SECTION 1: INTRODUCTION

1.1. STUDY BRIEF

The Emfuleni Local Municipality appointed Urban Dynamics Gauteng to prepare a Spatial Development Framework (SDF) for the Emfuleni Municipal Area. According to the Terms of Reference, the following objectives needed to be met by the SDF:

- To provide a strategic development vision for Emfuleni in line with the EGDS, the MSDF, RSDF and the IDP;
- To draft a comprehensive spatial development framework for Emfuleni;
- To address specific developmental issues and challenges in Emfuleni;
- To provide a strategic context for the integration and implementation of existing studies applicable to Emfuleni;
- To identify specific interventions to realise the vision; and
- To ensure sustainable integrated development.

The Emfuleni SDF is an overall strategic land development document that provides municipal wide strategic direction in terms of effecting desired development patterns, promotion of economic development in close proximity to residential developments, conservation of valued environmental assets, enhancement of the effectiveness of public capital projects, optimization of existing and planned municipal engineering infrastructure, promotion of tourism and agricultural industries, and reversing of distorted spatial human settlement patterns of apartheid.

As an overall strategic document, the Emfuleni SDF may be devoid of comprehensive details pertaining to certain specific geographical areas. Detailed stand-level planning has been delegated to Local Spatial Development Frameworks or Precinct Plans to depict more detailed land use planning or spatial land development guidance, as may be allowed by the scope of the areas since the level of detail is circumscribed by the size of the area under consideration. Larger areas permit limited detail, whereas smaller areas provide more detailed planning information.

The evaluation or assessment of lodged development applications shall be guided by the Local Spatial Development Frameworks (LSDFs) or Precinct Plans. Where Local Spatial Development Frameworks or Precinct Plans have not been formulated and approved by the Municipality, the Emfuleni SDF shall be applicable. Where a LSDF or Precinct Plan is in
contradiction with the Emfuleni SDF, the Emfuleni SDF shall take precedence over a LSDF or Precinct Plan, since local plans should only give a more detail or refined expression of the contents of the Emfuleni SDF and not contradict its expressed intentions.

Provisions of most land development policies/ frameworks have been improved and accommodated in the Emfuleni SDF document to ensure planning alignment. However, some planning policies cannot be accommodated due to lost relevance or observed superfluity when read in conjunction with land development proposals of the Emfuleni SDF.

1.2. METHODOLOGY AND APPROACH

1.2.1. PROJECT METHODOLOGY

The methodology for the preparation of the Emfuleni SDF was conducted in 7 distinct phases, as set out in detail below. This methodology was based on the interpretation of the Terms of Reference and aimed to holistically address all the project requirements that were set out in the Terms of Reference.

Phase 0: Data Collation

This phase involved preparing the base information for the compilation of the Development Framework. Primarily, this involved creating GIS base maps, delineating Emfuleni boundaries and requesting Census 2001 data from Statistics South Africa. It also involved acquiring data relevant to Emfuleni from various sources, such as the Department of Transport, Gauteng Department of Agriculture and Rural Development (GDARD) and the Satellite Application Centre (SAC). All documents relevant to Emfuleni were obtained, such as the Emfuleni Growth and Development Strategy and the existing Emfuleni Precinct Plans.

Phase 1: Situational Analysis

Phase 1 involved the analysis of the information obtained for Emfuleni. This status quo analysis comprised of the following components.
a. Socio-economic analysis

This component involved an analysis of the socio-economic profile of Emfuleni population. This profile analysis specifically took into account the socio-economic attributes of households that live within Emfuleni, such as household income and age distribution.

b. Spatial characteristics

This component involved an analysis of the spatial characteristics of Emfuleni. The spatial characteristics included aspects such as the existing land uses within Emfuleni, housing typologies applied within Emfuleni and social amenities currently available within Emfuleni.

c. Infrastructure network

This component involved an analysis of the existing and planned transportation network within Emfuleni. It included identifying the existing public transportation network for all modes of public transportation (bus, minibus taxi and commuter rail). The existing municipal services (water, sanitation and electricity) infrastructure network serving Emfuleni was determined and information was obtained with regard to the capacity of this infrastructure network, were available.

d. Environmental issues

This component involved determining environmental issues affecting Emfuleni. In particular, environmental sensitive areas, high-potential agricultural soils and geo-technically unsuitable areas were identified. The impact of these on urban development was illustrated.

Phase 2: Land Use Estimates

The purpose of this phase was to formulate a Land Use Budget for Emfuleni. This Land Use Budget was tailor-made for Emfuleni and assessed the development need and development potential within Emfuleni over a given period. This Land Use Budget provided quantitative projections upon which the spatial proposals were based, thus providing realistic and achievable spatial development goals.
The time-span of the Land Use Budget was divided into a number of incremental periods (5-year periods) and the calculation of the Land Use Budget was made accordingly. This provided a clear indication of the growth and development envisaged during each Land Use Budget period. In turn, this enabled the planning of roads, bulk municipal services infrastructure that needs to coincide with each growth and development period. The Land Use Budget also enabled the planning of affordable housing, social and recreational amenities, and it calculated the retail floor area potential that will be generated by each consecutive growth and development period.

Phase 3: Vision and Development Concept

The visioning phase involved defining objectives for the development of Emfuleni, based on a rudimentary SWOT analysis of the development challenges facing Emfuleni. These objectives focused on issues such as urban consolidation and urban infill, nodal and corridor development, and land use and public transportation integration. Based on these objectives, a Development Concept was drafted for Emfuleni. This Development Concept illustrated proposed nodes and corridors, urban linkages and aims to promote positive development trends and urban patterns within Emfuleni.

Phase 4: Development Framework

The fourth phase involved preparing development proposals for Emfuleni. The development proposals were based on the information gathered and conclusion made in previous phases. Proposals were made with regard to the following:

a. Spatial Development

Proposals were made with regard to land use development to ensure the orderly development of future land uses within Emfuleni. It included proposals with regard to residential expansion and housing development, the development of activity nodes, the infill of greenfield areas, and the intensification brownfield areas. Proposals were also made with regard to the development of public-owned land, where applicable.

b. Socio-Economic Development

The proposals incorporated criteria for the provision of community facilities in an equitable manner. This included, for example, the provision of education facilities, health facilities and recreation facilities. Also, proposals were
made with regard to the economic viability and sustainability of Emfuleni, such as the development of retail and office nodes and industrial and commercial areas.

c. Infrastructure Development

The proposals included guidelines for the development of transportation infrastructure, the promotion of public transport and the integration of land use and transportation. The concept of Transit Oriented Development (TOD) was employed. The proposals also guided the development of municipal infrastructure by applying the land use budget, which estimated the extent of future urban development within Emfuleni.

d. Housing Development

Proposals not only addressed the housing backlog within the Municipal Area, but housing was also applied as a strong form-giving element that would impact on the future development of the Municipal Area. For example, housing was used as an infill land use, which could integrate the fragmented urban area currently found within Emfuleni. Also, housing was used to provide the necessary land use densities to support public transport and retail centre development within the Municipal Area.

e. Open space conservation

Guidelines for the conservation of natural open space and the creation of an open space lattice were proposed. These proposals were based on existing environmental documents, such as C-Plan2 that was prepared by GDARD.

Phase 5: Strategic Environmental Assessment

The primary aim of the Strategic Environmental Assessment (SEA) was to evaluate the Emfuleni SDF proposals and its impact on the natural, social and infrastructural environment. This was done in order to determine the sustainability of the proposed spatial development pattern and to propose mitigating measures to limit the negative impacts that these proposals may pose to the natural environment.

Phase 6: Land Use Management System
The Development Framework set out above, was translated into a Land Use Management System (LUMS) that can be used to implement the Framework proposals through applications for land use change. Detailed land use management issues pertaining to the implementation of the Development Framework proposals were addressed. The Land Use Management System was presented in the following mutually supporting formats:

a. Demarcated zones

Emfuleni was divided into a number of Land Use Management Zones. Each of these zones aimed to promote the development of a specific land use character within the Municipal Area through the application of land use mix and density.

b. Land use matrix

The Land Use Management System was presented in a matrix format for easy reference and use by municipal planners, developers and property owners. The matrix was linked to the demarcated zones mentioned above and must be read with these zones. The matrix defines the land use mix and density to be allowed within each demarcated zone.

Phase 7: Implementation Framework

A comprehensive Implementation Framework was prepared for the implementation of the proposals made in the Emfuleni SDF. This Implementation Framework contained the following components:

a. Development programme

The Emfuleni SDF phased the development of Emfuleni over a number of years. This development programme aims to guide the township establishment process and the approval of land use rights within Emfuleni. In addition, this programme enables the planning of the roads and bulk municipal services infrastructure that needs to coincide with and support each development phase. This phasing programme also enables the planning of affordable housing development and the provision of the necessary supporting community facilities.

b. Capital Investment Programme
A rudimentary Capital Implementation Programme (CIP) was prepared; based on the development programme set out above. The CIP focuses on the public sector investment needed to unlock the development potential of Emfuleni.

**1.2.2. GIS DATABASE COLLATION**

The spatial and infrastructure planning information pertaining to the Emfuleni Municipal Area was drawn into a GIS database. The electronic mapping and other information was made available to the Municipality for inclusion in their GIS database and is compatible with the Municipality’s Geographical Information System. Care was taken to ensure that the information that was presented is as true as possible, legible and user-friendly.

**1.2.3. STAKEHOLDER PARTICIPATION**

It was considered essential to obtain buy-in into the Emfuleni Spatial Development Framework. To achieve this, Urban Dynamics Gauteng consulted with all the relevant stakeholders. Consultation was conducted on the following three levels:

a. **Project Manager**

   Monthly meetings were held with the municipal project manager and the core municipal planning team responsible for the management of the Emfuleni SDF. This enabled the municipal project manager to be kept up to date with the progress of the project.

b. **Technical Steering Committee**

   Two meetings were held with the Technical Steering Committee, which included relevant municipal technical representatives from all the relevant municipal departments of the Municipality. Technical meetings were convened and
chaired by the Municipality. Provision was made to allow Steering Committee members to review all interim project documents.

c. Community Stakeholders

Urban Dynamics Gauteng consulted with key local stakeholders in Emfuleni. To ensure relevant and needs-accurate inputs are obtained, the consultation process targeted specific stakeholders that have a good understanding of Emfuleni, but who also had the necessary experience of and exposure to town planning and town planning principles. This will include ward representatives, environmental action groups, property owners, town planning consultants, developers, and resident’s associations.

In total, 2 project presentations were presented to the Technical Steering Committee, one after the completion of the draft Status Quo (Phase 2) and one after the completion of the draft Development Framework proposals (Phase 4). To accommodate local stakeholders, a presentation was held were all ward representatives were present. A report was prepared detailing the public participation process followed. This report is included as the last chapter of the Emfuleni SDF report. This report sets out the consultation process followed, as well as the comments received on the draft Emfuleni SDF report.
SECTION 2: STATUS QUO

2.1. CONTEXTUAL SETTING

The Emfuleni Municipal Area (also referred to as Emfuleni) is located within the southern region of the Gauteng Province. As depicted on Figure 1, Emfuleni is situated south of Johannesburg and southwest of Ekurhuleni. Midvaal is situated between Emfuleni and Ekurhuleni. To an extent, Emfuleni is peripherally located within Gauteng and it is therefore not well-located in terms of access to core employment opportunities found within the region, which is mostly found within the triangle formed by the Johannesburg CBD, the Tshwane CBD and the OR Tambo International Airport. However, Emfuleni is well-connected to its neighbouring municipal areas by the N1 freeway and the R59 freeway (amongst others), which gives it access to these areas and the employment opportunities that are found within these areas. The Vaal River forms the southern boundary of Emfuleni. It also forms the boundary between the Gauteng Province and the Free State Province. The Vaal River is a popular tourist destination and weekend holiday destination.

Figure 2 depicts an aerial photograph of Emfuleni. It is evident from this photograph that Emfuleni is basically separated in terms of land use by the N1 freeway. Emfuleni is mostly rural in nature to the west of the N1 freeway, comprising smallholdings and farmland. In contrast, Emfuleni is mostly urban in nature to the east of the N1 freeway. The eastern half of Emfuleni includes (amongst others) Evaton, Sebokeng, Vanderbijlpark Boipatong, Bophelong, Sharpeville, Vereeniging and Three Rivers. Mittal Steel is located in the centre of Emfuleni, between Sebokeng and Vanderbijlpark. This industrial facility is one of the largest heavy industrial facilities within Gauteng. Coal mining land is situated on the southeastern boundary of Emfuleni, directed southeast of Vereeniging.

2.2. EXISTING POLICY

A number of policy document relating to spatial development within Emfuleni have been developed in recent year. These documents include the Sedibeng Growth and Development Strategy 2005, the Sedibeng Spatial Development Framework 2009, and the Emfuleni Spatial Development Framework 2009/10. These policy documents are recognized as the basic points of
departure in the formulation of the Emfuleni SDF 2011. This will be done to ensure that the Emfuleni SDF meets the objectives of overarching plans such as the Sedibeng Growth and Development Strategy and the Sedibeng Spatial Development Framework, which aim to integrate spatial development on a regional level. Where the Emfuleni SDF 2001 differs from these plans, the reasons for this will be clearly explained during the course on the document.

2.2.1. SEDIBENG GROWTH AND DEVELOPMENT STRATEGY 2005

The Sedibeng Growth and Development Strategy aims primarily to house the entire Sedibeng population in an integrated and sustainable human settlement pattern by way of implementing the following strategic guidelines:

- Infilling and densification should be prioritized
- Housing provision needs to be integrated with engineering and social services provision in order to enhance sustainability
- A functioning property market need to be created through the development of mixed income human settlements
- A range of alternative housing typologies and tenure option need to be provided

2.2.2. SEDIBENG SPATIAL DEVELOPMENT FRAMEWORK 2009

The Sedibeng Spatial Development Framework was drafted for the Sedibeng District Municipality to guide spatial development within Sedibeng. This document is a primary policy document that guides urban development within Sedibeng on a regional level. The Emfuleni SDF thus needs to heed the spatial development principles and objectives set out in this document. The following main development principles of the Sedibeng SDF aim to guide the spatial structuring of the Sedibeng District:

- Promoting economic activity within the core development triangle formed by Sebokeng, Meyerton and Vanderbijlpark.
- Development and promote specialised activity nodes within the core development triangle.
- Optimise linkages within the core area.
- Link disadvantaged communities to the core area.
- Develop mixed use, high-density development along corridors and at nodes.
- Structure the Integrated Regional Public Transport Network (IRPTN) to support development corridors.
- Extend economic activities to Previously Disadvantaged Areas (PDAs).
• Promote infill residential development.
• Upgrade engineering and social infrastructure in townships.
• Maintain and upgrade residential quality in suburbs.
• Formalize and protect the metropolitan open space system.
• Promote access to services through Customer Care Centres (CCCs).
• Implement a statutory Urban Development Boundary.
• Support and promote land reform.

The following spatial objectives were derived by the Sedibeng Spatial Development Framework:

• Create a continuous and sustainable open space network through the Sedibeng district.
• Promote a system of functionally defined activity nodes within the district.
• Optimise linkages between the identified nodes within the district, as well as linkages between the disadvantaged communities and the main employment centers. The current commuter rail linkages should be promoted as the main public transport corridors within the district.
• Demarcate an Urban Development Boundary and enforce it in order to strengthen the existing urban areas and nodes, to contain urban sprawl, to promote a more compact urban development pattern and to protect the agricultural and ecological potential of the district.
• Future urban development should consist primarily of infill and densification within the proposed Urban Development Boundary.
• Maximise the major development opportunities within the district.
• Promote high-density development along main public transport routes.
• Focus the upgrading of services in previously disadvantaged township areas.

The ensuing proposals of the Sedibeng Spatial Development Framework are as follows:

a. Nodal development

The Sedibeng SDF considers the main urban node within the District to remains the Vereeniging/Vanderbijlpark complex, supported by the secondary urban nodes of Meyerton (located in Midvaal) and Heidelberg (located in Lesedi). The respective Central Business Districts of Vereeniging, Vanderbijlpark, Meyerton and Heidelberg were identified for revitalization.
b. Corridor development

A major economic development corridor is proposed along the P156 (R59 freeway), while the K147 (Barrage Road) is seen as a secondary activity spine over the long term. Future integrated development was proposed along the N1 freeway, as well as along the K57 (Johannesburg Road), the K45 (Golden Highway) and K147 (Barrage Road). It was proposed that developments adjacent to corridors, which are located outside the Urban Development Boundary, be supported for tourism, commercial and higher density residential development.

c. Township development

The Sedibeng SDF proposed that the Evaton and Sebokeng complex should be the focus area for future reconstruction and redevelopment initiatives. In general, the Sedibeng SDF proposed that development opportunities should be maximised in areas where existing engineering infrastructure existed. The SDF revised Urban Development Boundary should guide decision-making on developmental applications within Sedibeng and aims to promote the intensification of the existing urban structure.

d. Tourism and rural development

The Sedibeng SDF proposed that tourism development should be prioritized along the Vaal River. Regarding rural, the SDF proposed that existing rural nodes should be strengthened and consolidated. The SDF revised Urban Development Boundary aims to protect high potential agricultural land within Sedibeng.

2.2.3. EMFULENI SPATIAL DEVELOPMENT FRAMEWORK 2009/10

The Emfuleni Spatial Development Framework was drafted to guide spatial development within Emfuleni. The Emfuleni SDF provides a regional overview of development trends and desired land use objectives within Emfuleni. In addition, it provides detailed Local Spatial Development Frameworks (LSDFs) which refine the content of the Emfuleni SDFs. Local Spatial Development Frameworks were drafted for Bedworth Park, Lochvaal, Three Rivers and Evaton. The main elements of the Emfuleni SDF are the following:
a. Strategic Development Areas

Strategic development areas have been identified by the Emfuleni SDF, where principles of integration, densification and infill development can be encouraged. According to the SDF, this should occur to the east of Sebokeng and the southeast of Evaton; specifically in the area located between Sebokeng, Evaton and Sonlandpark. The development of this land should take place in an incremental way, starting at Sebokeng in an eastward direction. Higher-density development must be located near Sebokeng and Evaton and these development densities must be tapered off towards the K57 (Johannesburg Road). These higher densities will provide a platform for public transport oriented development near the Sebokeng rail line, which form the western boundary for this strategic development area.

b. Transport and Infrastructure

According to the Emfuleni SDF, Emfuleni is well-served with an extensive road network. Major routes tend to converge on the primary central business centres of Vereeniging and Vanderbijlpark. According to the Emfuleni SDF, engineering infrastructure capacity within Emfuleni has lagged behind development pressures in recent years. However, plans have been set place to address the existing infrastructural backlogs.

c. Urban Development Boundary

According to the Emfuleni SDF, the Urban Development Boundary is a planning tool that directs development towards a more compact and densified urban form. The SDF suggested that the Urban Development Boundary be amended to incorporate Mantevrede A.H., a portion of Zuurfontein Ext 3, Cyferpan, a portion of Steelvalley, Rietkuit, Linkholm A.H., Eatonside, Waterdal A.H., Quaggafontein, a portion of Houtkop A.H., a portion of the Vlakfontein Development, Roshnee, and Rust-ter-Vaal.

d. Economic Catalyst Projects

The following economic catalyst projects were initiated with a view to help reducing the high unemployment rate within Emfuleni:

- The revitalization of the Central Business Districts
- The development of tourism facilities
• The expansion of manufacturing
• The development of activity nodes
• The promotion of vacant industrial stands
• The establishment of urban agriculture and the implementation of land redistribution projects
• The development of housing by the beneficiaries themselves
• The investigation into an airport

e. Agriculture

The Emfuleni SDF proposed that agricultural activities should be encouraged on land identified for such purposes in terms of land suitability criteria. Various portions of land have been identified in the SDF that are located in close proximity to existing and proposed urban development areas. The primary purpose of these identified areas is to present unemployed disadvantaged beneficiaries an opportunity to become involved in subsistence urban agriculture activities.

2.3. SOCIO-ECONOMIC

2.3.1. SOCIO-DEMOGRAPHIC PROFILE

The purpose of this section is to provide an analysis of Emfuleni in terms of its socio-demographic development, particularly with regard to population and education.

2.3.1.1. POPULATION AND HOUSEHOLDS

Emfuleni population was calculated using Census 2011 figures based on Census 2011 sub-place areas (see Figure 3). As depicted by the Table below, Emfuleni housed a population of approximately 654000 people by the year 2005. It was estimated that this population had increased to approximately 680000 people by the year 2010. The number of households that resided in Emfuleni area by 2005 was estimated to be approximately 183000. This figure was estimated to have increased to an estimated 204000 by 2010. Emfuleni currently has approximately 12974 informal households living in informal settlements within Emfuleni and approximately 17675 informal households living within backyard shacks within Emfuleni.
TABLE 1: EMFULENI POPULATION 2011

<table>
<thead>
<tr>
<th>Item</th>
<th>Population (2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Population</strong></td>
<td><strong>721663</strong></td>
</tr>
<tr>
<td>Formal population</td>
<td>603903</td>
</tr>
<tr>
<td>Informal population</td>
<td>72106</td>
</tr>
<tr>
<td>Traditional Residential</td>
<td>53777</td>
</tr>
<tr>
<td>Farms</td>
<td>2444</td>
</tr>
<tr>
<td>Collective living quarters</td>
<td>14179</td>
</tr>
<tr>
<td>Industrial</td>
<td>2530</td>
</tr>
<tr>
<td>Small Holdings</td>
<td>17778</td>
</tr>
<tr>
<td>Vacant</td>
<td>3624</td>
</tr>
<tr>
<td>Commercial</td>
<td>5099</td>
</tr>
</tbody>
</table>

Source: Estimated from Census 2011

The Table below illustrates that Emfuleni is a largely urban area in terms of population, with 88% of its population living within urban areas. This is despite the fact that most of Emfuleni is rural in nature from a geographical perspective. The size of the urban population is also significant, constituting roughly half of the population of the Tshwane Metropolitan Municipality. This high level of urbanization within Emfuleni inevitably stresses the need to manage urban development within this Local Municipal area.

TABLE 2: EMFULENI URBAN AND RURAL POPULATION 2010

<table>
<thead>
<tr>
<th>Item</th>
<th>Population Estimate (2010)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural population</td>
<td>79976</td>
<td>12</td>
</tr>
<tr>
<td>Urban population</td>
<td>600320</td>
<td>88</td>
</tr>
<tr>
<td>Total</td>
<td>680296</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Estimated from Census 2001
FIGURE 3: CENSUS 2001 SUB-PLACE AREAS
2.3.1.2. Age Profile

The Diagram above reflects the age distribution within Emfuleni. From this Diagram it can be concluded that Emfuleni has a predominantly young to middle-age population with most of the residents between the ages of 0 and 39 years. The decreasing numbers of children (ages 0 and 19 years) suggest that most households are becoming smaller.
2.3.1.3. Education Level

The Diagram above illustrates the education levels within Emfuleni area. This Diagram shows that 23% of Emfuleni population has a primary school education and 53% of the residents living within Emfuleni have completed secondary school education. In total, 3% of the population has no education, which constitutes a significant section of the population. Only 1% of the population has a post-scholastic educational qualification. Higher education levels are usually associated with higher income levels and certain employment categories, such as professional and managerial positions.
2.3.2. ECONOMIC OVERVIEW

The purpose of this section is to perform an analysis of Emfuleni area in terms of its economic development, particularly with regard to employment, income and expenditure patterns.

2.3.2.1. LEVEL OF EMPLOYMENT

![Diagram showing levels of employment]

**Diagram 3: Level of Employment**

Source: Census, 2011
The unemployment rate can be expressed as the number of economically active people who are willing and able to work but do not have jobs. Unemployment is one of the major contributors to poverty as unemployed people are not able to provide for their household’s basic needs due to the lack of disposable income. The Diagram above indicates high unemployment levels within Emfuleni, with almost 50% of the economically active population being unemployed.

2.3.2.2. **Sector Employment**

![Diagram 4: Employment by Sector, 2001](Source: Census, 2001)

The Diagram above shows major employment sectors that employ residents living within Emfuleni. The key sectors employing Emfuleni area residents are the community sector, the retail sector and the manufacturing sector. It can be assumed that the
Vanderbijlpark CBD and the Vereeniging CBD contribute significantly to the community sector and retail sector statistics, and that Mittal Steel and the industrial areas of Vereeniging contribute significantly to the manufacturing sector statistic. The number of people employed by the agricultural sector is surprisingly low, which suggests that the smallholdings and farms within Emfuleni are primarily used for rural residential purposes, rather than commercial farming purposes.

2.3.2.3. OCCUPATION

![Diagram 5: Occupation](source: Census 2001)
The Diagram above depicts the occupations held by economically active persons within Emfuleni area. Of these, significant numbers of persons within Emfuleni are labourers, tradesman, machine operators, clerks and service workers. These occupation types correspond with the employment sectors found within Emfuleni, such as the industrial and commercial areas of Vanderbijlpark and Vereeniging. Occupation relates directly to other economic factors, such levels of education, employment levels and income. Again, the low number of agricultural workers resident within Emfuleni is surprising, suggesting that most of the agricultural properties within the Municipal Area are not used for commercial agricultural purposes.

2.4. TRANSPORTATION

2.4.1. MOVEMENT PATTERN

Movement patterns provide an understanding of how an area functions, because it illustrates the spatial relationships between settlements and core areas (employment and shopping areas) and the linkages that exist between such spatial entities. The Diagram below depicts the movement of people within Emfuleni and between Emfuleni and the neighbouring municipal areas. Four primary core areas are located within and close to Emfuleni. Movement within Emfuleni largely occurs within a triangle, anchored by the core areas of Vanderbijlpark, Vereeniging and Sebokeng. Movements between Emfuleni and neighbouring municipal areas occur along two axes. The first axis is located between Vanderbijlpark and Sebokeng towards Orange Farm and Johannesburg. The second axis is located between Vanderbijlpark, Vereeniging and Meyerton towards Ekurhuleni.

The strongest movement of people is between Vanderbijlpark, Vereeniging and Meyerton towards Johannesburg along the P156 freeway. A strong movement also occurs between Sebokeng and Johannesburg, especially during morning and afternoon peak hours, as commuter access employment opportunities in Johannesburg and surrounding areas. A strengthening of movement in future can be expected between Vereeniging and Sebokeng, as urban development and densification occurred along this corridor. The densification of this corridor is set out in the Development Concept that is presented in Section 4 of the Emfuleni SDF. Movement along the corridor between Vereeniging, Sebokeng and Johannesburg will be supported by the existing commuter railway line serving these locations.
2.4.2. ROAD NETWORK

The South African Road Classification and Access Management Manual is an official requirement for National, Provincial and Municipal Authorities to implement. The South African Road Classification and Access Management Manual is funded and supported by SANRAL and the National Department of Transport (NDOT).

According to the South African Road Classification and Access Management Manual, the road hierarchy within South Africa functions on 5 levels (see Diagram above). The first level contains freeways, consisting of national freeways and provincial PWV roads and these are classified as Class 1 roads. These roads provide regional access, connecting an area to neighbouring cities and towns. The second and third levels comprises major and minor arterials (or K-routes), which aim to provide better intra-urban access between suburbs and activity areas. These are classified as Class 2 and 3 roads. The fourth level comprises collector roads, which are classified as Class 4 roads. These roads connect residential areas to the mentioned arterial network. On the fifth level, local streets provide direct access to land uses and link these land uses to the mentioned collector roads. These are classified as Class 5 roads.
FIGURE 5: PUBLIC TRANSPORTATION NETWORK
In essence, freeways and arterials are highly mobile and therefore aim to connect people over large distances to activity areas and neighbouring settlements. Collector roads and local streets provide good accessibility and therefore aim to connect people and land uses to the more mobile roads. Road-based public transportation systems (minibus taxis and busses) mostly use arterials and collector roads, as these provide an efficient balance between mobility and land use accessibility.

Figure 4 depicts the road network serving Emfuleni area. The N1 freeway passes through the centre of Emfuleni, linking Emfuleni to Johannesburg and Soweto. The primary role of this freeway is link Gauteng Province to the Free State Province and the Western Province and therefore fulfills a through-traffic function, rather than serving Emfuleni specifically. The P156 freeway, on the other hand, primarily serves Emfuleni, linking Vanderbijlpark and Vereeniging to Ekurhuleni and the OR Tambo International Airport. Due to function; corridor development is increasingly occurring along the P156 freeway, especially in the Vereeniging and Meyerton areas. The P156 freeway is located on the eastern boundary of Emfuleni.

Characteristic of Emfuleni is the fact that much of its planned K-route network has been developed, although not all the K-routes have been to a dual carriageway level. Many of the K-routes are also in need of rehabilitation, especially K-routes such as the K174 (Barrage Road). Despite this, the complete K-route network allows urban infill and expansion to take place in almost any part of Emfuleni, providing the access needed for urban development. There are four K-routes that can be highlighted as prominent K-routes serving Emfuleni. The first is the K53 (Moshoeshoe Road that become the Golden Highway), which runs between Vanderbijlpark and Sebokeng. This is an important commuter spine serving Emfuleni. The second K-route worth mentioning is the K174 (Barrage Road), linking Vanderbijlpark to Vereeniging. This is considered by Emfuleni to be a gateway route into Emfuleni, and the Municipality is thus concerned over the type and development that take place along this route. The K178 link Sebokeng to Vereeniging and the shopping and employment opportunities found within Vereeniging. As was mentioned, it is expected that the importance of this route will increase in the near future as urban development and infill occurs along this route. This K-route is expected to become a major commuter spine, as urban development intensifies along this route. The fourth K-route is the K164, which links Evaton to Meyerton. Savanna City (a 14000 residential unit development) will be situated on and have access from the K164, which will increase the prominence of this K-route.

2.4.3. RAIL NETWORK

Emfuleni is served by a rail network that connects Emfuleni to neighbouring areas in Gauteng and the Free State. As depicted by Figure 4, this rail network consists of 3 lines. The first rail line stretches along the P156 (R59) freeway and links Sasolburg to Vereeniging, Meyerton and Germiston. This rail line is primarily a freight line, but does contain commuter railway stations along
the line. The second railway line stretches from Sasolburg, via Vereeniging towards Sebokeng, Orange Farm and Johannesburg. This railway line also functions as a freight railway line, although it also fulfills a significant commuter railway line function. The third railway line stretches from Sebokeng towards Weston area. This railway line is exclusively used for rail freight purposes.

2.4.4. PUBLIC TRANSPORTATION

The Diagram below provides an indication of the modes of transport that commuters within Emfuleni area use to access employment opportunities and social amenities. According to this Diagram, most people within Emfuleni access employment opportunities and social amenities by mini-bus, but also by bus and by train, making Emfuleni a predominantly public transport-reliant community. Cars also make up a significant portion of the transportation modes used to access employment opportunities and social amenities within Emfuleni. Pedestrians are non-motorised transport and are, within the context of the entire transportation market, the most significant means of accessing employment opportunities and social amenities within Emfuleni. The modes of transport used as set out above points to a situation where most households within Emfuleni are reliant on public transport to access employment opportunities and social amenities. In a certain sense, this is a desirable situation, because there are very specific and valid reasons for providing and promoting the use of public transport within urban areas. One such a reason is to lessen carbon emission, which is the primary cause of climate change. As depicted by Figure 5, three municipal-level public transport networks serve Emfuleni. These are the following:

a. Metrorail

Emfuleni is served by a commuter rail network that connects Emfuleni to neighbouring areas in Gauteng. This commuter rail network consists of 2 lines. The first rail line stretches from Vereeniging to Meyerton and towards Germiston. This commuter railway line contains commuter railway stations, with prominent stations being the Vereeniging Station, the Duncanville Industrial Halt Station and the Meyerton Station. The use of this railway line as a commuter railway line is limited due to fragmented urban development and low residential densities along this railway line. The second commuter railway line stretches from Vereeniging towards Sebokeng, Orange Farm and Johannesburg. Prominent stations along this line are Houtheuwel Station, Residentia Station and Stredford Station. This railway line traverses densely built-up urban areas, as is found in Sebokeng and Orange Farm, and it therefore fulfills a significant commuter railway line function. However, the full potential of this railway line to function as a commuter railway line is impeded by the following factors:
• Large undeveloped areas between Vereeniging and Sebokeng, with low residential densities
• The lack of urban development on both sides of the railway line, in particular in the Sebokeng and Evaton region
• Gaps in the spacing of commuter railway stations, in particular between the Leeuhof Halt and Kleigrond Stations and between the Houtheuwel and Kwaggastroom Stations

DIAGRAM 8: MODE OF TRANSPORT
Source: Census 2001
Urban development along the Vereeniging-Sebokeng-Orange Farm commuter railway line will provide the necessary commuter thresholds needed to ensure the viable operation and expansion of this commuter railway line. In turn, this will provide opportunities for Transit Oriented Development (TOD) along this line.

b. Bus network

Emfuleni comprises an extensive bus network that serves the municipal area. A prominent bus route is the bus route linking Vereeniging to Sebokeng along the K53 (Moshoeeshoe Road) and the K45 (Golden Highway). This bus route links Evaton and Sebokeng to the Vereeniging CBD and the industrial areas located within Vereeniging. Other bus routes worth mentioning are the bus route linking Vereeniging to Meyerton, the bus route linking Vereeniging to Residentia Station, and the Bus route linking Evaton to Meyerton. This bus network provides a platform for the future urban development and expansion within Emfuleni area. Also, linking the bus network to the commuter rail network will enable the bus network to act as a feeder system to the commuter rail network. This will give Emfuleni access to an integrated hierarchy of public transportation modes servicing different geographic levels (local to regional levels). This will greatly improve the current public transportation network serving Emfuleni and provide strong spatial structuring elements to guide and shape future urban development within Emfuleni.

c. Mini-bus taxi network

Emfuleni comprises an extensive minibus taxi network. This network largely serves the route and areas within the municipal area that the bus network does. The only significant exception is that a minibus taxi route links the Vanderbijlpark CBD to Sebokeng via Mittal Steel; a route which the bus network does not serve. A disadvantage of the minibus taxi network is that the minibus taxi routes are not dedicated and fixed, thus they are potentially subject to change in future. This limits the certainty of where to densify parts of Emfuleni to support the use of public transportation. Bus routes and in particular commuter railway lines provide much better indication and certainty of where to density within Emfuleni in the future.

2.4.5. AIRPORTS

Emfuleni comprises 2 light aircraft airports. The Vanderbijlpark Airport is located on the western boundary of Bophelong and the Vereeniging Airport (Aerovaal) is located on the eastern boundary of Roshnee. The Vereeniging Airport has two runways and hangar facilities to accommodate approximately 64 planes. It has the capacity to handle freight and handles an average of
80 tons of freight per month. The airport is situated within the airspace of the OR Tambo International Airport, requiring air traffic from Vereeniging Airport to be co-coordinated from the OR Tambo International Airport control tower. OR Tambo International Airport is located approximately 80km from Emfuleni and is accessed via the P156 (R59 freeway).

2.5. MUNICIPAL SERVICES

The primary municipal services (water, electricity and sanitation) are briefly discussed below. It illustrates the level of municipal services provision within Emfuleni, as well as the bulk network serving Emfuleni. The level of service is derived from Census 2001 and only shows the existing number municipal services connections by 2001. It does not show the capacity of the bulk municipal services network to accommodate urban expansion and densification. The following information was extracted from the Emfuleni Annual Report 2007/8 and the Emfuleni IDP 2007-12.

2.5.1. INFRASTRUCTURE CHALLENGES

Emfuleni’s existing infrastructure is overburdened, largely due to population growth and the poor state of the infrastructure within Emfuleni. In addition, the replacement, rehabilitation and preventative maintenance of existing infrastructure has suffered due to persistent focus on the extension of infrastructure and ad hoc repairs.

In order to address this problem, the Municipality appointed consultants to compile an infrastructure master plan with the intention to look at the current status of the existing infrastructure, deliberate ways of addressing the challenges and to make proposals to cater for future developments. The study also intended to assist in linking water, sanitation and electricity development in an integrated manner.

The Regional Sewer Scheme is a project aimed at addressing the sewer problems of the Sedibeng district municipal area and its locals: Emfuleni, Midvaal and Lesedi. The project will be constructed over a period of five years and it is estimated that the project will cost approximately R2 billion.
2.5.2. WATER SUPPLY

According to the Diagram below, the majority of households that live in Emfuleni have access to tapped water within their house or a tap inside their yard. A relatively small number of households acquire water from a standpipe.

![Diagram 9: Water Supply](source: Census 2011)