacts requires a sound understanding of the size of the economy and its dynamics in the past. Several indicators exist that can describe the economy of a region or an area. The most common variables that are used for the analysis include production and Gross Domestic Product per Region (GDP-R) or Gross Value Added (GVA). The former represents the total value of sales of goods and services, or the turnover of all economic agents in a region; while the latter, using the output approach, means the sum of value added created by all residents within a certain period, which is typically a year. The trend at which the GDP-R has been changing in the past is also referred to as an economic growth indicator. It is a measure of both the performance of an area and the well-being of the citizens of an area.

The Gross Domestic Product per Region (GDP-R) of the Lesedi LM was valued at R7 241 million in 2015 in current prices (Quantec, 2016). The Lesedi economy accounted for 12% of the Sedibeng District Municipality’s Gross Domestic Product (GDP) and contributed 0.6% towards Gauteng’s GDP. Evidently, the Lesedi Local Municipality, at a provincial level, constitutes a relatively small economic production and output.

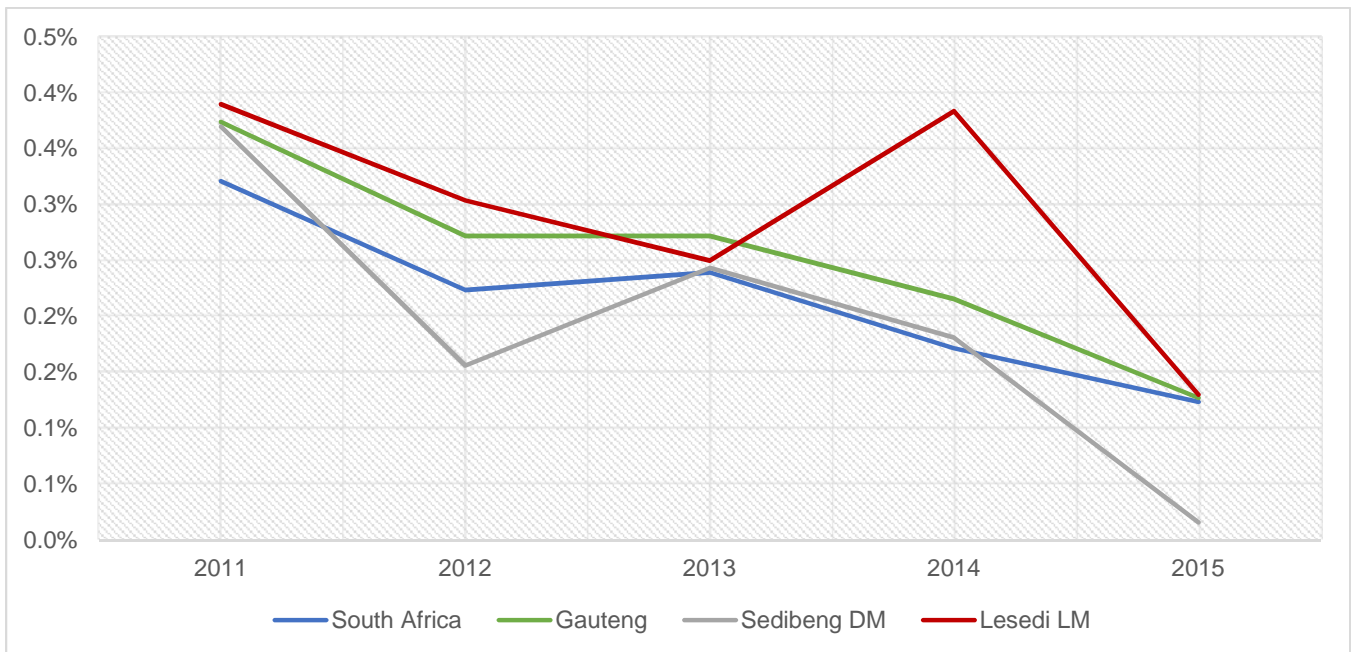


Figure 3-1: GDP-R growth trends for study areas (Urban-Econ Calculations based on Quantec, 2016)

Figure 3-1 above indicates that the Lesedi LM has had an average growth rate of 2.9% between 2011 and 2015. This was higher than the average growth rates observed for the other economies, such as the district, the province and the country, suggesting that the Lesedi economy is more resilient towards exogenous fluctuations and was capable to show far better performance in the challenging domestic and global economic environment observed in the past few years. Nonetheless, similar to the other economies under analysis, it has shown a steady slowdown in economic growth. A further slowdown or stagnation of economic growth is forecast expected for 2016 to 2017 due to the drought and political uncertainties.

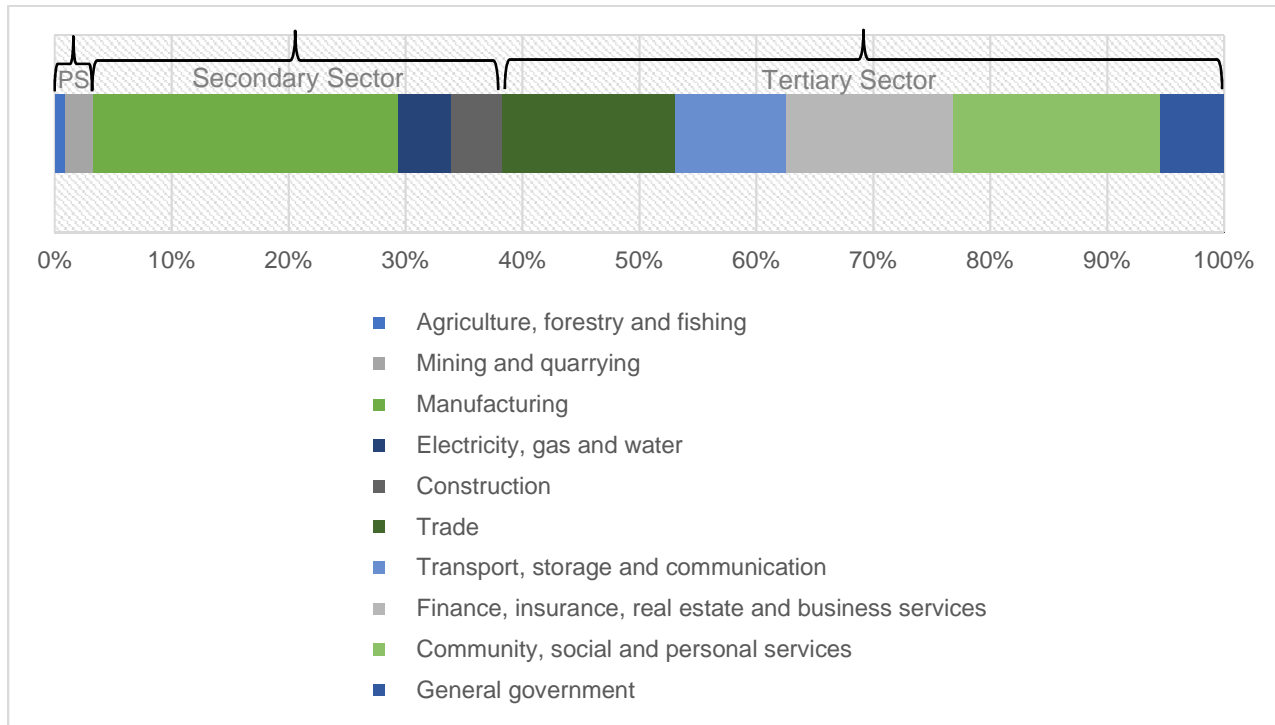


Figure 3-2: Lesedi Local Municipality Economic Sectors Composition (Quantec, 2016)

The Manufacturing Sector, Community, Social and Personal Services and the Trade Sector are the top contributing industries to the GDP in the Lesedi LM. In addition, the tertiary sector has the greatest contribution (62%) to the overall GDP of Lesedi LM. This insinuates that as much as Lesedi is largely considered rural and agricultural, it has progressed and evolved significantly with regard to the secondary and tertiary sectors over time. This is on par with global shifts and transitions across sectors of the economy. The secondary sector constitutes 35% of the municipality's GDP.

All sectors, excluding general government have experienced a decline in GDP between 2014 and 2015. Additionally, all sectors have had fluctuating growth rates over the past five years, with a common trend of the most drastic decline from 2008 due to the global financial and local electricity crisis. Lastly, the general government sector has had the steadiest growth rate over the past four years.

Lesedi labour force and its dynamics

Employment is the primary means by which individuals who are of working age may earn an income that will enable them to provide for their basic needs. As such, employment and unemployment rates are important indicators of economic well-being. Employment figures further serve as indicators of labour market performance. This, additionally, provides information pertaining to economic sectors and their respective labour absorption. The following paragraphs examine the study area's labour force and dynamics.

Table 3-1: Labour Statistics

Indicators	South Africa	Gauteng	Sedibeng DM	Lesedi LM
Total Population	51770562	12272264	916485	99519
Working Age Population	33919109	310407	637320	68274
Employed	13254829	4481719	272706	31764
Formal	9772038	3416349	206129	22755
Informal	1640933	408178	26427	3527
Unemployed	5586624	1592928	126921	10940

(Stats SA, 2011)

In 2011, 65.5% of South Africans were of working age. Similarly, 68% of Lesedi LM residents were of working age. Just under half of the working age population of the Lesedi LM was employed, and the majority of these were working in the formal sector. At the same time, on a local level, 16% of the working age population are unemployed whereas on a provincial and national level, the unemployment rates were 18% and 25%, respectively (Stats SA, 2011). The above suggests that the employment situation in the Lesedi LM was on average better than that in the province or nationwide.

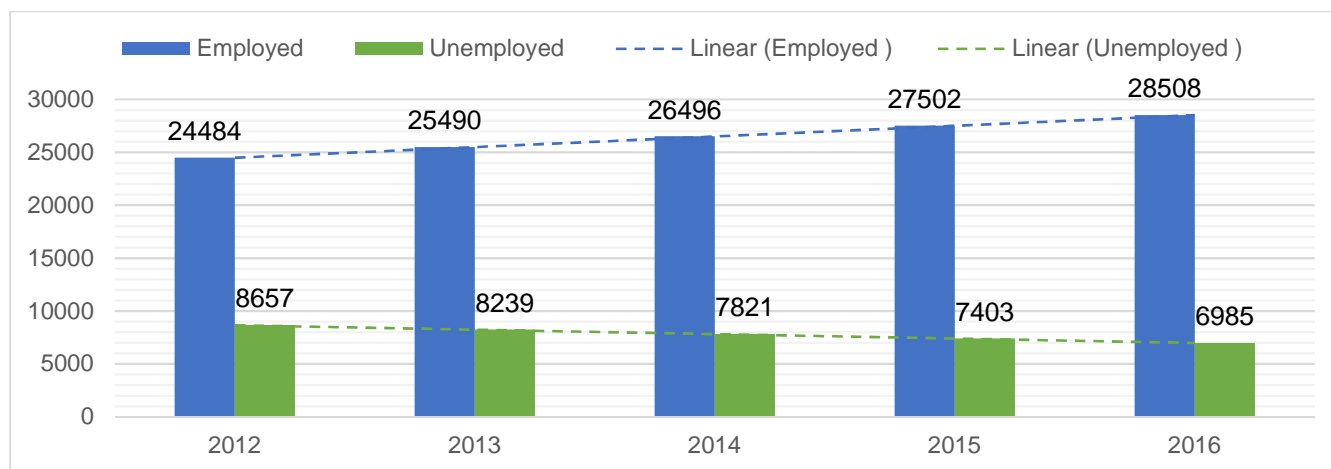


Figure 3-3: Five-year employment and unemployment trends for Lesedi Local Municipality (Urban-Econ Calculations based on Quantec, 2013)

Over the five-year period from 2012-2016, the number of the unemployed labour force has been decreasing. On the contrary, in the same period, the number of employed people has been increasing. These trends indicate that employment situation is gradually improving on an annual basis in the Lesedi LM. At a national scale, though, the employed and unemployed are both gradually increasing on an annual basis.

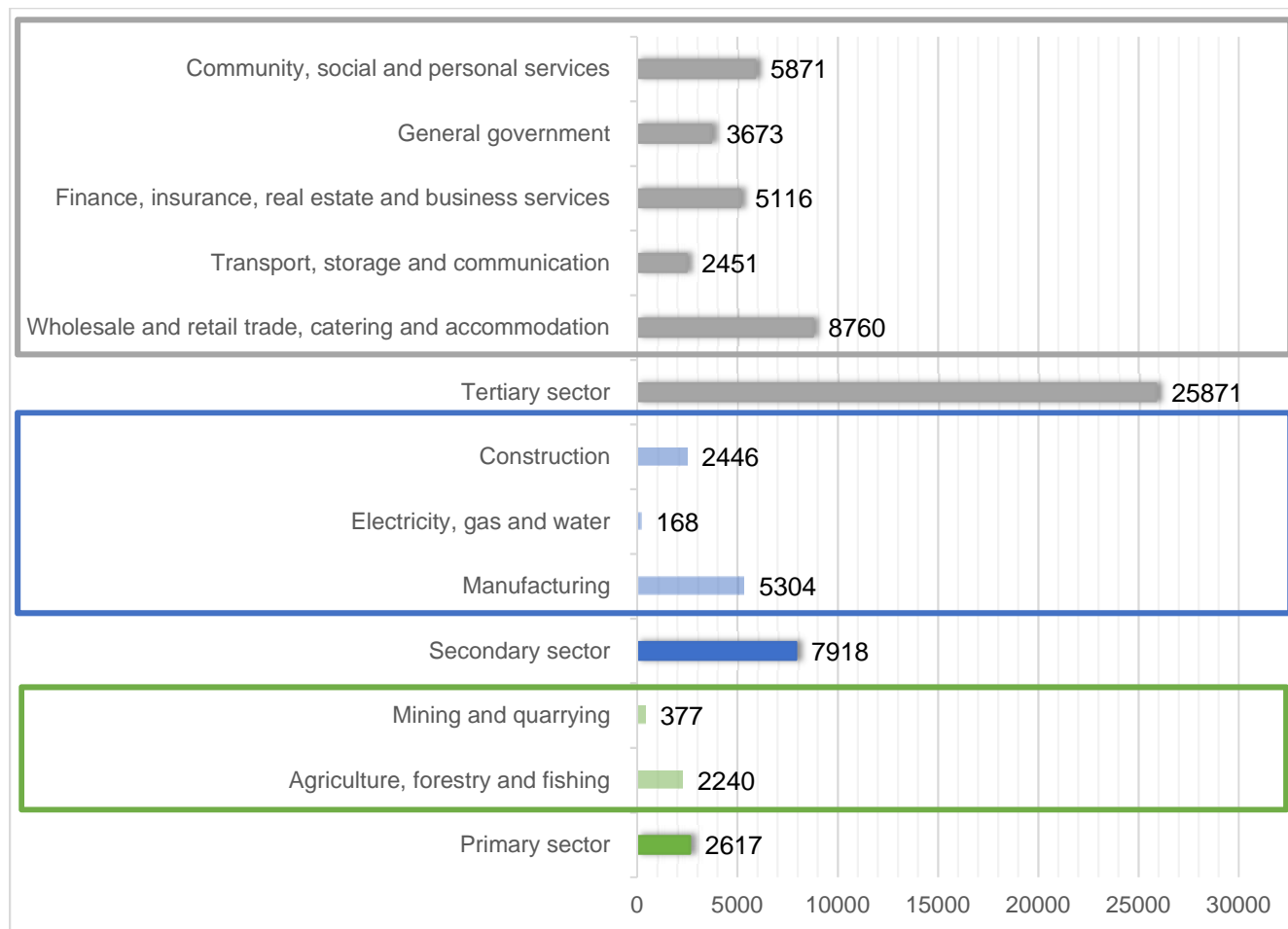


Figure 3-4: Employment by Sector Lesedi LM (Quantec, 2015)

Of all the sectors of the economy, the tertiary sector employs the largest number of people. The specific sectors with the highest employment numbers are wholesale and retail trade, catering and accommodation, community, social and personal services and manufacturing. The aforementioned sectors are evidently key sectors in the municipality, given that a similar trend was observed in terms of their contribution to GDP. Most of the sectors have had a gradual increase in employment over the past five years. The transport, storage and communication and construction sector have had the highest increase in employment. No significant job shedding has occurred in the past five years in all the local sectors.

Mining contributes a very small percentage towards employment in the Lesedi LM. In 2015, it employed about 377 people. Agriculture on the other hand, provided 6.2% of all employment opportunities in the municipality. Importantly, its employment has been steadily increasing in the last few years; while employment by the mining sector has been stagnating.

Lesedi income levels

In general, household income levels are a basis for determining poverty levels in a community. Additionally, the income levels of a particular area provide some insight into the economic behaviour of

a particular community, i.e. the purchasing power of that community and vulnerability to changes in the economy. Table 3-2 indicates the distribution of monthly household income for the different study areas.

Table 3-2: Household Income across study areas

	Study Area			
	South Africa	Gauteng	Sedibeng	Lesedi
01 No income	2 152 374	641 878	47 326	4 310
02 R1-R4800	646 925	133 482	12 872	1 195
03 R4801-R9600	1 076 164	191 067	18 918	1 744
04 R9601-R19200	2 464 927	446 414	43 369	4 720
05 R19201-R38400	2 751 482	646 012	48 080	5 622
06 R38401-R76800	1 887 290	562 895	38 100	4 359
07 R76801-R153600	1 338 859	426 949	29 710	3 175
08 R153601-R307200	1 045 790	365 495	22 258	2 275
09 R307201-R614400	685 507	285 292	13 045	1 468
10 R614401-R1228800	270 758	142 327	4 283	567
11 R1228801-R2457600	81 663	44 320	1 083	122
12 R2457601 or more	47 744	22 517	702	112
13 Response not given	680	376	23	-
Total	14 450 163	3 909 024	279 769	29 669

(Stats SA, 2011)

Based on the 2011 income profile of households, it can be deduced that the average household monthly income is R10 495 in 2016 prices for a household size of 3 in the Lesedi LM (Stats SA, 2011). Less than two thirds of the Lesedi LM residents are low income earners, whereas one third is ranked as middle income earners.

Considering the conflict between the agricultural and mining industries in terms of land uses, it is worthwhile examining the income levels derived from these sectors. The average income in the agricultural sector on a provincial scale is R1 287 per week, which sums up to R5 146 per month (Urban Econ Calculations based on Labour Force Survey, 2014). The average income in the mining sector is just over double that of the agricultural sector, where mining employees earn an average of R3 452 weekly, or R13 808 monthly (Urban-Econ Calculations based on Labour Force Survey, 2014). It is clear that the mining industry employees earn more than employees in the agricultural sector.

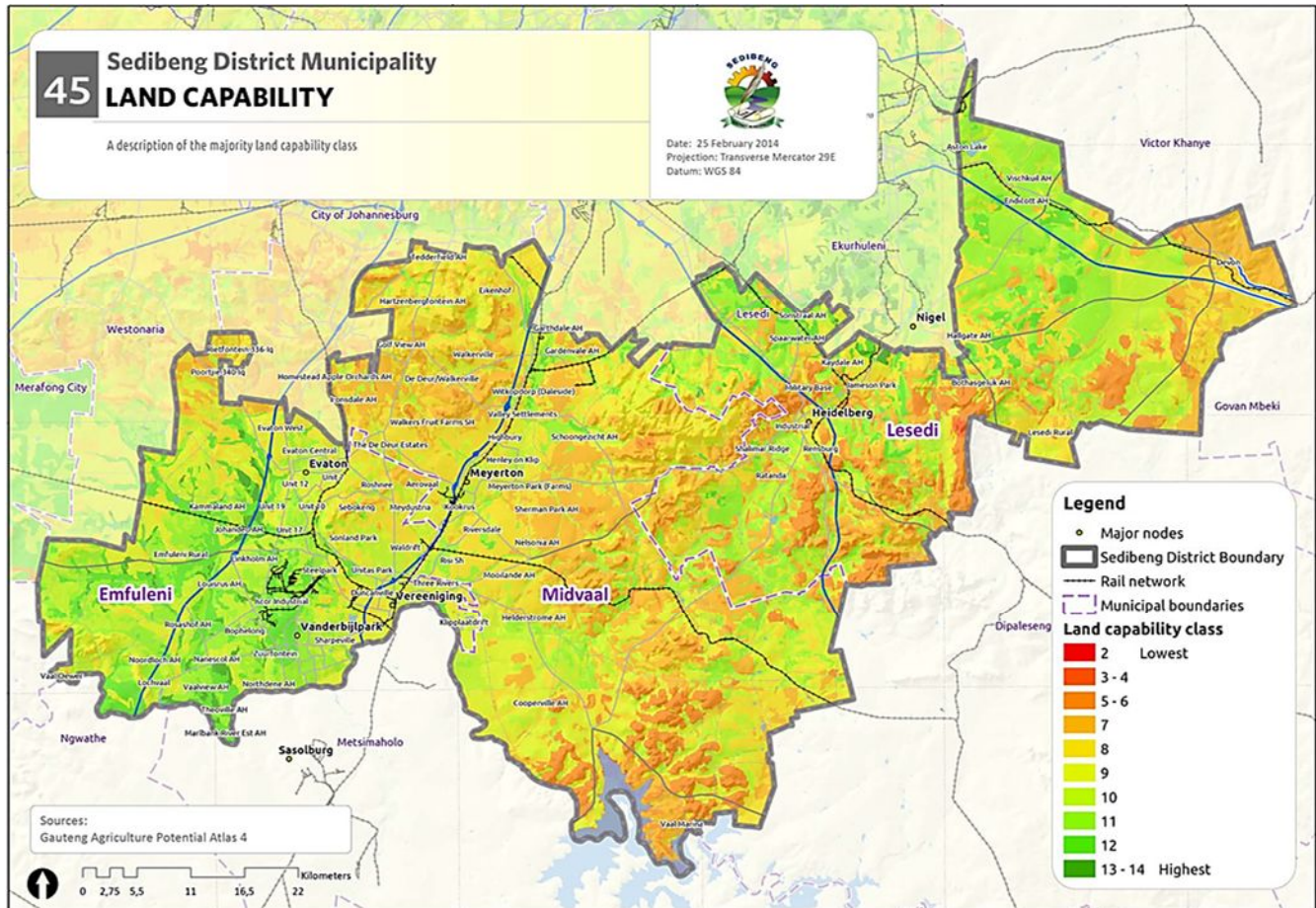
3.2 Importance of agriculture

Land capability and capacity in the Lesedi LM

On a national scale, high potential arable land comprises only 22% of total arable land in South Africa (PGTA, 2012). In general, the Gauteng Province has the least number of commercial farming units (Africa, 2012). At a district level, the Sedibeng DM IDP states that the District has good agricultural

potential, with areas of varying agricultural viability (Sedibeng DM, 2016). Furthermore, the Sedibeng DM has three agricultural hubs of which one is the Lesedi agricultural hub.

The Lesedi LM is largely an agricultural municipality from a spatial perspective (Lesedi LM, 2016). Map 3-1 demonstrates that the western and north-eastern regions of Lesedi have the most concentrated land capability in the municipality. It is evident that the proposed project area is proposed to be located on land, which capability class is classified between 9 and 12, denoting high agricultural land capability. It can then be argued that these are also the areas that make the greatest contribution towards agricultural production in the municipality.



Map 3-1: Land Capability in the Sedibeng District Municipality (Sedibeng DM, 2016)

A major concern for the Sedibeng DM is the continued loss of high potential agricultural land to other land uses. The preservation, development, and sustainable use of agricultural land are integral to ensure long-term food security in South Africa (Sedibeng DM, 2016). The NDP concurs that the national food security goal for South Africa is to maintain a positive trade balance for primary and processed agricultural products, whilst job creation and increased agricultural productivity are needed to address food security at a household and individual level in rural areas (National Planning Commission, 2011). In addition, food security is a key element for poverty alleviation and addressing inequality. Moreover, the Comprehensive Africa Agriculture Development Programme aims to increase agricultural productivity to a minimum of 6% annually, as this increase in food production is required to alleviate poverty and to eliminate hunger on the continent.

Agricultural sector's GDP contribution and labour force dynamics in the Lesedi LM

The agricultural sector has contributed an average of 1.7% to the Lesedi LM's GDP over the past five years (Urban-Econ calculations based on Quantec, 2015). The agricultural sector in the Lesedi LM employed 2 240 individuals in 2015, which makes up about 6% of the municipality's total employment. The Lesedi LM's agricultural sector employment figure constitutes well over a quarter of the total agricultural figure in the Sedibeng DM (Quantec, 2015). This suggests that although the agriculture makes a relatively small contribution towards the Lesedi economy, it is considered to be a prominent contributor to agricultural activities not only in the district but also in the province.

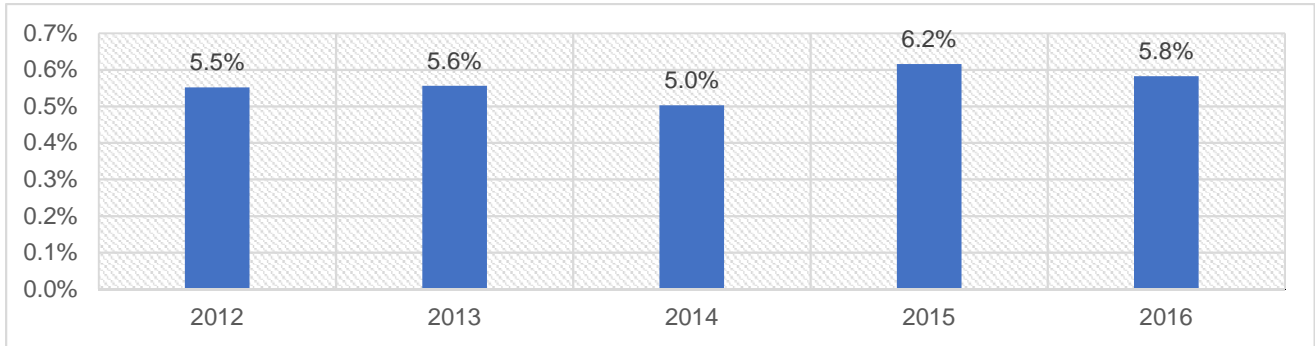
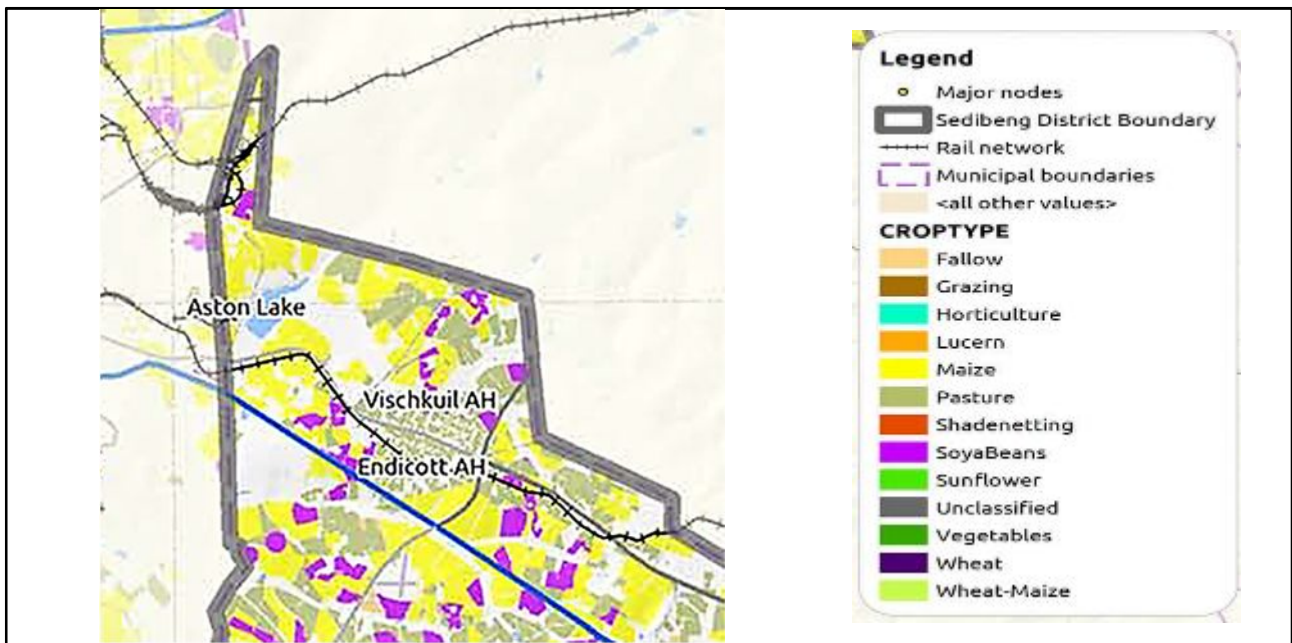


Figure 3-5: Agricultural sector employment contribution over five years (Urban-Econ Calculations based on Quantec, 2015)

As demonstrated in Map 3-2 below, the dominant crops found in the proposed project area are Maize and Soya beans. The same pattern of cultivated crops is observed in the surrounding areas. The rest of the land is pasture. The agricultural activity demonstrated in the SDF correlates with what the land is currently used for.



Map 3-2: Agricultural activity on proposed project area and surrounding areas (Sedibeng DM, 2016)

In 2015, 4 242 000 tons of maize have been produced in the Gauteng Province. This makes 5.2% of the national maize production. At the same time, 50 600 000 tons of soya beans have been produced in 2015 in the Gauteng Province, which contributed 7% to the national soya beans production.

The following images illustrate agricultural activities observed in the project area in November 2016, which include both crop production and livestock grazing. The area also hosts a number of chicken farms that focus on egg production.

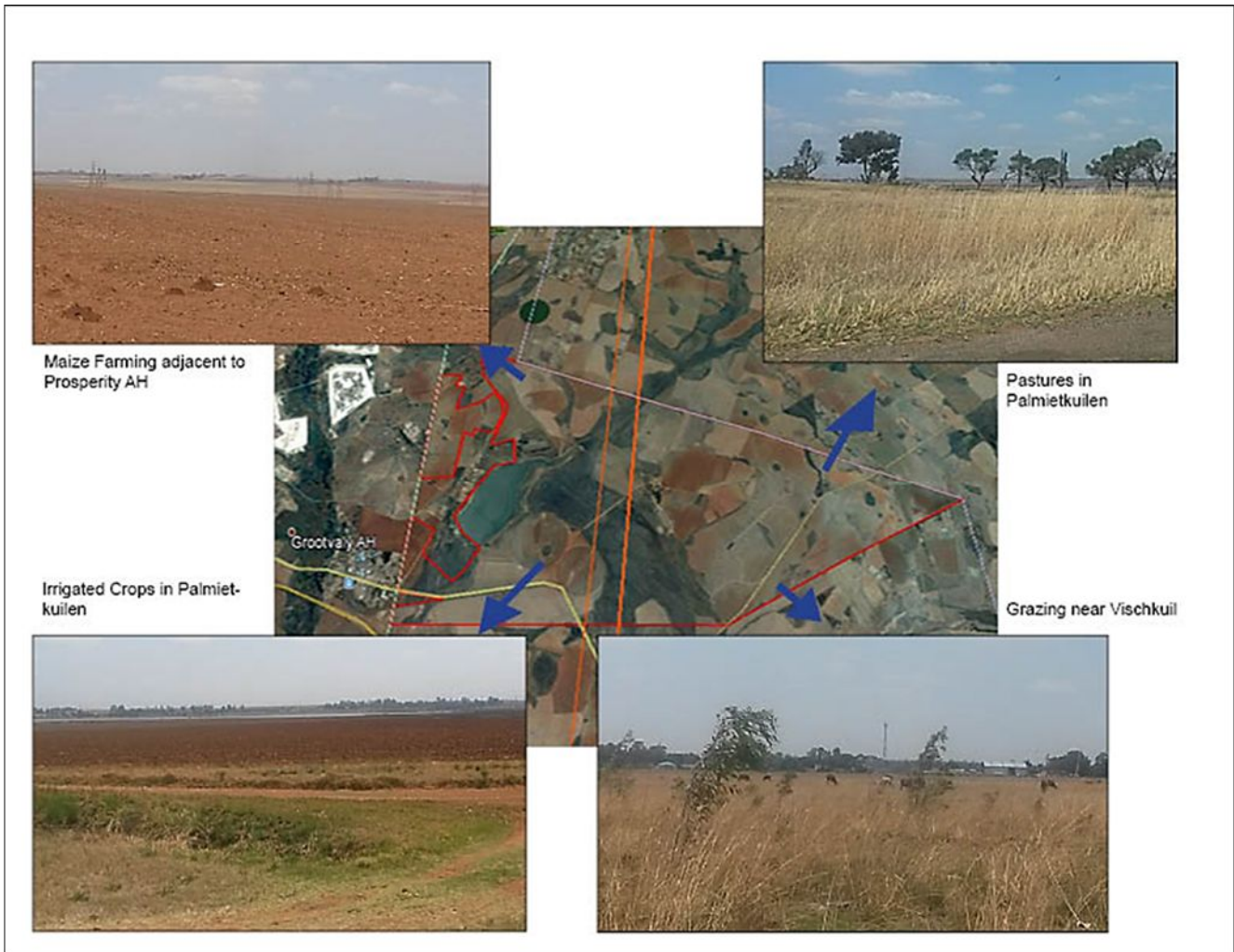


Image 3-1: Agricultural activity within proposed project area

Egg industry in brief

As mentioned previously, aside from crop farming, the area houses livestock farming. The national trends in red meat production have been on par with consumption. On the contrary, local poultry production has increased significantly over the past 20 years and has not been able to meet the greater increase in local demand for white meat (WWF, 2006). The consumption of chicken continuously grows and exceeds the total consumption of red meat. Thus, chicken is currently one of South Africa's major agricultural imports (DAFF, 2016).

In terms of the egg industry, it is the fourth largest animal sector in South Africa with a gross revenue of

R9.8 billion in 2015 (SAPA, 2014; SAPA, 2015). The general trends observed in the egg industry in the past few years can be summarised as follows:

- In 2015, there were 24.9 million **layer hens** in the country, showing a 2.1% increase compared to the previous year (SAPA, 2015).
- Gauteng was the single **biggest Province** in terms of concentration of egg farming activities accounting for 24.7% of layer birds in the country (SAPA, 2014).
- About 7 887 people (workers, supervisors, and managers) were employed by the egg industry in 2014 (SAPA, 2014).
- **Egg production** has been on a downward trend since 2012 (SAPA, 2014); however, 2015 seen a 2.05% growth compared to 2014 reaching 407 770 of cases per week (SAPA, 2015). A total of 7 654 443 988 eggs were produced in 2015 weighing 446 388 tons (SAPA, 2015).
- **Consumption of eggs** amounted to 7 854 355 543 in 2015 weighting 458 047 tons (SAPA, 2015). The per capita consumption of eggs in 2015 reached 150 eggs per annum, which is higher than the numbers observed in 2013 and 2014, but still below the highest point of 153 eggs per annum recorded in 2012 (SAPA, 2015) (SAPA, 2014). This suggests though that the demand for eggs in the country is slowly improving. It is still far below the global per capita figures of 251 for the USA, 220 for Russia, and 300 for China, which clearly illustrates the considerable scope for increase per capita consumption of eggs in South Africa, especially considering price competitiveness of eggs compared to other sources of animal protein (SAPA, 2014).
- South Africa **exported** 7 432 tons of egg products including shell eggs and other egg products in liquid and dry forms (SAPA, 2015). In 2014, chicken shell eggs earned R58.9 million in export revenue for the country (SAPA, 2014).
- **Imports of eggs and egg products** in liquid and dried forms amounted to 342.5 tons in 2015, which is a sharp decline from 462.2 tons in 2014 (SAPA, 2015).
- The egg industry faces a number of **challenges** in South Africa. Rising inputs costs including feed costs, labour, fuel, and electricity coupled with a weak South African rand are among the major aspects affecting the profitability of the industry (SAPA, 2014). Producers are receiving a diminishing share of the consume price (DAFF, 2015). Nonetheless, as seen above, the demand for egg products remain high and exceeds the current domestic production volumes.

Maize production and high potential arable land for food security in the country

South Africa is the main maize producer in the Southern Africa Development Community (SADC). Maize is a vital grain crop in South Africa due to its attributes as a major feeder grain and staple food for the majority of the South African population. Furthermore, it has been the largest contributor (47.3%) towards the gross value of field crops for the past five seasons (DAFF, 2016). The demand for maize in developing countries is projected to double by 2050. The demand is driven by population growth as well as changes in income and urbanisation that induce changes in dietary patterns in the emerging economies (Shifew, 2011). However, there are challenges hampering the optimal production of maize.

Maize is grown across a range of altitudes and latitudes than any other food crop, under temperatures ranging from cool to very hot, on wet to semi-arid lands and in many different types of soils. In this robust context, maize still remains vulnerable to climate change and is primarily a rainfed crop. The dependence on rainfall causes annual variations in maize yields and production. The changes in precipitation patterns increase the probability of short-term crop failures and long-term production declines. In addition, it is

anticipated that climate change will exacerbate water scarcity in the coming decades, impacting the production and yields (Shifew, 2011).

Table 3-3: Maize Production in past five years in South Africa (Department of Agriculture, 2016)

Season	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015
Plantings (ha)	2 372 300	2 699 200	2 781 200	2 688 200	2 652 850
Production (t)	10 360 000	12 120 656	11 810 600	14 250 000	9 941 650
Yield (ha/t)	4.37	4.49	4.25	5.30	3.75

Severe drought conditions in the major maize producing areas such as the Free State Province remain a challenge. Drought is a major constraint in the enhancement of maize and productivity. The poor rainfall has resulted in an unsatisfactory overall regional food security problem for the 2015/16 marketing year, with an overall cereal (maize, wheat, rice, millet and sorghum) deficit of 7 900 million tons, compared to a surplus of 1 210 million tons in the 2014/15 marketing year (DAFF, 2016). Climate conditions additionally affect producer prices. The average producer price of maize increased by 16.7% from R1 909.25/t in 2013, to R2 228.45/t in 2014/15 largely due to dry weather conditions that occurred in South Africa's maize belt during the respective summer season (DAFF, 2016).

The majority of maize produced in South Africa is consumed locally; consequently, the domestic market is very important to the industry. Food security is imperative and agricultural land conservation is key in this quest. The Gauteng Province has a relatively small contribution to the overall national maize production. Nonetheless, the accumulation of mainly maize and soya beans amongst other crops as well as livestock and chicken farming in the Lesedi LM play a notable role in food production.

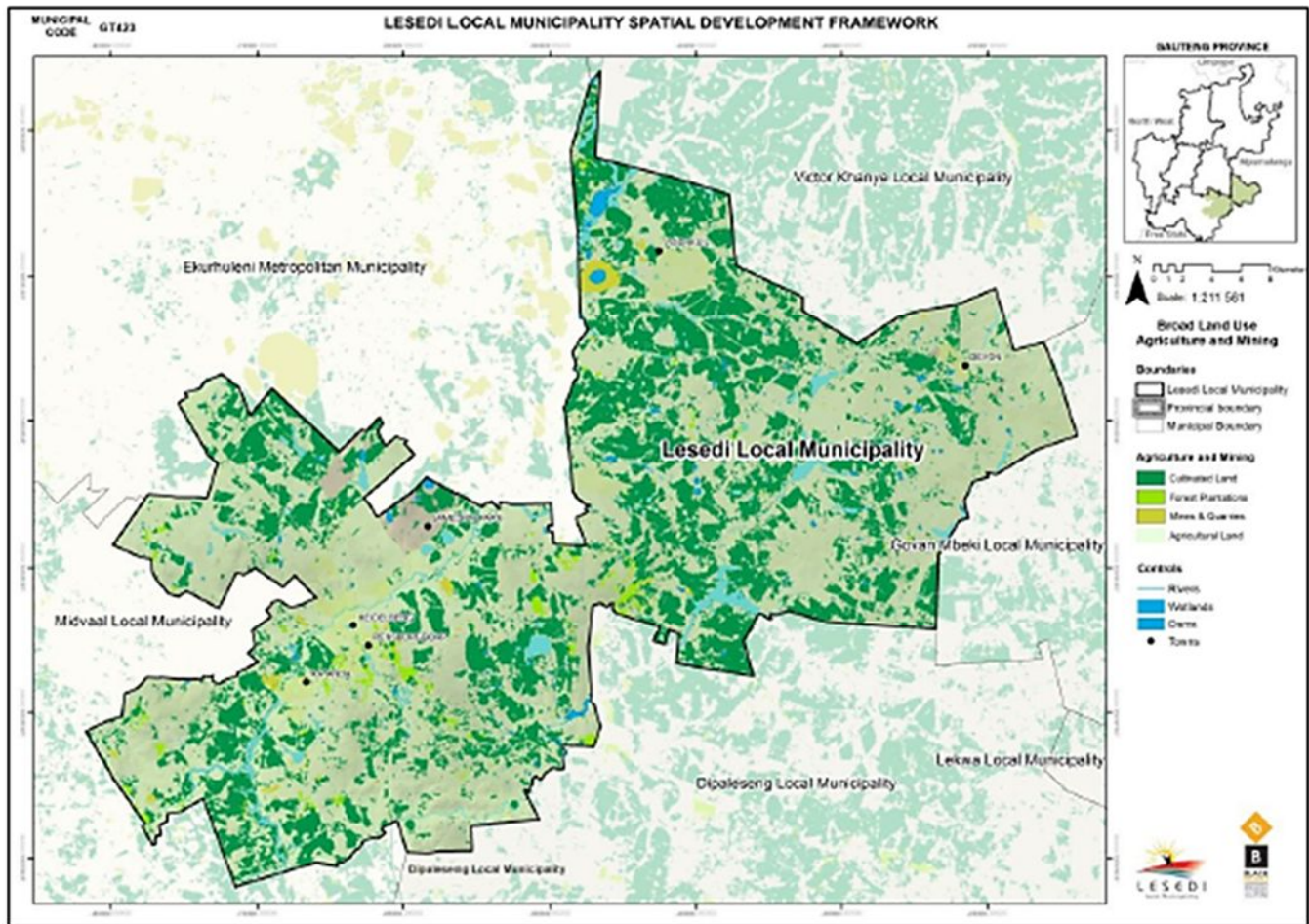
3.3 Importance of coal mining

Baseline of mining in the Lesedi LM

Mining activities in the Lesedi LM are relatively small. In 2015, mining contributed a meagre 0.6% towards the local economy's GDP and created 377 employment opportunities (Quantec, 2016).

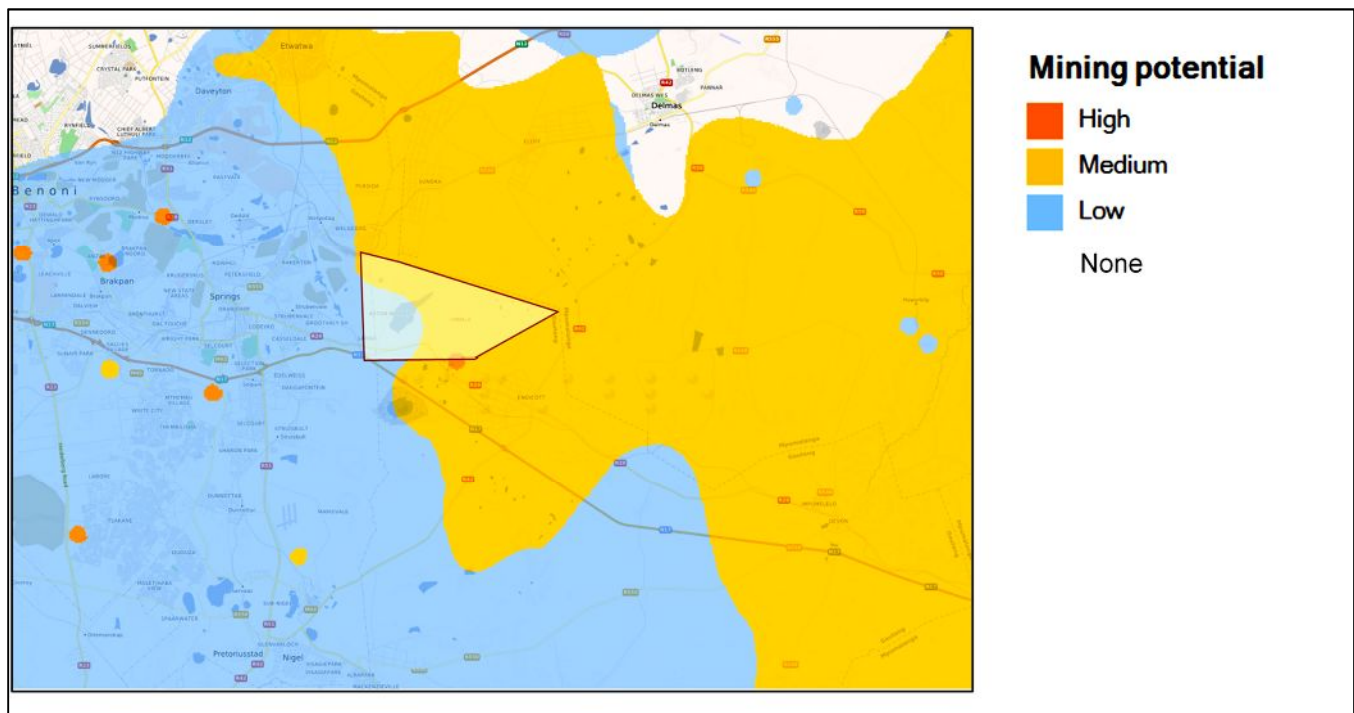
Map 3-3 serves to demonstrate the distribution of mining and agricultural land uses in the Lesedi LM. It is clear that the footprint of past and in some instance present mining and quarrying activity is scattered across the municipality but is largely concentrated in the south and western region, whereas agricultural land uses dominate the municipality. The footprints of the largest mine in the municipality and other smaller mines are situated to the west of the proposed project area, but the footprint across the Lesedi LM is limited. Gold mining is no longer taking place in the area due to the uneconomic nature of the remaining reserves, however numerous old/defunct shafts such as those linked to the Nigel Gold Mine are still present in the area (Sedibeng DM, 2016).

Mining-related activities in close proximity to the proposed project area include a slimes dam adjoining the south of N17 to the west of Vischkuil/Endicott. In addition, shale and brick clay quarries are located to the north of Vischkuil. Towards the south west of the proposed project area, various mining activities took place. The activities included mining, refining, handling of gold, silver and platinum group metals (Sedibeng DM, 2016).



Map 3-3: Mining and Agriculture Contrast in Lesedi Local Municipality (Lesedi LM, 2016)

Map 3-4 demonstrates that the project area dominantly has medium mining potential and a portion with low mining potential. Furthermore, to the south of the project area, a very small area has high mining potential. Evidently, the region has high land capability but also has notable mining potential.



Map 3-4 Mining Potential in study area and broader surrounding area (Council for GeoScience; Mapable)

Strategic importance of coal mining and sustainable coal supply for long-term energy security

The South African Coal Roadmap was developed to explore the required interventions in support of the coal industry from the current period to 2040 (Fossil Fuel Foundation and SANEDI, 2013). Key indications are that, even in a low carbon world, there will still be a demand for export coal to 2040 and beyond. The roadmap states that coal exports can continue to provide a significant source of foreign revenue for South Africa.

Approximately 224 million tons of coal is mined annually; 28% of this coal is exported, 53% is utilised for electricity generation, and the remainder is distributed across various industries (Eskom, 2016). The Coal Roadmap estimates that 4 000 million tons of coal are required by 2050, of which only half is currently secured with contracts. The rest is not contracted yet (Fossil Fuel Foundation and SANEDI, 2013). Thus, new mines will need to be developed in the Central Basin, where the proposed project is located, as well as in Waterberg.

The coal that can be mined at the proposed mining project includes export quality coal, which can potentially be sold to other countries. However, it is likely to be blended with the lower quality seams to retain the required qualities for supply to the coal-fired power station located in the region.

The supply of coal to Eskom for generating electricity is at risk due to the price disparity between the domestically supplied coal and coal for export. It is estimated that up to 800 million tons of the unsecured contracts are at risk to be diverted to export markets, which could create a significant supply shortage of coal in the future (Fossil Fuel Foundation and SANEDI, 2013). Additionally, investment in South Africa is being deterred due to the unfavourable policy and legislative environment, labour risks, and better returns

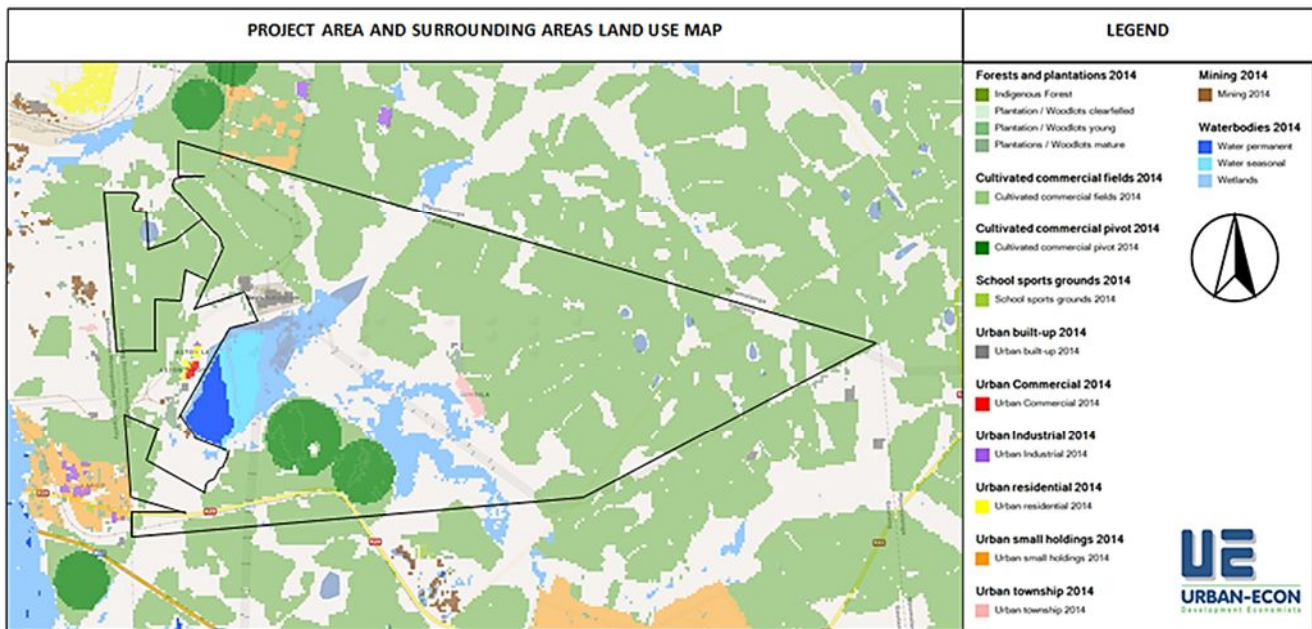
in other commodities and geographies. If the desirability of investing in South African coal mines declines further, this could result in future reductions in the availability of coal for both local and export market (Fossil Fuel Foundation and SANEDI, 2013).

In terms of employment, close to 80% of the direct employment associated with the coal value chain is in coal mining itself (Fossil Fuel Foundation and SANEDI, 2013). This implies that there is a possibility for a high labour absorption in the coal value chain, which can contribute to reducing the unemployment rate.

In the context of the current project, the mine will have a lifespan of about 53 years, which means that coal produced by the mine will be available even after 2060. Thus, the proposed project is in direct alignment with the South African Coal Roadmap and can be seen as a strategic project that would contribute to energy security in the country.

3.4 Zone of influence profiling – land uses and activities

The project area is dominantly constituted of cultivated commercial fields, irrigated land, and water bodies. There is a township located in the project area called Umbila. The surrounding areas are also comprised of cultivated commercial fields with the main agricultural production including maize farming, soya bean farming and chicken farming. In addition, there are agricultural holdings, residential areas, commercial activity, industrial activity and mining activity (refer to Map 3-5).



Map 3-5: Project Area and surrounding areas land use map (extracted from Mapable)

The discussion below outlines the details of farming activity per farm portion of the successfully contacted directly affected farms and adjacent farms.

Table 3-4: Economic profile of the directly impacted area (project site)

Farm Portion (s) and size	Agricultural activity and size	Yield	Revenue generated	Number of Employees	Concerns raised
Portion 2, 13 and 19 of Farm Palmietkuilen 3419 Ha	<u>Crop Farming:</u> Maize Farming (945 Ha) Soya Beans (472 Ha) Navy Beans (472 Ha)	7.5t/Ha 2.3t/Ha 2t/Ha	R19.1 million p.a R6.5 million p.a R12.3 million p.a	45 permanent employees 40 temporary (5 months) employees	<ul style="list-style-type: none"> • Food security • Land rehabilitation • Pollution • Job losses-increased unemployment • A disconnection in local business connections • Business closures • Utilising land for mining is unsustainable and short sighted
Portion 9,4,10 and 13 of Farm Palmietkuilen 362.87 Ha	Crop Farming Maize Farming Schoeman Boerdery	73 Ha	No Data Available	No Data Available	<ul style="list-style-type: none"> • Community located around portion 9 • Lake on land

Table 3-4: Economic profile of adjacent activities

Farm Portion (s) and size	Agricultural activity and size	Yield	Revenue generated	Number of Employees	Concerns raised
Portion 5 and 6 of Farm Vischkuil 274	Chicken Egg Farming	*109 776 dozen eggs/week	*R74.8 million p.a	*49-63	N/A
Portion 8 of Farm Vischkuil 274	Chicken Egg Farming	*125 125 dozen eggs/week	*R85.2 million p.a	*56-72	N/A
Portion 2 of Farm Vischkuil 274	Chicken Egg Farming	*96 250 dozen eggs/week	*R65.6 million p.a	*43-55	N/A
Portion 39 of Farm Droogfontein 242	Chicken Egg Farming	*123 123 dozen eggs/week	*R83.9 million pa	*55-71	N/A
Portion 33 of Farm Droogfontein 242	Chicken Egg Farming	*123 123 dozen eggs/week	*R83.9 million pa	*55-71	N/A
Portion 21 and 22 of Farm Grootvaly 124.	No activity currently taking place	N/A	N/A	N/A	<ul style="list-style-type: none"> • No concerns raised
Portion 17 of Farm Grootvaly 124.	Chicken Egg Farming	300 dozen eggs/week	*R0.2 million p.a	10 permanent employees	<ul style="list-style-type: none"> • Dust negatively affects chickens

Farm Portion (s) and size	Agricultural activity and size	Yield	Revenue generated	Number of Employees	Concerns raised
	Livestock Farming (153 cattle)			4 permanent employees	<ul style="list-style-type: none"> • Blasting affects laying process • Chicken mortalities increase • Decrease in eggs produced • Water quality reduction • Water shortage
Remainder of Farm Rietfontein 276.	Factory: Brick Making Quarry for Clay	No data available	No data available	150 employees	<ul style="list-style-type: none"> • No concerns raised

(*values in asterisks are based on estimations)

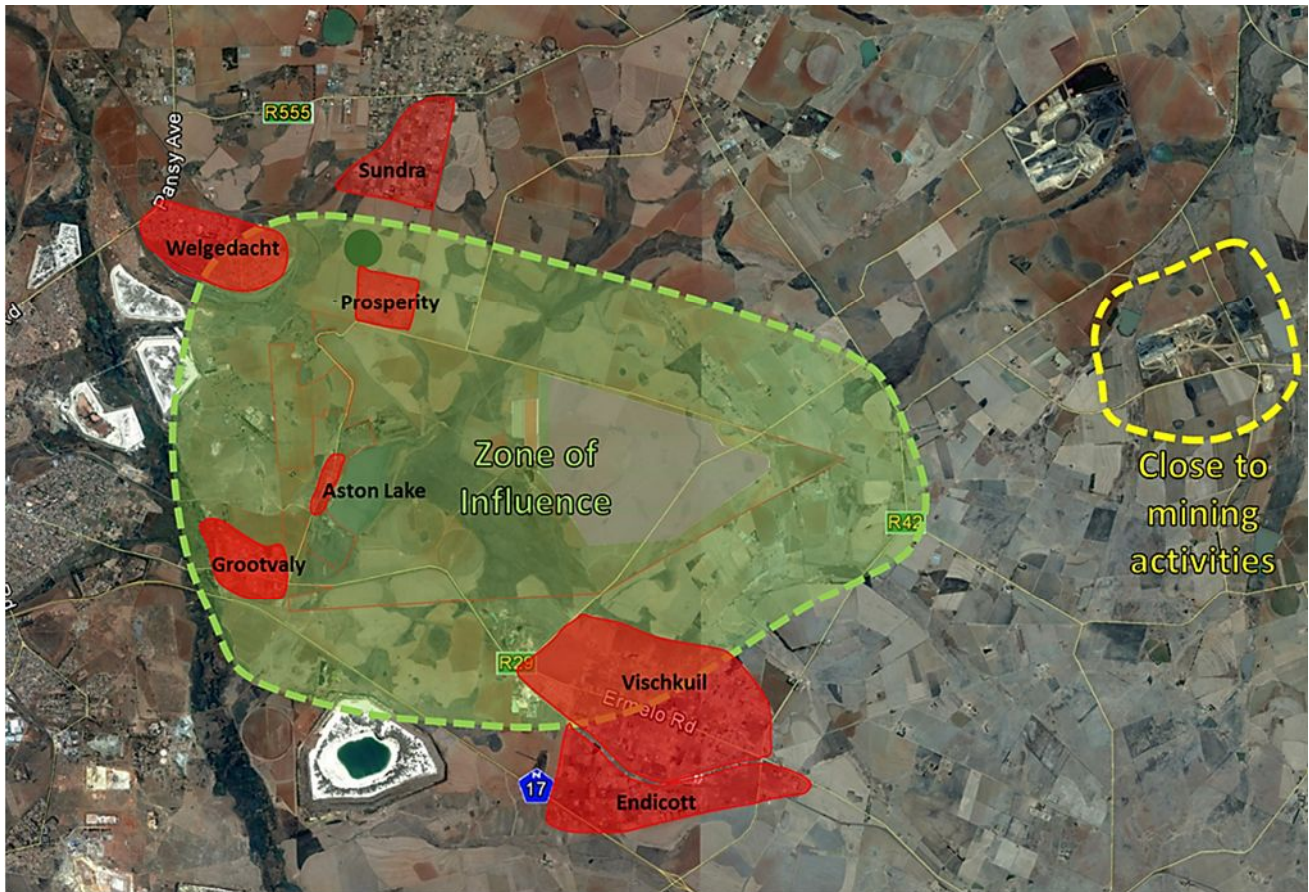
3.5 Property values in the surrounding area

The purpose of this section is to provide a baseline profile of the existing property values within the zone of influence, which includes properties that would be directly affected by the proposed mining development and properties that may be indirectly affected as a result of environmental effects (i.e. noise, dust, and visual pollution), as well as properties already located in close proximity to existing mining activities. The latter is done to determine whether mining activities have a negative impact on property values and the extent of this impact.

For the purpose of this study, the following land categories were analysed:

- a. **Irrigated land**
 - within the zone of influence
 - within proximity of zone of influence and located in close propinquity to existing mining activities
- b. **Dry land**
 - within the zone of influence
 - within proximity of zone of influence and located in close propinquity to existing mining activities
- c. **Chicken farms**
 - within the zone of influence
 - within proximity of zone of influence and located in close propinquity to existing mining activities
- d. **Agricultural holdings and residential areas** within the study area

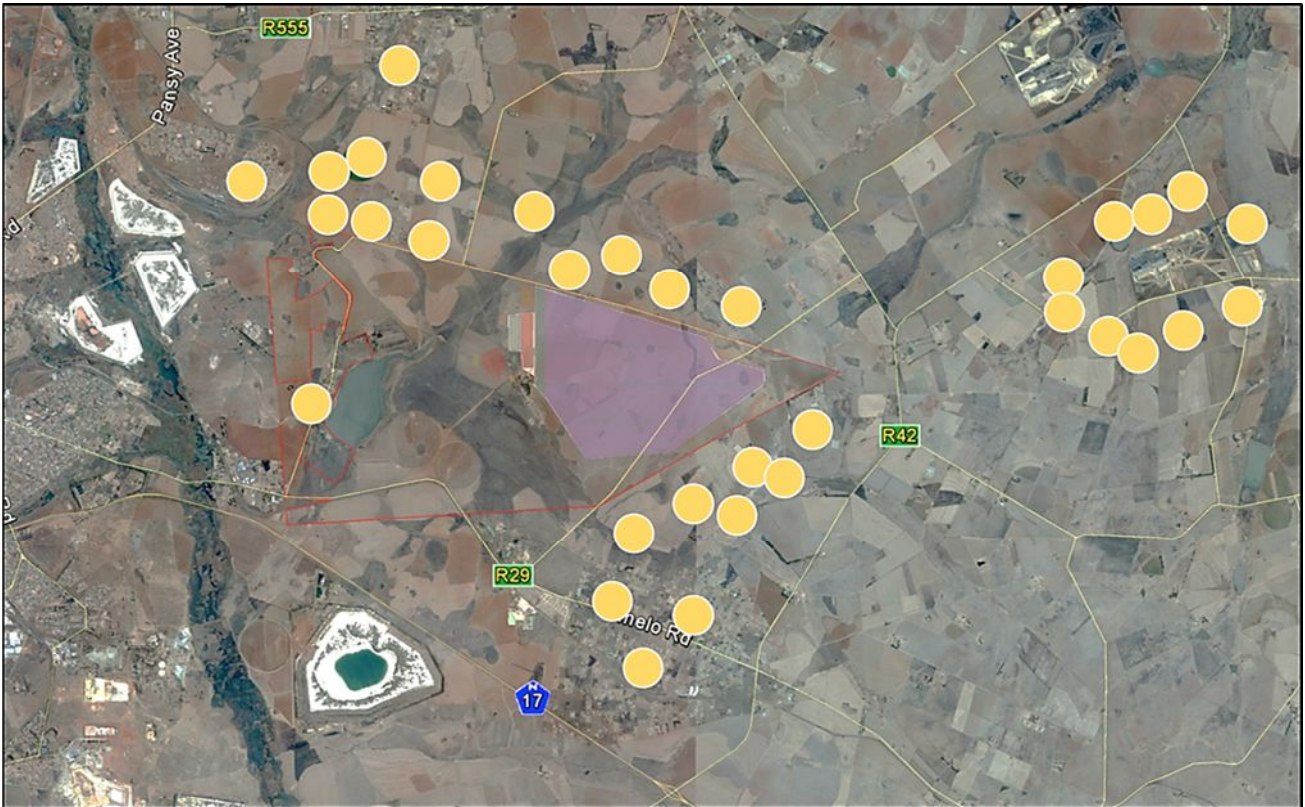
The following map indicates the identified zone of influence, existing mining activities surrounding the zone of influence, as well as the agricultural holdings within and around the zone of influence indicated in red.



Map 3-6: Agricultural Holdings within and near Zone of Influence and properties located near existing mining activities

The property values referred to in this section are based on the comparable average sales prices as obtained from the deeds registry office through the Lightstone database. The comparable average sales price reflects the potential market value of an identified property, based on the average sales price within the study area, and is not an exact property valuation amount, but rather an estimated figure based on primary data. The average sales price therefore, provides a representative sales amount for the identified study area. The information obtained from the Lightstone database was augmented with data obtained from the interviews with various real estate agents operating in the area and specialising in agricultural holdings, agricultural land, and residential properties.

The following map illustrates the properties that are included in the property value analysis.



Map 3-7: Properties in and near Zone of Influence

The intention of the property analysis is to provide a baseline profile of the current property values in the identified area. A number of attributes including proximity, accessibility, size, existing services, zoning rights, etc., affect these values. For example, properties with good accessibility and with existing services could have a higher value than those that do not. Certain conditions raise property values and others bring them down. Other factors influencing property values include the following:

- Physical Attributes: Location, topography, availability of water, etc.
- Accessibility to Economic Activities: Good access to employment opportunities adds value to property.
- Neighbourhood Amenities: Shopping centres, medical facilities, schools etc.
- Transport Linkages: Good access to national and regional roads adds value to property.

3.5.1 Irrigated land

In order to determine the average value of irrigated land, four irrigated properties were identified and examined. These properties are located within the identified zone of influence and are largely owned by private family trusts and farming industries.

Table 3-4 provides detail in terms of the size and value of the reviewed properties. As indicated in the table, the irrigated property values within the study area vary in sizes and range between R 1.4 million to R 1.5 million. This translates to roughly between R30 000 and R 55 000 per hectare.

Table 3-4: Examples of property values of irrigated land within the zone of influence

Property	Size	Value	Unit cost (R/ha)
1	26 Ha	R 1 444 934	R 55 574
2	41 Ha	R 1 509 000	R 36 805
3	52 Ha	R 1 543 214	R 29 677
4	26 Ha	R 1 412 964	R 54 344

In order to determine the effect that close proximity to the existing mining activity has on the value of irrigated property, a property with these characteristics has been identified.

Table 3-5: Examples of property values of irrigated land within proximity of the zone of influence and located in close propinquity to mining activities

Property	Size	Value	Unit cost (R/ha)
5	175 Ha	R 3 835 700	R 21 918

Table 3-5 indicates that the size of the identified property is roughly 175 hectares, with a total value of R 3.8 million and R 21 918 per hectare. When compared to the property values within the zone of influence it is evident that the irrigated property located in close proximity to existing mining activities has a lower value than those within the zone of influence. The identified property (property 5) is 50% less than the average value of the properties identified in the zone of influence.

3.5.2 Dry land

As indicated, a number of dry land portions are included in this property profile. These land portions are typically categorised as vacant land with very limited farming activity currently taking place on the land. The following table indicates the land values for the identified dry land portions within the zone of influence.

Table 3-6: Examples of property values of dry land within the zone of influence

Property	Size	Value	Unit cost (R/ha)
6	133 Ha	R 1 722 264	R 12 949
7	134 Ha	R 1 736 014	R 12 955
8	132 Ha	R 1 736 514	R 13 155
9	116 Ha	R 2 243 214	R 19 338
10	134 Ha	R 2 139 214	R 15 964
11	163 Ha	R 1 956 186	R 12 001
12	129 Ha	R 1 956 186	R 15 164
13	77 Ha	R 1 627 714	R 21 139

The dry land property values within the zone of influence are typically 130 ha in size or more, and range between R1.6 million and R 2.2 million per property. This translates into roughly R12 000 – R22 000 per hectare. It is evident that the values of these properties are about three to four times lower than that of the irrigated properties, when looking at per ha unit cost.

The land values of dry land for properties that are in close proximity to existing mining activities, as indicated in the table below suggest that these properties have a significantly higher value than those within the zone of influence. Possible reasons for this are that these properties could have existing land rights that are suitable for associated mining activities such as light industrial or commercial land rights. In order to determine this, a detailed analysis is required. Therefore, it can't be concluded that the mining activities have contributed to the higher value, but rather, that the mining activities do not necessarily have a negative impact on these values.

Table 3-7: Examples of property values of dry land within proximity of the zone of influence and located in close propinquity to mining activities

Property	Size	Value	Unit cost (R/ha)
14	64 Ha	R 3 236 242	R 50 566
15	64 Ha	R 2 632 776	R 41 137
16	95 Ha	R 2 757 776	R 29 029
17	393 Ha	R 3 764 701	R 9 579
18	68 Ha	R 2 874 479	R 42 271
19	64 Ha	R 3 236 242	R 50 566
20	239 Ha	R 3 381 092	R 14 146

The property values in the table above range between R2.6 million and R3.7 million, which translates to roughly between R9 000 to R50 000 per hectare. When compared to the properties within the zone of influence, it is evident that properties located in close proximity to existing mining activities are on average 55% higher in value when compared to those located within the zone of influence.

3.5.3 Chicken farm

There is a large presence of chicken farming within the study area. Therefore, the property values of these farms are also included in this study. Four chicken farms were identified within the zone of influence, and one chicken farm was identified in close proximity to existing mining activity areas.

The following table indicates the property values for the chicken farms located within the zone of influence. As indicated, the property values of chicken farms in the zone of influence range between R1.7 million and R2 million, with roughly between R14 000 and R33 000 per hectare.

Table 3-8: Examples of property values of chicken farms within the zone of influence

Property	Size	Value	Unit cost (R/ha)
21	57 Ha	R 1 896 526	R 33 272
22	112 Ha	R 2 063 851	R 18 427
23	92 Ha	R 2 018 014	R 21 934
24	124 Ha	R 1 763 514	R 14 221

The table below indicates the property value for the identified chicken farm that is within close proximity to the existing mining area.

Table 3-9: Examples of property values of chicken within the region and located in close propinquity to mining activities

Property	Size	Value	Unit cost (R/ha)
25	60 Ha	R 3 133 515	R 52 225

Based on the table above, it is evident that the chicken farm located in close proximity to the mining activity has a property value of R 3.1 million, or R52 225 per hectare. This suggests that the value is roughly 58% higher than the properties located within the zone of influence.

3.5.4 Vischkuil

The property value information for the agricultural holdings located in Vischkuil, is based on the average price and size per property. As indicated in the table below, the average size of properties in Vischkuil is 1.6 hectare, which value averages at R 1.1 million per property. The majority of property owners in Vischkuil owned their properties for a period of eight years and more. This suggests that the property market in the area is stable implying that it is well established and unlikely to change. In terms of property market activity, it is evident that there is some property market activity in the area. The properties being sold in Vischkuil are largely 3-4 bedroom residential properties along with some farm portions. A real estate agent from the area stated that a squatter camp situated between the proposed mine and Vischkuil, has negatively affected the property values of the area. The agent does not believe any further decline in property values can emerge from the introduction of a mine near the area.



Table 3-10: Property value profile of Vischkuil

Indicator	Description
Type of dominant property	Freehold Residential
Number of properties	6 registered properties
Average size of properties	1.6 Ha
Average price of property	R 1 070 000
Key characteristics	
Ownership duration	80% of Vischkuil property owners own property for a period of 8 years and more

3.5.5 Endicott

The following table provides property value information for Endicott, which is based on the average size and price per property.

Table 3-11: Property value profile of Endicott

Indicator	Description
Type of dominant property	Freehold Residential
Number of properties	4 properties
Average size of properties	18 Ha
Average price of property	R 1 286 800
Key characteristics	
Ownership duration	100% of Endicott property owners own property for a period of 8 years and more

As indicated, the average size of properties in Endicott is 18 hectare and values at R1.3 million per property. All of the property owners in Endicott owned properties in the area for a period of eight years and more. This suggests that the property market in the area is very steady. In contrast, one of the real estate agents in Endicott argued that the property values are low in the area with one of the reasons being the distance to town. Another real estate agent concurred stating that it is not easy to sell agricultural land in the area. This is due to the banks giving out between 60%-80% of loans in the area and the rest is required from the buyer. The agent further stated that people scarcely purchase plots in the area and therefore, it proves difficult to re-sell plots.



3.5.6 Aston Lake

As indicated in the table below, the average size of properties in Aston Lake is 0.9 hectare and values at R660 000 per property. Roughly, two thirds (67%) of property owners in Aston Lake owned their properties for a period of eight years and more. This suggests that the property market in the area is relatively steady. In terms of the property market activity in Aston Lake, it is evident that there is some activity taking place. The majority of units being sold in the area are 2-3 bedroom housing units along with a number of vacant stands. In addition, the average Living Standard Measurement (LSM) within Aston Lake is between 4 and 7. This suggests that the population within Aston Lake has moderate access to basic goods and services are of low- to middle- income group.



Table 3-12: Property value profile of Aston Lake

Indicator	Description
Type of dominant property	Freehold Residential
Number of properties	69 properties
Average size of properties	0.9 Ha
Average price of property	R 660 000
Key characteristics	
Ownership duration	67% of Aston Lake property owners own property for a period of 8 years and more
LSM profile	LSM 4 - LSM 7

3.5.7 Welgedacht

The following table provides property value information for Welgedacht.

Table 3-13: Property value profile of Welgedacht

Indicator	Description
Type of dominant property	Freehold Residential
Number of properties	1335 properties
Average size of properties	1 Ha
Average price of property	R 620 000
Key characteristics	
Ownership duration	70% of Welgedacht property owners own property for a period of 8 years and more
LSM profile	LSM 6 – LSM 7

As indicated, the average size of properties in Welgedacht is 1 hectare and values at R620 000 per property. About 70% of property owners in Welgedacht owned property for a period of eight years or more. In terms of property market activity, it is evident that there are currently very few properties for sale in the area. This suggests that the property market activity within the area is relatively low and that people are more likely to stay within the area than move out.



The average LSM for the Welgedacht area is between 6 – 7, indicating that the local population has moderate access to basic goods and services and represent middle-income households.

3.5.8 Prosperity

Prosperity is located in the northern region of the zone of influence, and has an average property size of 4 hectares and an average value of R660 000 per property. The majority of property owners in Prosperity owned their property for a period of eight years and more. Similar to the previous agricultural holdings indicated in this section, the property market is well established and unlikely to change. Recent listings indicate that the property market in Prosperity is not active. Only two properties are currently listed for sale.



Table 3-14: Property value profile of Prosperity

Indicator	Description
Type of dominant property	Freehold Residential
Number of properties	52 properties
Average size of properties	4 Ha
Average price of property	R 660 000
Key characteristics	
Ownership duration	83% of Prosperity property owners own property for a period of 8 years and more
LSM profile	Data unavailable

3.5.9 Sundra

The following table provides property value information for Sundra.

Table 3-15: Property value profile of Sundra

Indicator	Description
Type of dominant property	Freehold Residential
Number of properties	51 properties
Average size of properties	2.5 Ha
Average price of property	R 1 750 000
Key characteristics	
Ownership duration	69% of Sundra property owners own property for a period of 8 years and more
LSM profile	LSM 7 – LSM 8

As indicated, the average size of properties in Sundra is 2.5 hectares and values at an average of R 1.7 million per property. Roughly 69% of property owners in Sundra owned properties in the area for a period of eight years or more. There are a number of properties currently listed for sale in the larger Sundra area. These properties are largely farm portions and vacant land. This suggests that the property market activity within the area is quite active.



The average LSM for the Sundra area is 7 – 8, indicating that the local population in Sundra has higher access to basic goods and services than that of the surrounding areas and represent middle to higher-income household groups.

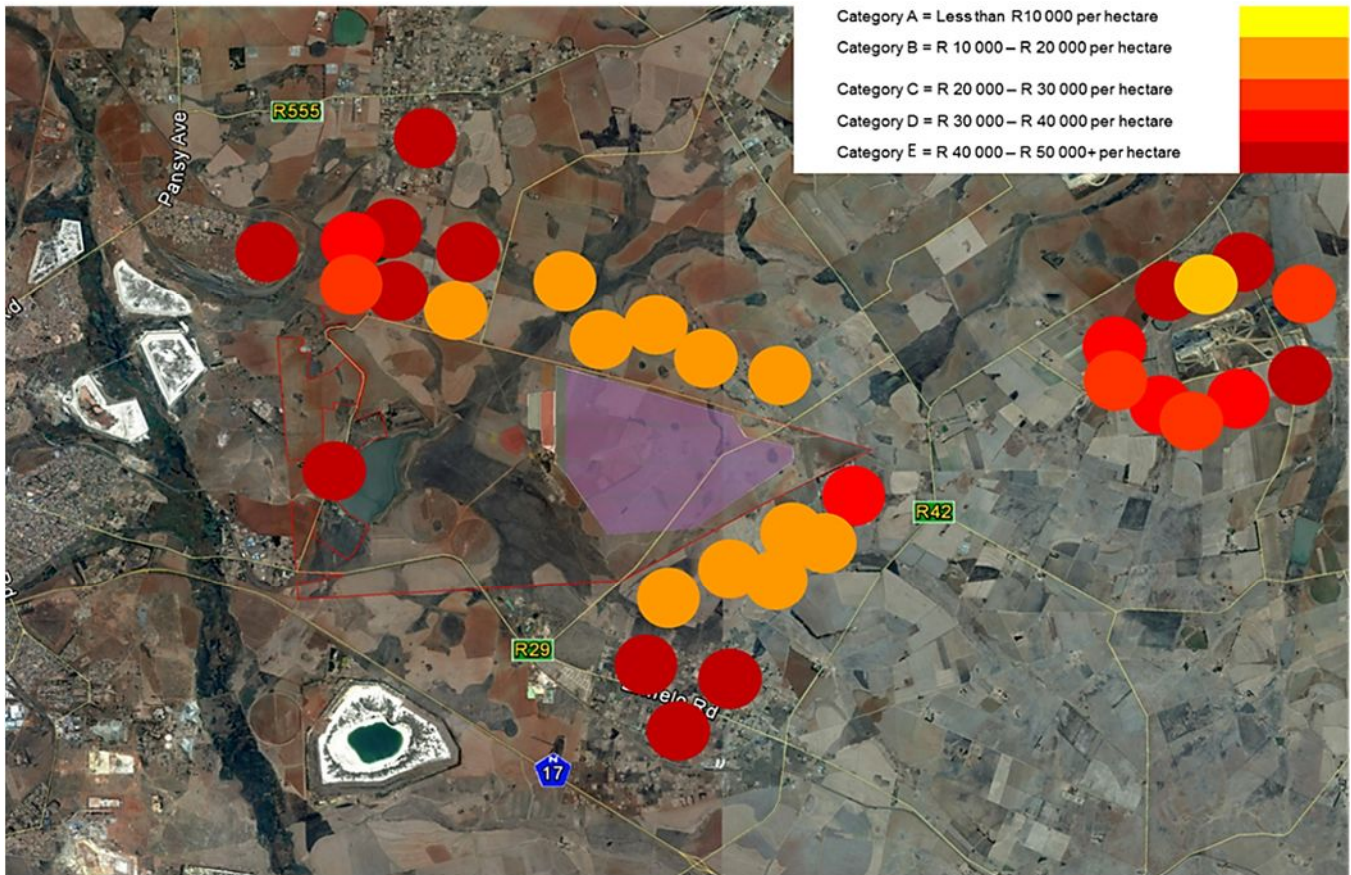
3.5.10 Key observations

The following table provides a summary of the key observations in the property value analysis:

Table 3-16: Property Values key observations

Property Type	Average Land Value (R/Hectare)		Key observation
	Within Zone of Influence	In close propinquity to mining activities	
Irrigated land	R 44 100	R 21 918	It is evident that, based on the analysis of the identified properties, the irrigated land located within the zone of influence has a significantly higher value than those close to mining activities. It is assumed that in this case the mining activities seem to have some effect on the property values. However, it should be noted that the property values are influenced by a number of attributes (directly and indirectly); therefore, any change in property values can never be attributed only to one factor whether it is mining or not.
Dry land	R 15 333	R 33 899	The identified dry land portions located in close proximity to existing mining activities have a much higher value than those within the zone of influence. This suggests that the mining activities do not necessarily have a negative impact on the property values of dry land.
Chicken Farm	R 21 963	R 52 225	The chicken farm located next to existing mining activities has a value of more than double that of the chicken farms located in the zone of influence. Based on this, it is evident that the mining activities do not negatively affect the value of farmland used for chicken farming. However, these property values can be attributed to much more than just mining activities.
Agricultural Holdings	The agricultural holdings that were identified are all located within and around the zone of influence. Due to the nature and proximity of these land portions, the likelihood of a negative impact on property values is limited. However, it can be assumed that due to its location, the Aston Lake land portions are likely to be slightly more affected by the visual effect of the proposed mine compared to other agricultural holdings in the area.		

The following map provides a visual representation of the property values as identified in the study area and those used for the baseline assessment.



Map 3-10 Property Values within and near Zone of Influence

4 IMPACT ANALYSIS

4.1 Introduction

This chapter presents the analysis of the economic impacts that are expected to ensue as a result of the development of the proposed project, and evaluation of these impacts according to the predefined criteria. The potential economic impacts identified arise as a consequence of construction, operation, and closure of the Proposed Palmietkuilen Coal Mining Project following the prescribed methodology (refer to Annexure A).

4.2 Impact ensued during construction phase

4.2.1 Impact on production

Economic production is defined as any activity that uses inputs such as labour and capital to produce outputs in the form of services or goods. The construction phase of the proposed mine will involve activities such as engineering and design, site and infrastructure development, construction of buildings and facilities, installation of machinery and equipment, civil engineering works, and other business activities related to the construction of the mine. As indicated in Table 4-1, the direct effect will be experienced in the mining sector as this phase is not solely inclusive of construction but dominantly the accumulation and preparation of mining operations. In addition, the construction phase encompasses capital expenditure into mining equipment and services, process equipment, and infrastructure.

The economic benefits of the investment into the proposed mine will spread throughout the national economy and will positively impact all economic sectors. The effect is categorised according to direct, indirect and induced impacts, together forming the multiplier effect. These various impacts spread throughout the economy, contributing to heightened production levels.

The initial construction-related activities required for the proposed mine establishment will take place over one year, although some of the capital expenditure will continue into the second and third years of the mine's lifespan. The R476 million (2016 prices) of investment planned to be spent during this stage, over a period of three years, will increase the production output of the national economy by R819.7 million (2016 prices). This denotes that for every R1 spent, a R1.72 increase in production within the South African economy will ensue.

Approximately R207.7 million (2016 prices) of the production output generated, as a result of the construction activities, will be triggered by indirect effects of production-prompted effects; i.e. by companies that will be supplying inputs and services to the contractors and engineering firms operating on site. The indirect effects during the construction period will be distributed throughout the country depending on the location of the suppliers.

Mining preparations and construction activities will stimulate the creation of new temporary employment opportunities through both direct and indirect effects that will resultantly increase household income. This will in turn stimulate sales in a variety of sectors through an increased household's consumption. About R140.9 million (2016 prices), or 16%, of the production output generated by the project will be as a result of consumption induced effects. The sectors benefitting the most from induced effects are the manufacturing sector, real estate and business services, and trade and accommodation. Although the

majority of new business sales stimulated through consumption induced effects will be distributed throughout the country, a portion of it will be captured by the local economy.

Table 4-1 Impact on Production during construction (R million) (2016 prices)

Sector	Direct	Indirect	Induced	Total	Percentage (Total)
Agriculture	-	R0.0	R1.4	R1.4	0.2%
Mining	R476.0	R56.7	R0.6	R532.0	64.9%
Manufacturing	-	R36.9	R54.9	R90.9	11.1%
Electricity	-	R2.0	R3.5	R5.4	0.7%
Water	-	R0.0	R1.5	R1.5	0.2%
Building and Construction	-	R20.3	R2.5	R22.3	2.7%
Trade and accommodation	-	R27.3	R16.8	R43.4	5.3%
Transport and storage	-	R20.5	R12.0	R32.0	3.9%
Financing	-	R5.6	R15.3	R20.7	2.5%
Real estate and business services	-	R33.6	R20.9	R53.7	6.5%
Government services	-	R3.9	R7.8	R11.6	1.4%
Other	-	R0.9	R3.8	R4.7	0.6%
Total	R476.0	R207.7	R140.9	R819.7	100.0%

Urban-Econ Modelling based on data supplied by client

Temporary increase in production during construction			
Impact Description: The impact takes place due to the investment on the project that will be spent in the country. Besides the direct impact, it involves the indirect and induced effects that are created when either suppliers of goods and services to the project experience an increase in demand, or when businesses servicing households experience an increase in demand for their products.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Medium-term (3)	The construction phase will last for one year	Moderate Positive (+78)
Extent	National (6)	Production increase will affect the entire country	
Intensity x type of impact	Average to Intense (+4)	The national economy's output will increase by R819.7 million	
Probability	Highly Probable (6)	It is most likely that there will be a temporary increase in production during construction	
Enhancement Measures			
The impact is positive; measures to maximise the stimulation of the economy may include procurement of goods and services from local business where feasible.			
Post Enhancement Measures: Enhancement measures will not change the rating.			
Duration	Medium-term (3)	The construction phase will be for one year	Moderate Positive (+78)
Extent	National (6)	Production increase will affect the entire country	
Intensity x type of impact	Average to Intense (+4)	The national economy's output will increase by R819.7 million	
Probability	Highly Probable (6)	It is most likely that there will be a temporary increase in production during construction	

4.2.2 Impact on GDP

A country's Gross Domestic Product (GDP) is the total value of all "final" goods and services, which were produced within the borders of the country, in a period of a year. Most of the investment activities in the country are associated with a value-adding activity, which has a positive impact on the Gross Domestic Product per Region (GDP-R).

Table 4-2 indicates that the direct expenditure into the establishment of Proposed Palmietkuilen Coal Mining Project will generate a direct R58.5 million worth of growth within the mining sector. Overall, the initial investment for the construction of the Palmietkuilen Coal Mine will inflate the South African GDP by R207.7 million. This is a lower than expected figure, due to the fact that:

- A large volume of mining equipment that will be procured for the establishment of the mine will be bought from a local representative of the global Original Equipment Manufacturer, i.e. it will be imported into the country and not manufactured locally; and
- Almost 22% of the total capital expenditure during the first three years will be directed towards land acquisition; such transactions have limited effect on value added creation.

In general, for every R1 spent on the establishment of the mine, approximately R0.44 will be generated in value added within the South African economy. The Gauteng Province is expected to realise the largest effect on GDP due to the specialised goods and services related to mining requirements offered within the province.

The indirect-impact is projected to create R91.6 million in value added within the national economy. Sectors forecast to greatly benefit from the indirect impacts include the Mining Sector, Trade and Accommodation, Real Estate, and Business Services. As encountered within production, the growth resulting from the production induced impact will cause employment numbers and the related salary costs to increase throughout the economy. The consequent consumer-induced effect will offer stimulus sector-wide; the induced impact is projected to create approximately R57.3 million in value added within the national economy. The Manufacturing Sector will experience the greatest value added due to consumption stimulation.

Table 4-2 Impact on GDP during construction (R' million) (2016 prices)

Sector	Direct	Indirect	Induced	Total	Percentage (Total)
Agriculture	-	R0.0	R0.7	R0.7	0.4%
Mining	R 58.5	R30.6	R0.4	R89.8	43.2%
Manufacturing	-	R9.1	R14.3	R23.4	11.3%
Electricity	-	R1.0	R1.9	R2.9	1.4%
Water	-	R0.0	R0.5	R0.5	0.3%
Building and Construction	-	R6.2	R0.7	R6.8	3.3%
Trade and accommodation	-	R13.6	R8.1	R21.7	10.4%
Transport and storage	-	R8.6	R5.1	R13.7	6.6%
Financing	-	R3.3	R9.2	R12.5	6.0%
Real estate and business services	-	R16.6	R10.4	R27.0	13.0%
Government services	-	R2.0	R3.9	R5.9	2.8%
Other	-	R0.6	R2.2	R2.8	1.3%
Total	R 58.5	R91.6	R57.3	R207.7	100.0%

Urban-Econ Modelling based on data supplied by client

Temporary increase in the country's GDP during construction			
Impact Description: The impact is generated through capital expenditure that heightens activity in the economy. It results in growth of sectors that include businesses supplying goods and services necessary for the development of the mine and businesses that benefit from the increased consumer expenditure.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Medium-term (3)	The construction phase will span for a year.	Minor Positive (+72)
Extent	National (6)	Increase in GDP will have an impact across the country	
Intensity x type of impact	Average but not widely spread (+3)	The national economy's GDP will increase by R207.7 million	
Probability	Highly Probable (6)	It is most likely that there will be a temporary increase in GDP during construction	
Enhancement Measures			
<ul style="list-style-type: none"> • Recruit local labour • Sub-contract to local construction companies • Use local suppliers where viable and arrange with the local Small and Medium and Micro Enterprises to provide transport, catering and other services for the construction crew 			
Post Enhancement Measures: Enhancement measures will not increase the significance rating but will assist with increasing the benefits felt by the local economy.			
Duration	Medium-term (3)	The construction phase will span for a year.	Minor Positive (+78)
Extent	National (6)	Increase in GDP will have an impact across the country	
Intensity x type of impact	Average but not widely spread (+3)	The national economy's GDP will increase by R207.7 million	
Probability	Highly Probable (6)	It is most likely that there will be a temporary increase in GDP during construction	

4.2.3 Impact on employment

Info Box: Full Time Equivalent (FTE) man-year or FTE jobs

Employment impacts are calculated in terms of the Full Time Equivalent employment positions, which is the same as a FTE job or one man-year of work. This does not directly translate into the headcount of people employed or into the new job opportunities. Generally, one FTE man-year is equal to one person working for 40 hours per week for about 50 weeks per year; however, it could vary depending on the industry.

An FTE man-year means that if one person worked only 20 hours per week for 50 weeks in a year, its FTE equivalent would be 0.5; if two people worked for 20 hours per week for 50 weeks in a year, the combined work load would be estimated as one FTE man-year or one FTE job. In the short-term, an increase in FTE employment positions could be absorbed by the existing workforce either by working overtime or if these labour resources are underutilised in the industry.

The municipality perceives mining as an opportunity sector in terms of the notable potential employment it can create. Approximately 6 985 people in the Lesedi LM are unemployed (Urban-Econ calculations

based on Quantec, 2016). However, unemployment has been lessening over the past five years in the Lesedi LM. This is attested by the constant decrease in the number of unemployed working-age individuals and the increase of the number of employed working age individuals, annually. The proposed project will also consequently assist in the continuation of this trend.

The establishment of the proposed mine is expected to create 739 FTE man-years over the construction period, most of which will be created during the first year of the mine's project lifespan:

- About 168 FTE man-years or 19% will be created on site itself during the first year of construction. Due to the nature of the work involved in the construction of the mine, the majority of positions made available on site are expected to be of a semi-skilled nature, which can be occupied by individuals with limited skills and experience. Therefore, these direct jobs are expected to be made available for the local community during mine establishment. Overall, about 136 positions are expected to be filled by workers from the local communities.
- In addition, 313 FTE man-years will be established through indirect impacts during the construction phase, while the rest (258 FTE man-years) will be created through consumption induced impacts. Real Estate and Business Services are expected to incur the highest increase in labour through indirect and induced effects.

Table 4-3: Impact on employment during construction (R million) (2016 prices)

Sector	Direct	Indirect	Induced	Total	Percentage (Total)
Agriculture	-	0	10	11	1.5%
Mining	168	26	0	194	26.2%
Manufacturing	-	14	21	35	4.8%
Electricity	-	1	1	2	0.2%
Water	-	0	0	1	0.1%
Building and Construction	-	18	2	21	2.8%
Trade and accommodation	-	57	36	93	12.6%
Transport and storage	-	25	12	37	4.9%
Financing	-	25	71	97	13.1%
Real estate and business services	-	142	90	232	31.4%
Government services	-	4	9	13	1.8%
Other	-	1	4	5	0.6%
Total	168	313	258	739	100.0%

Urban-Econ Modelling based on data supplied by client

Creation of employment opportunities during construction			
Impact Description: The impact is generated through capital expenditure that shocks the economy. It involves the creation of direct new job opportunities related to the construction of the proposed development and employment opportunities that will be indirectly created through the increased expenditure in sectors supplying goods and services for the construction of the mine and in sectors benefiting from the increase of consumer expenditure.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Medium-term (3)	Individuals will be employed over a one year construction period	Minor Positive (+72)
Extent	National (6)	Increase in employment will affect the entire country	
Intensity × type of impact	Average but not widely spread (+3)	Will create about 739 FTE man-years	

Probability	Highly Probable (6)	It is most likely that there will be a temporary increase in employment during construction	Minor Positive (+78)
Enhancement Measures			
<ul style="list-style-type: none"> • Use labour intensive construction methods, where feasible • Sub-contract to local construction companies • Use local suppliers • Set-up a skills desk at the local municipal office and in the nearby communities to identify skills available in the community and assist in recruiting local labour during both construction and operation 			
Post Enhancement Measures: Enhancement measures could increase the impact on the local economy but would not change the total impact. Therefore, the weights assigned for the impact before improvement will not be affected.			
Duration	Medium-term (3)	Individuals will be employed over a one year construction period	Minor Positive (+78)
Extent	National (6)	Increase in employment will affect the entire country	
Intensity x type of impact	Average but not widely spread (+3)	Will create about 739 FTE man-years	
Probability	Highly Probable (6)	It is most likely that there will be a temporary increase in employment during construction	

4.2.4 Impact on skills development

A third of the employed people in the Lesedi LM are semi-skilled, just under a quarter are low-skilled and 14% are skilled. The Proposed mine will provide a platform for low-skilled and semi-skilled people to develop and attain new skills. The construction of the proposed mine will require general construction experience as well as some mining-related expert knowledge. Workers already adept in particular skills will sharpen their abilities. Although the construction phase will be temporary, the impact on skills development is sustainable and has a positive impact on the employability of the affected individuals in the future.

Skills development during construction			
Impact Description: The impact takes place during the creation of new employment opportunities, and unlike the actual employment created, is sustainable.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Medium-term (3)	Skills development will result from employment opportunities generated during the one year period	Minor Positive (+40)
Extent	Municipal Area (4)	Skills will be transferred to workers sourced from the municipality	
Intensity x type of impact	Average but not widely spread (+3)	Average impact on local employees' skills	
Probability	Probable (4)	It is likely that there will be skills transfer during construction	
Enhancement Measures			
<ul style="list-style-type: none"> • Ensure that the main contractor shares knowledge with the sub-contracting companies during the construction period. 			

<ul style="list-style-type: none"> Encourage the main contractor to offer internships and learnerships, especially to those coming from the local communities 			
Post Enhancement Measures			
Duration	Medium-term (3)	Skills development will result from employment opportunities generated during the one year period	Minor Positive (+50)
Extent	Municipal Area (4)	Skills will be transferred to workers sourced from the municipality	
Intensity × type of impact	Average but not widely spread (+3)	Notable impact on local employees' skills	
Probability	Likely (5)	It is likely that there will be skills transfer during construction	

4.2.5 Impact on household income

Household earnings are closely associated with trends in employment and as such will be positively affected by the increase in FTE person-years resulting from the investment into the mine's establishment, as discussed. The creation of 739 direct, indirect and induced FTE man-years during the construction period will temporarily increase affected households' income to the value of R112.9 million in 2016 prices. Approximately 48% of this will be earned by households whose members will be working at the project site itself. It is anticipated that most of this direct income earned by households will remain in the local communities. Additionally, an improvement in the standard of living of the benefiting households will occur, albeit temporarily.

Businesses supplying inputs to the mine's establishment are expected to indirectly benefit and earn R33.7 million in household income (2016 prices). Due to increased household consumption induced through the creation of direct and indirect employment opportunities, an additional R25 million will be earned by households in South Africa. Overall, trade and accommodation, mining, and the manufacturing sectors will have the greatest gains in household income.

Table 4-4: Impact on Household Income (R million) (2016 prices)

Sector	Direct	Indirect	Induced	Total	Percentage (Total)
Agriculture	R0.0	R0.0	R0.2	R0.2	0.1%
Mining	R5430	R8.0	R0.1	R62.5	55.3%
Manufacturing	R0.0	R4.6	R6.5	R11.1	9.8%
Electricity	R0.0	R0.4	R0.7	R1.1	1.0%
Water	R0.0	R0.0	R0.2	R0.2	0.1%
Building and Construction	R0.0	R2.6	R0.3	R2.9	2.6%
Trade and accommodation	R0.0	R6.4	R3.8	R10.1	9.0%
Transport and storage	R0.0	R3.4	R1.8	R5.2	4.6%
Financing	R0.0	R1.4	R4.0	R5.4	4.8%
Real estate and business services	R0.0	R5.0	R3.3	R8.3	7.4%
Government services	R0.0	R1.4	R2.4	R3.8	3.4%
Other	R0.0	R0.4	R1.6	R2.0	1.8%
Total	R54.3	R33.7	R24.9	R112.9	100.0%

Urban-Econ Modelling based on data supplied by client

Temporary increase in household income during construction			
Impact Description: Household income will result due to jobs created through direct, indirect and induced effects.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Medium-term (3)	Household earnings will be attained by employees for duration of one year	Minor Positive (+72)
Extent	National (6)	Increase in income will affect households of local workers as well as workers benefitting through multiplier effect throughout the country	
Intensity x type of impact	Average but not widely spread (+3)	Household earnings will be derived by individuals involved in the mine establishment	
Probability	Highly Probable (6)	It is most likely that household income will temporarily increase	
Enhancement Measures			
<ul style="list-style-type: none"> • Employ labour intensive methods in construction • Sub-contract to local construction companies • Use local suppliers where viable and arrange with the local Small and Medium Enterprises to provide transport, catering, and other services for the construction crew 			
Post Enhancement Measures: improvement measures could increase the impact on the local economy but would not change the total impact. Therefore, the weights assigned for the impact before improvements will not be affected.			
Duration	Medium-term (3)	Household earnings will be attained by employees for the duration of one year	Minor Positive (+72)
Extent	National (6)	Increase in income will affect households of local workers as well as workers benefitting through multiplier effects throughout the country	
Intensity x type of impact	Average but not widely spread (+3)	Household earnings will be derived by individuals involved in the mine establishment	
Probability	Highly Probable (6)	It is most likely that household income will temporarily increase	

4.2.6 Impact on Government Revenue

The construction phase of the Proposed Palmietkuilen Coal Mine will span for a period of one year, although some capital equipment will be purchased during the second and third year of the mine's ramp up period. Regardless of the duration of the construction phase, as a result of capital expenditure on the project, companies will be generating a revenue and employ people. From this, companies are obliged to pay the government income taxes and payroll taxes. Additionally, increased spending power will translate into more purchases, which would increase the Value Added Tax base for government. The various tax received by government improves government's ability to deliver services and an increase in national fiscus will prevail.

Increase in Government Revenue during construction

Impact Description: The impact will occur due to local expenditure on construction and will be acquired by government through indirect and direct taxes.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Medium-term (3)	Government Revenue due to construction activities will be derived for a period of one year.	Minor Positive (+72)
Extent	National (6)	Government Revenue may filter through the three spheres of government.	
Intensity x type of impact	Average but not widely spread (+3)	Increase in government revenue will remain in the domain of government.	
Probability	Highly Probable (6)	It is most likely that tax will be paid.	
Enhancement Measures			
No enhancement.			
Post Enhancement Measures			
Duration	Medium-term (3)	Government Revenue due to construction activities will be derived for a period of one year.	Minor Positive (+72)
Extent	National (6)	Government Revenue may filter through the three spheres of government.	
Intensity x type of impact	Average but not widely spread (+3)	Increase in government revenue will remain in the domain of government.	
Probability	Highly Probable (6)	It is most likely that tax will be paid.	

4.2.7 Impact on agricultural production due to sterilisation of productive agricultural land

The project area and surrounding areas are dominantly characterised by agricultural activity, non-operational and operational mining activity and agricultural holdings, with pockets of industrial activity. The main agricultural activities are maize farming, soya bean farming, as well as chicken farming. The agricultural dominance can be attributed to the high land capability. One municipal official stated that the municipality is working towards developing local agro-processing sector; thus, accentuating the importance of having access to local agricultural land now, and in the near future.

The proposed project will sterilise all surface areas that will be affected by the footprint of the mine and its infrastructure as indicated in Map 4-1. This will have adverse effects on the agricultural activity taking place in the area and in the municipality. A loss of 140 Ha of land for irrigated crops and 1 749 Ha of land for dry land crops is envisaged to ensue.



Map 4-1: Project Infrastructure Footprint

The Gauteng Province contributes 5% to national maize production and 7% to soya bean production. Thus, at a national scale, the Gauteng Province is not a key producing province for maize and soya beans. However, collectively, farms in the Lesedi LM make a notable contribution towards the above-mentioned productions in the province.

It should be noted that productive utilisation of agricultural land is key to the food security in the country. However, in the past few years, the area under maize has seen large upward and downward fluctuations, while the area under soya and dry beans, for example, has been steadily increasing. Production of soya beans, as a result, has seen a staggering increase of 50% between 2010/2011 and 2014/2015 (from 710 000 t to 1 070 000 t); while production of dry beans almost doubled, and grew from 46 000 t in 2010/2011 to 81 000 in 2014/2015. The situation with maize production has seen a somewhat different trend, but when compared to 2010/2011, the area under maize was slightly bigger but the production was slightly smaller.

One of the biggest threats to the retention of productive agricultural land is the conflict between agriculture and mining land uses. An analysis of the Mpumalanga area, adjacent to the current project area, has revealed a trend of mining developments taking over agricultural land (BFAP, 2012). In the long term, therefore, food security may be under threat if the trend continues and large-scale cumulative effects ensue.

According to the owner of the land, where the proposed project is to be established, there is no alternative location for the continuation of agricultural activity. Inherently, the supply of agricultural produce derived from the land currently used for agricultural activities, but sterilised once the mine is established, to the provincial grain market and exports will cease. As indicated in the next table, it is estimated that the losses will equate to the following volumes in the context of 2014/2015 yields:

- about 0.07% and 1.5% of maize production in South African and Gauteng, respectively;
- approximately 0.1% and 1.6% of production of soya beans in South African and Gauteng, respectively; and
- about 1.1% and 19.7% of dry beans production in in South African and Gauteng, respectively.

Overall it is clear that the sterilisation of land due to the mining activity will have a minor negative effect on production of maize and soya beans in the Gauteng Provinces, but will be significant in the context of the current production of dry beans in Gauteng. In the context of the South African economy, though, the production losses will be small and should not pose an immediate threat to food security in the country. However, the consideration of the losses on the proposed site together with the losses observed in the other parts of the country, the risks do exist, particularly if the affected land is considered to be a high productive arable land.

Table 4-5: Loss of agricultural land and production in the context of SA and Gauteng agricultural land and production

Indicator	Maize	Soya beans	Dry beans
Site related information			
Area (ha)	945	472	472
Yield (t/ha)	7.5	2.3	2
Estimated production (t)	7 088	1 086	944
Loss in the context of SA			
Area planted in SA (2014/2015, ha)	3 048 000	687 000	64 000
Production in SA (2014/2015, t)	10 629 000	1 070 000	81 000
Sterilised land in %	0.03%	0.06%	0.7%
Lost production/yields in %	0.07%	0.1%	1.1%
Loss in the context of Gauteng			
Production in Gauteng (2014/2015, t)	486 000	69 000	4 800
Lost production/yields in %	1.5%	1.6%	19.7%

(Urban-Econ calculations based on interviews with the land owners and DAFF, 2016)

One landowner raised a concern over the spill-over effects on the local economy where land sterilisation will lead to the unsustainability of affected businesses in the area, leading some businesses to close and thus exacerbate unemployment. Overall, considering the agricultural area that will be subjected to the sterilisation as a result of the proposed project, approximately R38 000 000 in annual agricultural production will be forfeited, which is equivalent of 10.7% of agricultural production in the Lesedi LM and 0.02% of agricultural production in the country. The loss of direct agricultural production will have some negative effect on the businesses that supply inputs to the farmers, i.e. fuel, seeds, pesticides, fertilisers, utilities, etc., which will increase the footprint of the impact to the regional scale.

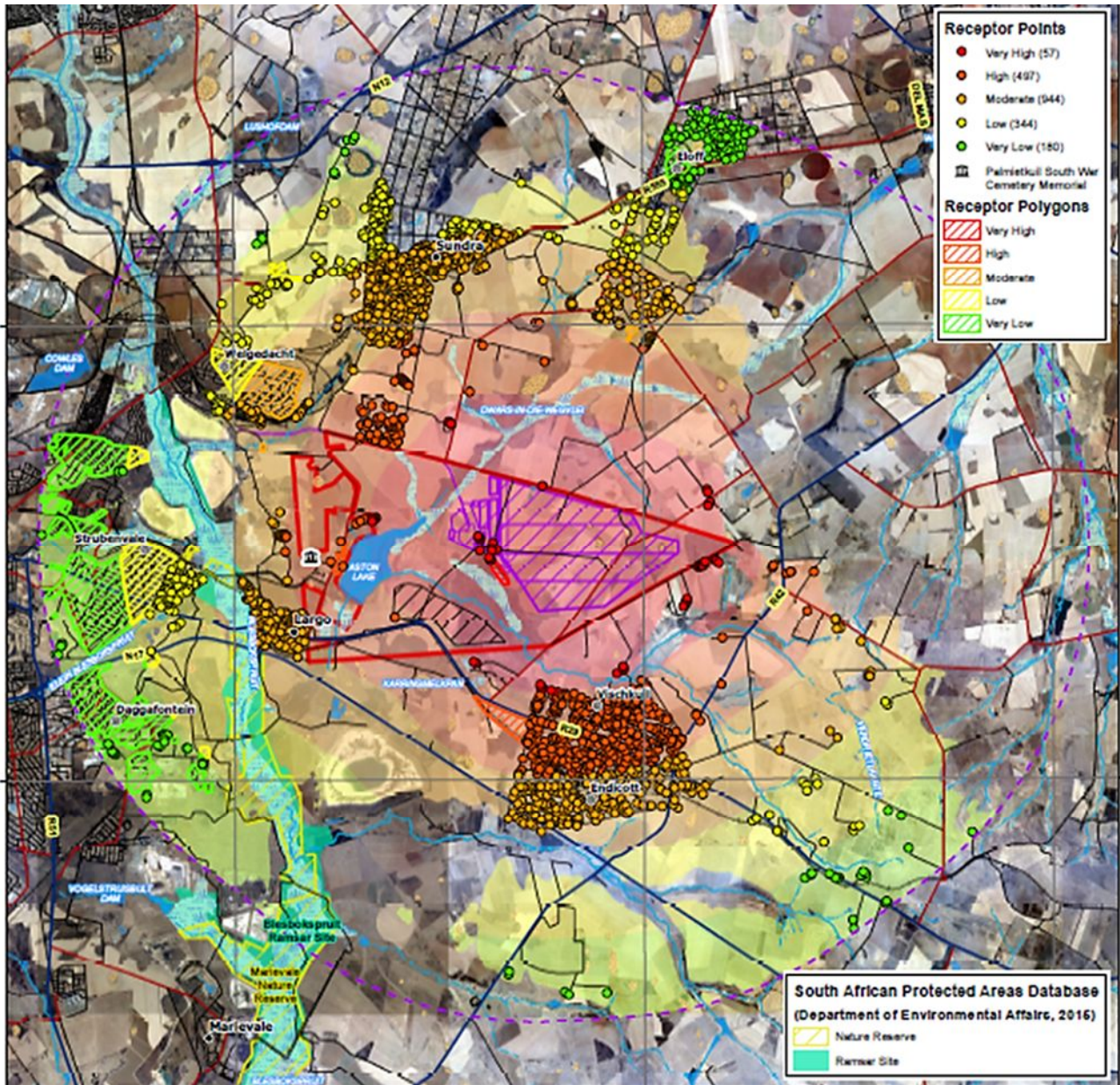
Impact on agricultural production due to sterilisation of productive agricultural land			
Impact Description: The impact will take place as a result of land sterilisation thus, halting agricultural production that is taking place on site at the moment. It should be noted that the land is currently considered as high potential arable land and is used for crop cultivation.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Permanent (7)	Land sterilisation and specifically unavailability of productive arable land will continue beyond the project life	Major Negative (-112)

Extent	Regional (5)	Although the direct losses will be local, a region-wide effect is expected due to spill over effects.	
Intensity x type of impact	Moderate loss (-4)	Loss of agricultural production to the value of R38 million or 10.7% of the province's agricultural sector output.	
Probability	Definite (7)	A loss of agricultural activity is definite.	
Mitigation Measures			
<ul style="list-style-type: none"> • The establishment of the mine should be done with a minimal impact on the agricultural land and on the footprint of the properties • Engage with directly affected farmers and landowners on alternative farming locations and investigate ways to minimise loss of agricultural production. • Off-set impact by training local small-scale farmers as stated in SLP in order to have no net loss. • If feasible, continue utilising land not affected by the mine's footprint for agricultural production. • Where possible, ensure that land preparation and rehabilitation activities implemented during various staged of the mine's lifecycle allow for restoration of land to above-grazing capacity, i.e. suitable for crop production. 			Moderate Negative (-98)
Post Mitigation Measures			
Duration	Beyond project life (6)	Proposed management mitigations could allow the land to be returned to agricultural land post-mining activity; although possibly not to the same productive potential.	
Extent	Region (5)	Loss of agricultural production will remain on the regional scale.	
Intensity x type of impact	Moderate loss (-3)	Off-setting the impact could reduce the intensity, but will continue to impact negatively on agricultural production.	
Probability	Definite (7)	A loss of agricultural activity is definite.	

4.2.8 Potential Negative Impact on Property Values

The quality of life sought by rural residents reflects the many desirable attributes of rural settings including peace, solitude and proximity to nature. Farmers in particular, prefer arable land, adequate access to water, and access to transport routes amongst others. A mining development may alter this state of environment. Landowners raised concerns that the development of the mine will reduce the marketability of farms and diminish their land values. The general perception is that open pit mining is undesirable as it requires the removal of virtually all vegetation, topsoil and subsoil to access resource. As a result, natural habitats and pre-existing stream flows are disrupted (Hui, 2007).

Studies indicate that an open pit mine, like landfills and other disamenities may lower the market value of properties (Neelawala, 2012; Williams, 2011; Hui et al, 2007; Chicoine,1981). The distance from the disamenities is a key factor, given that the closer a property is to an undesirable land use, the lower the property value may be (Williams, 2011). Map 4-2 below demonstrates that most receptors in the immediate surrounding areas will have moderate visual exposure to the mine. The receptors with high visual exposure and thus potentially lower property values are located on Farms Vischkuil, Geigerle and portions of Strydpan.



Map 4-2: Visual Exposure from Coal Mine (Digby Wells Environmental, 2016)

In addition, the negative attributes associated with disamenities creates negative perceptions about the area and deters potential buyers. In this case, the pre-construction awareness currently being spread about the proposed coal mine has shifted perceptions about the area and likely discouraged prospective buyers.

An additional concern raised by landowners has been water availability. Many of the farms rely on irrigation to derive their primary income and any impact on water availability for these farms would most likely reduce their value to potential buyers. Water scarcity on agricultural land, renders an area less attractive to existing and potential future farmers.

Real estate agents have revealed that the property market in the area surrounding the project site has been relatively down due to numerous factors such as the distance from town, the unwillingness of banks to offer 100% loans for plots, water availability and poor infrastructure. One of the real estate agents also argued that the establishment of the mine may not have a greater negative impact on property values than the squatter settlement in Vischkuil.

Overall, the establishment of the mine may prolong the low activity in the property market in the area, but considering the analysis of property value presented earlier in the report, it can be argued that only the farms with irrigated land in the direct proximity to the project site and Aston Lake land portions are likely to be slightly negatively impacted by the development of the mine.

Contrary to afore-discussed issues, one of the real estate agents perceived an increase in the property market activity due to the influx of people into the area as a result of the mine. He argued that long term and short term accommodation will be a necessity for migrant labour.

Potential Negative Impact on Property Values			
Impact Description: The impact will take place as a result of the change in the state of environment which may reduce the property market activity and make some of the properties less desirable/attractive for selected buyers.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Project life (5)	The impacts will span beyond the construction phase and throughout operations.	Minor Negative (-65)
Extent	Municipal area (4)	Impact will occur on development site and affect surrounding premises, i.e. beyond the project site.	
Intensity x type of impact	Moderate Negative (-4)	Moderate disturbance of state of environment.	
Probability	Likely (5)	The impact will likely take place.	
Mitigation Measures			
<ul style="list-style-type: none"> • Mitigation measures proposed by visual and noise specialists should be strictly adhered to, to minimise the probability and intensity of the visual exposure in the area. • Independent appraisals of properties and land values in the area adjacent to the site to determine the baseline before the project's implementation is advisable • Educate and inform the affected parties on the potential environmental impacts that could ensue and the activities to adequately manage perceptions regarding potential effects of the project on the surrounding land uses 			
Post Mitigation Measures			
Duration	Project life (5)	The impacts will span beyond the construction phase and throughout operations.	Minor Negative (-48)
Extent	Municipal area (4)	Impact will occur on development site and affect surrounding premises, i.e. beyond the project site.	
Intensity x type of impact	Moderate Negative (-3)	Moderate disturbance of state of environment.	
Probability	Probable (4)	The impact will likely take place.	

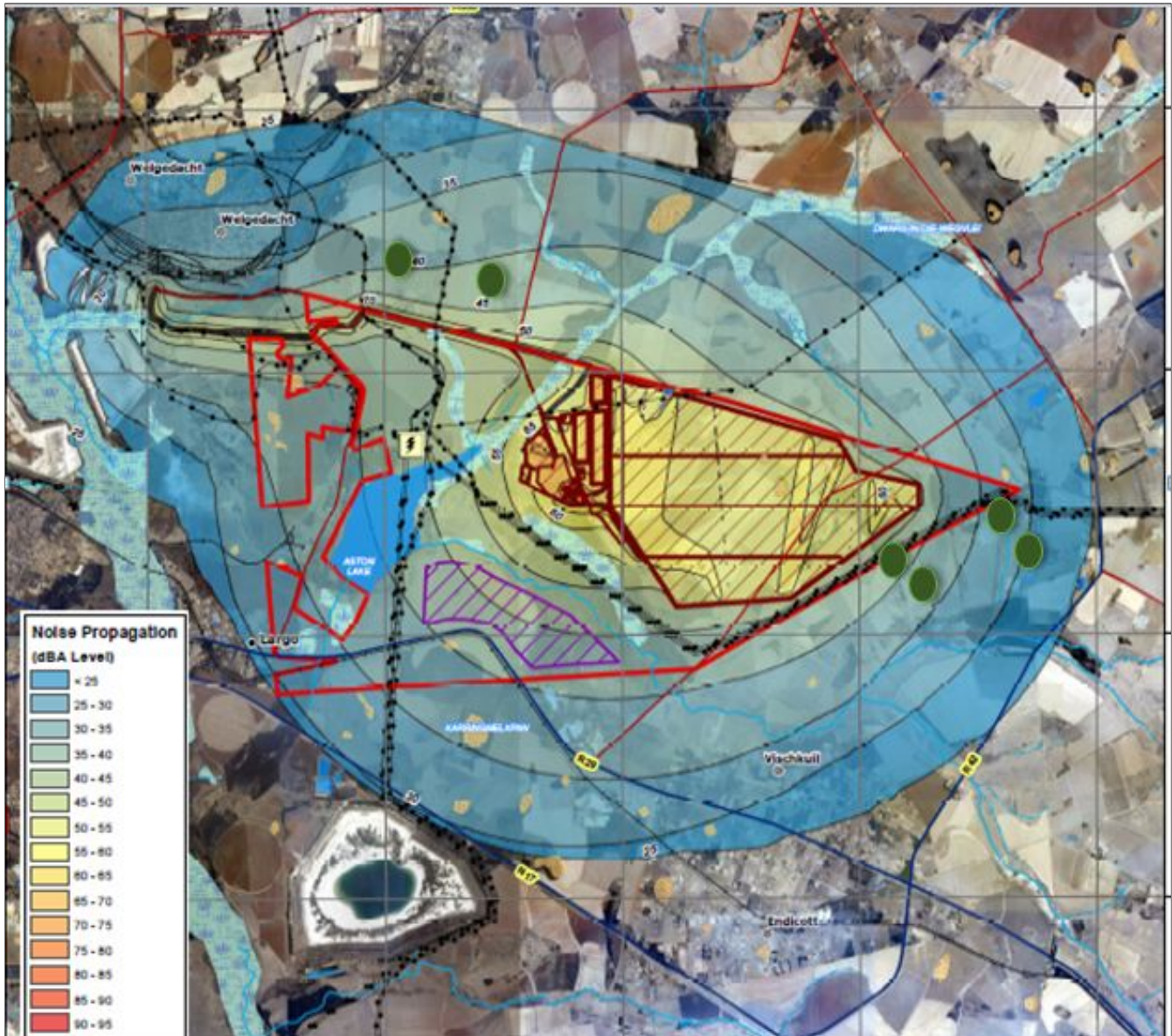
4.2.9 Potential Negative Impact on the egg industry and its value chain due to potential environmental effects exerted by the mine during both construction and operations

The proposed mine is surrounded by a large activity of chicken farming. There are 19 chicken farms within a 10km radius around the project area, represented by the small green points on Map 4-2. The nearest five chicken farms to the mining footprint have been analysed, due to their close proximity to the proposed open pit coal mine. These farms are all within 3.5km from the project footprint, and are demonstrated with large green points on Map 4-3. It is assumed that these facilities are likely to be subject to negative externalities from mining activities and environmental factors.



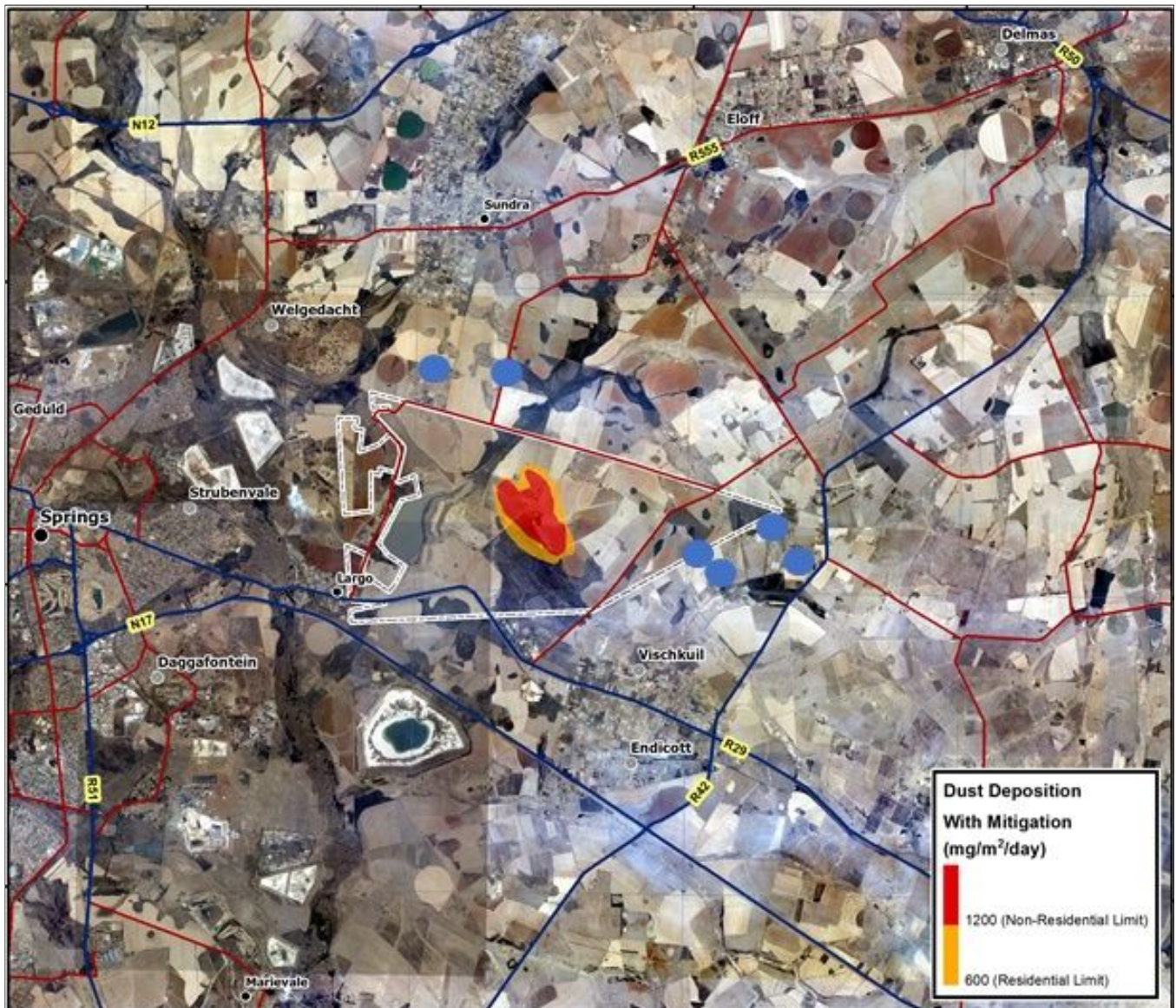
Map 4-3: Chicken Farms within 10km radius of proposed project area

The proposed coal mine is considered a causative source of **noise pollution**. The selected chicken farms are located in the region where noise propagation is between 30 and 45 dBA during construction and operations (Sadler, 2016). The noise specialist deduced that the expected noise as a result of construction and operation activities will not likely cause a noise disturbance in terms of the Gauteng Noise Control Regulations at any receptor within the Gauteng Province (Sadler, 2016). As is evident on Map 4-3, noise propagation is most extreme at the infrastructure footprint and decreases outward.



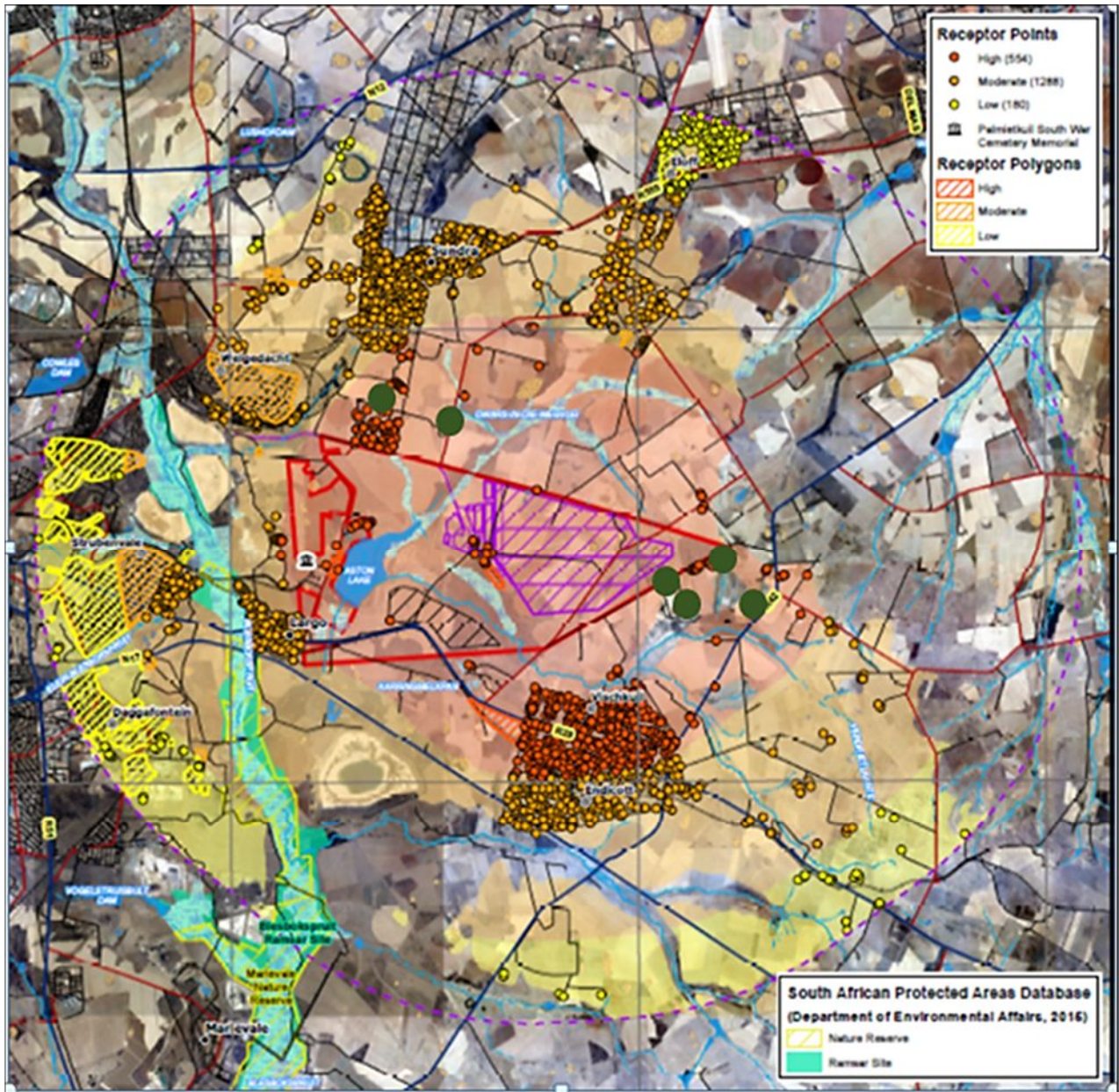
Map 4-4: Noise Propagation from Coal Mine (Sadler, 2016)

In terms of air quality, **dust deposition** will deteriorate the current air quality and may affect chicken farming. However, the air quality specialists argue that with mitigation measures applied, the dust effects will be solely constrained to the mining footprint and Umbila Township, as indicated in Map 4-5 below. Therefore, chicken farming may not be affected if mitigation measures are adequately implemented.



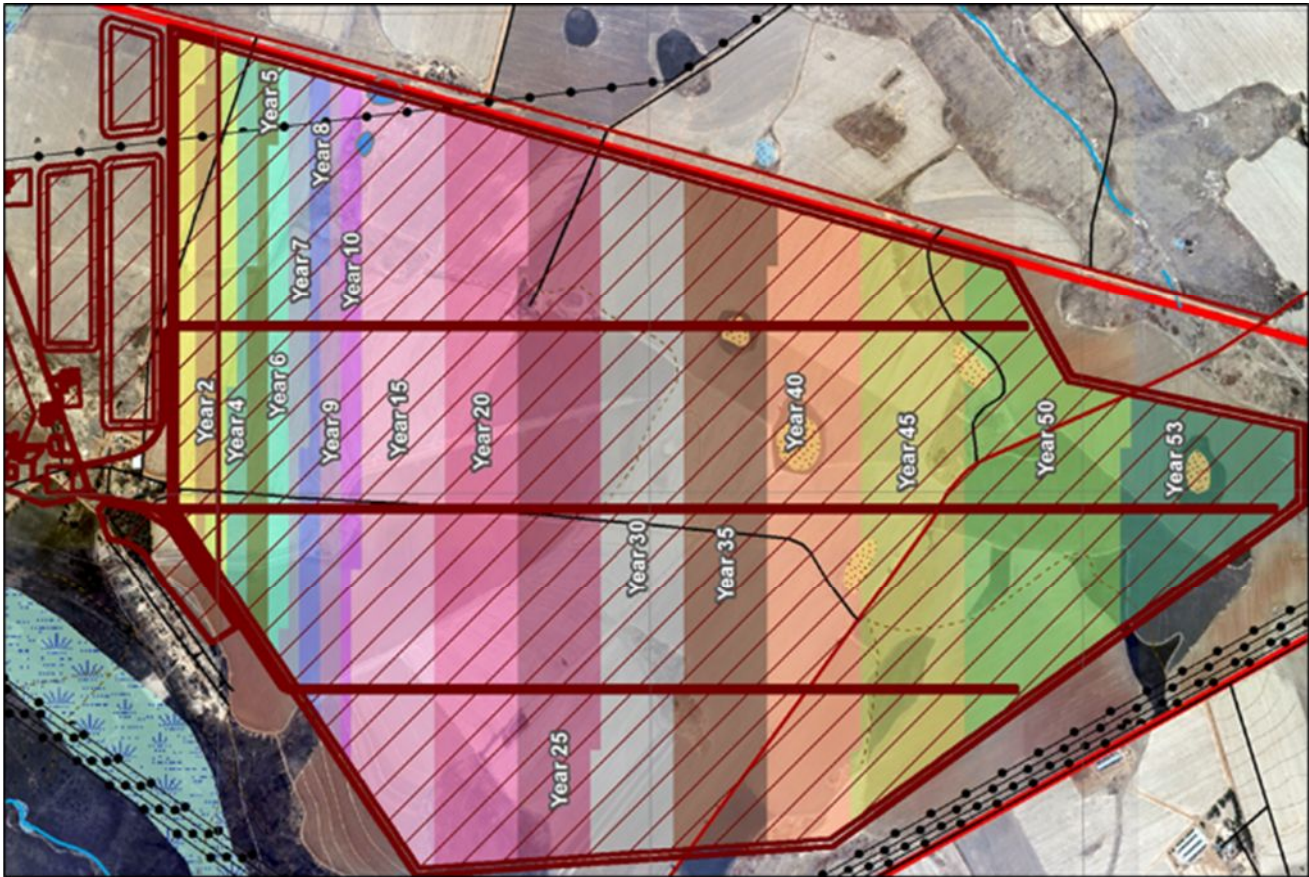
Map 4-5: Dust Deposition with Mitigation (Digby Wells Environmental, 2016)

An additional environmental factor that may affect chicken farming is the **light intrusion during night time**. According to Map 4-6, the chicken farms are situated in areas of moderate to high visual exposure. This may have negative impacts on the chicken farming.



Map 4-6 Night time Visual Exposure (Digby Wells Environmental, 2016)

It is imperative to note that mining activity is not set to take place in one area for the lifespan of the mine; thus, the continuation of chicken farming may not be affected for the entire construction and operation phase but will be affected during certain periods. Mining operations are set to expand in an easterly direction, as indicated in Map 4-3 above. Therefore, the mining impact will increase towards Farm Vischkuil and away from Farm Droogfontein, on an annual basis. This insinuates that mining impacts will lessen for chicken farms on the Farm Droogfontein and worsen for Farm Vischkuil over time. In this case, chicken farming will not cease but may need mitigation measures for periods of highest impact.



Map 4-7 Mining Operations per year and per location

Having discussed the environmental factors, the next section outlines the scale of chicken farming and the extent that these negative impacts may have on chicken farming.

Numerous attempts have been made to obtain the economic activity information from the adjacent landowners of the five closest chicken farms; however, these telephonic and email interactions have not yielded any success. Due to this lack of primary information, estimations were made based on the assumptions derived from South African Poultry Association (SAPA) reports and statistics, as well as Department of Agriculture, Forestry and Fishery (DAFF) and Stats SA data.

Given the assumptions outlined in the beginning of the report, the following estimates of economic activities could be determined for the chicken farms located in the immediate zone of influence of the project:

Table 4-5: Estimations of chicken farming production, revenue and employment in the zone of influence

Farm Portion	Number of layers and layer facilities	Dozens of eggs produced per week	Revenue		Number of Employees
			Weekly	Annual	
Portion 5 and 6 of Farm Vischkuil 274	188 188 (7 layer facilities)	109 776	1.4	74.8	49-63
Portion 8 of Farm Vischkuil 274 (north)	214 500 (6 layer facilities)	125 125	1.6	85.2	56-72

Farm Portion	Number of layers and layer facilities	Dozens of eggs produced per week	Revenue		Number of Employees
			Weekly	Annual	
Portion 2 of Farm Vischkuil (south)	165 000 (4 layer facilities)	96 250	1.3	65.6	43-55
Portion 39 of Farm Droogfontein 242	211 068 (6 layer facilities)	123 123	1.6	83.9	55-71
Portion 33 of Farm Droogfontein 242	211 068 (6 layer facilities)	123 123	1.6	83.9	55-71
TOTAL	989 824 (29 layer facilities)	577 397	7.6	393.3	260-332

(Urban-Econ Estimations based on aforementioned assumptions)

From the estimated findings above, it is evident that the commercial chicken farming taking place on the adjacent properties is at a large scale and includes egg production. Over 100 000 layers are present at each chicken farm, producing total of over 570 000 dozens of eggs per week. It is also estimated that about R393 million is earned in turnover by the egg laying farms located in the zone of influence. Thus, collectively and separately, the chicken farms generate a notable revenue. Lastly, between 260 and 332 employees are estimated to work on the above-mentioned farms and benefit from income earnings.

In the case of a complete shutdown of operations due to any negative effects of mining establishment and activity during operations, a loss of all aforementioned chicken farming attributes will take place. More specifically:

- Firstly, the local agricultural sector will sharply contract losing R393 million in production output. Considering the number of hens and egg production observed in 2015 (refer to the earlier sections in the report), the loss will represent 4.0% of the total number of hens in the country and 4.6% of the eggs produced in South African in 2015.
- Secondly, Rossgro has operations on the farm portions in Vischkuil, where 60% of their egg produce is supplied to major supermarkets such as Checkers, Shoprite, Spar and Pick and Pay and 40% is supplied to smaller retailers and informal traders (Rossgro, 2014). This supply chain will be discontinued.
- Thirdly, a loss of income and employment for between 260 and 332 individuals and their families will occur. This entails the termination of once sustainable earnings for numerous households and a possible deterioration in their standard of living.
- Fourthly, the Rossgro website states that their operations are strategically located, and this enables the business to have low input costs. The relocation of chicken farming, if possible in this case, will need to take cognisance of these locational advantages and ensure that they are not lost.

Potential Negative Impact on the egg industry and its value chain			
Impact Description: The impact will take place as a result of mining activity externalities negatively affecting egg farming in the zone of influence.			
Dimension	Rating	Motivation	Significance
<i>Prior to Mitigation</i>			

Duration	Project life (5)	The effects will span beyond the construction phase, but will cease after closure.	Minor Negative (-60)
Extent	Regional (4)	Impact will not only be limited to the farms but will spill over the entire value chain of the egg industry, which is deemed to be spatially spread over the region	
Intensity × type of impact	Serious loss (-5)	Loss of over R393 million in agricultural output alone and potential shedding of between 260 and 332 jobs.	
Probability	Likely (5)	The impact may occur.	
Mitigation Measures			
<ul style="list-style-type: none"> • Engage with respective researchers and specialists to determine with greater certainty the effect that any negative environmental impacts could affect the production of eggs on the nearby egg farms. • Engage with adjacent landowners and compile the baseline, as well as monitor the effects of the mining activity on the production at the potentially affected farms. • In the event that the production is affected and proven to be the result of mining activity, engage with adjacent landowners and investigate appropriate alternatives suitable for all the parties to ensure overall production is not affected (relocation, expansion of other facilities, etc.). • Strictly adhere to environmental specialists recommendations’. 			
Post Mitigation Measures:			
Duration	Short-term (2)	The effects will be experienced for a short period or may be eliminated altogether.	Negligible Negative (-24)
Extent	Regional (4)	Impact will not only be limited to the farms but will spill over the entire value chain of the egg industry, which is deemed to be spatially spread over the region	
Intensity × type of impact	Minor loss (-2)	Could affect the strategic location of operations, however chicken farming continues.	
Probability	Unlikely (3)	Impact on the egg industry is unlikely.	

4.3 Impacts ensued during operational phase

4.3.1 Impact on production

The operations of the propose mine will produce on average 1.3 million tons of coal, which will yield R540.3 million (2016 prices) of business sales per annum. Due to the backward linkages and the multiplier effect associated with the consumption induced impacts, for every R1 of revenue generated by the mine directly, it will create an additional R1.15 in the rest of the South African economy. Therefore, the total annual impact on the production in the country will amount to R1 161 million per annum.

- The mine will have to acquire inputs from a variety of sectors such as trade and accommodation, transport and storage, and government services. These additional new business sales averaging R343.8 million (2016 prices) per year, will be created as a result of the indirect multiplier effect stimulated by operating activities of the mine. According to Table 4-5, manufacturing followed by trade and accommodation will experience the largest increase in production due to stimulus.

- The upsurge in household expenditure in the country, induced by the mine's activities, will further generate R 277.5 million (2016 prices) per annum. This expenditure pattern of households in South Africa will cause the manufacturing and real estate and business services to experience the largest increase in demand for their products and services. Considering that the mine will be located in the Lesedi LM and assuming that the entire production value will be accounted as part of the output of the municipality, the size of the Lesedi LM economy is expected to increase significantly.

Table 4-6: Impact on production during operations – per annum during steady state (R' million) (2016 prices)

Sector	Direct	Indirect	Induced	Total	Percentage (Total)
Agriculture	-	R 0.1	R 2.7	R 2.8	0.2%
Mining	R 540.3	R 52.6	R 1.3	R 594.1	51.2%
Manufacturing	-	R 93.8	R 108.4	R 202.2	17.4%
Electricity	-	R 8.8	R 6.9	R 15.7	1.4%
Water	-	R 0.8	R 2.9	R 3.7	0.3%
Building and Construction	-	R 2.9	R 4.9	R 7.8	0.7%
Trade and accommodation	-	R 61.2	R 33.1	R 94.2	8.1%
Transport and storage	-	R 39.5	R 23.9	R 63.4	5.5%
Financing	-	R 9.1	R 29.7	R 38.7	3.3%
Real estate and business services	-	R 37.4	R 40.8	R 78.2	6.7%
Government services	-	R 36.1	R 15.6	R 51.7	4.5%
Other	-	R 1.5	R 7.3	R 8.9	0.8%
Total	R 540.3	R 343.8	R 277.5	R 1 161.5	100.0%

Urban-Econ Modelling based on data supplied by client

The mine will operate for 51 years, with the ramp up period lasting for the first two years. Considering that the steady state production will last for 49 years, the mine will produce 60.7 million tons of coal over its lifespan and generate the revenue of R24.9 billion (2016 prices) in the process. Considering the multiplier effects, the total impact on the South African economy during the 51-year of the mine's lifespan will account to R53.6 billion in 2016 prices.

Temporary increase in production during operations			
Impact Description: The impact occurs due to the sustainable production of the mine, as well as procurement of goods and services for its operations and creation of employment opportunities through direct and indirect effects.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Project-life (5)	Production will cease after 47 years.	Moderate (positive) (+102)
Extent	National (6)	Production increase will affect the entire country due to direct and spill over effects.	
Intensity x type of impact	High Positive (+6)	The national economy's output will increase by R1 161.5 million per annum.	
Probability	Highly Probable (6)	It is most likely that there will be a sustainable increase in production during operations.	
Enhancement Measures			
Procurement of goods and services from local business where feasible, will increase benefits to the local economy, but will not change the rating.			

Post Enhancement Measures: Improvement measures will not change the significance of rating.			
Duration	Project-life (5)	Production will cease after 47 years.	Moderate (positive) (+102)
Extent	National (6)	Production increase will affect the entire country.	
Intensity x type of impact	High Positive (+6)	The national economy's output will increase by R1 161.5 million.	
Probability	Highly Probable (6)	It is most likely that there will be a sustainable increase in production during operations.	

4.3.2 Impact on GDP

The revenue generated by the mine, as discussed under production, will translate into R430.6 million (2016 prices) of value added annually and R19.9 billion (2016 prices) of GDP over the lifespan of the project. Assuming that the direct impact on GDP, i.e. R164.2 million, to be created on an annual basis will be registered within the municipal boundaries, it can be suggested that the Palmietkuilen Coal Mine operations will expand the current Lesedi LM GDP economy by 2.3%, while the mining sector's GDP increase by about 70%.

Through procurement expenditure, the operation of the mine will create an additional R153.7 million (2016 prices) of value added. The mining and manufacturing sectors will experience the greatest increase in this instance. In the case of increased household income and subsequent growth in household expenditure, a further stimulation will create R112.7 million of value added. Here, manufacturing, real estate and business services, and financing will experience the largest increase in value added. From Table 4-6, it is evident that the mining and manufacturing sectors are the dominant beneficiaries of the project's operations, and will comprise of 56.9% of all value added stimulated by the project through its direct and multiplier effects. In summation, the greater the value of goods and services procured by the mine during its operations from the local economy, the greater the overall economic benefit for the local municipality.

Table 4-7: Impact on GDP during operations (R' million) (2016 prices)

Sector	Direct	Indirect	Induced	Total	Percentage (Total)
Agriculture	-	R 0.1	R 1.4	R 1.5	0.3%
Mining	R 164.2	R 29.1	R 0.7	R 194.0	45.0%
Manufacturing	-	R 22.9	R 28.3	R 51.3	11.9%
Electricity	-	R 4.7	R 3.7	R 8.4	2.0%
Water	-	R 0.3	R 1.0	R 1.3	0.3%
Building and Construction	-	R 0.8	R 1.3	R 2.1	0.5%
Trade and accommodation	-	R 31.3	R 16.0	R 47.3	11.0%
Transport and storage	-	R 16.8	R 10.1	R 26.9	6.3%
Financing	-	R 5.5	R 17.9	R 23.4	5.4%
Real estate and business services	-	R 19.0	R 20.3	R 39.3	9.1%
Government services	-	R 22.4	R 7.7	R 30.0	7.0%
Other	-	R 1.0	R 4.3	R 5.2	1.2%
Total	R 164.2	R 153.7	R 112.7	R 430.6	100.0%

Urban-Econ Modelling based on data supplied by client

Temporary increase in the country's GDP during operations			
Impact Description: The impact is created through the continuous operation of the mine. This stimulates economic activities of directly and indirectly affected businesses. Subsequently, production is increased and value added is created. An additional value added is further created through household expenditure.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Project-life (5)	Value added due to production will cease after 47 years	Moderate (positive) (+96)
Extent	National (6)	GDP increase will affect the entire country	
Intensity x type of impact	Medium Positive (+5)	The national economy's value added will increase by R430.6 million pa and LM's GDP grow by 2.3%	
Probability	Highly Probable (6)	It is most likely that there will be a sustainable increase in production during operations	
Enhancement Measures			
• Explore local procurement prospects			
Post Enhancement Measures: augmentation though will not increase the significance rating but will assist with increasing the benefits felt by the local economy.			
Duration	Project-life (5)	Value added due to production will cease after 47 years	Moderate (positive) (+96)
Extent	National (6)	GDP increase will affect the entire country	
Intensity x type of impact	Medium Positive (+5)	The national economy's value added will increase by R430.6 million pa and LM's GDP grow by 2.3%	
Probability	Highly Probable (6)	It is most likely that there will be a sustainable increase in production during operations	

4.3.3 Impact on employment

Info Box: Full Time Equivalent (FTE) man-year or FTE jobs

Employment impacts are calculated in terms of the Full Time Equivalent employment positions, which is the same as a FTE job or one man-year of work. This does not directly translate into the headcount of people employed or into the new job opportunities. Generally, one FTE man-year is equal to one person working for 40 hours per week for about 50 weeks per year; however, it could vary depending on the industry.

An FTE man-year means that if one person worked only 20 hours per week for 50 weeks in a year, its FTE equivalent would be 0.5; if two people worked for 20 hours per week for 50 weeks in a year, the combined work load would be estimated as one FTE man-year or one FTE job. In the short-term, an increase in FTE employment positions could be absorbed by the existing workforce either by working overtime or if these labour resources are underutilised in the industry.

The propose mine will create 320 employment opportunities once steady state operations are reached. Approximately 30% of this labour will be sourced from Lesedi LM, 35% will be obtained from Gauteng, whilst the remaining 35% will be sourced from the rest of South Africa. The current number of unemployed people of working age in the Lesedi LM are 6 985. The local employment of 96 people by the mine will reduce the number of unemployed by 1.4%. The mining sector currently absorbs 1% (384 people) of the total employed; therefore, the created employment opportunities at the mine will assist in almost doubling the labour absorption capacity of the mining sector in the municipality.

In addition to the direct jobs created on site, the mine will also stimulate the creation of 985 sustainable employment opportunities through production and consumption induced impacts. Some of these employment opportunities will be created also in the mining sector through the employment of mining subcontractors. Overall, a total contribution of the project towards sustainable employment creation in South Africa will be 1 305. Jobs created during operations through direct and multiplier effects will be distributed among all economic sectors. Table 4-7 indicates that the largest number of jobs will be created in the mining, real estate and business services, and trade and accommodation sectors.

Table 4-8: Impact on employment (R' million) (2016 prices)

Sector	Direct	Indirect	Induced	Total	Percentage (Total)
Agriculture	-	1	21	22	1.7%
Mining	320	24	1	345	26.4%
Manufacturing	-	29	42	71	5.4%
Electricity	-	3	2	5	0.3%
Water	-	0	1	1	0.1%
Building and Construction	-	3	5	7	0.6%
Trade and accommodation	-	131	71	202	15.5%
Transport and storage	-	49	24	73	5.6%
Financing	-	42	138	181	13.8%
Real estate and business services	-	162	176	338	25.9%
Government services	-	34	18	52	4.0%
Other	-	1	7	9	0.7%
Total	320	480	505	1 305	100.0%

Urban-Econ calculations based on data supplied by client

Creation of employment opportunities during operations			
Impact Description: The impact takes place throughout the operational phase and is translated into the creation of new employment opportunities at the mine and businesses that are affected through indirect and induced effects.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Project Life (5)	Individuals will be employed for the lifespan of the mine (46 years)	Moderate Positive (+90)
Extent	National (6)	Increase in employment will affect the entire country	
Intensity x type of impact	Average to intense Positive (+4)	The project will provide over 1 000 sustainable employment opportunities throughout the country and increase the local economy's labour absorption capacity by a minimum of 320 jobs	

Probability	Highly Probable (6)	It is most likely that there will be a temporary increase in employment during operations	Moderate Positive (+90)
Enhancement Measures			
• Employ local labour to increase benefit to the local community			
Post Enhancement Measures: improvement measures could increase the impact on the local economy but would not change the total impact. Therefore, the weights assigned for the impact before improvements will not be affected.			
Duration	Project Life (5)	Individuals will be employed for the lifespan of the mine (46 years)	
Extent	National (6)	Increase in employment will affect the entire country	
Intensity x type of impact	Average to intense Positive (+4)	The project will provide over 1 000 sustainable employment opportunities throughout the country and increase the local economy's labour absorption capacity by a minimum of 320 jobs	
Probability	Highly Probable (6)	It is most likely that there will be a temporary increase in employment during operations	

4.3.4 Impact on skills development

The Workplace Skills Plan for the proposed mine aims to equip employees with skills that will aid their progression in the minerals industry. The plan seeks to continuously identify skills gaps in employees of the mining operation. Similarly, the purpose of the Skills Development Plan for the proposed mine is to improve access to quality education and offer skills that will increase the sustainable employability, self-employability or mobility in the workplace (Canyon Resources, 2016). The Skills Development Plan for the proposed mine is founded on the following targets (Canyon Resources, 2016):

- To provide all employees with the opportunity to obtain a minimum education level equivalent to ABET Level 4;
- To ensure that the operation has the required skills and competencies within the workforce to achieve the business and operating mandate; and
- To provide an enabling environment for employees to develop and pursue clear career paths within the organisation as a whole.

Over the first five years, R5 596 166 will be spent on Human Resource Development, including 15 internships (three per annum), three bursaries, and five learnerships. Bursary programmes, study assistance schemes, and the provision of Learnerships and skills programmes will be provided to address skills shortage and hard-to-fill vacancies (Canyon Resources, 2016).

In cases of retrenchment, the following mechanisms will be applied:

- Assessment and counselling;
- Self-employment training and kick-start programmes; and
- Re-employment (with specific training) programmes (Canyon Resources, 2016).

Overall, it is clear that the skills programmes to be applied during mining operations are holistic, given that they cover qualification attainment, basic education provision, on the job training, and retrenchment impact reductions. If implemented accordingly, the skills levels particularly of the local community will improve and thus enable employees to acquire future employment.

Skills development during operations			
Impact Description: The impact results from the mine's investment in skills development of the local communities and mine's employees during its operations			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Permanent (7)	Skills will be retained beyond the project life	Moderate Positive (+90)
Extent	Municipal area (4)	Skills will be transferred to mine's workers and other beneficiaries from the local communities.	
Intensity x type of impact	Moderate Positive (+4)	Notable improvement in local labour's and employees' skills	
Probability	Highly probable (6)	It is most likely that there will be skills transfer during operations	
Enhancement Measures			
The mine is required by law to adhere to the provisions detailed in the Social and Labour Plan – no augmentation measures required			
Post Enhancement Measures			
Duration	Permanent (7)	Skills will be retained beyond the project life	Moderate Positive (+90)
Extent	Municipal area (4)	Skills will be transferred to mine's workers and other beneficiaries from the local communities.	
Intensity x type of impact	Moderate Positive (+4)	Notable improvement in local labour's and employees' skills	
Probability	Highly probable (6)	It is most likely that there will be skills transfer during operations	

4.3.5 Impact on Household Income

Over half of the population of the Lesedi LM is classified as low-income earners. Household earnings are significant for advancing living standards and the proposed mine will assist in achieving this as a result of the 320 FTE man-year opportunities created. It is estimated that households benefitting directly from the mine's operation will earn R49.6 million on average annually, and R2 281.6 million (2016 prices) in sum over the lifespan of the project. Considering that the average household size in the region is between 3.1 and 3.3 people, it can be suggested that over 1 000 people will benefit from the salaries and wages paid by the mine directly. Nationally, though, over 4 600 people are to benefit from the mine's operations directly and through multiplier effects, as household income levels are set to rise by R168.5 million

throughout the country. Household income will have a positive impact and will be sustainable over a long period of time.

Table 4-9: Impact on Household income during operations

Sectors	Direct	Indirect	Induced	Total	Percentage (Total)
Agriculture	-	R 0.0	R 0.3	R 0.3	0.2%
Mining	R49.6	R 7.7	R 0.2	R 57.5	34%
Manufacturing	-	R 11.4	R 12.8	R 24.2	14.3%
Electricity	-	R 1.8	R 1.4	R 3.2	2%
Water	-	R 0.1	R 0.3	R 0.4	0.2%
Building and Construction	-	R 0.4	R 0.6	R 1.0	0.6%
Trade and accommodation	-	R 14.6	R 7.4	R 22.1	13%
Transport and storage	-	R 6.6	R 3.7	R 10.3	6%
Financing	-	R 2.4	R 7.8	R 10.2	6%
Real estate and business services	-	R 5.7	R 6.5	R 12.2	7%
Government services	-	R 18.6	R 4.8	R 23.4	14%
Other	-	R 0.7	R 3.1	R 3.8	2%
Total	R49.6	R 70.0	R 48.9	R 168.5	100%

Urban-Econ calculations based on data supplied by client

Increase in household income during operations			
Impact Description: Household income will be earned due to jobs created through direct, indirect and induced effects; this will allow some of the beneficiaries to improve their living standards.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Project Life (5)	Household earnings will be attained by employees for the lifespan of the project	Moderate Positive (+90)
Extent	National (6)	Increase in income will affect households of local workers as well as workers benefitting through multiplier effects throughout the country	
Intensity x type of impact	Average to intense (+4)	Household earnings will be derived by employees during this phase	
Probability	Highly Probable (6)	It is most likely that household income will increase	
Enhancement Measures			
<ul style="list-style-type: none"> Investigate opportunities to increase local procurement and localise mine's expenditure Explore opportunities to employ as many people from the local communities as possible 			
Post Enhancement Measures: improvement measures could increase the impact on the local economy but would not change the total impact. Therefore, the weights assigned for the impact before improvements will not be affected.			
Duration	Project Life (5)	Household earnings will be attained by employees for the lifespan of the project	Moderate Positive (+90)
Extent	National (6)	Increase in income will affect households of local workers as well as workers benefitting through multiplier effects throughout the country	
Intensity x type of impact	Average to intense (+4)	Household earnings will be derived by employees during this phase	

Probability	Highly Probable (6)	It is most likely that household income will increase	
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4.3.6 Impact on Government Revenue

A significant amount of government revenue will be derived from payments of income taxes, royalties, contributions towards national skills fund, fee payments in line with respective regulations, and payroll taxes as a result of mining operations. Overall, the mine will contribute over R50 million towards government revenue. It is estimated that R20.9 million is expected to be paid in royalties alone. The main source for rest of the payments will mainly be personal income taxes. Increase in government revenue allows the public sector to maintain the existing infrastructure and improve on its service delivery.

Increase in government revenue during operations			
Impact Description: The impact takes place mostly with payment of royalties and corporates taxes, as well as a result of payment of salaries and wages and declaration of dividends.			
Dimension	Rating	Motivation	Significance
Prior to Mitigation			
Duration	Project Life (5)	Government Revenue due to mining operations will be derived for the project life	Moderate Positive (+90)
Extent	National (6)	Government revenue increase will be experienced nationally	
Intensity x type of impact	Moderate Positive (+4)	Increase in revenue is not widespread but is felt by government	
Probability	Highly Probable (6)	It is most likely that tax will be paid	
Enhancement Measures			
No mitigation.			
Post Enhancement Measures			
Duration	Project life (5)	Government Revenue due to mining operations will be derived for the project life	Moderate Positive (+90)
Extent	National (6)	Government revenue increase will be experienced nationally	
Intensity x type of impact	Moderate positive (+4)	Increase in revenue is not widespread but is felt by government	
Probability	Highly probable (6)	It is most likely that tax will be paid	

4.4 Impact ensued during decommissioning phase

The life of the proposed mine is planned to for 51 years. Thereafter, the termination of the project will occur. It is envisaged that R232.7 million will be allocated by the mine towards the closure and rehabilitation activities throughout its project lifespan. Most of these funds will be spent at the end of the project. This expenditure on closure activities will generate positive impacts on production, GDP, employment and household income, albeit relatively small and for a temporary period. Resultantly, the local economy will be stimulated for the duration of the decommissioning phase. Decommissioning expenditure such as the disassembly of buildings and machinery and rehabilitation of land will increase the demand for construction services and services offered by other industries.

The decommissioning process will inform the land restoration process. Infrastructure such as roads and service-related facilities (building), water, and storm water systems may be utilised for future activities. It can be assumed that the existence of the project in the community will create a significant stimulus, leading to industry development in the area and the availabilities of opportunities even after decommissioning of the mine. Nonetheless, most impacts will cease to exist succeeding the project.

5 CONCLUSION

The proposed Palmietkuilen Mining Project is envisaged to be located in the Lesedi Local Municipality in the Gauteng Province, near Springs. The national and provincial strategies acknowledge the importance of energy security and subsequently the sustainable supply of coal to the coal-fired power stations that the economy is currently reliant on for electricity production; however, local level strategies prioritise food security. Considering the impact of mining on the environment, all spheres of government highlight the importance of environmental conservation. Conflicts between the planned mining activity on the proposed site and local policies, which promote the agricultural land uses on the proposed project site, have been identified.

There are conflicting rationalities between agricultural and mining activities in the project area. The area has been identified to have coal reserves, which are imperative for energy security. On the contrary, the land is highly arable and salient for food security and has been utilised for this purpose for numerous years. Both, electricity supply and food supply are significant for the future growth and development of the country and for the improvement of living standards of its citizens. From the analysis of both sectors, it is evident that the mining sector currently has a greater contribution to GDP and household earnings than agriculture. Agriculture, instead, contributes a greater percentage to employment than mining.

The economic baseline revealed that the Lesedi LM is a relatively small economy and makes a minor contribution towards the economies of the Sedibeng DM and Gauteng Province, although the economy has shown above average growth in the past few years mainly due to the growing tertiary industries. In addition, the primary sector has a negligible impact on employment and GDP in the local economy of Lesedi. Lastly, the municipality is dominated by low-income earners. The planned mining project should improve these economic shortcomings. Providing employment to the local labour will have a major impact on the employment creation, skills development, household earnings and local economy activity.

The assessment of the current economic state in Lesedi LM, the profile of the zone of influence, and the project itself revealed that the proposed mining activity will create numerous positive impacts and will likely stimulate the local economy. The stimulation of the national economy will occur as a result of the investment into the mine and proceeding increase in production. The subsequent benefits are employment creation, a rise in consumption levels, new business sales, and a contribution to GDP.

Overall, R208 million of GDP during construction and R58.5 billion of GDP during the operational phase will be created in the South African economy because of the proposed mine's operational phase (51 years). A total of 739 FTE person-years will be created during construction in the entire national economy and an additional 1 305 FTE jobs will be made on an annual basis for the entire mine's establishment (i.e. 53 years). Moreover, the salaries paid out will result in an increase in the average household income.

However, due to the nature of the area where the proposed mine is to be established, the following needs to be highlighted:

- Firstly, the development of the mine will sterilise the productive agricultural land (140 Ha of land for irrigated crops and 1 749 Ha of land for dry land crops), which will lead to the loss of about R38 million of agricultural production per annum and may result in the loss of 45 permanent and 40 temporary employment positions in the agricultural sector. It should also be noted that the local spatial development visions do not support mining on the proposed land.

- Secondly, the mine could lower the property values of the surrounding properties.
- Thirdly, the land surrounding the proposed project includes a number of egg farms. It is estimated that these farms produce about R393.3 million in annual turnover and employ up to 332 jobs. Overall, the egg industry in the area is estimated to account for about 4.6% of the national egg industry.

The assessment into the potential effects of the mine on the above-mentioned aspects revealed the following:

- The **loss of agricultural land** will not pose a risk towards the country's food security, when considered in isolation with other trends in the country. However, considering the continuous loss of highly productive agricultural land in the Mpumalanga Province to the mining and other land uses, the cumulative effect of any additional loss of arable land and highly productive dry land could be of a concern. Having said this, from an economic perspective, the loss of agricultural production due to sterilised land will be offset by more than ten-times increase in mining sector's production. Furthermore, the jobs that the mine will create will be more than five times greater than the jobs that will be lost if the agricultural production were to cease on the affected farm portions.
- The investigation into the **values of properties** in other parts of the region, particularly where coal mines are already established, suggested that mining activities have negligible effect on property values of dry land and chicken farms, but could negatively impact on the value of irrigated land and agricultural holdings, depending on the proximity to the mine itself. The property market in the area surrounding the project site has been relatively down due to numerous factors such as the distance from town, the unwillingness of banks to offer 100% loans for plots, water availability and poor bulk infrastructure. The establishment of the mine can prolong this trend, but it is envisaged that only the farms with irrigated land in the direct proximity to the project site and Aston Lake land portions are likely to be slightly negatively impacted by the development of the mine.
- The **egg production** could be susceptible to various environmental effects, including noise pollution, dust pollution, and night time light intrusion. Although various mitigation measures exist to reduce and eliminate the negative effect of the proposed mining construction and operational activities on the surrounding environment, including chicken farms, some risks exist that the latter will be negatively impacted. If all the nearby egg farms are to close, the potential negative impacts for the agricultural sector could be significant. The proposed mining activity will be able to offset some of these negative effects, but the net effect on the economy, considering the loss of agricultural land due to sterilisation may not be positive. Therefore, it will be imperative to ensure that the mitigation measures implemented focus on achieving a zero-loss effect with respect to both egg industry and other agricultural activities that the mine will negatively impact.

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ANNEXURE A: IMPACT RATING METHODOLOGY

Rating	Intensity/Replaceability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	Positive Impacts (Nature = +1)			
7	Irreplaceable loss or damage to biological or physical resources or highly sensitive environments. Irreplaceable damage to highly sensitive cultural/social resources.	Noticeable, on-going natural and / or social benefits which have improved the overall conditions of the baseline.	<u>International</u> The effect will occur across international borders.	Permanent: The impact is irreversible, even with management, and will remain after the life of the project.	Definite: There are sound scientific reasons to expect that the impact will definitely occur. >80% probability.
6	Irreplaceable loss or damage to biological or physical resources or moderate to highly sensitive environments. Irreplaceable damage to cultural/social resources of moderate to highly sensitivity.	Great improvement to the overall conditions of a large percentage of the baseline.	<u>National</u> Will affect the entire country.	Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management.	Almost certain / Highly probable: It is most likely that the impact will occur. <80% probability.
5	Serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread benefits to local communities and natural features of the landscape.	<u>Province/ Region</u> Will affect the entire province or region.	Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Likely: The impact may occur. <65% probability.

Rating	Intensity/Replaceability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	Positive Impacts (Nature = +1)			
4	Serious loss and/or damage to physical or biological resources or moderately sensitive environments, limiting ecosystem function. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense natural and / or social benefits to some elements of the baseline.	<u>Municipal Area</u> Will affect the whole municipal area.	Long term: 6-15 years and impact can be reversed with management.	Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.
3	Moderate loss and/or damage to biological or physical resources of low to moderately sensitive environments and, limiting ecosystem function. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	<u>Local</u> Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	Unlikely: Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.
2	Minor loss and/or effects to biological or physical resources or low sensitive environments, not affecting ecosystem functioning. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by a small percentage of the baseline.	<u>Limited</u> Limited to the site and its immediate surroundings.	Short term: Less than 1 year and is reversible.	Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.

Rating	Intensity/Replaceability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	Positive Impacts (Nature = +1)			
1	<p>Minimal to no loss and/or effect to biological or physical resources, not affecting ecosystem functioning.</p> <p>Minimal social impacts, low-level repairable damage to commonplace structures.</p>	<p>Some low-level natural and / or social benefits felt by a very small percentage of the baseline.</p>	<p><u>Very limited/Isolated</u> Limited to specific isolated parts of the site.</p>	<p>Immediate: Less than 1 month and is completely reversible without management.</p>	<p>Highly unlikely / None: Expected never to happen. <1% probability.</p>

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change	Major (positive) (+)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and / or social) environment	Moderate (positive) (+)
36 to 72	A positive impact. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive) (+)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive) (+)
-3 to -35	An acceptable negative impact for which mitigation is desirable. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and / or social environment	Negligible (negative) (-)
-36 to -72	A minor negative impact requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and / or social environment	Minor (negative) (-)
-73 to -108	A moderate negative impact may prevent the implementation of the project. These impacts would be considered as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe changes.	Moderate (negative) (-)
-109 to -147	A major negative impact may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts are likely to be irreversible and/or irreplaceable.	Major (negative) (-)

