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GAUTENG LAND USE PLAN

PART 1: PROVINCIAL SPATIAL PERSPECTIVE

1. INTRODUCTION

The Gauteng Land Use Plan is intended to spatially guide, inform, and direct the Gauteng Integrated Transport Master Plan, and in doing so comprises the following main components:

- An assessment of the existing spatial structure of Gauteng Province;
- An assessment of current future planning policies/plans for Gauteng Province, including the Gauteng City Region Concept;
- A synthesis highlighting the implications of the existing and envisaged future spatial structure of the Province for the ITM25;
- A comprehensive Gauteng Land Use Plan which will serve as backdrop to the ITM25 Modelling process.

2. STATE OF PLANNING

As illustrated on Diagram 1 there are several statutory land use/spatial plans or development concepts relevant to Gauteng Province. Most of these have been compiled in terms of legislation, e.g. the Metropolitan and District Spatial Development Frameworks, Local Spatial Development Frameworks and Precinct Plans which have all been compiled in terms of the Municipal Systems Act (2000), and the provincial Spatial Development Framework which have been developed in terms of the Gauteng Planning and Development Act (2003).

At national level the National Spatial Development Perspective (NSDP) puts forward five principles to guide and inform spatial planning at all spheres of government in South Africa, while planning pertaining to the future Gauteng City Region is undertaken in the Office of the Gauteng Premier.

Collectively, all these plans/principles should be consolidated to create a Land Use Plan/Spatial Development Perspective for Gauteng Province which will inform the Gauteng Integrated Transport Master Plan (GITMP25).
3. POLICY DIRECTIVES

Below is a brief summary of the development principles and directives emanating from the National Development Plan, National Spatial Development Perspective, and Gauteng City Region initiatives respectively. The information pertaining to provincial, metropolitan and district municipality Spatial Development Frameworks are incorporated into sections 3 and 4 of this document.

3.1. National Development Plan

The National Development Plan envisages an economy that serves the needs of all South Africans – rich and poor, black and white, skilled and unskilled, those with capital and those without, urban and rural, women and men. It states that, in 2030, the economy should be close to full employment; equip people with the skills they need; ensure that ownership of production is less concentrated and more diverse (where black people and women own a significant share of productive assets); and be able to grow rapidly, providing the resources to pay for investment in human and physical capital.

NDP proposals are intended to lower the cost of living for poor households and for businesses through targeted microeconomic reforms, especially in transport, public services, telecommunications and food. It deems the lowering of cost of living a necessary adjunct to raising the standard of living and encouraging investment.
Based on South Africa's existing infrastructure plans the NDP suggests that the following investments should be prioritised:

- The upgrading of informal settlements.
- Public transport infrastructure and systems, including the renewal of the commuter rail fleet, supported by station and facilities upgrades to enhance links with road-based services.
- The development of the Durban-Gauteng freight corridor, including the development of a new dug-out port on the site of the old Durban airport.
- The construction of a new coal line to unlock coal deposits in the Waterberg, extension of existing coal lines in the central basin and, through private partnership, the upgrading of the iron ore line to Saldanha.

The NDP also proposes three complementary strategies:

- Increasing urban population density, while improving the liveability of cities by providing parks and other open spaces, and ensuring safety.
- Providing more reliable and affordable public transport with better coordination across municipalities and between different modes.
- Moving jobs and investment towards dense townships that are on the margins of cities.

The NDP envisages that a marked change to public transport will emerge through concerted effort, strong leadership, consistent messages and actions, and public system alternatives that work. The aim is that by 2030, public transport will be user-friendly, less environmentally damaging, cheaper and integrated or seamless. It furthermore states that better monitoring of emissions - and apportioning cost to origin - is also likely to be a major contributor in moving to a low-carbon future.

Finally, the NDP concludes that significant investment in the public transport system is needed to extend bus services, refurbish commuter rail, link high-volume corridor services and integrate all these into an effective service.

In terms of land use, the NDP suggests that shifting settlement patterns should be investigated to align public investment in infrastructure and services with these trends, and to develop appropriate systems of land tenure and growth management. Special attention must be given to areas of densification along public transport corridors. It envisages that spatial transformation will reduce travel time and cost between home and work, and increase mobility for poor households to access better job and education opportunities. This in turn will reduce poverty and inequality.

Finally, the NDP concludes that the outcomes of spatial change may take decades to be fully realised, but the shift in trajectory can happen relatively quickly. These proposed interventions can be fully implemented in five years. Positive outcomes from these reforms should be evident within 10 years, providing the basis for real transformations in the rural and urban landscape over the subsequent decades.
3.2. National Spatial Development Perspective (NSDP)

The National Spatial Development Perspective was initiated with the aim of not only providing a strategic assessment of the spatial distribution and socio-economic characteristics of the South African population, but also gaining an understanding of the distribution of economic activity and potential across the South African landscape. Based on the research conducted, and with key trends and issues identified, the NSDP delineates a number of guidelines for infrastructure investment in South Africa (including Gauteng Province) as summarised below:

- Economic growth is a prerequisite for the achievement of other policy objectives, key among which would be poverty alleviation.
- Government spending on fixed investment, beyond the constitutional obligation to provide basic services to all citizens (such as water, electricity as well as health and educational facilities), should be focused on localities of economic growth and/or economic potential in order to attract private-sector investment, stimulate sustainable economic activities, and/or create long-term employment opportunities.
- Efforts to address past and current social inequalities should focus on people, not places. In localities where there are both high levels of poverty and development potential, this could include fixed capital investment beyond basic services to exploit the potential of those localities.
- In localities with low development potential, government spending, beyond basic services, should focus on providing social transfers, human resource development and labour market intelligence. This will enable people to become more mobile and migrate, if they choose to, to localities that are more likely to provide sustainable employment or other economic opportunities.
- In order to overcome the spatial distortions of apartheid, future settlement and economic development opportunities should be channelled into activity corridors and nodes that are adjacent to, or link the main growth centres. Infrastructure investment and development spending should primarily support localities that will become major growth nodes in South Africa and the Southern African Development Community region to create regional gateways to the global economy.

3.3. Gauteng City Region

The primary objective of the Global City Region (GCR) is to build Gauteng into an integrated and globally competitive region where the economic activities of different parts of the province complement each other in consolidating Gauteng as an economic hub of Africa and an internationally recognised global city-region. The main aim being to encourage greater internal coherence and cooperation within the Province for greater external competitiveness.

Gauteng is not only seen as a GCR – it is also most likely a future “Mega-City” within the African context. Diagram 2 graphically depicts the concept of the Gauteng City Region with the primary urban conurbation clustered around Tshwane, Ekurhuleni, Johannesburg, Mogale City and Emfuleni.
The Gauteng City Region is furthermore supplemented by four large secondary economic clusters around Rustenburg, Potchefstroom/Klerksdorp, Sasolburg, and Secunda/Middelburg/Witbank as illustrated on Diagram 2. Functional linkages between these areas and the Gauteng City Region core area are critically important.

**Diagram 2: Concept of Gauteng City Region**

The GCR concept aims to develop the Province based on the following principles:

- Reducing reliance on private mobility in favour of safe, convenient and affordable public transport and non-motorised transport.
- Reduce present rates on non-renewable energy usage.
- Reduce rates of energy expended on the manufacture of goods, the delivery of these goods to market and the import of goods.
- Integrating open space systems into the city region and providing sustainable ecosystems, urban agriculture, and quality of life as a fundamental of the province’s development patterns.
- Promoting a democratic urban order in terms of opportunities for all.

The GCR implementation/ action plan comprises eleven strategic pathways to facilitate and integrate implementation and alignment of this concept. Of specific relevance to this study is Strategic Pathway ten which deals specifically with aligning strategies within the GCR perspective. In this regard the key project relates to contextualizing the following strategies within the GCR short and long terms vision:
- Safety and security;
- Transport infrastructure and authorities;
- Integrated Safety and Transport System;
- Sustainable human settlements;
- Investment and tourism promotion;
- Infrastructure provision; and
- Environment and sustainability.

Transportation will play a vital role in the urban consolidation and restructuring of the Province and in finding sustainable movement solutions which lessen the reliance on private mobility in favour of safe, environmentally friendly and affordable public transport and non-motorised transport.

4. CURRENT REALITIES

4.1. Institutional Structure

Gauteng Province comprises three metropolitan areas and two district municipalities as illustrated on Figure 1. These include the City of Tshwane; City of Johannesburg; Ekurhuleni Metropolitan Municipality; West Rand District Municipality; and Sedibeng District Municipality. The West Rand District Municipality comprises the local authorities of Merafong City, Randfontein, Westonaria and Mogale City Local Municipality, while the Sedibeng District Municipality includes Emfuleni, Midvaal, and Lesedi Local Municipalities.
4.2. Spatial Structure

Figure 2 depicts the spatial structure of Gauteng Province as a whole. The first important feature to note is the regional open space network in the province which includes a number of nature reserves and conservation areas which act as strong structuring elements and which will guide, direct, and influence future spatial development patterns. The most prominent of these features are the Dinokeng Nature Reserve\(^1\) initiative located to the north-east of City of Tshwane, the Cradle of Humankind\(^2\) to the north-west to the City of Joburg, the Magalies mountain range\(^3\) which runs through the City of Tshwane from west to east, the Rietvlei Dam Nature Reserve\(^4\) which is located to the south-east of the City of Tshwane, and the Suikerbosrand Nature Reserve\(^5\) which is located to the south of the Ekurhuleni Metropolitan area.

The centre of gravity/ core activity area in terms of economic activity within the province is located in the triangular area defined by the CBD of the City of Tshwane, the CBD of the City of Joburg, and the OR Tambo International Airport in the Ekurhuleni Metropolitan Area as graphically illustrated on Figure 2.

As is clearly evident from Figure 3, there are three major concentrations of economic activities in the Province: one around the central parts of the City of Tshwane, the second one in the central part of the Ekurhuleni-Joburg Metropolitan complex, and the third, smaller concentration is located towards the south of the province in the Emfuleni (Vereeniging-Vanderbijlpark) area. Apart from these major
Economic Activity Areas

Source: Gauteng Spatial Development Perspective 2007
clusters of economic activity, there are a few smaller, decentralised activity nodes located in the peripheral areas of the province as illustrated in Figure 3.

The major concentrations of business (office and retail) development occur in the north-western suburbs of the City of Joburg and the south-eastern parts of the City of Tshwane (see Figure 2).

As far as industrial development is concerned, the major features reflected on Figure 2 include, in the first place, the north-south and east-west axis of industrial development which converge in the vicinity of Germiston in Ekurhuleni. The east-west industrial belt extends from Chamdor in the West Rand area right through the City of Joburg and up to Springs and Nigel in the east; while the north-south belt extends from Olifantsfontein in the north, southwards past Isando-Spartan and Wadeville-Alrode, and along the R59 Corridor through Meyerton (Midvaal), and up to the Emfuleni (Vereeniging-Vanderbijlpark) industrial complex in the Sedibeng District Municipality.

Apart from this major industrial footprint in the province, there are also several smaller industrial areas located to the north-west of the City of Joburg around Laserpark, Kaya Sands, and Kayalami, as well as along the N1-Midrand Corridor extending towards Centurion in the central part of the province. In the City of Tshwane the four major industrial areas include Pretoria West, the Silverton-Waltloo complex to the east, the Rosslyn industrial area located towards the north-west in the vicinity of Soshanguve, and Ekandustria near Bronkhorstpruit.

The Province has historically been a major mining region, with a large proportion of land use and economic development funded by gold production. However, declining production and increasing costs threaten the viability of several mines, so the overall opportunities for employment have significantly reduced.

The relatively small geographic size of Gauteng Province means that the agriculture sector only accounts for a minor percentage of the total GVA. Its potential is further hampered by the lack of adequate water supplies to support intensive farming practices, so the levels of job opportunities are relatively minor, especially compared with industrial activity.

Although natural tourist attractions form an important economic driver, its role within Gauteng is limited, particularly when compared with the neighbouring Provinces of Limpopo and Mpumalanga. Two prominent tourism features include the Cradle of Humankind near Mogale City and the Dinokeng Nature Reserve to the north-west of Tshwane.

From Figure 2 it is also evident that the low income residential areas and associated informal settlements in Gauteng Province are located on the urban periphery of the major urban settlements.
These include the GaRankuwa-Mabopane-Winterveld-Temba complex\(^{(11)}\) located to the north-west of the City of Tshwane, and Atteridgeville\(^{(12)}\), Mamelodi\(^{(13)}\) and Olievenhoutbos\(^{(19)}\) located to the west, east and south-west respectively.

In Ekurhuleni the low income communities are clustered together in four main urban complexes: Tembisa\(^{(21)}\) to the north-west, Daveyton-Etwatwa\(^{(22)}\) to the north-east; Kwatsaduza\(^{(23)}\) to the south-east and Katorus\(^{(24)}\) to the south-west.

In the City of Joburg low income communities are mainly concentrated in the Zandspruit and Diepsloot\(^{(20)}\) areas to the north-west, Ivory Park\(^{(21)}\) (which is functionally part of Tembisa) and Alexandra to the north-east, and Soweto\(^{(25)}\) towards the south-west.

Further towards the west of Soweto is Kagiso\(^{(27)}\), Munsieville\(^{(29)}\), Mohlakeng\(^{(28)}\), and Bekkersdal\(^{(30)}\) located in the West Rand District Municipality.

Towards the south of Soweto low income communities reside in Lawley, Ennerdale and Orange Farm\(^{(26)}\), followed by the Evaton\(^{(31)}\)-Sebokeng\(^{(32)}\) complex further towards the south in the Sedibeng District Municipality area. These settlements form a linear urban conurbation parallel to the N1 South freeway over a distance of approximately 40 kilometres.

In the central parts of the Emfuleni urban area are the Bophelong, Boipatong and Sharpeville\(^{(33)}\) low income residential areas.

**Development Trends**

The following is a brief summary of the most salient development trends in the Gauteng Province:

- The areas that have seen the bulk of new property investment in recent years are the central, northern and north-western parts of the City of Johannesburg, the eastern, southern and south-eastern parts of the City of Tshwane and the western parts of the Ekurhuleni Metropolitan Municipality - especially the area around OR Tambo Airport and southwards towards Boksburg and Germiston.

- Office development is by and large concentrated in the wealthier north-western suburbs of the City of Johannesburg, followed by the south-eastern suburbs of the City of Tshwane, with the core area around OR Tambo Airport in the Ekurhuleni Metropolitan Municipality a distant third.

- Mixed-use developments are concentrated in the City of Johannesburg and the City of Tshwane and are located along main roads in high-income areas in these two municipalities.

- Residential development, especially of a higher density nature, has focused in the northern, north-western and southern sections of the City of Johannesburg, the eastern and south-eastern parts of the City of Tshwane, and the northern section of the Emfuleni Local Municipality.
- The three metros are home to just below 90% of all households living in informal settlements in the province (2009-figure).
- Although the Johannesburg CBD has experienced a major slump in building occupancy rates in recent years, there is a renewed interest with major investment planned for the CBD.
- The Tshwane CBD plays a significant office, retail and administrative function serving the greater Tshwane region. Much of the office development is located to the east, south and southern parts of the City.
- The Germiston CBD, Boksburg and OR Tambo International Airport form part of the ‘Ekurhuleni Core Economic Triangle’, which include the proposed future development of an Aerotropolis around the OR Tambo airport.

As Gauteng represents the economic hub of South Africa, most national freeways converge on Gauteng, resulting in a number of national and provincial corridors affecting the study area. These are illustrated on Figure 4 and discussed in more detail in Section 4.3 of this report.

The rail commuter system in the Province comprises four major links, working together with several shorter feeder systems linking low-income communities to the main system:
- An east-west orientated line serving the Witwatersrand from Springs in the east to Randfontein in the west;
- A north-south link between the Witwatersrand and Tshwane to the north; and
- Two north-south links between the Witwatersrand and Sedibeng to the south.

### 4.3. EXISTING MOVEMENT NETWORK/MAIN CORRIDORS

#### 4.3.1. Roads

Gauteng is the ‘heartland’ of South Africa. As Gauteng represents the economic hub of South Africa, most national freeways converge on Gauteng, resulting in a number of national and provincial corridors affecting the study area. These are discussed in more detail below, and illustrated on Figure 4.

**National Corridors**

- **Tshwane to Emfuleni (N1 National Corridor)**
  At national level this corridor links Zimbabwe in the north to Cape Town in the south, and it traverse Gauteng Province from north to south. Within Gauteng Province N1 corridor stretches from Tshwane in the north to Emfuleni in the south. This corridor primarily functions as a development corridor and connects major land uses, amongst other, the Tshwane CBD, Midrand strip, Joburg CBD and Emfuleni industrial areas to one another. A rail link exists parallel to route
N1 in the Tshwane area and the area between Joburg CBD and Emfuleni. The area between Tshwane and the Joburg CBD is also served by Gautrain.

- **Maputo to Zeerust (N4 Corridor)**
  The N4 corridor stretches from Maputo (located in Mozambique) to Zeerust (located in the North West Province) and currently functions as a transportation corridor. This national corridor passes through the northern parts of Tshwane and provides access to significant land use concentrations such as the Rosslyn/ Blue IQ automotive cluster and the CSIR/ Innovation Hub, and it links to Rustenburg to the west, and Emalahleni and Middelburg to the east; all of which represent secondary activity areas to the Gauteng City Region.

- **Durban to Johannesburg (N3 Corridor)**
  In addition to providing a road and rail link between Durban and Johannesburg, this corridor provides access to the Germiston Rail-Freight Junction and the City Deep Container Depot. Whereas the northern parts of this corridor are densely populated (Alberton, Edenvale and Alexandra), the southern parts are relatively sparsely populated, making it a transportation corridor rather than a development corridor.

- **Springs to Westonaria (N12 and N17 Corridor)**
  The N12 and the railway line link Randfontein to Springs, located west and east of Johannesburg respectively. To the east of Johannesburg, the N17 freeway can also be considered part of this corridor. There are a number of railway lines forming part of the corridor. The Germiston Rail-Freight Junction is a primary rail freight hub within Gauteng and is linked to this corridor.

  The mine dumps located east of Johannesburg are systematically being removed, opening up land along this corridor for urban development that is centrally located within Ekurhuleni. Densification of this corridor will largely involve infill development in close proximity to the existing rail network, and holds significant potential for future Transit Oriented Development.

  The N12 links the GCR to Emalahleni and Middelburg, while the N17 provides the functional link between the GCR and Secunda.

- **Tshwane to Mogale City (N14 Corridor)**
  This corridor links Mogale City (Krugersdorp) to Centurion and primarily functions as a transportation corridor. Although most of this corridor traverses agricultural areas, it does link industrial areas within the West Rand and Centurion. Large-scale urbanization along this corridor will mostly be concentrated east of Centurion in the Olievenhoutbosch region, Diepsloot and
Lanseria Airport, while densification of the Mogale City area may also occur, specifically in the Kagiso and Muldersdrift regions.

No rail infrastructure exists within this corridor.

**Provincial Corridors**

- **Mabopane to Tshwane (PWV9 Corridor)**
  This corridor stretches from Mabopane to the city centre of Tshwane and is served by both road and rail. This corridor primarily functions as a development corridor and serves the low income residential areas of Winterveld, Mabopane, Soshanguve, Klipfontein, Kruisfontein and Garankuwa. It also provides access to the Rosslyn Blue IQ automotive cluster.

- **Tshwane to OR Tambo and Germiston (R21 Corridor)**
  This corridor traverses Tshwane via Kempton Park to Germiston and it also links the OR Tambo International Airport to Tshwane and the greater Johannesburg area. Although largely neglected to date, the northern and southern ends of this corridor, between Tshwane and Kempton Park, are being opened up for large-scale, mixed-use urban development, setting the stage for this corridor to become a significant development corridor within Gauteng. The main rail link between Tshwane, OR Tambo Airport and the City of Joburg forms part of this corridor.

- **Vereeniging to Johannesburg (R59 Corridor)**
  This corridor links Emfuleni to Ekurhuleni via Meyerton and primarily functions as a transportation corridor. At present this corridor is relatively sparsely populated, but it has seen significant investment over the past six years since the Midvaal Municipality earmarked it as a development corridor. The corridor comprises the R59 freeway as well as a commuter railway line.

- **Siyabuswa (Kwandebele) to Tshwane (Moloto Corridor)**
  The Siyabuswa (Kwandebele in the Mpumalanga Province) to Tshwane corridor links the residential areas in Siyabuswa with Tshwane via the so-called Moloto road. This is mostly a transportation corridor linking rural communities to the City of Tshwane. The feasibility of establishing a commuter railway line along this corridor is currently being investigated.

- **Sandton to Soshanguve (PWV9 Corridor)**
  The PWV9 is probably the most important new freeway to be constructed in Gauteng Province in future. This freeway will improve linkage between the northern suburbs of Johannesburg and the north-western parts of Tshwane, creating an alternative to the N1 freeway and the R21. It will also intersect with the N4 Platinum Corridor, providing linkage to areas such as Rustenburg in
the North West Province and Maputo in Mozambique. No rail infrastructure exists along this movement desire line.

- **Lanseria to Rustenburg (R512 Corridor)**
  Another potential corridor is the Johannesburg to Rustenburg link, which will develop as an extension of Malibongwe Drive in Johannesburg. The Rustenburg area is one of the fastest-growth towns within the country, primarily due to the expansion of the platinum industry surrounding the town. As Rustenburg expands economically and residentially, it will increasingly become a ‘magnet’ drawing traffic from Johannesburg/Gauteng. No rail infrastructure exists along this corridor.

### 4.3.2. Rail

A Strategic Plan by PRASA (2011) presented the following summary of the future development potential of existing and proposed rail corridors within Gauteng Province (also refer to Figure 5):

1. **Hammanskraal-Pretoria CBD**: There is significant pressure from the community to reinstate this line as a commuter service to the Pretoria CBD. This line also holds potential for increased ridership in future as the major concentration of new residential development in the Temba-Hammanskraal complex will be located in the area to the south-east and south of the existing Hammanskraal railway station. It is anticipated that this area could have about 24 207 more residents in close proximity to the railway station by 2025. The hinterland between the Pretoria CBD and Hammanskraal will however remain rural in nature for at least the next 30 years as it forms part of the floodplain area of the Apies River and currently holds intensive agricultural activities.

2. **Mabopane-Pretoria CBD**: This is currently one of the priority rail corridors in the Province and there is ample opportunity for further residential infill and densification along the railway line, especially in the Soshanguve South area and around the Kopanong railway station along the line. About 73 400 additional people can be settled around this line up to 2025.

3. **Ga-Rankuwa-Pretoria CBD**: This line also holds potential for incremental development as there are medium term plans to promote development in the area adjacent to the south of the railway line and up to the Rosslyn industrial area. This line also feeds into the Soshanguve South area which is a major focus area for residential development in the City of Tshwane and will obviously benefit from this initiative. The estimate is for about 31 000 new residents to the area over the next fifteen years.

4. **Atteridgeville-Pretoria CBD**: Although this line is already operational and fairly busy there is still some opportunity for more residential infill development (about 42 700 people) in the area between Atteridgeville and the Pretoria West industrial area along the rail corridor. There are also proposals to expand the line from the Saulsville station a few kilometres towards the west in order to link up with the latest residential expansions of Atteridgeville.
5. **Mamelodi-Pretoria CBD**: The vacant areas adjacent to the south of the Mamelodi township are served by railway stations like Denneboom, Eerste Fabriek, Green View and Plenaars Poort. These areas are declared expansion areas of the Mamelodi area and hold potential to accommodate at least 20 356 more people in close proximity to the railway line over the next fifteen years.

6. **Pretoria Ring Rail System**: As part of a general densification, infill development, and growth management strategy of the City of Tshwane, the City Planning Department aims to promote infill development and densification around the railway stations along the ring rail system as reflected on the attached figure in the City of Tshwane. Although at this stage it is not expected that this will make a significant difference to commuter numbers in the short term, this initiative will in the medium to longer term certainly enhance the viability and utilisation of rail infrastructure in the central parts of the City of Tshwane.

7. **Pretoria CBD-OR Tambo-Germiston**: This railway line runs parallel to the R21 freeway which is a declared development corridor to both the Ekurhuleni Metro and the City of Tshwane. It currently attracts extensive residential, commercial and light industrial activity and it is expected that this trend will persist in future. In terms of the Ekurhuleni Growth Management Strategy and Metropolitan Spatial Development Framework, it intends to promote densification along the entire Tembisa-Germiston railway line utilising all vacant pockets of land around the railway stations. Current estimates are that the entire corridor between Pretoria CBD and Germiston will serve about 105 030 more residents over the next fifteen years (up to 2025).

8. **Daveyton-Germiston**: This corridor is also earmarked to be utilised and promoted for residential infill development and Transit Orientated Development. About 91 052 more residents can be expected along this corridor up to 2015.

9. **Springs-Germiston**: This line holds potential for Transit Orientated Development around the Anzak, Brakpan, New Era and Pollak Park railway stations with estimated capacity for about 42 966 more residents residing along this corridor.

10. **Kwesine-Khatlehong-Germiston**: This railway line is well utilised at present, but it can be expected that about 41 496 additional people will reside along this corridor by 2025.

11. **Joburg-Germiston**: This line forms part of the Randfontein-Springs commuter system and again in terms of the Growth Management Strategy of both the City of Joburg and the Ekurhuleni Metropolitan Municipality, spatial plans are in place to optimise the utilisation of all vacant land for densification and infill development purposes around all railway stations. The estimated increment is 27 644 people by 2025.

12. **Joburg-Randfontein**: This rail section serves areas like Florida, Roodepoort, Mogale City and Randfontein and partially runs through the historic mining belt of the West Rand of Gauteng Province. There is currently renewed interest in redeveloping the historic mining land for residential, commercial and industrial purposes, and several land parcels in close proximity to the railway line and railway stations have been identified as priority sites for detailed feasibility studies in order to formalise development (in line with the CoJ Growth Management Strategy.
promote public Transport Orientated Development). Current estimates are that there is latent development potential for about 148 392 more people along this corridor up to 2025.

13. Naledi-Joburg: This is one of the busiest railway corridors in South Africa and currently operates almost at capacity. There is not much potential for further densification or infill development along this alignment (± 12 000 people by 2025), but it can at least be assured that the current commuter numbers will be retained in years to come.

14. Joburg-Vanderbiljpark: This railway line serves the areas between Joburg past Lenasia, Orange Farm, Sebokeng and up to the Vanderbiljpark area towards the south. It holds enormous potential for increased residential development in close proximity to the railway line with large areas like Syferfontein, Orange Farm, and areas to the east of the railway line in the vicinity of Evaton and Sebokeng having been earmarked for future residential infill development. In total this line thus holds potential for 139 182 new residents by 2025 if the township developments are effectively linked and integrated with the railway stations along this line.

15. Vereeniging-Meyerton-Germiston: Although this line currently serves primarily an industrial corridor and holds limited commuter numbers, no large scale residential development which will significantly impact on commuter numbers along this railway line is expected in the next 10 to 15 years. The medium to longer term projection (2025-2050) however shows a potential 70 900 new residents.

16. Springs-Nigel: The current alignment of this railway line passes the KwaThema, Tsakane and Duduza residential complex to the east and there are no major development pressures for these areas to expand towards the railway line. Instead, these areas are expanding to the west and the north-west towards the centre of gravity of the Ekurhuleni Metropolitan Municipality. There is general consensus that the alignment of this railway section is problematic and PRASA have in the past investigated the possibility of realigning this line to run through the central parts of the Kwasaduza complex which will obviously enhance the viability thereof as the Kwatsaduza community comprises about 275 456 people. This would however require new rail infrastructure to be constructed along this section (see number 17).

18. Daveyton-Etwatwa Extension: There is a PRASA plan to expand the Daveyton railway line towards the east to serve the Etwatwa community and then to link back to the north through the Mayfield area which is the declared future expansion area of the Daveyton-Etwatwa complex. If this railway line is expanded along this section it could serve an additional 160 000 residents.

19. Kirkney-Andeon Rail Extension: This existing railway line runs parallel to Van Der Hoff Drive through the Kirkney-Andeon area in the western suburbs of the City of Tshwane but it is not operational. Large parts of the Kirkney-Andeon area have been identified as possible areas to accommodate the need for residential expansion of Atteridgeville which is located adjacent to the south thereof. From recent investigations it was indicated that there is potential to accommodate at least 74 664 more people in this area by 2025 which could enhance the viability of reinstating a commuter service on this railway line.

20. Mabopane-Hammanskraal: This link is part of the PRASA plans and a preliminary route determination has already been conducted for this line. The main benefit to be derived from
such a rail link would be that it would serve the communities to the north of Mabopane which includes Winterveld, New Eersterust and Stinkwater which would make rail accessible to about 345 000 more people. In addition to this, it would also create a continuous circular rail system between the Pretoria CBD, Hammanskraal and Mabopane.

4.3.3. Air

The major airport in Gauteng Province is the OR Tambo International Airport which is also the largest airport in South Africa. The airport and its surrounds represent a major emerging activity node in the province being branded as a future aerotropolis. The Lanseria airport to the northwest of the City of Joburg supplements the OR Tambo in terms of passenger and cargo transport. Several smaller airports exist in the province, the major ones being Wonderboom, Grand Central and Rand Airport.

5. FUTURE VISION AND DEVELOPMENT PRINCIPLES

5.1. Local Spatial Development Frameworks

All the Metropolitan, District and Local Spatial Development Frameworks of municipalities located within the province collectively seek to achieve the following:

- The creation of an integrated open space system and promoting the function of natural systems;
- The integration of economically disadvantaged communities into the urban system, particularly those on the periphery of the system;
- The promotion of densification in specific areas to utilise resources more efficiently;
- The promotion of viable public transport systems and reduction of reliance on private mobility. (Noteworthy in this regard is the strong emphasis on densification along the priority public transport routes (especially rail and BRT routes) in the Spatial Development Frameworks of Ekurhuleni, Joburg and Tshwane);
- The establishment of a hierarchy of nodes, and supporting existing development nodes;
- The improvement of linkages and connectivity.
- Land use-public transport integration through nodal and corridor development; and
- Growth management that seeks to advance compaction, residential densification, in-fill development and the restriction of sprawl.

The following is a brief summary of the main features of each of these.

5.1.1. City of Tshwane

5.1.1.1 Current Spatial Structure
The spatial distribution of retail and office functions in Tshwane is mostly concentrated in the inner city, regional shopping centres and a host of neighbourhood centres. The main retail/ office nodes within the city include central Pretoria, Hatfield, Brooklyn, Menlyn and Centurion. The largest of these are the Pretoria Inner City, Menlyn and Centurion.

The main retail/ office nodes in the former Metsweding District, comprising the eastern extents of the ‘new’ Tshwane, are located in Cullinan and Bronkhorstspruit. Cullinan is also an important location for mining. There are several concentrations of previously disadvantaged communities within Metsweding, including Refilwe, Zithobeni, Rethabiseng and Ekangala.

In Tshwane the main industrial complexes are located at Pretoria West near Atteridgeville, Walthoo near Mamelodi, Rosslyn near Soshangwu, and Ekandustria near Bronkhorstspruit. There is a distinct spatial relationship between these industrial areas and the previously disadvantaged communities. Secondary, smaller industrial nodes occur in the Moot area, comprising Koedoespoort, Hermanstad and Kirkney, as well as in the southern parts of the metropolitan area, such as Lyttelton, Gateway next to the N1 and Sunderland Ridge in the Centurion area.

Residential development within Tshwane mostly occurs within the eastern, south eastern and north western parts of the city. The older parts of the city are mostly concentrated around the CBD in areas such as Villiera (north), Muckleneuk (south) and Brooklyn (south east). The western and southern parts of Tshwane, adjacent to the N1, accommodate the newer suburbs, such as Garsfontein and Centurion. Previously disadvantaged communities in the City include the Soshanguve / Mabopane and Winterveldt complex, which are situated to the north and northwest of the city respectively. Atteridgeville (west of the city), Mamelodi (east), and Olievenhoutbosch (southeast) are also major catchments.

A number of small holdings are situated in the eastern extents of Tshwane, along the previous Tshwane-Metsweding border. These include areas such as the Willow Glen, Olympus and the Roodplaat Dam agricultural holdings. These smallholding areas are increasingly under pressure for urban development and densification, with areas such as Willow Glen already redeveloped with cluster housing.

There are a number of environmental features within Tshwane, which guide urban development within the municipal area, including amongst others the Dinokeng Nature Reserve, which is a Blue IQ project, the Rietvlei Dam Nature Reserve, the Magaliesberg mountain range and the Bronkhorstspruit Dam.

5.1.1.2 Spatial Development Framework

The Tshwane Spatial Development Framework Concept is illustrated on Figure 6 overleaf.
Tshwane Spatial Development Framework: Concept
Development Principles

The Vision of the City of Tshwane (CoT) is to become The African Capital City of Excellence. Seven strategic objectives have been identified in order to respond to this vision:

- Provide basic services, roads and stormwater.
- Economic growth and development and job creation.
- Sustainable communities with clean, healthy and safe environment and integrated social services.
- Foster participatory democracy and batho pele.
- Promote sound governance.
- Ensure financial sustainability.
- Organisational development and transformation.

The CoT Draft Metropolitan Spatial Development Framework 2012 (MSDF) responds primarily to:

- Strategic Objective 2 (Economic growth and development):
  - Provide strategic direction around infrastructure provision.
  - Guide developers and investors as to appropriate investment localities.
  - Rural management programmes to improve livelihoods and stimulate employment.

- Strategic Objective 3 (sustainable communities with clean healthy and safe environment and integrated social services):
  - Restructure the spatially inefficient City through compaction, densification and Transit Orientated Development.
  - Promote sustainable use of land resources.
  - Growth management.

The philosophy of the Tshwane MSDF is based on three building blocks, namely:

- Nodes and Activity Areas;
- Movement and Connectivity; and
- Environmental Structuring Concept.

The Spatial Pattern

a) Nodes

In the identification of nodes, the CoT took its context within the Greater City Region (which incorporates the City of Johannesburg and Ekurhuleni) into consideration. This implies that nodes within the CoT should serve a specific function within the local, provincial or national context. Therefore a distinction has been made between five nodal typologies i.e:

Capital Core
The Tshwane Inner City is identified as the Capital Core as it is the city's first order node amongst all metropolitan nodes.

The Capital Core must:
- Be the focal point for housing government departments.
- Be developed to a higher than average density, supporting all principles of smart growth.

**Metropolitan Nodes**

Metropolitan Nodes are primary nodes of the highest order. The Metropolitan Nodes accommodate the highest degree of service specialisation and offer the widest range of services. Often, metropolitan nodes will have regional/provincial relevance. In the Tshwane context, Metropolitan nodes are those nodes within the City (economically) benefiting primarily from the investment of the private sector.

The following Metropolitan Nodes were identified:
- Akasia CBD
- Kollonade
- Hatfield
- Brooklyn
- Menlyn
- Bronkhorstspruit
- Centurion CBD

**Urban Cores**

The following township areas that were developed as a result of forced relocation programmes were identified as Urban Cores:
- Hammanskraal / Temba
- Mabopane / Soshanguve
- Ga-Rankuwa
- Atteridgeville / Saulsville
- Mamelodi
- Ekangala
- Refilwe
- Zithobeni
- Olievenhoutbos

**Emerging Nodes**

Over the past few years, certain economic, social and/or residential opportunities have begun to emerge in various localities within the city as a result the following Emerging Nodes were identified:
- Soshanguve / Kopanong
- Pretoria North / Rainbow Junction
- Hazeldene
- Wingate Park
- Irene
- Monavoni
Woodlands

Specialised Activity Areas

These are nodes within the metropolitan area that are characterised by largely mono-functional land uses taking up large, concentrated and defined space. The character of the areas ranges from industrial to high technology smart industries, medical facilities, educational and research facilities. Specialised Activity Areas include the following areas:

- **Industrial Estates**
  - Babelegi
  - Ga-Ranquwa
  - Rosslyn
  - Klerksoord
  - Kirkney
  - Hermanstad
  - Pretoria Industrial
  - Sunderland Ridge
  - Rooihuiskraal
  - Irene
  - Hennopspark
  - Samcor Park
  - Watloo
  - Silvertondale
  - Koedoespoort
  - Silverton
  - Ekandustria

- **Research, Innovation, Education and Technology Institutes**
  - Council for Scientific and Industrial Research (CSIR) and Innovation Hub (Blue IQ);
  - Highveld Technopark;
  - Human Science Research Council (HSRC);
  - George Mukahri Academic Hospital;
  - Onderstepoort Research Laboratories / Veterinary Institute;
  - Steve Biko Academic Hospital;
  - Tshwane University of Technology (Pretoria Campus);
  - University of Pretoria; and
  - Thaba Tshwane.

- **Airports**
  - Waterkloof Air Force Base; and
  - Zwartkop Air Force Base.

- **Tourism nodes.**
  - Dinokeng Nature Reserve; and
  - Cullinan.
b) Corridors

The aforementioned nodal concept is dependent on connectivity and ease of access from one node to the other. As efficient as a node may be within itself, the node will not be sustainable if the target users cannot access it. Connectivity via the movement system effectively strings the city together, making it ‘smaller’ and providing equal access for all residents to all nodes, integrating labour markets and providing flexibility around options for residential location versus one’s place of work. Thus, the CoT has a comprehensive system of higher order mobility routes and development corridors.

The N1, N4 (Platinum Highway), N14 and R21 have been identified as development corridors at a metropolitan scale. Relative to the Midrand and Johannesburg areas, the CoT has a vast length of un- or underutilized metropolitan development corridors, and there still exists an untapped potential to welcome developments along the highways.

The MSDF has identified a number of vehicular routes that could link the Metropolitan Activity Areas and therefore become the most important vehicular public transport routes. The mobility function of these routes is very important as they must be able to effectively move people and goods between areas of significant opportunity.

The linkages are:

- Atterbury Road connecting the proposed K99 route and the Zambesi Drive / Kolonnade node with the Inner City and Hatfield Metropolitan Activity Areas (very important as it provides for the third north-south option to cross the mountain).
- The K14, joining Rachel de Beer Street and Zambezi Drive, and the extension of Braam Pretorius Street westward to the Paul Kruger extension (to improve east-west movement north of the mountain and to link to the Inner City).
- Zambezi, K17, Rachel de Beer linkage.
- Doreen Street and Heinrich Road extension connecting Klip-Kruisfontein and Mabopane Urban Cores.
- Church Street East and West, connecting the Eerste Fabrieke Station, Hatfield, Inner City and Atteridgeville nodes.
- Christiana de Wit Drive / Botha Avenue / River Road connecting the Inner City and Centurion nodes.
- Lynnwood Road / Atterbury Road / Garsfontein, Hans Strydom Charles Street/George Storrar Street/ Duncan Street route connecting the Mamelodi, Menlyn, Brooklyn and Hatfield nodes.
- Stormvoël Road / K16 route connecting the Eerste Fabrieke, Capital Park and Inner City nodes.
- Soutpansberg Road (and its proposed eastward extension).
- The R25 Provincial Road linking Bronkhorstspruit to O.R. Tambo International Airport.
• The R513/R42 road links the industrial area of Ekandustria with O.R. Tambo International Airport.

5.1.1.3 Key Issues

The Tshwane district area is a very large and dispersed metropolis featuring numerous problematic characteristics:

• **Low density sprawl**, which is based on an anti-urban ethic of the free-standing house on a plot (In the case of lower income housing this means housing estates generally located on the periphery);

• **Fragmentation**, which means that the 'grain' of development is coarse, with isolated (introverted) pockets (or cells) connected by roads (and freeways) and frequently separated by buffers of under-utilised open space; and

• **Separation of functions**, which means that land uses, public facilities (urban elements), races, income groups are all separated by great distances.

Some of the spatial issues as identified in the Draft Consolidated Integrated Development Plan 2011 are:

• High density disadvantaged areas with high levels of poverty and poor access to opportunities.

• There are currently a number of informal settlements that do not have the accepted level of services and infrastructure.

• Tshwane also has some areas which can be classified as rural. Thus, a specific approach will therefore have to be developed to ensure that the areas are optimally developed in terms of rural development attributes.

• Tshwane is also fortunate to have areas with existing infrastructure and services as well as the majority of economic activity. The focus should be on the maintenance of infrastructure and services and also to create a positive investment environment for shared and inclusive economic growth.

• As is stated, even while new investments are undertaken, proper and appropriate investment programmes for the maintenance of existing infrastructure is needed.

• The inclusion of the Metsweding District Municipality into the CoT area of jurisdiction has been assessed and challenges and opportunities identified.

5.1.2 City of Joburg

5.1.2.1 Current Spatial Structure

The retail and office functions of Johannesburg are concentrated in a few large nodes, such as the Joburg CBD, Sandton, Rosebank and Fourways. The Johannesburg City Centre remains the most prominent retail and office location.
The Midrand mixed use node is located between Johannesburg and Tshwane and is characterised by extensive modern, high-tech business facilities. Similar industries have been established at Kayalami, Kya Sand, Laser Park, Strijdom Park, Linbro Park and Marlboro. Heavier industries are located along the axis between Johannesburg and Ekurhuleni and include Industria, Selby, City Deep, Cleveland and Denver. The Modderfontein industrial precinct is in a process of redevelopment with large portions of land being converted to residential and commercial uses.

The major concentrations of residential development in the City of Johannesburg are found in Parktown, and in the newer suburbs of the city to the north, including Sandton, Fourways and Randburg. The main concentrations of disadvantaged communities within the city are located in Soweto, located south west of the city, and the Orange Farm complex, located further to the south. A number of small holdings are situated in the outskirts of the Johannesburg municipal area. These include areas such as the Chartwell Agricultural Holdings located northwest of the city and the Glen Austin Agricultural Holdings located in the Midrand area. Increasingly, these smallholding areas are coming under pressure for urban development and densification, as is evident in the Lanseria region.

5.1.2.2 Spatial Development Framework

The resultant CoJ Spatial Development Framework is depicted on Figure 7. In terms of the CoJ Spatial Development Framework, the City thus strives towards establishing a good urban structure which is efficient, accessible and sustainable.

Development Principles

The COJ Growth and Development Strategy has identified six core paradigms to guide the City’s medium/long term strategic development direction, namely:

- The pro-active absorption of the poor;
- Balanced and shared growth;
- Facilitated social mobility;
- Settlement restructuring;
- Sustainability and environmental justice; and
- Innovative governance solutions.

These paradigms are used as the basis on which the RSDF and its proposals were moulded and provide the context in which development and growth are defined and directed.

Spatial Pattern: Nodes and Corridors

a) Nodal Development
Johannesburg is a polycentric metropolis. The JHB CBD remains the primary core node with focus falling on renewal and rejuvenation of the central business area and its immediate surrounds.

There are more established nodes to the north, even though the population density is greater towards the south. This reinforces the marginal and dormitory nature of southern townships. Nodes north of the CBD are generally characterized by market driven commercial and retail development along major mobility routes.

In most cases nodal development takes place in existing and established nodes, but there is detrimental “creep” along specific arterials.

The City defines a node as a well-defined and legible urban environment where highly accessible, mixed and compatible land uses are concentrated and serviced.

The following table lists the various nodal types as well as the identified areas within the City of Johannesburg to accommodate these nodes:

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>NODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan</td>
<td>Johannesburg</td>
</tr>
<tr>
<td></td>
<td>Midrand</td>
</tr>
<tr>
<td></td>
<td>Sandton</td>
</tr>
<tr>
<td>Regional</td>
<td>Baralink</td>
</tr>
<tr>
<td></td>
<td>Bruma</td>
</tr>
<tr>
<td></td>
<td>Constantia/Strubensvalley</td>
</tr>
<tr>
<td></td>
<td>Cresta/Beyer Naude</td>
</tr>
<tr>
<td></td>
<td>Fourways</td>
</tr>
<tr>
<td></td>
<td>Greater Sloane</td>
</tr>
<tr>
<td></td>
<td>Greenstone</td>
</tr>
<tr>
<td></td>
<td>Illovo</td>
</tr>
<tr>
<td></td>
<td>NASREC</td>
</tr>
<tr>
<td></td>
<td>Northgate</td>
</tr>
<tr>
<td></td>
<td>Ormonde / Gold Reef City</td>
</tr>
<tr>
<td></td>
<td>Parktown</td>
</tr>
<tr>
<td></td>
<td>Randburg</td>
</tr>
<tr>
<td></td>
<td>Rivonia</td>
</tr>
<tr>
<td></td>
<td>Roodeport</td>
</tr>
<tr>
<td></td>
<td>Rosebank</td>
</tr>
<tr>
<td></td>
<td>Southgate</td>
</tr>
<tr>
<td></td>
<td>Sunninghill</td>
</tr>
<tr>
<td></td>
<td>Westgate / Princess</td>
</tr>
<tr>
<td></td>
<td>Woodmead</td>
</tr>
<tr>
<td>Marginalised Area District</td>
<td>Ennerdale</td>
</tr>
<tr>
<td></td>
<td>Jabulani</td>
</tr>
<tr>
<td></td>
<td>Kliptown</td>
</tr>
<tr>
<td></td>
<td>Lenasia</td>
</tr>
<tr>
<td></td>
<td>Lenasia South / Unaville</td>
</tr>
</tbody>
</table>
b) Corridors

The City of Johannesburg defines corridors to have the following attributes:

- High volume transport routes that connect major activity centres and nodes;
- Existing / potential for regional and inter-regional accessibility;
- Provision of a number of movement options – i.e. road and rail;
- Potentially lower transit costs on current / potential routes;
- Intense, high-density mixed land uses;
- Availability of tracts of vacant / under-utilised land that provides opportunities for higher densities and integration opportunities;
- Provide the basis and support for long-term investment priorities and
- Strong bias towards maximizing the benefits of already dominant movement flows.

The City has identified and promotes the following corridors (discussed in more detail below):

<table>
<thead>
<tr>
<th>District</th>
<th>Stretford</th>
<th>Gleneagles / Oakdene</th>
<th>Hyde Park / Dunkeld</th>
<th>Killarney</th>
<th>Melrose Arch and surrounds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aeroton</td>
<td>Amalgam / Crown 3, 7</td>
<td>Anchorville</td>
<td>Benrose</td>
<td>Booyens Reserve / Theta</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Booyens / Reuven / Ophirton</td>
<td>Prolecon</td>
<td>City Deep</td>
<td>Cleveland / Heriotdale</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Commercial / Chloorkop / Modderfontein</td>
<td>Denver</td>
<td>Devland</td>
<td>Frankenwald / Linbro Park</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Industria / Industria North / Industria West</td>
<td>Klipriviersoog</td>
<td>Kya Sands / Northlands</td>
<td>Kyalami / Barbeque Downs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lanseria</td>
<td>Laser Park / Honeydew</td>
<td>Longmeadow</td>
<td>Lanseria</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nancelfield</td>
<td>Robertsham / West Turfontein</td>
<td>Robertville / Lea Glenn / Stormill</td>
<td>Rosherville</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Selby / Village Deep</td>
<td>Steeledale / Tulisa Park</td>
<td>Strijdom Park</td>
<td>Wanderers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wynberg / Marlboro / Kew</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialist nodes (mono-use or unique to City)</th>
<th>Stretford</th>
<th>Gleneagles / Oakdene</th>
<th>Hyde Park / Dunkeld</th>
<th>Killarney</th>
<th>Melrose Arch and surrounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amalgam / Crown 3, 7</td>
<td>Anchorville</td>
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<td>Booyens / Reuven / Ophirton</td>
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</tr>
<tr>
<td>City Deep</td>
<td>Cleveland / Heriotdale</td>
<td>Commercial / Chloorkop / Modderfontein</td>
<td>Denver</td>
<td>Devland</td>
<td>Frankenwald / Linbro Park</td>
</tr>
<tr>
<td>Industria / Industria North / Industria West</td>
<td>Klipriviersoog</td>
<td>Kya Sands / Northlands</td>
<td>Kyalami / Barbeque Downs</td>
<td>Lanseria</td>
<td>Laser Park / Honeydew</td>
</tr>
<tr>
<td>Lanseria</td>
<td>Longmeadow</td>
<td>Nancelfield</td>
<td>Robertsham / West Turfontein</td>
<td>Robertville / Lea Glenn / Stormill</td>
<td>Rosherville</td>
</tr>
<tr>
<td>Selby / Village Deep</td>
<td>Steeledale / Tulisa Park</td>
<td>Strijdom Park</td>
<td>Wanderers</td>
<td>Wynberg / Marlboro / Kew</td>
<td></td>
</tr>
</tbody>
</table>
• East West Development Corridor.
• North South Development Corridor.
• Mogale City/ Tshwane Development Corridor.
• Sedibeng/ City of Johannesburg Development Corridor.

The East West Development Corridor (EWDC)

The EWDC links the industrial development from the Ekurhuleni with the western areas of the Mogale City Local Municipality. This corridor comprises the previous mining belt, which is seen as a structure barrier to development and functional spatial integration. However, the revival of mining activities within this belt and plans to rehabilitate land parcels for future long-term development purposes allow for the corridor to play a strategic and cross-municipal role in terms of employment and mobility.

This corridor presents the COJ with the following opportunities:
• Fast-track development in impoverished southern areas;
• Create employment;
• Improve the quality of life for the urban poor; and
• Improve the north-south spatial integration.

In order to achieve the above-mentioned benefits of the EWDC the following goals have been identified:
• Creating an efficient public transport system;
• Creating an efficient urban structure;
• Establishing integrated and sustainable neighbourhoods; and
• Economic regeneration.

The alignment of the EWDC incorporates the following major nodes and public investment initiatives presently being undertaken in the area including:
• Phase 1 BRT: Lenasia - Regina Mundi-Parktown-Sunninghill;
• NASREC Regional Node and 2010 stadium precinct;
• Westgate Regional Node;
• Roodepoort Regional Node;
• Industria Industrial Node;
• Robertville Node;
• City Deep Specialist Node;
• Selby / Village Deep Specialist Node;
• Johannesburg Metropolitan Node;
• Ormonde / Gold Reef City Regional Node;
• Denver Specialist Node;
• Rosherville Specialist Node; and
• Steeldale / Tulisa Park Specialist Node.

The North South Development Corridor (NSDC)

Conceptually the North South Development Corridor (NSDC) extends from Orange Farm north via Lenasia and Soweto to the central anchor point of the CBD. From the CBD it continues north through Sandton to Midrand. It provides inter-regional access beyond the municipal boundaries to Sedibeng to the south and Tshwane to the north.

The NSDC presents the City with the opportunities to:
- Utilise the existing infrastructure and public amenities;
- Reinvestment and infill development possibilities for higher density residential development;
- Reduce the distance between employment and residential amenities;
- Further densification when services are available at strategic locations; and
- Further economic growth and development.

The character of this corridor is split between the central north section and the central south section. The central north section is characterized by high economic investment and employment opportunities. Due to a dominant reliance on private transport, traffic congestion is major constraining factor.

The central south section is characterized by fewer economic and employment opportunities even though the labour force is greater. Public transport dominates this section of the corridor and infrastructure and service capacity should be supported in this regard.

The alignment of the central-south section of the NSDC incorporates the following major nodes and public investment initiatives presently being undertaken in the area including:
- Phase 1 BRT: Lenasia - Regina Mundi-Parktown-Sunninghill;
- NASREC Regional Node and 2010 stadium precinct;
- Baralink Regional Node;
- Kliptown District Node;
- Lenasia District node;
- Lenasia South / Unaville District Node;
- Ennerdale District Node;
- Stretford District Node; and
- Devland Industrial Node.

The Mogale Tshwane Development Corridor (MTDC)
One of the strategic cross border development issues that has not previously been reflected in the City’s SDF is the conceptual corridor that links Mogale with Tshwane.

Importantly, the corridor intersects three strategically important localities for the City, namely: the Lanseria proposed Metropolitan Node / Airport, the Nietgedacht Farm (integral to the Kya Sands and resident Informal Settlements) and Diepsloot and the proposed adjacent developments. Development in these areas would be guided by the RSDF and Northern Areas Development Framework for Diepsloot, Kya Sands and Lanseria.

*Sedibeng Johannesburg Development Corridor (SJDC)*

The provision of public transport is one of key infrastructure requirements in the area. In addition, economic development in the southern part of the North-South corridor would provide much needed job opportunities for the very poor and marginalised communities of Orange Farm, Sebokeng and Evaton. Trends data from the Gauteng spatial development framework, 2007 indicates that the inhabitants of these communities travel as far south as Vereeniging and surrounds for work purposes.

**5.1.2.3 Key Issues**

The following key issues were identified in the City of Johannesburg RSDF with specific relevance to this study:

- Mobility function of mobility spines and roads is compromised.
- Rail station development and usage.
- Lack of east-west routes.
- Optimising modal utilisation.
- Over development in areas without adequate infrastructure.
- Marginalised communities in older settlements and at the periphery of the city.
- Car focused higher density development and security estates.
- Marginalised communities in older settlements and at the periphery of the City.
- High levels of unemployment.
- Increasing immigration.
- Spatial concentrations of low income households.
- Insufficient capacities maintenance and refurbishment.
- Expansion outstripping supply.
- Balancing capital investment vs maintenance expenditure.

**5.1.3. Ekurhuleni Metropolitan Municipality**
5.1.3.1 Current Spatial Structure

OR Tambo International Airport in the Ekurhuleni municipal area forms part of the economic core of the municipal area which includes Kempton Park, Germiston, Boksburg and Benoni. The airport precinct is being branded as a future Aerotropolis, and together with the Inner City of Tshwane and Joburg, represents the Provincial Economic Core Triangle. Significant economic areas include the CBD of Alberton, Edenvale, Brakpan, Springs and Nigel. Retail activity is strongly concentrated in regional shopping centres, such as the East Rand Mall.

The Witwatersrand mining belt, extending from Randfontein to Springs, traverses the Ekurhuleni municipal area. Most of the mines have been depleted and are currently being rehabilitated. This process is unlocking development potential in large parts of the mining belt that can be used for future urban development/ infill. The short term focus area is the mining belt between Germiston and Boksburg, and the mining belt area between Benoni and Daveyton.

The bulk of industrial activity in Ekurhuleni is located along two corridors. The east-west axis broadly follows the alignment of the mining belt and includes industrial areas such as Germiston East and West, Anderbolt, Benoni South and Apex. The north-south axis stretches from Chloorkop near Tembisa southwards past Spartan, Sebenza, Isando, Jet Park, Elandsfontein, Wadeville and up to Alrode. The eastern part of Ekurhuleni also has industrial areas, such as New Era and Nuffield in the vicinity of Brakpan and Springs, and Pretoriusstad and Vorsterkroon towards the south at Nigel.

The major concentrations of residential development in the Ekurhuleni Metropolitan Municipality occur around the business nodes within the municipal area. These include the suburbs of Alberton, Edenvale, Kempton Park, Benoni, Boksburg, Brakpan and Springs. The major concentrations of previously disadvantaged communities are situated in the peripheral areas. These include Tembisa, located north of Kempton Park, Daveyton/ Etwatwa (northeast of Benoni), Kwatsaduza, (south of Springs), and Katorus (south of Germiston). A number of small holdings are also situated within the municipal area, for example, the area north of Benoni.

5.1.3.2 Spatial Development Framework

The following is a summary of the main principles which, according to the Ekurhuleni MSDF (see Figure 8a) represents the preferred approach towards the spatial restructuring of the Ekurhuleni Metropolitan area:

- Promoting economic activity within the core development triangle (refer to Figure 8b).
- Strengthening specialised activity nodes within the core development triangle.
- Optimising linkages within the core area.
- Linking disadvantaged communities to the core area.
- Mixed use, high-density development along corridors and at nodes.
Ekurhuleni Spatial Development Framework: Concept
- Structure the Integrated Regional Public Transport Network (IRPTN) to support development corridors.
- Extend economic activities into Previously Disadvantaged Areas.
- Promote infill residential development.
- Upgrading of 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 (CCC’s).
- Implement a statutory urban edge.
- Land reform.
- Informality.

Supplementary to the above, the Ekurhuleni Spatial Objectives as contained in the EMM MSDF are listed below:

- To create a single, uniform identity for Ekurhuleni Metro
  - Determining an Ekurhuleni City Identity on a national, continental and international scale
  - Core Nodes in Gauteng
  - Focusing towards the Ekurhuleni Core Node
  - Creating a ‘sense of place’ for Ekurhuleni
  - Strengthening transportation and other linkages in EMM

- To develop a well-defined system of nodes
  - Identify primary and secondary activity nodes to support the Core Node
  - Protecting existing industrial areas from the potential negative effects of informal settlements located in close proximity thereof
  - Determining an ‘Ekurhuleni unique’ niche market for each of the Primary Nodes
  - Improve and further develop existing nodes in the PDAs
  - Combining activity nodes and public transport nodes
  - Linking these activity nodes to one another through activity spines

- To promote the development of a sustainable compact urban structure
  - Densifying activity nodes, residential areas and transport linkages
  - Aligning the Urban Edge with the Gauteng Urban Edge
  - Directing growth to the Ekurhuleni Core Node and to Johannesburg
  - Identifying developable land for infill development mindful of strategic location, socio-economic value and soil conditions

- To create a sustainable and functional open space network
  - Optimising the unique characteristics of Ekurhuleni
  - Incorporating the open space system into the urban fabric
  - Optimising unutilised open space in the urban fabric

- To optimise the job creation capacity of the formal economy
  - Promoting specialisation in manufacturing, transport, finance, retail, and institutional uses
- Developing sector-specific growth strategies
- Protecting existing industrial areas from the negative effects of informal settlement located in close proximity thereof
- Urban regeneration in industrial areas and CBDs
- Providing infrastructural linkages for globally orientated growth
- Promoting SMME Development and Growth

- To integrate the disadvantaged communities into the urban fabric as follow:
  - Infill development on vacant land located close to CBDs, industrial areas, bus and taxi routes and railway stations
  - Social housing should be provided on developable vacant land close to the CBDs of Germiston, Boksburg, Brakpan and Springs
  - Development close to industrial areas should be handled with extreme caution so as not to negatively influence the industrial area
  - Housing projects should also be initiated and promoted within the CBDs either by converting existing buildings or by erecting new ones for this purpose. Emphasis should additionally be on providing housing for people already employed in the specific industrial area. This will enhance a sense of place and will allow for sustainability
  - Low income projects for unemployed people should not be provided in close proximity to industrial areas. Care should also be taken to protect residents of these developed residential areas from the negative effects, e.g. pollution, of industrial areas
  - Existing bus and taxi routes, especially close to taxi ranks, should also be focus areas for social housing. Additional to this, priority stations as identified in the ITP should be focus areas for social housing. Emphasis at all of these nodes should be on the areas within walking distance from, e.g. the station or taxi rank. Social housing should be managed as to not cause urban decay.
  - Promoting economic development along the main linkages between these communities and the major concentrations of job opportunities
  - Directing growth of the PDAs to the Ekurhuleni Core Node (between the CBDs of Kempton Park, Germiston, Boksburg and Benoni) – outward sprawl of the Previously Disadvantaged Areas (PDAs) should be stopped as this is mostly leading to the further polarisation of the disadvantaged community
  - Growth of Katorus should be directed to the north, with limited and controlled growth to the west and east
  - Growth of Kwatsaduza should be directed to the north
  - Growth of Daveyton and Etwatwa should be directed to the west
  - However in the long term these PDAs must develop into sustainable ‘CBD’ neighbourhood nodes in their own right

- To actively promote sustainable public transport
- Providing public transport along all main corridors
- Effective management of Taxi ranks
- Promoting mixed use, high density development along suitable corridors and at suitable nodes
- Promoting Transit Orientated Development along the main railway infrastructure
- Promoting pedestrianisation
- ‘Tightening’ and enforcing the Urban Edge
- Initiating a “Road to Rail Program” for passengers and cargo

- To promote access to social and municipal services through CCCs
- To identify the impacts of Climate Change on EMM
- Promote sustainable livelihoods development
- Promote sustainable development
- Optimise the comparative and competitive advantages of EMM

It is evident from the above that the Ekurhuleni MSDF provides clear guidelines towards densification/development within activity nodes like CBD’s, around railway stations in the form of Transit Orientated Development, and along the main Public Transport Corridors. These spatial priority areas as defined in the MSDF are highlighted on Figure 8c.

5.1.4. West Rand District Municipality

5.1.4.1 Current Spatial Structure

The West Rand District Municipality consists of four Local Municipalities: Merafong, Mogale City, Randfontein and Westonaria Local Municipalities. Retail and office functions within the district municipality tend to remain concentrated within the CBDs of Carletonville, Mogale City, Randfontein and Westonaria. Limited decentralization has taken place in Mogale City with the development of the Key West Shopping Centre towards the north. The bulk of industrial activity within the West Rand is located in the Chamdor, Aureus and Factoria industrial areas located within or along the western mining belt.

The West Rand is the only area in Gauteng where mining has retained its strong presence. The Witwatersrand mining belt extends to Randfontein, with large tracts of land still dedicated to mining in Mogale City, Randfontein, Westonaria and Carletonville. Mogale City is very much the economic driver of the district. It has considerable manufacturing capacity while tourism is mostly consolidated in the Cradle of Humankind in the north-western parts of Mogale City. Significant attractions within the Cradle of Humankind include the Magalies Meander, the Sterkfontein caves and the Krugersdorp Game Reserve.

Large-scale commercial farming also takes place in the District. Residential development in the southern parts is mainly aimed at consolidating the existing fragmented urban fabric while a fairly strong trend of residential development is emerging in the northern parts of Mogale City around the R28 freeway.
The older residential areas in the West Rand District Municipality are predominantly concentrated around the historic Central Business Districts of Mogale City, Randfontein and Westonaria. Noordheuwel is a newer extension of Mogale City which links to Roodepoort. There are a number of previously disadvantaged communities within the West Rand District municipal area. These include Kagiso and Munseieville located within Mogale City, Mohlakeng located in Mogale City and Bekkersdal located in Westonaria. A number of rural residential areas or small holdings are situated within the district municipal area. Most of these are located west of Randfontein, such as the Loumarina, Elands and Wheatlands agricultural holding.

5.1.4.2 Spatial Development Framework

The WRDM Spatial Development Framework is illustrated on Figure 9.

Development Principles

The RSDF identified the following principles that will guide decisions on planning, transport and infrastructure development within the WRDM:

- Inclusive growth and development – where everybody shares in the benefits from a multi sector and diverse economy and quality developments.
- Quality designed developments and environments – where new and re-developed developments contribute positively to creating better urban and rural environments.
- Clean and safe environments – where people can enjoy and partake in social and recreation events; be proud of their communities and business are willing to invest and develop.
- Viable infrastructure and service provision – Growth and development ought not to put a burden on the financial capacities of the district and infrastructure and services should be planned and developed in an affordable manner for the communities as well as the district.
- Adaptability – The district will have to monitor future and past trends in order to adapt strategies and policies when faced with changes and unexpected situations.

Spatial Pattern: Nodes and Corridors

The WRDM is experiencing a strong development pull towards the two metropolitan areas of Tshwane and Johannesburg. Within the WRDM east-west accessibility is provided by the N14, R24, R41, N12 and the N4 (to a lesser extent). The aforementioned roads link the WRDM with the metropolitan areas of Tshwane and Johannesburg to the east and the rural areas of Potchefstroom and Rustenburg to the west.

a) Nodal development
The following nodes identified in the RSDF have an influence on the development in the WRDM:

- **Lanseria Development Node/ Beyers Naude Drive (K29) Development Corridor/Cosmo City Development Node**
  The WRDM defines the Lanseria Development Node as a municipal “hotspot” because of its rapid expansion with spin offs such as job opportunities and attracting developers to the area. The K29 links the Lanseria International Airport (LIA) on the far western portion of the City of Johannesburg Metropolitan Municipality (CoJMM) with the Cosmo City Development Node. Although the bulk of the K29 is located within the CoJMM jurisdiction area, it has a notable effect on the WRDM due to its location. Areas to the south-west of the corridor and the LIA node are under tremendous development pressure for land use rights such as light commercial development, tourism facilities and residential developments with its associated uses.

- **N14 Development Corridor**
  It is envisaged that mixed use developments will occur along the N14, especially to the south-east.

- **Ruimsig/ Little Falls Development Node**
  Ribbon development is taking place along Hendrik Potgieter Road. Furthermore, this node experienced a development boom of mainly residential and related uses in the last few years.

- **Leratong Development Node**
  This activity node and anchor point addresses the need to develop a node for the wider Kagiso Community. The project is related to the Transport Corridor Initiative for the Western Gauteng. Future development entails public transport-, retail-, commercial-, business-, office-, light industrial facilities as well as mixed land use areas and high and medium density residential development.

- **Zuurbekom & Syferfontein/ Soweto & Lenasia Development Node**
  Syferfontein was earmarked for the development of affordable housing opportunities. This development will result in the formation of an urban corridor linking Carletonville, Westonaria, Simunye, Syferfontein, Lenasia and Johannesburg. The centre of this corridor is formed by the N12 and the Carletonville to Johannesburg railway. Future development possibilities entail a cemetery, commercial and light industrial uses.

**b) Corridors**
The Public Transport Plan – Consolidation of Corridors, identified seven Public Transport Corridors that facilitate the movement of commuters and increase the accessibility within the WRDM district but also to the larger region. These corridors are:

- **Corridor A**
  The corridor comprises the R24 stretching from Magaliesburg, through Krugersdorp, to the Clearwater Shopping Centre in the CoJ. It is therefore an important regional linkage.

- **Corridor B**
  The corridor proceeds on the R559 from Mohlakeng, turns onto the R558 into Protea Glenn and continue along the R554 across the N12 towards Lenasia.

- **Corridor C**
  The corridor proceeds predominantly along the R28 stretching from Westonaria, through Randfontein, the Krugersdorp CBD and turns left at Pretoria Street up to the transfer facility.

- **Corridor D**
  The corridor originates at the Krugersdorp Pretoria Street transfer facility and proceeds along a number of streets and ends at the CoJ bus station at Westgate shopping centre.

- **Corridor E**
  The corridor starts at the Randfontein station and also ends at Westgate Shopping centre. It proceeds predominantly along the K 198/R41.

- **Corridor F**
  The corridor is indented to facilitate higher income and tourist commuters. It therefore originates from the Key West Shopping Centre, along the R28 and R512 to end at the Lanseria Shopping Centre.

- **Corridor Y**
  The origin of this corridor is still up for further investigation. The current option is to start at the west of Tshepisong, crossing the R41 and through Kagiso. From Kagiso the route continues to the Luipersdsvlei station through the Krugersdorp CBD and up to Pretoria Street.

### 5.1.4.3 Key Issues

The following key issues were identified in the WRDM:

- The WRDM is well located to connect the central and outer nodes of the Global City Region (GCR).
• Numerous opportunities exist to expand and diversify the economic base of the WRDM (e.g. industrial developments and capitalising on the tourism potential).

• The WRDM has a range of established, affordable residential areas with its associated services and amenities that could play a supportive function in the GCR.

• Some threats and weaknesses are critical to address, e.g. low and inappropriate skills, low general income levels, outflow of human and financial capital to major nodes, service and housing backlogs.

• There is a need to consolidate the development structure of the WRDM to be aligned with the principles of sustainable development as promoted in national and provincial spatial policy, keeping in mind geological conditions (cost implications) and ecosystem sensitivities.

5.1.5. Sedibeng District Municipality

5.1.5.1 Current Spatial Structure

In Sedibeng, the retail/office functions are mainly concentrated in the CBDs of Vereeniging, Vanderbijlpark, Meyerton and Heidelberg. Industrial activity in Sedibeng is at the heart of South Africa’s iron and steel industry. The major industrial area within the district is ArcelorMittal located north of Vanderbijlpark. The remainder part of industrial activity is located along a north-south axis stretching from Johannesburg towards Meyerton and Vereeniging in the south. This axis includes industrial areas such as Waterfall/ Kliprivier Business Park along route R59 towards the north, as well as Meydustria, Peacehaven, and Powerville further to the south.

Heidelberg produces bacon and tobacco with Eskort and British American Tobacco being the two major companies in the area.

Apart from industrial and business activities along the R59 corridor (with the Heineken Brewery being the latest addition), the Midvaal area has extensive agriculture and tourism activities.

The older residential areas within Sedibeng District are predominantly concentrated around the historic Central Business Districts of towns such as Vanderbijlpark, Vereeniging, Meyerton and Heidelberg. In addition, a number of large previously disadvantaged communities exist. Most of these are located within Emfuleni and include Evaton, Sebokeng, Sharpeville and Bophelong. Ratanda is located within Lesedi. Small holdings are mostly situated west of Vanderbijlpark (for example Zuurfontein and Vanwaartshof) and west and south of Meyerton (for example De Deur Estates and Walker Fruit Farms).
Large environmental features within Sedibeng include the Suikerboschrand Nature Reserve, located within the Midvaal municipal area, and the Vaal River, forming the southern boundary of the Emfuleni municipal area. The Klip River at Henley-on-Klip and the Vaal Dam are major tourist attractions.

5.1.5.2 Spatial Development Framework

The Sedibeng Spatial Development Framework Plan appears on Figure 10.

Development Principles

The Sedibeng SDF identified the following seven main spatial objectives for the District:

- **A continuous and sustainable open space network** should be created throughout the Sedibeng District, utilizing the natural features within the area, such as the ridges, rivers, nature reserves, etc. The two major elements within this system will be the greater Suikerbosrand area, as well as the Vaalriver area.

- **A system of functionally defined activity nodes** needs to be promoted within the district. The main activity node will be Vereeniging/Vanderbijlpark, while two secondary nodes already exist, namely Meyerton in Midvaal and Heidelberg/Ratanda in Lesedi. In addition to these nodes a number of rural service nodes should be promoted throughout the district.

- **Linkages** between the identified nodes in the district should be optimized, as well as linkages between the disadvantaged communities and the main employment centres. In this regard a number of main road linkages have been identified, including Routes R29, R42, R59, R82, R54 and R553. The current commuter rail linkages should be promoted as the main public transport corridors within the district and mixed-use high-density development should be promoted along the routes.

- **An urban development boundary/urban edge** should be demarcated and enforced in order to strengthen the existing urban areas and nodes, to contain urban sprawl, to promote more compact urban development and to protect the agricultural and ecological potential of the rural hinterland within the district. Future urban development should consist primarily of infill and densification within the proposed urban edge.

- The existing major development opportunities in the district should be maximized, namely tourism development opportunities around the Suikerbosrand and along the Vaalriver area, and economic development opportunities along Provincial Routes R59. The area abutting Route R59 is seen as a major future economic development corridor.

- **High-density** development should be promoted along main public transport links.

- **Upgrading of services** should be focused primarily on previously disadvantaged township areas.

Spatial Pattern: Nodes and Corridors
Sedibeng Spatial Development Framework: Concept

Sedibeng District Municipality
Spatial concept

General overview of study area indicating the current and proposed future development areas.

Map prepared by:
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Date: 14 March 2012
Projection: Transverse Mercator 29E
Datum: WGS 84

Sources:
GSDF - DED 2010
Terrain Model - MandalaGIS 2008

Legend:
- Sedibeng District Boundary
- Spines and corridors
  - Urban Development Corridor
  - National Freeway
  - Major Arterial Activity Spine
  - Urban Arterial Activity Spine
  - Main road
  - Strategic road connectors/links
  - Municipal boundaries
  - Urban nodes
  - Protected Areas/Natural Systems
  - Urban consolidation zones
  - Future corridors
  - Urban development corridors influence area
  - Anticipated extend of urban development by 2055
  - Existing mining settlements
  - Future urban consolidation within the urban edge
  - Rural centres
  - Existing Residential Estates
  - Partial Consolidation Zone
  - Urban consolidation zones
  - Designated Agricultural Hubs
a) **Nodal development**

A hierarchy of activity nodes has been identified throughout the District to address the establishment of higher order retail and social facilities in close proximity to historically disadvantaged areas.

According to the SDF, activity “nodes” are “point” developments and are most often located at intersecting or transfer points in the transfer system. They predominantly accommodate business activity combined with a high-density residential component. The identified nodes in the three Local Municipalities are as follows:

i) **Emfuleni Local Municipality**

- **Sebokeng**
  It currently comprises an agglomeration of various complementary land uses such as health, commercial, retail and light industrial activities. Further, it is located along the most important and busiest road in the area (Moshoeshoe Road), and is also close to an active rail line. If the node is to be developed, the current land use must include formal retail and banking facilities.

- **Evaton**
  This node is situated adjacent to the Golden Highway. A public transport facility will be appropriate due to its proximity to the Golden Highway and Moshoeshoe Road.

- **Vacant land to the north of Tshepiso and Boipatong**
  There is vacant land to the north of Tshepiso and Boipatong, and south of the R54. It is suitable for economic activity, which thrives on high levels of passing trade, easy access and high visual exposure. Employment and services provided by a node situated at this point will not only cater for the need of Sharpstown, but will also serve the Steel Park area and its proposed extensions.

- **Rust-ter-Vaal / Roshnee**
  The development of an activity node on the R82 in close proximity to Roshnee and Rust-ter-Vaal will serve the northern rural areas, the adjacent communities and the proposed developments.

- **General Hertzog / Vootrekker Street Intersection**
  The development node is earmarked to the west of Mario Milan Road on both sides of railway line in the vicinity of General Hertzog Road.

ii) **Lesedi Local Municipality**
In the Lesedi Local Municipality the purpose of the nodal structure is to concentrate similar and supportive uses in a particular area, thereby stimulating economic forces. The following development nodes have been identified:

- Primary Activity Node: Heidelberg CBD.
- Secondary Activity Node: Ratanda CBD and Devon CBD.
- Transport Related Activity Nodes:
  - R23/N3 (Commercial and Service Industries).
  - R42/N3 (Mixed Activities).
  - R42/R29 (Mixed).
- Tertiary Activity Nodes: Jameson Park, Shalimar Ridge.

iii) Midvaal Local Municipality

The Strategic Development Rationale for the Midvaal Municipality is to develop the area with a hierarchy of nodes. These nodes will form the focal points for development and service provision, to ensure access to social and economic opportunities for the entire sub-region. This nodal system will ensure functional integration of the area and create connectivity, which stimulates economic and social interaction. The principle of concentrating activities in nodes recognises that access enables empowerment.

The following hierarchy of nodes was proposed:

- Primary Node: Meyerton/ Sicelo.
- Secondary Nodes: Henley-on-Klip, Walkerville, De Deur, Vaal Marina.
- Tertiary Nodes: Mamello and Kliprivier.
- Proposed Multi-Purpose Community Centres: Kliprivier and Lakeside.

b) Corridors

The SDF has outlined the following objectives for corridor development within Sedibeng District Municipality:

- To determine the infrastructure needed to promote development within the corridors and nodes;
- To develop a plan to optimally capitalise on the development potential in each corridor and node;
- To promote the maximum yield in as far as job opportunities within the corridors and nodes are concerned;
- To retain and expand existing development opportunities and promote new investments; and
- To determine catalytic interventions along the corridors and nodes to maximise economic development.

i) Emfuleni Local Municipality
Development corridors feature a combination of transport services and supporting infrastructure in parallel and denser mixed land use integrated with the transport system, which includes land uses such as retail, residential, service industries, commercial, activities, social, agricultural related uses and recreation. The proposed development corridors are as follows:

- Moshoeshoe Road, Sebokeng;
- R54, between Sebokeng and Vereeniging;
- Along the R59 between Meyerton and Vereeniging (partial development only);
- R82, between Vereeniging and De Deur;
- Barrage Road, between Vereeniging and Vanderbiljpark;
- K174, Extension of Barrage Road to the N1;
- General Hertzog Boulevard (Three Rivers);
- Johannesburg Road / Adams Street (Evaton); and
- R57 from the N1 Southwards.

ii) **Lesedi Local Municipality**

The SDF defines a development corridor as “a linear strip of land or area, connecting large activity nodes, traversing urban or inter-urban areas, surrounding a major transport facility or facilities, providing an appropriate regional level of mobility and accessibility to adjacent areas, and containing a high concentration of population and mixed land uses (job opportunities)”.

The following inter-and intra-regional linkages are proposed:

- **Primary Corridors (National Roads)**

  The two major development corridors within the Lesedi Local Municipality are the N3 and the N17 Freeways. Although the total length of these corridors within Lesedi Local Municipality will not be feasible to develop, the focus will be to attract potential investors to invest at certain focused areas (accessibility) and to create economy of scale advantages.

  The development proposals along the respective Freeways are as follows:

  - **N3 Freeway**

    The development focus along the N3 freeway should be a combination of nodal development and corridor development in order to maximize investment opportunities. The existing accesses and entrances to the N3 with the R23, R42 and the R550 should be strengthening by nodal development. Apart from the frontage (visual impact) along the N3 between the respective nodal areas should be utilized (subject to available areas) for “clean” service
industries, the development strip between the N3 and the R103 presents the ideal opportunity for the establishment of mixed land uses, with the focus on industries, office parks and manufacturing. This area could become the new locality for investors, which are dependent on the Gauteng/ Kwazulu Natal and Free State link.

- **N17 Freeway**
  The N17 Freeway is located within the northern section of the Lesedi Local Municipality and creates a link between Gauteng and Mpumalanga Province. Although the R29 Road (between Endicott AH and Devon) runs parallel to the N17, the distance between these roads is too far to provide an effective development corridor. It is proposed that development nodes be established at the intersection of the R42/N17 and R550/N17. These development nodes could act as catalysts for the development of Endicott/ Vischkuil and Impumelelo/ Devon.

- **Secondary Corridors (Provincial Roads)**
  There are a number of very important inter-and intra-roads within Lesedi Local Municipality that should be defined and linked to function and activities. The secondary development corridors are as follows:
  - **R42 Route**
    This road provides an important linkage between the Lesedi Local Municipality and the remainder of the Sedibeng District Municipality towards the south and northwards through Heidelberg towards Endicott/ Vischkuil. The following areas along the R42 should receive priority:
    - The section south of the Suikerbosrand Nature Reserve towards Heidelberg CBD;
    - The section through the Heidelberg CBD;
    - The intersection of the R42/N3;
    - The section between the N3 and Nigel; and
    - The section between the N17 and R29.
  
  - **R23 Route**
    This road links Heidelberg with Dipaleseng Local Municipality and should be strengthened as from the intersection with the N3 Freeway towards Heidelberg and between the N3 northwards through the Spaarwater A.H.
  
  - **R549 Route**
    This route links the Lesedi Local Municipality with the Vaal Dam (Vaal Marina and other resorts) which is an important tourist destination. The section between Ratanda and Heidelberg should be promoted for mixed land use activities.

  - **R103 Route**
This route runs parallel to the N3 and would provide the ideal access road for development between the N3 and R103. Development should only occur to the south of the R103.

- **R550 Route**
  
  This route provides an east/west link throughout the Lesedi Local Municipality area. Sections on this road where nodal or corridor development should be considered, include: Corridor development within the Hall Gate AH and between the N17 and the R548 intersection.

- **Heidelberg Road (Ratanda)**

  Heidelberg Road functions as the primary transportation spine (buses and taxis) traversing Ratanda. This road-based public transportation spine can be considered the most valuable asset contributing to the development potential of Ratanda, enabling the development of higher-density and mixed land uses.

- **Tourism Corridors**

  With the locality of Heidelberg/Ratanda centrally along the N3, the Suikerbosrand Nature Reserve, cultural and historical assets; the linkage to and from other urban concentrations and areas of natural significance should be strengthened as tourism corridors. The following roads have been identified to provide some tourism focus:

  - R42 Road: Linking Heidelberg with Vereeniging (Vaalriver) and Meyerton past the Suikerbosrand Nature Reserve; and
  - R549 Road: Linking Heidelberg with the Vaal Dam and associated resorts.

**iii) Midvaal Local Municipality**

In the Midvaal Local Municipal area the R59 is the most prominent road and thus should be promoted as an Economic Spine, with economic uses along the road, as well as the promotion of public transport and transport facilities along the road.

The location of the R59, Morris Road and the railway line as parallel movement networks in close proximity to each other lends itself to corridor development. Ribbon development along other roads is however not promoted, as these impacts on the mobility of the movement network.

The SDF identified the R59 as a mobility spine and the R82 as an activity spine.

The proposals and guidelines along the R59 Road as per the SDF are:

- The Johannesburg/East Rand Complex and Vaal Triangle will remain the major nodes in the development corridor. Development should aim to capitalise on the inherent economic energy associated with Johannesburg and specifically the City Deep and Wadesville / Alrode Blue IQ
projects. Economic regeneration of the Vaal Triangle is very important to the success of the development corridor.

- Four nodes were earmarked as designated development areas along the corridor (beads on a string). Each of these nodes were earmarked for a specific purpose, to allow for the clustering of uses. These nodes and the proposed uses are detailed below:
  - **Meyerton**: This will be the primary node along the corridor, with a mix of land uses. This area can accommodate heavy industries, large-scale manufacturing, commercial uses, retail, general business and urban residential uses.
  - **The Nampak/ Everite area**: This node is situated at the gateway of the corridor and should therefore be protected in terms of the type of uses and aesthetic appearance. Light industrial uses, mini-factories, offices, warehouses and commercial uses are proposed for this node.
  - **Daleside/ Witkop**: This is an existing node, in need of upgrading and renewal. Commercial uses (such as transport uses), manufacturing, industrial uses and service industries for agriculture are proposed.
  - **Henley-on-Klip**: This node has strong residential and tourism development potential. Residential uses and hospitality uses in support of the tourism industry are proposed.

The proposals and guidelines along the R82 as per the SDF are:

- Protect the existing major nodes in the region, specifically the CBDs and industrial areas of Meyerton, Vereeniging and Vanderbijlpark;
- Protect the corridor status of the R59 and prevent competition between the R59 and R82;
- Limit and manage development permitted along the R82 to: Firstly ensure that the road is upgraded to improve safety and service standards; and Secondly protect the mobility function of the route;
- Protect the existing rural character and associated tourism potential of Midvaal;
- Limit land use changes for business purposes to properties directly fronting onto the R82 Activity Spine. The highest order land uses should be directly adjacent to the road, with a decline in the intensity and scale of uses away from the road;
- Protect the farms and agricultural holdings in the area for agricultural and rural residential purposes; and
- Promote the development of alternative north/south routes, which could compliment the R82 and R59, specifically the K47 and K77.

### 5.1.5.3 Key Issues

The identified main development issues in Sedibeng District can be summarised as follows:

- **Locality on Provincial Periphery**
Sedibeng is situated on the southern periphery of Gauteng Province, away from the hub of economic activity, which is situated in the Johannesburg/Pretoria area.

- **Rural Nature of the area**
  Sedibeng is largely a rural area, with low population densities. The rural nature of the area has a serious implication in terms of cost effective service delivery.

- **Good urban services Infrastructure**
  The existing services infrastructure in the urban areas of the district is reasonably good, and has spare capacity to accommodate further urban development. Services backlogs are experienced in certain areas, while services upgrading is also required in certain areas, notably the previous disadvantaged township areas.

- **Economic Stagnation**
  Economic growth in the district has failed to keep pace with population growth, and this has resulted in a general decrease in the standard of living in the District. The local economy is overly dependent on the heavy industrial sector [Sasol, Arcelor Mittal, Samancor, etc.] and economic diversification is urgently required. Economic sectors that show potential for future growth include tourism and agriculture, and investment into these sectors should be actively promoted.

- **Socio-Economic Disparities**
  There are huge socio-economic disparities between the different communities in the district, with high levels of poverty prevailing in the previously disadvantaged township areas.

- **Environmental Constraints and Opportunities**
  Environmental constraints include high levels of pollution, especially in the western parts of the study area, the visual unattractiveness of certain parts of the study area, adverse environmental conditions in the township areas, etc. Environmental opportunities in the district include the existing nature reserves [Suikerbosrand and Alice Glockner], the various watercourses through the study area, especially the Vaalriver and Vaaldam, the Suikerbosrand ridges, and the agricultural potential of the study area.

- **Synthesis**
  The following are the sectoral dominance in the Sedibeng Region:
  - Manufacturing;
  - Government services; and
  - Ancillary manufacturing activities.

### 5.2. Gauteng Spatial Development Framework
The Gauteng Spatial Development Framework as reflected on **Figure 11** represents the future spatial vision for Gauteng Province. It was completed in 2011 and was based on an extensive consultation process undertaken with all major roleplayers in the Province at the time.

### 5.2.1. Development Principles

The GSDF as reflected on Figure 11 is based on the following Development Principles:

- The horizontal spatial extent of the urban system is kept tight and outward sprawl should be contained;
- The majority of the province is kept rural for agricultural, recreational, bio-diversity and aquifer management purposes;
- The intensity of urban development, and the densities at which people are accommodated are increased significantly through time as population increases;
- An integrated open space network is embedded in the urban system as one of the principal spatial ordering principles;
- **Mass public transport is used as a fundamental shaper of the urban structure with the existing rail systems and BRT routes forming the basis of the movement system**;
- Urban structuring elements (consolidation zones, urban corridors, urban activity nodes, activity spines) are defined to create a ‘skeleton’ on which urban development/ redevelopement takes place over time;
- **Strong relationships between movement, particularly public transport routes and urban intensification are formed as public transport routes become the priority areas for densification and infill development**;
- The shape and pattern of the urban system’s existing and proposed road network is used to reinforce and shape the urban form.

It is important to note from the above principles the strong emphasis on public transport becoming the basis of the movement system in the province, and urban corridors, activity spines and public transport routes creating the “skeleton” for future process of densification and intensification. This would also include Transit Oriented Development (TOD) around railway stations.

### 5.2.2. Strategic Initiatives

The GSDF identifies several strategic initiatives focused on implementation within the next 5 to 10 years, which relate to urban structuring and priority action areas. These initiatives are regarded as the primary spatial focal points to act as catalysts in terms of significant urban transformation in Gauteng Province over the next decade. Following is a brief overview of these projects/initiatives as depicted on **Figure 12**.

- The continued growth and expansion of the Rosslyn Industrial Node which should serve as an urban anchor to support the large concentration of low income communities located to the north.
1. Rosslyn growth node
2. Lanseria growth node
3. Modderfontein consolidation
4. R21 City economic growth node
5. OR Tambo economic node
6. Blockhouse economic node
7. Vereeniging / Vanderbijlpark
8. Ennerdale
9. Chamdor
10. Mabopane
11. Hammanskraal
12. N17 western extension
13. Chamdor / Ennerdale
14. Ennerdale / Blockhouse
15. Blockhouse / ORT
16. Sandton / Lanseria
17. Tshwane inner-rail loop
18. Jhb inner-rail loop
19. Tshwane / Hammanskraal
20. Mabopane / Hammanskraal
21. Mamelodi
22. Atteridgeville
23. Tembisa
24. Katorus
25. Soweto
of the City of Tshwane. This node is located at the intersection between the Maputo Corridor (N4) and the Mabopane Freeway (PWV9).

- The Lanseria Airport holds enormous potential for economic and residential development with an estimated residential capacity of about 30,000 households. It is already acknowledged as a future metropolitan node to the City of Joburg. At present the major development constraint is the lack of bulk water, sanitation and electricity infrastructure to the area.

- The Modderfontein consolidation and infill development which holds development capacity in excess of 50,000 residential units. This area could also be expanded northwards onto the agricultural holdings of President Park, Austin View and Glen Austin in the future. It is strategically located in the central part of the economic core triangle of Gauteng Province being bordered by the N1 to the west, R24 towards the south, and R21 towards the east. It is also served by Gautrain and Prasa passenger rail services. This area represents a large-scale mixed use infill development opportunity between the three major activity nodes in Gauteng Province - Joburg CBD, Tshwane CBD and OR Tambo Aerotropolis.

- The R21 development corridor between Tshwane and Ekurhuleni currently attracts significant private investment with a wide range of economic activities establishing along this route.

- The OR Tambo Aerotropolis is a new initiative intended to further intensify and optimally utilise the economic benefits to be derived from the OR Tambo Airport and surrounds. This is expected to become the third large activity node within Gauteng Province, at similar scale to the Inner Cities of Joburg and Tshwane.

- The Waterfall node to the south of Gauteng Province along the R59 development corridor is an emerging activity node which recently attracted a large investment with the Heineken brewery plant being established here. This represent the first phase of a longer term initiative driven by the Midvaal Local Municipality to promote corridor development along route R59.

- Along the N1 south in the vicinity of Ennerdale, the City of Joburg intends to initiate the development of a mixed-use activity node in close proximity to the Ennerdale and Orange Farm communities next to the N1 Freeway. This is an effort to promote local economic development in the southern parts of the City of Joburg which would enhance the economic sustainability of the large concentrations of low income communities residing in this area.

- The Chamdor node has a predominant industrial focus and forms part of a cross-border initiative between the City of Joburg and the Mogale City Local Municipality with large housing projects like Lufhereng, Leratong, as well as extensions of Kagiso being located in close proximity. The proposed extension of the Naledi railway line to link up to this node is also being investigated.

- The City of Tshwane identified the areas around the Temba-Hammanskraal railway station, the Mabopane railway station, as well as the Kopanong railway station further towards the south in Klip-Kruisfontein as future activity nodes intended to support the surrounding low income communities. Applications for Neighbourhood Partnership Development Grant initiatives have been approved for these three areas, and some of the urban renewal initiatives are currently underway. Large parcels of council owned land, especially in the Temba-Hammanskraal area will also be made available to the private sector to enhance investment in these areas.
The Western Mining Belt in the City of Joburg currently attracts extensive development interest, specifically for low and middle income residential development. In the far western parts of the mining belt south of the Roodepoort CBD current housing projects at different stages of planning total about 26,000 units. As the development potential of the mining belt is exploited more and more, the need to create a proper east-west link through this area by way of the N17 western extension becomes more prominent.

Following from the above, the Gauteng Spatial Development Framework highlights the need for a continuous ring road through the southern parts of the Gauteng City Region which would link the existing and/or proposed nodes at Chamdor, Ennerdale, and Klip River, to the Aerotropolis located around the OR Tambo International Airport. This ring road will not only enhance the economic potential of these areas by improving access and accessibility to the individual nodes, but it will also provide a functional link between the N1 and route R59 which will offer the low income communities in the southern parts of the City of Joburg access to a wider range of economic opportunities in the province.

With the increased importance of the Lanseria node in the north-western parts of the City of Joburg, there is also interest to establish a mass transport service between Sandton and Lanseria through the Fourways area. This could be done as an extension of the existing BRT initiative of the City of Joburg.

Within the inner cities of the City of Tshwane and the City of Joburg there is potential to create/enhance a local ring-rail system/loop which would enhance and fully utilise the development potential in the surrounding areas.

The functional extension of the existing Mabopane railway line to link up to Temba in the north and eventually create a circular rail system through the far northern parts of the City of Tshwane is also one of the priority projects emanating from the Gauteng Spatial Development Framework.

Not noted in the GSDF is the potential to establish a rail system along the existing Moloto road to serve the communities of Thembisile and Dr JS Moroka to the north-east of Tshwane.

Apart from the above, the upgrading of activity nodes in peripheral townships like Mamelodi, Atteridgeville, Alexandra, Soweto and Katorus is also high on the agenda of the Gauteng Spatial Development Framework. The Neighbourhood Partnership Development Grant managed by National Treasury already contributes significantly towards this initiative.

6. LAND USE INPUT FOR MODELLING PURPOSES

6.1. Demographic and Economic Forecasts

IHS Global Insight was contracted to provide population projections and forecasted economic growth as inputs for this study. The previous Gauteng Transportation Model, the Natmap 2050 Study, as well as Gauteng Vision 2055 were consulted as part of the literature review. Further to these studies, IHS
Global Insight also added projections and forecasts based on the latest available data and/or official sources, such as Census 2011.

6.1.1. Population Projections

Projections used in the various studies differ quite a lot, with historical context and availability of data at the time of the study being one of the main reasons driving these differences. On the population side, the assumptions on in-migration into Gauteng, specifically into future, differs substantially.

IHS Global Insight considered three population scenarios, namely low, base and high population scenarios.

The base scenario describes the highest probable population outcome assuming a slowing in-migration into Gauteng, as well as a gradual decline in fertility arriving at 14.5 million in 2037. The high scenario assumes migration-levels like we had in 2005 as a constant into future, as well as keeping the fertility levels at the same rate as in 2010, constant into future. The high scenario reaches 16.3 million in 2037. The low scenario is considered unlikely and was not considered further.

Since the release of the Census 2011 results (which was much higher than anticipated), the high scenario was adjusted upwards to 18.7 million in 2037.

IHS Global Insight together with the rest of the 2037 Consortium recommend using the High projection. The uncertainty around the in-migration parameter justifies a more conservative (i.e. higher projection to model the more significant impact on transport demand) population projection to be used in the transport modelling. Although the base scenario provides the highest probable population outcome, in order to allow for testing the impact of the worst case scenario (higher number of trips) in the transport model, it was recommended to use the higher population projection.

6.1.2. Economic Growth Forecasts

The economic growth forecasts are more volatile due to the exposure to the global economy. Furthermore, any economy does have its business cycles, and unavoidably there will be periods of upswings and periods of slower growth or even recession – all of which is impossible to predict in the long run. The long term economic projections provide the average annual economic growth across the entire planning horizon, incorporating both ups and downs. IHS Global Insight forecasts an average annual growth of 4.5% between 2012 and 2037.

For transport planning, the biggest risk is on the upper side – when the economy grows faster than anticipated, and when the economy runs into transport infrastructure constraints. Having slower growth will result in having sufficient spare capacity on the transport system, and although this equates to ineffective spending on unutilised infrastructure, the negative effect on the economy is negligible.
In order to come up with a high variant of economic growth, IHS Global Insight has assumed a higher level of infrastructure spending, as well as more success in government’s initiatives to create jobs, thereby lowering the unemployment rate which is one of the structural constraints in the economy. The higher growth is forecasted at an average annual growth of 6% which is 1% higher than the base forecasts.

The 2037 Consortium recommended that the base forecasts, i.e. around 4.5% p.a. be used in the transportation modelling.

For more detail on the methodology, and reasoning behind the scenarios the reader is referred to the standalone report called the “Demographic and Economic Scenarios”, compiled by IHS Global Insight in April 2012.

6.2. Zonal System

The zoning system of the Review of the Strategic Road Network for Gauteng (GSRNR2010) was retained (833 Traffic zones in total).

6.3. Zonal Data

The base year demographic and socio-economic characteristics of each zone are required, so that growth in travel demand through time can be estimated from demographic and socio-economic projections.

6.3.1. Base Year and Design Years

The statistical base year of the study is 2010, because of the availability of aerial photography for Gauteng dated 2010. For the population projections, initially Statistics SA’s mid-year estimate for 2010 was used as the base year. This was later adjusted upwards to incorporate the Census 2011 results. The design years decided upon were 2025 (medium term), and 2037 (long term).

6.3.2. Deliverables per Traffic Zone

- 2010, 2025, 2037
  - Dwelling Units (low, middle, high income)
  - Population (low, middle, high income)
  - Economically Active Population (formal, informal and unemployed) – productions
  - Floor Area: retail and office
  - Formal Workers by type e.g. retail, office, industrial, commercial, local serving, agricultural and mining, construction and transport – attractions
  - Informal Workers
  - Unemployed People
6.3.3. Sources of Information and Methodology

- **Base Year**

In general the base year population was updated by counting the incremental number of dwelling units per traffic zone, complemented by additional information received from Local Authorities and GeoTerraImage.

Pertaining to job opportunities, the incremental floor areas for retail, office, commercial and industrial were measured and the additional workers calculated from that. Publications such as South Africa Property Review, SA Shopping Centre Directory, Shopping SA, Commercial and Industrial Property News, etc. were also consulted.

- **Medium Term Projections (2010-2025)**

Pertaining to future residential land use, the distribution by traffic zone was influenced by applications in the pipeline, the availability of vacant land, historic growth trends, but then also by the densification and intensification policies described in the Local Authorities’ SDFs. Public Transport to function as the backbone of the urban structure is a prominent feature in all the SDF’s. Densification and intensification of nodes and corridors were also a high priority.

Job opportunity allocations were influenced by projects in the pipeline, information received from local authorities, as well as news articles on new developments that appeared in publications such as the South Africa Property Review, SA Shopping Centre Directory, Shopping SA, Commercial and Industrial Property News, etc. Densification and intensification of nodes and corridors as described in the SDF’s were adhered to.

- **Long Term Projections (2025-2037)**

The long term residential allocations were developed with the objectives of densification, infill and redevelopment of land centrally located or with good access to public transport facilities e.g. TODs (at railway and Gautrain stations), nodes and corridors along BRT routes.

The long term economic projects were influenced by Growth and Development Strategies and other policy documents describing the expected economic future of Gauteng. Identified growth nodes (urban as well as rural) were taken into account in the allocation of job opportunities per traffic zone.

The following table is a concise summary of the methodology and sources of information used.

**Synthesis on Transport Modelling – Land Use Data**

**Base Year 2010**
<table>
<thead>
<tr>
<th>Item</th>
<th>Methodology</th>
<th>Sources of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRODUCTIONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Dwelling Units (per income group)</td>
<td>Count incremental dwelling units (2007-2010) per Traffic Zone (last update was 2007)</td>
</tr>
<tr>
<td>2</td>
<td>Household size</td>
<td>Adjust household size per Traffic Zone</td>
</tr>
<tr>
<td>3</td>
<td>Population</td>
<td>Calculation</td>
</tr>
<tr>
<td>4</td>
<td>Economically Active Population (EAP)</td>
<td>Adjust percentage Economically Active Population per Traffic Zone</td>
</tr>
<tr>
<td>5</td>
<td>Formal EAP</td>
<td>Adjust percentage per Traffic Zone</td>
</tr>
<tr>
<td>6</td>
<td>Informal EAP</td>
<td>Adjust percentage per Traffic Zone</td>
</tr>
<tr>
<td>7</td>
<td>Unemployed EAP</td>
<td>Adjust percentage per Traffic Zone</td>
</tr>
<tr>
<td><strong>ATTRACTIONS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Retail Floor Area per Traffic Zone</td>
<td>Use sources of information as well as measurements from aerial photography and land use surveys</td>
</tr>
<tr>
<td>9</td>
<td>Office Floor Area per Traffic Zone</td>
<td>Use sources of information as well as measurements from aerial photography and land use surveys</td>
</tr>
<tr>
<td>10</td>
<td>Retail Workers per Traffic Zone</td>
<td>Calculation by applying floor area ratio</td>
</tr>
<tr>
<td>11</td>
<td>Office Workers per Traffic Zone</td>
<td>Calculation by applying floor area ratio</td>
</tr>
<tr>
<td>14</td>
<td>Local Serving Workers per Traffic Zone</td>
<td>Apply Local Service Ratio</td>
</tr>
<tr>
<td>15</td>
<td>Agriculture and Mining Workers per Traffic Zone</td>
<td>Allocation per Traffic Zone – use aerial photography for inspection purposes</td>
</tr>
<tr>
<td>16</td>
<td>Transport Workers per Traffic Zone</td>
<td>Allocation is a function of number of dwelling units and formal employment per Traffic Zone</td>
</tr>
<tr>
<td>17</td>
<td>Construction Workers</td>
<td>Function of dwelling unit growth and formal worker growth</td>
</tr>
<tr>
<td>18</td>
<td>Informal Workers • at home • at work</td>
<td>Larger percentage informally employed at place of residence than at place of work</td>
</tr>
<tr>
<td>19</td>
<td>Unemployed People • at home • at work</td>
<td>Larger percentage unemployed at place of residence than at place of work</td>
</tr>
</tbody>
</table>

**Projection 2010-2025, 2025-2037**

<table>
<thead>
<tr>
<th>Item</th>
<th>Methodology</th>
<th>Sources of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2010</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### ATTRACTIONS

| Zone | According to Information received from Local Authorities, applications received, policy documents, SDFs, other reports from Local Authorities, SDFs, Human Settlement Plans, other stakeholders. Control Totals received from Global Insight Demographic Model |
| 2 Household size | Adjust household size per Traffic Zone | Global Insight Demographic Model |
| 3 Population per Income Group | Calculation | Number of Dwelling Units Household size, Global Insight Demographic Model |
| 4 Economically Active Population (EAP) | Adjust percentage Economically Active Population per Traffic Zone | Global Insight Demographic Model |
| 5 Formal EAP | Adjust percentage per Traffic Zone | Global Insight Demographic Model |
| 6 Informal EAP | Adjust percentage per Traffic Zone | Global Insight Demographic Model |
| 7 Unemployed EAP | Adjust percentage per Traffic Zone | Global Insight Demographic Model |
| 8 Retail Floor Area per Traffic Zone | Function of number of people per Traffic Zone and sources of information | Information from Local Authorities, applications, SDFs |
| 9 Office Floor Area per Traffic Zone | Function of number of people per Traffic Zone and sources of information | Information from Local Authorities, applications, SDFs |
| 10 Retail Workers per Traffic Zone | Calculation by applying floor area ratio | Information from Local Authorities, applications, SDFs |
| 11 Office Workers per Traffic Zone | Calculation by applying floor area ratio | Information from Local Authorities, applications, SDFs |
| 12 Industrial Workers per Traffic Zone | Calculation by applying floor area ratio | Information from Local Authorities, applications, SDFs |
| 13 Commercial Workers per Traffic Zone | Calculation by applying floor area ratio | Information from Local Authorities, applications, SDFs |
| 14 Local Serving Workers per Traffic Zone | Function of population per Traffic Zone, apply ratio | Global Insight Economic Model - Control Total |
| 15 Agriculture and Mining Workers per Traffic Zone | Allocation based on base year and possible known interventions | Global Insight Economic Model - Control Total |
| 16 Transport Workers per Traffic Zone | Allocation is a function of number of dwelling units and formal employment per Traffic Zone | Global Insight Economic Model - Control Total |
| 17 Construction Workers per Traffic Zone | Function of dwelling unit growth and formal worker growth | Global Insight Economic Model - Control Total |
| 18 Informal Workers | Larger percentage informally employed at place of residence than at place of work | Global Insight Economic Model - Control Total Literature surveys on the subject |
| • at home | at work | |
| 19 Unemployed People | Larger percentage unemployed at place of residence than at place of work | Global Insight Economic Model - Control Total Literature Surveys |
| • at home | at work | |

#### 6.4. FUTURE LAND USE SCENARIOS: GITMP25 TRAFFIC MODEL

#### 6.4.1. Population, Job Opportunities and Land Use Scenarios
The GITMP25 Traffic Model is based on three variables: projected future population for the province; projected future job opportunities/workers; and alternative land use scenarios.

In terms of the first two variables, the Census 2011 adjusted High Population and the Base Case Economic Scenario were selected to serve as input to the GITMP25 Model. The projected population and number of workers associated with these two scenarios as summarised in Table 1 below were then spatially allocated to traffic zones in different parts of the province based on two land use scenarios.

Table 1: GITMP: Total Population and Formal Workers Projections 2010-2037

<table>
<thead>
<tr>
<th>Gauteng</th>
<th>2010</th>
<th>2025</th>
<th>2037</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>11.2 million</td>
<td>16.3 million</td>
<td>18.7 million</td>
</tr>
<tr>
<td>Formal Workers</td>
<td>3.9 million</td>
<td>6.7 million</td>
<td>8.6 million</td>
</tr>
</tbody>
</table>

It is expected that the Gauteng population could increase from 11.2 million in 2010 to 18.7 million by 2037 (7.49 million people increment) while the 3.9 million job opportunities in 2010 are projected to increase by about 4.64 million to reach 8.6 million by 2037.

The period 2010 to 2025 represent a projected increment of approximately 5,156 million people and 2,746 million workers (job opportunities) distributed between the three metros and two district municipalities. This represents an annual population growth rate of 2.6% and job opportunity growth rate of 3.6% during this period.

For the period 2025 to 2037 the population increment is 2,338 million people and 1,900 million additional job opportunities based on a projected annual population growth rate of 1.1% and job opportunity growth rate of 2.1% per annum over the twelve year period.

Diagram 3 below schematically illustrates the different land use scenarios simulated in the GITMP25 model.

For the period 2010 to 2025 only one land use scenario was formulated (GSDF Based Approach). This scenario is based on the Development Principles of the Gauteng Spatial Development Framework and seeked to contain urban development within the existing urban footprint, promote development along the major public transport network in the province (Gautrain, Prasa rail and BRT network) and to utilise well-located vacant land for infill development.

Diagram 3: GITMP 25 Land Use Modelling
For the period 2025 to 2037 two land use scenarios (S1 and S2) were tested. The first (S1) comprised a continuation of the Gauteng SDF Based Approach within the existing urban footprint of the province while the second land use scenario (S2) for this period represents a more radical spatial intervention in the Province (Gauteng Core TOD Intervention Approach). This scenario consolidates all incremental development during the period 2025 to 2037 along and around existing and proposed rapid transit systems in the core area of Gauteng Province (the triangular area between the inner cities of Tshwane, Joburg, and the ORTIA aerotropolis).

The assumption is made that rapid rail can be a successful mode to transport public en masse over longer distances and the extension and expansion program of the Gautrain system could well serve as a catalyst to achieve a more desired urban structure at the GCR level.

The Gauteng Core Rapid Transit Intervention approach will require a pre-planned public transport system involving all modes of public transport and the development of high density and compact urban areas at transit oriented development nodes.

The fundamental difference between the two land use scenarios is thus the extent of the area within which the incremental population and job opportunities for the period 2025 to 2037 were placed. The GSDF based approach used the existing urban footprint of the province as development boundary while the Core Intervention approach contains the incremental population and job opportunities in a significantly smaller geographic area, the triangular Economic Core.

**Figure 13** depicts the Gauteng SDF Based Approach (2010 to 2037) and **Figure 14** the Gauteng Core Rapid Transit Intervention Approach. Following is a brief summary of the results of each of the two scenarios.
6.4.2. GSDF Based Approach Results (2010-2025)

According to Table 2 approximately 36% of the population increment up to 2025 will be located in the City of Joburg, 31% in Ekurhuleni, and 24% in the City of Tshwane. West Rand District Municipality will accommodate approximately 7% of the increment and Sedibeng District about 3%.

Table 2: GITMP: Population and Formal Workers Increment 2010-2025

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Tshwane</td>
<td>1241659</td>
<td>754248</td>
<td>24%</td>
<td>27%</td>
</tr>
<tr>
<td>City of Joburg</td>
<td>1854086</td>
<td>1121074</td>
<td>36%</td>
<td>41%</td>
</tr>
<tr>
<td>Ekurhuleni</td>
<td>1537696</td>
<td>642293</td>
<td>30%</td>
<td>23%</td>
</tr>
<tr>
<td>West Rand</td>
<td>179403</td>
<td>113106</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>Sedibeng</td>
<td>342778</td>
<td>115359</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5155622</strong></td>
<td><strong>2746081</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Note: Although a relatively high economic growth was experienced in the period 2004-2008, the growth in formal workers was also due to a change in definition of Formal workers in the model. Since 2001 Domestic Workers moved from Informal to Formal workers.

Figure 13 – Gauteng SDF Based Approach (2037)
An estimated 41% of the incremental jobs up to 2025 are expected to be located in the City of Joburg; 27% in the City of Tshwane, and 23% in Ekurhuleni while Sedibeng and West Rand District will both accommodate about 4% of all incremental job opportunities.

6.4.3. GSDF Based Approach vs Intervention Approach Results (2025-2037)

As illustrated on Table 3 the SDF Based Scenario for 2025 to 2037 results in 35% of the incremental population being located in the City of Joburg, 32% in Ekurhuleni and 23% in the City of Tshwane. Sedibeng accommodates about 7% of the increment and West Rand 3%. The Intervention scenario increases the City of Joburg’s incremental population from 35% to 39%, that of the City of Tshwane from 23% to 27%, and the Ekurhuleni population from 32% to 34%. No incremental population was placed in West Rand and Sedibeng.

Table 3: GITMP: SDF Based Scenario: Population and Formal workers Increment 2025-2037
In terms of job opportunities the SDF Based Approach allocated 35% of new job opportunities to the City of Joburg, 30% to the City of Tshwane and 25% to Ekurhuleni. West Rand (4%) and Sedibeng (6%) collectively holds 10% of the incremental job opportunities by 2037.

When the Intervention Approach is applied, the incremental job opportunities allocated to the West Rand (3%) and Sedibeng (3%) reduces to 6% of the provincial total. The incremental job opportunities allocated to Ekurhuleni increases from 25% to 26%, while the share of the City of Tshwane increases from 30% under S1 to 34% under S2. The CoJ receives 34% of the incremental job opportunities under S2 compared with the 35% allocated to it under S1.

### 6.4.4. Spatial Trends: GSDF Approach vs Intervention Approach

The main spatial features and results of the Gauteng SDF Based Approach are as follow:

- All new development was contained within the Urban Development Boundary (Urban Edge) of municipalities.
- About 43% of the household increment was placed in close proximity to the existing priority public transport network in the province. This represents transit oriented densification, infill development and redevelopment.
- Approximately 46% of the incremental households were placed on large, well-located vacant areas within the provincial urban footprint e.g. Modderfontein, Waterfall Estates, and some of the developable parts of the mining belt from Randfontein in the west up to Daveyton and Springs in the east.
- Only 11% of the increment was placed in the peripheral parts of the existing Gauteng urban footprint, but still within the various municipal urban development boundaries. These include the areas around the N1-N4 interchange north of the City of Tshwane; south-eastern and south-western parts of City of Tshwane; north-western suburbs of City of Joburg; the areas around the R21 freeway and towards Bredell and Pomona in the northern parts of Ekurhuleni; the areas between Lesedi and Nigel and towards Leeuwpoort, and Palm Springs in the southern parts of Ekurhuleni; the Waterfall Node along route R59 in Midvaal; and the vacant areas around Ironside and Doornkuil, towards Ennerdale and Lenasia; and up to Syferfontein along the N1 freeway (south) in the southern parts of the province.
- The majority of the incremental job opportunities/ workers are clustered around the central core area of the province (compare Figure 15 (2010) to Figure 16 (2037)).
- Significant growth in job opportunities is projected in the Inner City of Tshwane, southwards towards Centurion and along the Midrand Strip towards Modderfontein, Sandton, Rosebank and up to the Joburg CBD. Towards the east, job opportunities are clustered around the N1 freeway through the eastern suburbs of the City of Tshwane (Menlyn, Lynnwood and Silverton); and along Route R21 southwards towards the ORTIA Aerotropolis.

- Outside this core area significant growth in job opportunities occurs along route R28 to the north-west of the City of Joburg up to Lanseria, around Chamdor to the west, the R59 Waterfall Node to the south, the Tambo Springs and Sentra Rand Freight Hubs east and south-east of Ekurhuleni, and the Pyramid Freight Hub north of the City of Tshwane.

- The Core Intervention Scenario allocates the total incremental population of the province to the core area as demarcated on Figure 4.12. This results in higher residential densities in all the traffic zones within the core area which enhances the viability of public transport in these areas.

- This scenario also increases the number of job opportunities allocated to the Midrand Corridor, R21 Corridor, the ORTIA Aerotropolis and the areas around the N1-N14 interchange in Centurion and towards the eastern suburbs of the City of Tshwane (Compare Figure 15 with Figure 17).

- In order to strengthen the Gauteng economic core area the present growth trends to the south east of Tshwane, the south west of Tshwane, the northern Johannesburg areas and the north western areas of Ekurhuleni should be encouraged but should be guided to develop at higher densities in support of pre-planned public transport systems.

- Within the above mentioned areas significant regional mixed land use nodes have already reacted to the growth trends and the development of these nodes could well serve as the focus for land use and transportation planning in an integrated manner to achieve the over arching objective of creating a compact and effective urban structure. Nodes such as Garsfontein East, Irene, Rooihuiskraal, Sunninghill, Fourways and Bredell are typical examples in this regard.

**Figure 15 – Formal Workers 2010**

![Map of Formal Workers 2010](image)
Figure 16 – Formal Workers 2037 (S1)

Figure 17 – Formal Workers 2037 (S2)
• The proposed BRT Systems, the existing PRASA rail system as well as Gautrain tend to serve the core areas of Tshwane, Johannesburg and Ekurhuleni as well as the central spine along Ben Schoeman motorway. The new development focus areas as described above are however not well served by public transport systems and these could well become the target areas for the expansion of the Rapid Transit system of rail and BRT services.

• To conclude, the Gauteng Core Rapid Transit Intervention scenario will require a pre-planned public transport system involving all modes of public transport and the development of high density and compact urban areas at transit oriented development nodes. The public transport systems should dictate the nature and densities of the development and will require strict adherence to the required management systems and implementation plans that will be necessary to achieve the ultimate goal of a city region which is not dominated by private vehicle congestion.

6.4.5. Conclusions and Recommendations

• Within the existing Gauteng Urban Edge as demarcated on the Gauteng Spatial Development Framework (Figure 11) there is sufficient land available to accommodate the total increment of population and job opportunities (economic activity) projected for the province up to 2037.

• An even distribution of the incremental population and job opportunities on all the major vacant land areas within the urban edge and amongst other, also focusing on the areas around the provincial Strategic Public Transport Network, does not enhance the viability of the public transport network significantly.

• Instead, authorities will have to prioritise public transport corridors for processes of densification and infill development in the short, medium and long term in order to make any significant difference in the viability of specific corridors.

• The prioritisation of public transport corridors for processes of densification will have to be aligned and coordinated across municipal boundaries in the Gauteng City Region.

• It is critically important that the existing grant and subsidy code for subsidised housing be amended to achieve construction of significantly larger quantities of medium and high density residential units (rental and full title) on well-located land around the priority public transport network in the province. This is one of the spatial recommendations contained in the National Development Plan (refer to par.4.2.1).

Appendix A comprises a more detailed and technical description of the population, job opportunities and land use scenario results which can be read in conjunction with section 6.4.1 to 6.4.5 above.
APPENDIX A: RESULTS PER MUNICIPALITY

1. POPULATION

Table A1 reflects the historic and projected future population of Gauteng.

The population increased from 9.3 million in 2001 to 12.3 million in 2011. The population projections incorporated the higher 2011 Census results and is expected to reach 16.3 million by 2025 and 18.7 million by 2037. This projection compares very well with the Middle Scenario of Gauteng Vision 2055.

Two land use strategies were developed for the long term (2025-2037); the first strategy is a continuation of the Gauteng SDF based approach and the second strategy focus on densification in the Core Triangle area of Gauteng (Rapid Transit Intervention Approach).

The difference in allocated increment between the two strategies is evident from Table A1. The increased allocations in the City of Tshwane, City of Johannesburg and Ekurhuleni were done to test the influence on a possible new Rapid Transit System in the core area of Gauteng.

Table A1: GITMP: Population, 2001 – 2037

<table>
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<tr>
<th>MUNICIPALITY</th>
<th>HISTORIC GROWTH</th>
<th>PROJECTION</th>
<th>INCREMENT</th>
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</thead>
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<td>EKURHULENI MM</td>
<td>2,478,130</td>
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<td>3,178,470</td>
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<td>SEDIBENG DM</td>
<td>796,760</td>
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<td>744,160</td>
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<th>INCREMENT (%)</th>
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<tr>
<td>CITY OF TSHWANE MM</td>
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<td>23</td>
<td>24</td>
</tr>
<tr>
<td>CITY OF JOBURG MM</td>
<td>34</td>
<td>34</td>
<td>36</td>
</tr>
<tr>
<td>EKURHULENI MM</td>
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<td>27</td>
<td>26</td>
</tr>
<tr>
<td>SEDIBENG DM</td>
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Growth per Annum (%)

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<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
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<td>1.1</td>
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Source: 2001 Census, Plan Associates, Bureau of Market Research
2005, 2007: GSRNR2010
2010: Plan associates, GeoTerraImage
2025 to 2037: IHS Global Insight Demographic Model input to Land Use Model, Plan Associates, February 2013
Note: West Rand includes the Merafong Local Municipality
2. EMPLOYMENT STATUS OF THE ECONOMICALLY ACTIVE POPULATION

The employment status of the economically active population is depicted on Table A2.

“Economically Active People” refers to all people between the ages of 15 and 65 years who provide their labour for production of goods and services and includes people in the formal- and informal sectors, as well as the unemployed.

50% of the population in Gauteng is considered as economically active, and is expected to decrease slightly to 47% by 2025 and increase again to 50% by 2037. The unemployment rate is, however, expected to decrease sharply from 24% in 2010 to 6% in 2037. (This is also in line with the National Planning Commission’s vision of lowering the unemployment rate from 14% in 2020 to 6% in 2030).

3. EMPLOYMENT (BY PLACE OF WORK)

a) Formal Workers

Table A3 reflects the estimated number of formal workers per municipality (2001-2010), as well as the projected number of workers (2025-2037). The number of formal workers increased from 2.4 million in 2001 to 3.9 million in 2010, representing a relatively high growth period of 5.7% p.a. in Gauteng. A contributing factor to the high growth rate was a technical change in definition of formal workers.

It is expected that the formal workers will increase from 3.9 million in 2010 to 8.6 million in 2037 (2.9% growth p.a.). 88% of all formal workers are currently working in the three metropolitan areas of Tshwane, Johannesburg and Ekurhuleni, and is expected to increase to 90% by 2037.

Table A4 shows the expected distribution of formal workers by type. 25% of all workers in Gauteng can be categorised as Office workers, followed by 19% Industrial/Commercial and 17% Retail workers.

It is expected that the contribution of Office workers will increase to 28% of all formal workers by 2037, followed by Industrial/Commercial workers (19%) and Retail workers (17%). The contribution of Agriculture and Mining to the total is expected to decrease from 3% in 2010 to 1% in 2037.
### Table A2: ITMP25: Employment Status of the Economically Active Population, 2010-2037

<table>
<thead>
<tr>
<th>MUNICIPALITY</th>
<th>2010</th>
<th>2025</th>
<th>2037 SDF Base</th>
<th>2037 Intervention</th>
</tr>
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<td>ECONOMICALLY ACTIVE</td>
<td>ECONOMICALLY ACTIVE</td>
<td>ECONOMICALLY ACTIVE</td>
<td>ECONOMICALLY ACTIVE</td>
</tr>
<tr>
<td></td>
<td>FORMAL</td>
<td>INFORMAL</td>
<td>UNEMPLOYED</td>
<td>TOTAL</td>
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<td>923 183</td>
<td>93 156</td>
<td>251 492</td>
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</tr>
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<td>Economic Activity Rate (%)</td>
<td>73%</td>
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<td>20%</td>
<td>100%</td>
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<td>179 367</td>
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<td>Economic Activity Rate (%)</td>
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<td>100%</td>
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<tr>
<td>EKURHULENI</td>
<td>931 282</td>
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</tr>
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<td>Economic Activity Rate (%)</td>
<td>65%</td>
<td>9%</td>
<td>26%</td>
<td>100%</td>
</tr>
<tr>
<td>SEDIBENG</td>
<td>240 815</td>
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<td>104 695</td>
<td>377 950</td>
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<tr>
<td>Economic Activity Rate (%)</td>
<td>64%</td>
<td>9%</td>
<td>28%</td>
<td>100%</td>
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<tr>
<td>WEST RAND</td>
<td>271 137</td>
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<td>78 752</td>
<td>380 299</td>
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<tr>
<td>Economic Activity Rate (%)</td>
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<td>8%</td>
<td>21%</td>
<td>100%</td>
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<tr>
<td>GAUTENG</td>
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<td>460 275</td>
<td>3 130 959</td>
<td>5 545 364</td>
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<tr>
<td>Economic Activity Rate (%)</td>
<td>68%</td>
<td>8%</td>
<td>24%</td>
<td>100%</td>
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Sources: IHS Global Insight Demographic Model input to Land Use Model, Plan Associates, February 2013
### Table A3: ITMP25: Formal Workers, 2001-2037

<table>
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<tr>
<th>MUNICIPALITY</th>
<th>HISTORIC GROWTH</th>
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<th>INCREMENT</th>
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<tbody>
<tr>
<td></td>
<td>2001</td>
<td>2010</td>
<td>2025</td>
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<tr>
<td>CITY OF TSHWANE MM</td>
<td>580 231</td>
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<td>1 696 336</td>
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<td>CITY OF JOBURG MM</td>
<td>909 731</td>
<td>1 573 496</td>
<td>2 694 570</td>
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<td>602 307</td>
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<td>1 618 959</td>
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<td>SEDIBENG DM</td>
<td>139 969</td>
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<td>WEST RAND DM</td>
<td>158 321</td>
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<th>MUNICIPALITY</th>
<th>HISTORIC GROWTH (%)</th>
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<th>INCREMENT (%)</th>
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<tbody>
<tr>
<td></td>
<td>2001</td>
<td>2010</td>
<td>2025</td>
</tr>
<tr>
<td>CITY OF TSHWANE MM</td>
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<td>25</td>
</tr>
<tr>
<td>CITY OF JOBURG MM</td>
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<td>40</td>
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<tr>
<td>EKURHULENI MM</td>
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<td>25</td>
<td>24</td>
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<tr>
<td>SEDIBENG DM</td>
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<td>5</td>
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<tr>
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**Growth per Annum (%)**

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<th>2010 - 2025</th>
<th>2025 - 2037 BASE</th>
<th>2025 - 2037 Intervention</th>
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</table>


2010 to 2037: IHS Global Insight Demographic Model input to Land Use Model, Plan Associates, February 2013

Note: Although a relatively high growth was experienced in the period 2004 – 2008, the growth was also due to a change in definition of Formal workers in the model. Domestic workers moved from Informal to Formal workers.
Table A4: ITMP25: Formal Workers by Type, 2010-2037

<table>
<thead>
<tr>
<th>MUNICIPALITY</th>
<th>2010</th>
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<th>2037 Base</th>
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<tbody>
<tr>
<td></td>
<td>Retail</td>
<td>Office</td>
<td>Industrial</td>
<td>Commercial</td>
<td>Local Serving</td>
<td>Other</td>
<td>Agrig &amp; Mining</td>
<td>Construction</td>
<td>Transport</td>
<td>Domestic workers</td>
<td>Total</td>
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<td>Office</td>
<td>Industrial</td>
<td>Commercial</td>
<td>Local Serving</td>
<td>Other</td>
<td>Agrig &amp; Mining</td>
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<td>244 242</td>
<td>136 634</td>
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<td>41 310</td>
<td>12 072</td>
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<td>59 043</td>
<td>72 288</td>
<td>942 088</td>
<td>412 181</td>
<td>628 900</td>
<td>301 401</td>
<td>122 290</td>
<td>263 709</td>
<td>83 301</td>
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<td>14 060</td>
<td>103 341</td>
<td>104 814</td>
<td>149 652</td>
<td>1 573 496</td>
<td>607 538</td>
<td>1 297 866</td>
<td>296 886</td>
<td>75 635</td>
<td>414 645</td>
<td>4 905</td>
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<td>11 895</td>
<td>63 517</td>
<td>59 295</td>
<td>91 993</td>
<td>976 666</td>
<td>315 251</td>
<td>350 978</td>
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<td>1 099</td>
<td>33 641</td>
<td>391</td>
<td>69 971</td>
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<td>Commercial</td>
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<td>Agrig &amp; Mining</td>
<td>Construction</td>
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<td>15%</td>
<td>4%</td>
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</table>

10 to 2037: IHS Global Insight Demographic Model input to Land Use Model, Plan Associates, February 2013
Note: West Rand includes the Merafong Local Municipality
4. DISTRIBUTION OF FUTURE POPULATION

4.1. SDF Based Scenario

The spatial distribution of population which is depicted on Figure A1 is briefly summarised below:

In Tshwane relatively large incremental growth is expected in the Mabopane-, Soshanguve-, and Kopanong\(^1\) station areas (served by rail and BRT), as well as the CBD, Moot\(^2\) and Hatfield/Menlopark area\(^3\) which will be well-served by the Tshwane Ring Rail and the BRT. Market driven growth is expected in the east\(^4\) as well as in the south-west (Monavoni area\(^5\)). The Pyramid/N1 area\(^6\) is expected to develop in the long term because of the accessibility from the N1 and the development of the future freight hub in the area.

In Johannesburg densification was concentrated along the west-east stretching mining belt\(^7\) and the CBD\(^8\), as well as the north-south axis representing the Gautrain stations of Rosebank, Sandton, Modderfontein and Midrand\(^9\). Densification is also proposed around the BRT and train stations (TOD's) in Soweto\(^10\), and along the BRT corridors in the northern suburbs of Johannesburg\(^11\).

A relatively large market driven growth is still expected to happen in the north-western parts of Johannesburg, linking up with the proposed growth in Lanseria\(^12\). Various projects are well underway in the south-west of Johannesburg (Lufhereng\(^13\), Lehae, Sweetwaters\(^14\) area), but is toned down from its high levels in 2010-2025 to lower levels for the period 2025-2037, giving preference rather to infill and densification of the more centrally located areas.

In the case of Ekurhuleni, densification was prioritised along the north-south axis of rail (TODs) and priority BRT corridors e.g. from Tembisa in the north\(^15\), through the Western Mining Belt/Germiston\(^16\) area, and up to Katorus\(^17\) in the south.

During the development of the later phases of the BRT (more to the east), a larger growth is foreseen in the area south of the N12\(^18\) and the north-south axis on the far East Rand (Daveyton, eastern mining belt, Kwatsaduza)\(^19\). As the economic growth around the Aerotropolis took off, residential growth is expected to expand to the east thereof\(^20\), as well as along the R21 corridor, linking Ekurhuleni with southwards growth from Tshwane\(^21\).

Approximately 90% of the incremental population is expected to locate within the three metropolitan areas, and 10% will locate in nodes in the Sedibeng and West Rand District Municipalities. Worth mentioning is the development of the Waterfall Node along the R59 in Midvaal\(^22\) and the Syferfontein area south-west of Soweto\(^23\).
In the case of Tshwane, despite the huge effort to densify around the CBD/Moot/Hatfield area, the distortions of the past will still be with us in future.

In Johannesburg the densification within the ring road (around Gautrain stations and BRT) makes a huge difference in strengthening the south/north densification axis between Soweto CBD, northern suburbs, Midrand, Centurion and Tshwane CBD. The emerging axis to Lanseria is however visible.

In Ekurhuleni the south/north axis of Katorus/Germiston/Mining Belt/Tembisa is strengthened through the BRT and TODs.

4.2. Core Rapid Transit Intervention Scenario

The Core Intervention Scenario allocates the total incremental population of the province to the core area as demarcated on Figure A2. This results in higher residential densities in all the traffic zones within the core area which enhances the viability of public transport in these areas.

This scenario will require a pre-planned public transport system involving all modes of public transport and development of high density and compact urban areas at transit oriented development nodes.

5. DISTRIBUTION OF FUTURE JOB OPPORTUNITIES

5.1. SDF Based Scenario

The long term distribution of the expected Job Opportunities is shown in Figure A3.

- The majority of the incremental job opportunities/ workers are clustered around the central core area of the province.
- Significant growth in job opportunities is projected in the Inner City of Tshwane\(^{(1)}\), southwards towards Centurion\(^{(2)}\), and along the Midrand Strip\(^{(3)}\) towards Modderfontein\(^{(4)}\), Sandton\(^{(5)}\), Rosebank\(^{(6)}\) and up to the Joburg CBD\(^{(7)}\). Towards the east, job opportunities are clustered around the N1 freeway through the eastern suburbs of the City of Tshwane (Menlyn, Lynnwood and Silverton\(^{(8)}\)); and along Route R21 southwards\(^{(9)}\) towards the ORTIA Aerotropolis\(^{(10)}\).
- Outside this core area significant growth in job opportunities occurs along route R28 to the north-west of the City of Joburg up to Lanseria\(^{(11)}\), around Chamdor/Aureus\(^{(12)}\) to the west, the R59 Waterfall Node to the south\(^{(13)}\), the Tambo Springs\(^{(14)}\) and Sentra Rand Freight Hubs\(^{(15)}\) east and south-east of Ekurhuleni, and the Pyramid Freight Hub\(^{(16)}\) north of the City of Tshwane.
5.2. Core Rapid Transit Intervention Scenario

The long term distribution of the Core Scenario is shown in Figure A4.

- This scenario also increases the number of job opportunities allocated to the Midrand Corridor\(^{(1)}\), R21 Corridor\(^{(2)}\), the ORTIA Aerotropolis\(^{(3)}\) and the areas around the N1-N14 interchange in Centurion\(^{(4)}\) and towards the eastern suburbs of the City of Tshwane\(^{(5)}\).
- In order to strengthen the Gauteng economic core area the present growth trends to the south-east of Tshwane\(^{(6)}\), the south-west of Tshwane\(^{(7)}\), the northern Johannesburg areas\(^{(8)}\), and the north-western areas of Ekurhuleni\(^{(9)}\) should be encouraged but should be guided to develop at higher densities in support of pre-planned public transport systems.
- Within the above mentioned areas significant regional mixed land use nodes have already reacted to the growth trends and the development of these nodes could well serve as the focus for land use and transportation planning in an integrated manner to achieve the overarching objective of creating a compact and effective urban structure. Nodes such as Garsfontein East, Irene, Rooihuiskraal, Sunninghill, Fourways and Bredell are typical examples in this regard.

Following from the above the 20 largest nodes in 2010 are compared with the envisaged 20 largest nodes in the SDF Based- and Core Intervention Scenarios (Table A5).

It is evident from Table A5 that the Aerotropolis (both scenarios) has the potential to become the largest node in the long term, followed by Johannesburg CBD.

The Lanseria/Cradle City/Muldersdrift area has also the potential to become the third largest node (SDF scenario) in the long term, followed by Sandton and the Modderfontein/Linbro Park Node.

The Core Scenario focused on the development of the central core nodes of the Midrand Strip, R21 and the Modderfontein/Linbro Park Node.

The expected number of job opportunities in the 20 largest nodes in Gauteng is expected to increase from 1,5 million (39% of the total workers in Gauteng) in 2010, to 3,5 million in 2037 Base Scenario (41% of the total workers), and 3,8 million in 2037 Intervention (44% of the total workers).
FIGURE A4

GAUTENG 25-YEAR INTEGRATED TRANSPORT MASTER PLAN
GAUTENG CORE RAPID TRANSIT INTERVENTION APPROACH (2037)

FORMAL WORKERS

- Retail / Office
- Industrial / Commercial
- Other Formal Workers

- 410,000
- 265,000
- 100,000
Table A5: ITMP25: Existing and Projected Top 20 Nodes in Gauteng, 2010-2037

<table>
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<tr>
<th>Rank</th>
<th>Node/Strip</th>
<th>Total Formal Workers</th>
<th>Rank</th>
<th>Node/Strip</th>
<th>Total Formal Workers</th>
<th>Rank</th>
<th>Node/Strip</th>
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<td>Joburg CBD</td>
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TOTAL: 1 511 002 2 688 167 3 500 037 3 759 099

growth per annum: 3.9% 2.2% 2.8%

* includes ORTIA, Kempton Park CBD, Rhodesfield, Isando, Spartan, Denel/Atlas and surrounding areas, Bonero Park and Agricultural Holdings to the east thereof

moved into Top Ten ranking from previous period

moved into Top Twenty ranking from previous period