

A promising
future

3

Chapter

3

Confronting our reality: Challenges and opportunities

This overview provides a mirror, reflecting the challenges that countries and cities worldwide face today.

3.1 Introduction: Placing the analysis in context

The 2006 GDS included an analysis of the city's status quo, which was used to formulate the GDS' long-term goals and strategic interventions. This analysis was presented within the context of the following themes: economic development; human and community development (including a focus on housing and infrastructure); environmental sustainability; spatial development; transportation; health; safety; financial sustainability; governance and administration. This chapter serves to build on the analysis undertaken in support of the 2006 GDS, presenting an updated perspective of challenges and opportunities faced by the City.

As noted in Chapter One, inputs into this analysis have come from various sources. Following the initial communication of the draft Joburg 2040 GDS through the GDS outreach process, a significant number of stakeholders provided further comment. These stakeholders included, amongst others: citizens, city officials, political representatives, technical specialists, academics, students, business, community organisations, other bodies within government and numerous other participants. Their ideas and recommendations have been reviewed and included here-in, to bolster the original analysis within the draft 2040 GDS – and to augment the outcomes and outputs reflected in Chapter Four. The GDS outreach process and the input it solicited is acknowledged as an invaluable contributor to the strength of the Joburg 2040 GDS. It has provided an opportunity to draw from a far more extensive base of knowledge and experience, and thereby, allowed for improved conceptualisation and planning in respect of the path ahead. As noted in the draft 2040 GDS: "Recent events on the global stage also remind us of the importance of real community and stakeholder engagement and participation when formulating a view of our city's reality. Not only is this important if the City is to ensure it holds an accurate and informed view of the status quo, but it is also a critical step in driving legitimate decision-making. The role and purpose of strategies is not only to capture change,



but to review and confirm various imperatives through a process of dialogue and engagement. For success, the strategic decision-making process must be opened up, to source multiple opinions and divergent views.”

In an extensively networked, integrated global environment, events in one part of the world frequently ripple across other regions, unsettling distant cities. This city is not isolated from these realities and risks, and nor is it immune to its own set of changes, challenges and opportunities – with these frequently mirroring others’ experiences of rapid transformation and widespread volatility. The current context of global instability, typified by uncertainty in financial markets, global commodity constraints, oil price fluctuations, and massive political change and upheaval (both on the continent and in other parts of the world), casts new light on the role and purpose of city strategies – demanding greater depth of understanding and resilience in the planning framework itself. The process undertaken to arrive at this analysis is reflective of this recognition.

3.2 An overview of the analysis chapter

At a macro level, the analysis that follows is framed within nine key clusters that are, in themselves, indicative of the changes emerging since the 2006 GDS. While the previous GDS made use of sectoral clusters of analysis, this document addresses the following themes:

- Health and poverty;
- Economic growth;
- Resource sustainability;
- The environment;
- Transportation;
- Liveable communities;
- Community safety;
- The ‘smart city’; and
- Matters of governance.

These themes steer away from a sectoral approach, in recognition of the need for integrated solutions, to address the many challenges faced – and the opportunities these provide. They reflect a growing focus on challenges such as climate change, the complexities associated with balancing economic development with resource sustainability, the need for integrated human settlements that foster the concept of ‘community’, the prioritisation of good governance, and the benefits to be gained through smart technology.

Input on the city’s population dynamics precedes discussion on the themes noted above, given that demographics and data relating to population realities and changes underpin any city’s status quo assessment. Trends in this regard represent a cross-cutting factor that influences demand for infrastructure, community services, jobs, housing and other citizen needs – and informs planning and prioritisation imperatives. In this context, the City acknowledges the importance of understanding the changing population it aims to serve, using this then as the starting point – of relevance to each of the respective themes identified above.

3.3 Population dynamics

The world’s population reached the 7 billion mark in 2011. With this, the global population is expected to increase to 9,2 billion by the middle of this century. Urban areas account for only three percent to four percent of the world’s land area, but hold half of the world’s population. Urbanisation rates vary across the world, although Sub-Saharan Africa shows the fastest rates of urban population growth. Clusters of smaller cities (with urban populations of 1 to 5 million) are however growing more moderately.

At a national level, Gauteng is the smallest, most densely populated of South Africa’s nine provinces – but is also the province that contributes most sizeably to the nation’s GDP. According to the 2010 mid-year population estimates provided by Statistics South Africa (Stats SA), Gauteng is currently home to a total of 11 191 700 people – 22,4 percent of South Africa’s population. The overall change in population size for Gauteng between the time of the 2001 Census and the 2007 Community



Survey is noted by Stats SA as 13,61 percent, representing a growth rate of just under two percent per year. Gauteng’s population is influenced not only by births and deaths – but by significant in-migration into its three metropolitan municipalities (metros) from surrounding areas such as Rustenburg, Potchefstroom, Sasolburg and Witbank/Middelburg/Secunda. Migration within metros is also a key feature, as people try to access economic opportunity and services by moving from the periphery, closer to the urban centre (NPC 2011b).

Gauteng is also the province within which Johannesburg is located – with the city falling within the GCR, a cluster of cities, towns and urban nodes that together make up the economic heartland of South Africa. The GCR has features of a polycentric city-region (one that has multiple centres), and is anchored by its three large metros: Johannesburg; Tshwane; and Ekurhuleni. Johannesburg’s development is an integral part of the region in which it finds itself. In 2007, these metros, together, were home to a population of 8,9 million people, according to Stats SA’s national Community Survey (Stats SA 2007). Stats SA’s subsequent mid-year population estimates indicate that, by 2009, Gauteng was home to 10 531 300 people (2008). The GCR footprint is even larger than the province of Gauteng, with a further increase in size anticipated – a key point to note; as Johannesburg’s demographic transition is intricately linked to the GCR.

According to UNISA’s Bureau of Market Research (2010) projections, Johannesburg has a population of approximately 3,8 million people, made up primarily of a young population aged between 30 and 39 years. This total population translates into roughly 1,3 million households. The city’s population is projected to increase to about 4,1 million by 2015, implying an annual growth rate of about 1,3 percent per annum. Importantly, it is anticipated that, with a combination of factors such as births, deaths, rising infertility and decreased family sizes, Johannesburg’s population growth – while

increasing – is doing so at a slower rate. In addition, household projections indicate that the number of households in the city is likely to increase from about 1,3 million in 2010, to about 1,5 million in 2015 – with an average household size of about three persons. Of the total number of households projected for Johannesburg by 2015, it is estimated that 33 percent will be headed by females.

A review of population growth would not be complete without comment on the impact of HIV/AIDS. The number of people with HIV has begun to decline since 2004. However, the City acknowledges that South Africa still has one of the largest per capita HIV/AIDS prevalence and infection rates worldwide, and continues to enjoy the unenviable privilege of being home to one of “the fastest growing AIDS epidemics” globally (UNISA 2010).

Based on current trends, it is anticipated that Johannesburg’s population will double within 50 years, shifting from the current 3,8 million people, to an expected 6 to 8 million people by 2040. Understanding both the age and anticipated growth of the city’s population will assist in planning for the future demand for services, job opportunities and other necessities. There can be no doubt that rapid changes to the size of Johannesburg’s population will continue, as will changes in the population size of South Africa as a whole – and the continent – with various factors influencing the count, as reflected in the UN-Habitat’s statement:

“In 2009 Africa’s total population exceeded 1 billion. It took 27 years to reach 1 billion from 500 million... the next 500 million will only take 17 years”(UN-Habitat 2010: 1).

“In 1960 Johannesburg was the sole Sub-Saharan African (SSA) city exceeding 1 million inhabitants, in 1970 there were four (Cape Town, Johannesburg, Kinshasa and Lagos). By the late 1980s, the list also included Abidjan, Accra, Addis Ababa, Dakar, Dar es Salaam, Durban, former East Rand, Harare, Ibadan, Khartoum, Luanda and Nairobi. By 2010, SSA will have at least 33 cities of more than 1 million inhabitants, with two exceeding 5 million and one (Lagos) having more than 13 million inhabitants.” (UN Habitat 2004: 1).

In addition to the influence of births and deaths, migration significantly influences the size of Johannesburg’s population. Johannesburg continues to be an important switchboard for both domestic and international migrants. However, cross-border migration is still small in comparison to domestic migration. This suggests that the annual rate of population growth in the city is driven largely by positive net-migration into Johannesburg, from other places in South Africa. The manner in which the city addresses the reality of migration – of those both from within South Africa and beyond its borders – will influence the daily experience of all the city’s residents, regardless of origin.

3.4 Poverty and health

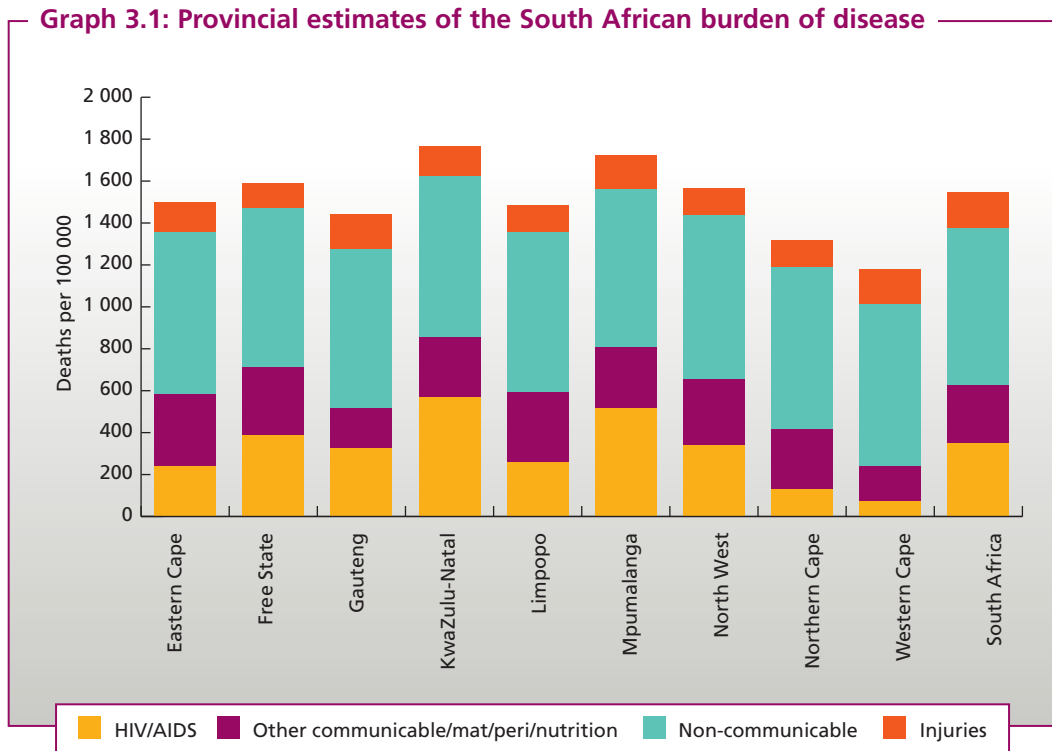
The elements of health and poverty are inextricably linked. In addition, unemployment is a key part of this equation – given its potential in respect of poverty reduction (The Presidency 2011c). Being healthy is dependent on a number of factors, including, for example, where people live, the quality of air they breathe, access to affordable and high quality food, the lifestyle choices they make the access they have to a source of income and the means to meet basic needs. Improving the material conditions experienced at the household level can result in greater health and resilience to disease amongst the broader community. A systems perspective of health, poverty and unemployment demonstrates that no single solution alone will work. In this section, these issues are analysed as inter-related, dynamic forces. The concepts of ‘burden of disease’ and ‘deprivation’ are used below as a frame through which to take a wider view of the issues presenting.

3.4.1 South Africa’s ‘quadruple burden of disease’

The phrase ‘double burden of disease’ is accepted internationally as describing the transitional health in developing countries, where the well-being or lack thereof of a population is displayed through both chronic forms of disease, such as diabetes, obesity and cardiac disease associated with an unhealthy lifestyle (typically seen in the developed world) – and those diseases associated with poverty and underdevelopment. South Africa displayed this ‘double burden of disease’ in the 1980s and early 1990s, but, taken together with a high level of injuries associated with trauma, violence

and the advent of HIV/AIDS, South Africa’s health system has seen a multiplied effect. This has led to a ‘quadruple burden of disease’ that necessitates a dedicated focus, if South Africa is to have a prosperous, healthy, productive citizenry.

The graph below depicts provincial estimates of mortality, based on deaths per 100 000 people. Unfortunately, as with much data in South Africa, the figures are out-dated – although they do provide a clear sense of the various causes of mortality. In addition, with the social stigma many attached to HIV/AIDS, many deaths that may have originated from this immune deficiency related syndrome will have been attributed to alternative causes, decreasing the clarity of perspective. Deaths are categorised according to cause: HIV/AIDS; communicable diseases; non-communicable diseases; and injury.



(Source: Medical Research Council 2006: 4)

3.4.2 Poverty and deprivation

In 2004, the City of Johannesburg invited multi-disciplinary research teams to contribute to the development of view on the human development challenges faced by Johannesburg, as a city. Based on this data, the City developed its HDS, addressing three strategic objectives:

- Safeguarding and providing support to poor and vulnerable households, through widened access to social protection and safety nets;
- Driving a reduction in inequality of a spatial, class, race, gender and generational nature; and
- Ensuring the promotion of social inclusion.

These elements were included within the 2006 GDS, given the GDS’ focus on reducing poverty and fostering human development into the next decade. The above also point to a further reality: poverty and inequality are part of the same story, and require simultaneous redress.

Further understanding of this area, at a Johannesburg-specific level, was generated through collaborative research between the City and academics from the University of Johannesburg (UJ), building on household data gathered across the City’s seven regions in 2005 and 2006 (in respect of poverty, livelihoods and human development indicators). The ‘household’ was identified as the

appropriate level of analysis, given that this represents the primary unit through which the City meets the needs of citizens, promotes access to resources and optimises opportunities for the realisation of social rights. The research resulted in the development of a Multiple Deprivation Index map, depicting major pockets of poverty across the city. Poverty was defined in terms of a lack of resources to meet basic human needs – a “condition of material and social deprivation in which people fall below a socially acceptable minimum standard of living or in which they experience deprivation relative to others in a society” (Hall and Midgley 2004: xii). The Multiple Deprivation Index focuses on five areas of deprivation: income and material deprivation; employment deprivation; health deprivation; education deprivation; and living environment deprivation. It was used further in the qualitative Johannesburg Poverty and Livelihoods Study (UJ 2008), to identify the most deprived wards, through the application of qualitative measures. Key findings provided a view of the realities of Johannesburg’s poorer residents, with insights as follows:

- *Demographic and social profile:* Household size varied across the areas studied. In terms of educational attainment, 77 percent of respondents confirmed their attainment of secondary level qualifications, or matric .
- *Livelihood strategies:* Poor households employed a diversity of coping and adaptation strategies. In 80 percent of the households, at least one person was formally employed. Only 30 percent of households confirmed that they had others beyond the household who they could receive help from, in times of need. Respondents noted that regular income came from grants, welfare organisations, friends and family.
- *Vulnerability:* Poor households attributed extreme vulnerability to life changing events, with events raised here including – from most to least severe: the death of a member of the household; loss of income; severe illness in the household; and a lack of food. In total, 40 percent of households noted that they did not make provision for unexpected events. In addition, household vulnerability was recorded in terms of access to food. Two-thirds of all households were categorised as either moderately or severely food insecure, in terms of the concept of Household Food Insecurity.
- *Health and psychosocial well-being:* Respondent households were affected by high levels of chronic illness, such as high blood pressure, diabetes and tuberculosis. Tobacco and alcohol usage was high, with greater levels recorded in certain areas. The overall incidence of mental disorder symptoms was 40 percent. All of these indicators highlight the significant levels of stress encountered in poor households. There were, however, variations between the respective areas surveyed.
- *Access to services:* Analysis indicated that access to piped water, flush toilets and electricity was high.
- *Household and community trust, support and networks:* A large proportion of households indicated limited access to community support. However, less than half of the participating households indicated that they felt unsafe in their neighbourhoods. While there were low levels of participation in political parties or unions, almost a third of households indicated that they were active in community organisations.
- *Gender:* Almost one-third of the households surveyed were female-headed – although this trend was unevenly distributed across the various neighbourhoods. Female-headed households were also noted, in general, as being acutely affected by food insecurity.

While some of the findings are generalisable across settlements, the analysis noted that the nature of poverty differed from one area to the next. This highlights a truth: the multi-faceted reality of poverty requires an integrated and inter-sectoral approach, for successful redress. Identifying the appropriate and unique set of interventions requires a thorough understanding of each settlement’s needs. In terms of the use of the Multiple Deprivation Index itself within the research undertaken – where measures of deprivation were analysed at a ward-based level – the following is noted: while of immense value, continued tracking of poverty trends at a ward-based level may not allow for a full comparison of ‘like with like’ over time. Wards are primarily an electoral tool, with community engagement and planning taking place within these parameters. Ward boundaries shift at times, with changes informed by voter numbers rather than other factors, such as the unique challenges faced within one community versus the next (where the latter would allow for greater targeting of interventions). Changes to ward boundaries impact on planning, and the ability to successfully address and track geographically-specific community challenges such as those assessed by the Index of Multiple Deprivation, in an optimal manner.

The sections that follow address specific challenges faced by those within the city, in respect of the various forms of deprivation: income and material deprivation; employment deprivation; health deprivation; education deprivation; and living environment deprivation.

i. Income and material deprivation: The broken safety net

With the levels of deprivation noted above, one of the key questions relates to the means that citizens are able to access, to address material needs and poverty realities – whether income or grant related, or some other form of support. With so many unable to access formal employment, the safety net provided by entities like the City, and other spheres and agencies of government, is critical. Despite its importance, this safety net has ‘broken’.

A number of challenges are noted. Firstly, it is argued that service offerings for vulnerable groups are less effective, due to planning that tends to be over-centralized in nature, with ‘one-size-fits-none’ planning jeopardised further on the delivery front, through fragmented and duplicated efforts by the different spheres and agencies of government. Ineffective integration of efforts with a poorly capacitated non-profit sector further complicates the outcome. As such, scarce resources are not being used to maximum effect. In addition, programmes are often too frequently reactive rather than transformative in nature – leading to short-term benefits rather than long-term change and empowerment of those assisted. A further challenge relates to the realities faced by economically inactive adults who are of working-age, with no dependents. Existing government support programmes do not adequately address these individuals’ needs, with old age and child support grants increasingly used to support wider households.

Many of the institutional and programmatic features of this broken safety net, such as the social grant delivery systems, education system and all provincially delivered support and programmes, are technically outside the City’s mandate. Nevertheless, in those areas that are not within the City’s domain, the institution recognises it still has a responsibility and an obligation to raise concerns, share information on progress and challenges and thereby support delivery by others.

ii. Employment deprivation: opportunities and threats in the informal economy

The OECD estimates that only 15 percent of South Africa’s GDP changes hands in the informal economy. By comparison, in major emerging market economies that are characterised by a majority living in poverty and unemployment, such as India and Brazil, that proportion is 50 percent. This suggests that ventures in the informal sector are one of the major opportunity channels through which the poor can empower themselves.

Welfare to work programmes, such as the City’s Job Pathways programme, have promoted the informal sector as an opportunity site for the poor, but this has not necessarily been echoed in the compliance demands and enforcement approaches taken by the wider public sector. The City has the power to set these conditions of trade and must protect the consumer, but must also consider how it can use the informal sector as a lever for social upliftment.

Expert input suggests that present by-law regimes impose an artificial set of values on informal trading, which capture official preferences, rather than preventing harm to consumers. This sets inappropriate barriers to entry and creates the opportunity for corruption on the part of those tasked with enforcement. It is noted, however, that certain segments of the informal economy clearly do present dangers that must be policed. Informal crèches which fail to meet basic safety standards present a clear danger to the well-being of the children who attend them; abandoned buildings managed by slumlords as a form of informal rental may meet market demand for low-cost rental, but do so under extremely hazardous conditions which too often link in with criminal enterprises. The City’s challenge is to police these negative segments while promoting genuine paths of opportunity.

iii. Inequality and its role in furthering deprivation

It is noted that by the Presidency (2011c) that, where high inequality exists, growth is frequently concentrated among sectors that benefit those who are already advantaged, while the poor often

lack the necessary resources to optimally benefit from growth, or, at worst, are excluded from the market opportunities it may offer. High inequality levels also make it more difficult to reduce poverty – even in the context of a growing economy. In highly unequal societies, the poor frequently engage in subsistence living, with this potentially influencing the size of the domestic market, constraining sustained growth. Furthermore, high inequality levels may undermine safety, social cohesion and the realisation of social political and civil rights. Inequality can also manifest in unequal access to infrastructure and services. Interventions that consider the gap between the wealthy and the poor, while growing the economic base from which all can benefit, and individual capabilities to meaningfully engage and contribute, have to be top of mind. Inequality is not only experienced through economic deprivation, but is reflected in various other experiences – e.g. social inequality, inequality of access, and inequitable governance arrangements.

iv. Functional failings in the education system

Education serves as one of the drivers that support people out of poverty, opening doors and increasing opportunity. But these outcomes demand quality education that is also relevant to the needs of the economy. Basic education, though it technically falls outside of the City's competency, is arguably the most significant bottleneck faced by poor youth as they seek to exit poverty. Looking purely through a national results lens, the majority of schools are unable to produce improved educational outcomes. A national 67,8 percent pass rate in 2010 is less cause for optimism when one considers that only 15 out of every 100 learners passing matric achieved marks of 40 percent or higher. Furthermore, 70 percent of all passes are achieved by 11 percent of schools (with the worst performing schools serving the most deprived areas). In Johannesburg, being educationally deprived (not possessing a matric) is highly correlated with all other forms of deprivation. Participants in the Health and Poverty Community listening session series (part of the GDS Outreach) consistently raised social ills such as drug abuse, sexual misconduct (including prostitution and other forms of transactional sex) and unplanned teenage pregnancy as prevalent concerns. Meanwhile, the Early Childhood Development (ECD) system, a major tool through which to close the achievement gap between the very poorest children and their middle-class peers, is acknowledged as being largely informal in nature (60 to 70 percent informal), and is often characterised as an informal commercial, rather than educational, sector.

It is useful to consider the contributory factors to low matric completion and failure rates – given the implication of these for the appropriate course of action. Key aspects noted include:

- Low levels of parental involvement in the school system, in general;
- Poor teacher attendance and ineffective classroom governance, poor availability of physical education programmes, absence of pro-active health programmes within the school environment, drug trafficking and transactional sex in and near schools;
- The reality that wider considerations very often play a significant part in poor outcomes – with international benchmarks from programmes that have addressed educational challenges linked to lifestyle and social factors, strongly advising that both preparatory education (ECD) and after-school programmes can have a significant impact.

v. A city where too many go hungry

Food security constraints are a worldwide reality. Globally, food prices escalated to record highs in June 2008, prompting riots in Haiti and Egypt. More recently, food prices have climbed again to their highest levels since 2008, in the context of escalating world food imports (where these exceeded USD 1 trillion in 2010), dwindling natural water resource inputs, and global competition for foodstuffs. Rising fuel prices, the related increase in transport costs, and increasing cost and scarcity of input factors have contributed. The global commodities crunch has also been devastating for many city economies. Rising prices have made commodities such as soya beans, sugar and cotton more attractive to grow – with increased global demand for non-staple foodstuffs further inflating the international food bill (Business Day 2010). The United Nations Food and Agricultural Organisation (FAO) argues that food prices have been negatively affected as a result of the quantity of supplies not increasing at the required level, to meet global demand. Other factors that have placed pressure on food prices include an increase in the areas dedicated to crops destined for bio-fuels, a growing world



population, increasing migration and urbanisation, exchange rate variability (especially the devaluation of the US Dollar), the impact of climate change events on weather, and the resultant variability of crop production (NEMC 2010).

In South Africa, food insecurity has increased in the context of escalating global food prices. Between 2007 and 2008, South Africa's food inflation outstripped overall inflation by 12.1 percent. To maintain the same food basket in the context of this inflation, the poorest households in South Africa would have to raise their incomes by a minimum of 22 percent. In 2008, estimates indicated that poor households in South Africa would spend 37 percent more on basic food items than in previous years (M&G 2008). In addition, while food poverty in the past was largely associated with rural areas, urban areas in South Africa are starting to face increasing risk, with the effects evident in Johannesburg and other South African cities. This reality is augmented by estimates that set the percentage of the Southern African population that will be urbanised by 2050 at above 80 percent (UN 2007) – with much of this growth, in Johannesburg's case, attributed to factors such as the in-migration of people from other towns, cities and rural areas.

Food prices in Johannesburg are a major factor affecting poor households' food security, with the fact that the city imports around 90 percent of its cereals and a high percentage of its fruits and vegetables further increasing its vulnerability. An underdeveloped public transport system, too few local markets, and the extensive zones of exclusion emerging from the Apartheid planning legacy further hamper access to affordable and nutritious food for many residents. Poor households are particularly at risk, with the food bill taking a higher proportion of their meagre incomes. Within this context, and the local dynamics related to unemployment, poverty and other forms of deprivation,

food security is a citywide challenge, with estimates of the proportion of food insecure residents running as high as 42 percent and above (AFSUN 2008). To determine the extent of a city's 'food insecurity', analysts focus on determining the number of households that have gone without food for between 3 and 10 times in the preceding four weeks. Three cities in South Africa show alarmingly high levels of food insecurity – namely, Cape Town, Msunduzi and Johannesburg. The Urban Food Security Baseline Survey (UFSBS)¹¹ conducted in late 2008 found that levels of food insecurity among the urban poor in these three cities averaged 70 percent, although a lower figure of '42 percent and above' was noted in respect of Johannesburg, when assessed on its own.

With poverty and food insecurity come health complaints, with dietary sufficiency and diversity important for adequate nutrition and the management of communicable diseases such as TB, and HIV/AIDS. The link between HIV/AIDS, and security of food and nutrition, are well established. AIDS also increases calorific nutritional requirements, as does ARV treatment, placing a further burden on affected household members to meet their nutritional needs. A further issue in the link between food and health is the issue of food safety. Food-borne infections and disease are a real risk that many within the city face, in the context of limited or no access to cold storage or exposure to food prepared in unsanitary conditions. It is also noted that disposal methods for food can also drive up rodent and vermin populations, further increasing the risk of disease.

The presence of a large commercial agricultural industry and the dominance of large retail food monopolies that constrain the growth of small medium and micro-enterprise food retailers are also noted as impacting the food economy. Little exploration has taken place into the benefits that may accrue from active promotion of small and/or informal providers of household food, even though such an approach would present an opportunity to link small-scale growers with emerging small to medium size retailers, while also addressing food security constraints. Despite the lack of formalised linkages between informal providers and the formal market, it is noted that the informal economy is playing a major food supply role in deprived areas – with 70 percent of respondents to a recent (2009) area-level survey in Orange Farm reporting food being sourced from street vendors, on a basis of at least once a week. In the face of scarcity, it is also of interest that only three percent of households in Johannesburg grow their own food. Urban agriculture remains necessity-driven, rather than opportunity-driven. This is in spite of the fact that localised food production systems do provide an option through which to reduce exposure to global food price shocks, while also addressing food vulnerability. During the GDS Outreach, residents of the 'deep south', in particular, expressed strong enthusiasm for farming programmes. Experts engaged on this issue reflected that policy co-ordination between spheres of government on this question has been poor, with results mixed, at best. An expert panel recommended three levels of intervention:

- The use of a range of instruments to tackle individual hunger on a day-by-day basis. This includes instruments such as food vouchers, food parcels, backyard gardens and programmes to connect citizens to income generating activity, thereby enabling them to buy food.
- Provision of support to the informal food supply sector, in terms of: local resource co-ordination – to assist growers in accessing basic supplies, finance and farming advice; the establishment of links with properly constituted local trading spaces/linear markets – although it is noted that these are largely non-existent in the most deprived parts of the city.
- Support for urban agriculture at the area level, where feasible, through the packaging of land and the establishment of hub-and-spoke infrastructure to connect networks of local producers to cold-chains, packing houses and wider distribution networks.

vi. Living environment deprivation – and the paradox of informal settlements

The City has a formally constituted list of 180 informal settlements, although a final proposed revision to this list at time of writing expands the number to 189. Every socio-economic challenge the city faces is epitomised by these areas, which nonetheless differ strongly from one to another. The majority of the city's informal settlements do not comply with even the minimum humanitarian

standards set for refugee camps in terms of access to water, shelter and sanitation. There is therefore significant risk to inhabitants in terms of exposure to environmental hazards, communicable diseases and, particularly during the winter months, the risk of fire.

While host to a significant variety of challenges, informal settlements also play a very specific spatial function in the city. They represent the means by which the most socially and economically disconnected queue for access. In this context, interventions such as the RDP housing allocation system only address, at best, part of the problem. Given the scale of the informally housed population, any medium-term shelter response must include very low cost rental. Informal settlements are also places from which residents interact intensively with the formal structures of the city. The proximity of such settlements to the city's labour markets, trade opportunities, social supports, transport systems and clinics serves as an additional driver of increased residency. The nature of settlement proximity to these city services and benefits is reportedly one of the factors considered in the pricing attached by shack farmers to their black market rentals (with these being, principally, self-standing or back yard shacks without direct linkage to services or any corresponding service charge liabilities).

One of the critical strategic questions posed by the expert panel was whether the City was willing to allow citizens to invest in the improvement of their own living conditions – and claim some form of recognised temporary legal occupancy. The City has, to a certain extent, already enabled such an approach – by creating a 'regularisation' category that can be used to give informal settlements certain cornerstones of formality. Arguably, the City needs to recognise the impossibility of eradicating its informal settlements outright, responding instead to the immediate humanitarian/living standards challenges they represent. A medium and long-term approach needs to be adopted, emphasising integration and, where possible, safe and feasible, an approach that provides residents with the legal opportunity to invest in the upliftment of their own living standards.

vii. Integrating migrants: Cohesion and clashes

Tensions between new migrants to the city and various entrenched local interests have been constant and varied. Clashes over both the opportunity to trade, and the market impact of migrant traders, are a major and persistent source of tension. How and where can a State facing substantial local poverty accommodate the needs of new migrants? The City must consider these critical issues. Cross-border migrants, already highly urbanised in their country of origin, are more likely navigate towards the Inner City, whereas newly arrived internal migrants tend to cluster into the low-cost 'gateway' informal settlements at the urban fringe. But the truth is that Johannesburg will continue to attract migrants as long as it ensures – or provides the potential for – successful poverty alleviation, employment opportunities and access to goods and services.

The entrepreneurial spirit of migrants is an asset to the city, but diversity also presents challenges. Building social cohesion across diverse communities, with different cultures, ways of being, and ways of living in the city, is a task for all cities. Growing our city is, beyond the bricks and mortar, also about building a shared sense of belonging. As is evident from the experiences of other successful cities, Johannesburg's future success is directly related to the extent to which all believe they belong. The promotion of an environment where everyone holds an equal opportunity to contribute is viewed as critical for long-term sustainability. The City of Johannesburg has a responsibility to help build a new appreciation of the 'identity' of migrants – thereby enabling all to contribute to the city, with a strong sense of their own value and security.

Lastly, one of the paradoxes of diverse cities is the tension between the desire specific communities may have to retain their individual cultures and identity – and the drive for social harmony that may exist at a city or regional level. Understanding this, and navigating the path between these two imperatives, is a hard task – but one the City has an obligation to tackle. A mixed approach will be necessary – with an appropriate focus on education, community engagement, monitoring and regulation to prevent violence, and activities through which to share and celebrate the diversity of

¹¹ The survey was conducted by the African Food Security Urban Network (AFSUN), and managed by the Programme in Urban Food Security (PUFS) at the University of Cape Town.

culture and history represented within the city. Barker (2011) notes that the wide diversity of people living in the city will result in many experiences and responses to the physical environment, that also need to be taken into account in delivering appropriate public environments (with this aspect addressed further below). It is argued that there is a need to invest in understanding diversity relating to variables of time, place, economic status, education and other factors, to deliver spaces that are appropriate for the various communities in the city – as a means of growing cohesiveness and inclusivity. There is also a need for greater collaboration and integrated design, development and management of public environments, given the diversity of role-players who operate in the city – with this also requiring the involvement of the diverse communities that constitute Johannesburg, if these efforts are to be successful.

3.5 Economic growth

The city of Joburg is the commercial and economic hub of South Africa, and a key centre and driver in respect of growth on the African continent. It contributes approximately 47 percent to the provincial economy – serving as a key contributor to the economy of the GCR and the nation. As the country's main economic hub, greater diversification and transformation of the city's economy would have positive ripple effects, not only for the city's population, but also for the economies of South African and other African nations. While the City has made significant efforts towards improving the livelihoods of its communities, a concentrated and skewed economy remains a challenge that needs to be addressed through long-term planning initiatives such as the GDS. Focusing on economic growth alone, however, will not achieve the outcomes the City hopes for. The status quo and specific areas that require attention are commented on below.

3.5.1 Placing the city's economy in context

In any society, the prerequisites for sustained and inclusive economic growth include a healthy socio-economic fibre (characterised, for example, by efficient and effective services in respect of health, transport, safety and education); institutional, operational and political efficiency (governance and policy design); and an empowering, business-friendly environment. Only with these elements in place will the City of Johannesburg be financially sustainable – and able to generate sufficient revenue to meet its political and governance objectives. This philosophy demands an integrated, forward-looking and multi-dimensional planning process, supported by careful target setting (Du Toit 2011).

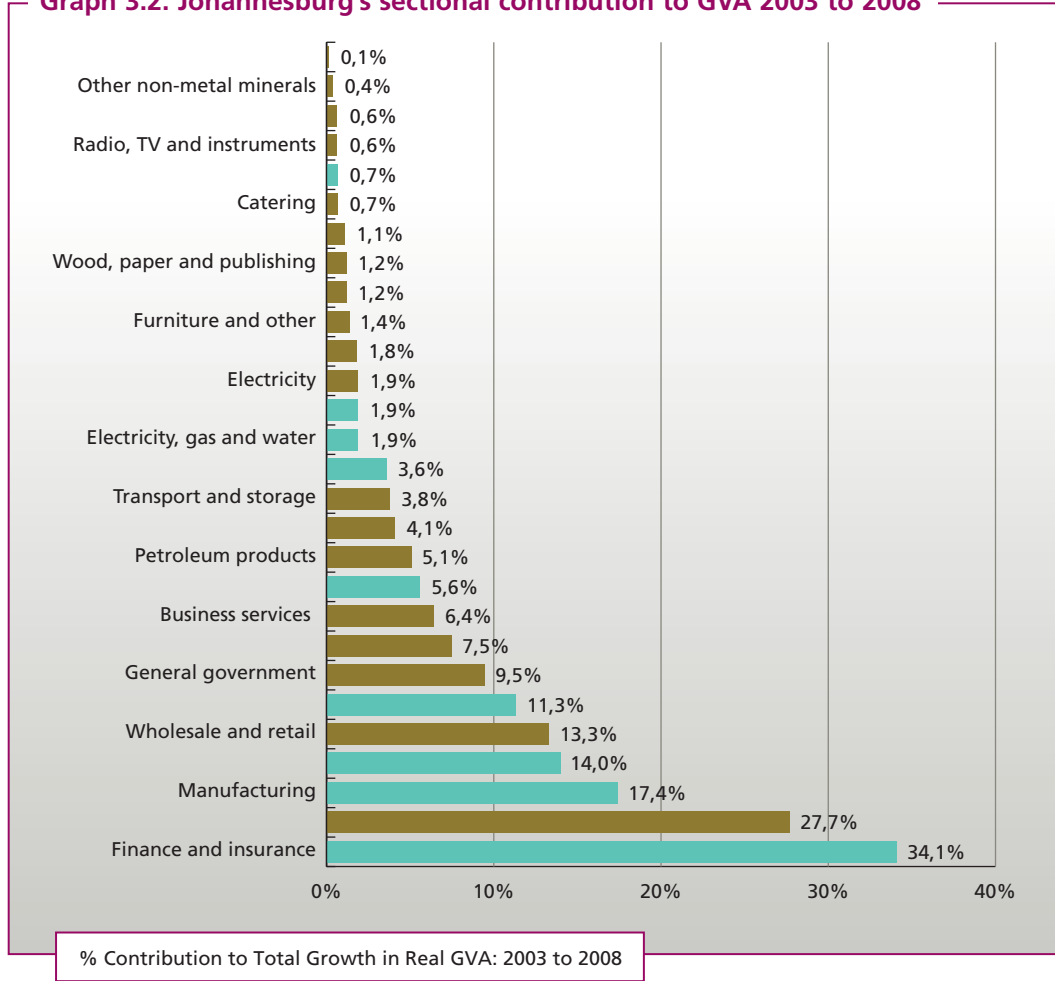
Beyond the financial sustainability of the City itself, focus needs to be placed on the performance of the city's economy, where economic growth is an imperative. Poverty eradication is dependent on sustained, inclusive economic growth. While Johannesburg's economy is competitive, growth is not evenly distributed. With its place as a central driver in the nation's economy, the City of Johannesburg has a duty to ensure it performs and delivers in ways that encourage innovation, entrepreneurship and improved investment, enhancing the city's competitiveness. This role includes delivery and engagement in a manner that supports a citywide environment conducive for business activity – an environment within which firms can compete, access required skills, build capacity and prosper. A competitive economy is viewed as one that can create sustained economic growth and generate decent work for the majority of its residents. While contributing significantly to South Africa's GDP, Johannesburg's economy has featured evidence of 'high and sticky levels of unemployment' (Du Toit 2011), with sub-optimal growth in jobs requiring targeted interventions in the future.

It is acknowledged that the financial services sector contributes significantly to the economic performance of the city. In this context, there is a role for the City to play in promoting and supporting alternative sectors, where these may be suitable for skills absorption and the generation of greater volumes of jobs. Playing a role in driving global competitiveness is also important. The City's challenge is how to drive job intensive competitiveness: creating more productive, decent jobs; supporting industry more effectively; defining new emerging sectors for growth. The vision for economic growth for the Johannesburg of the future is: "An economy that is inclusive, liveable and prosperous for all".

3.5.2 Economic trends

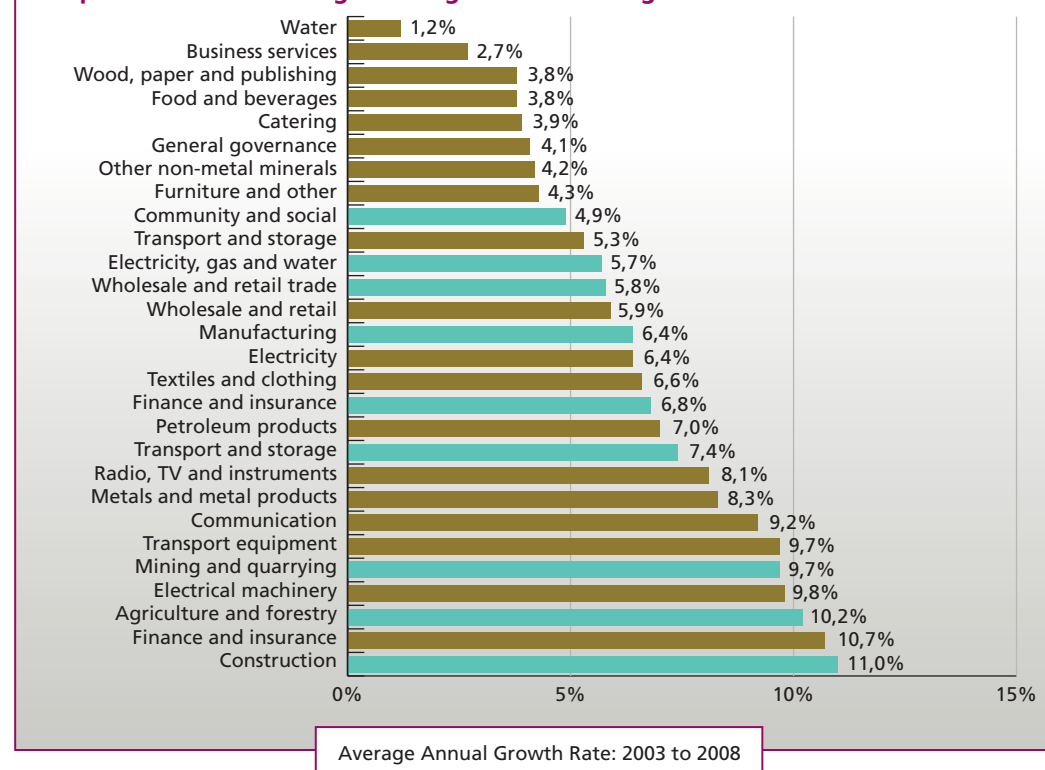
Johannesburg's economic structure is like that of any other large global city: dominated by service sectors. From an economy originally dominated by mining, the city has grown in diversity. However, the sectoral contribution and composition of Johannesburg's economy demonstrates the dominance of finance, insurance, real estate and business services. Combined, these sectors accounted for a third of GVA for the period 2003 to 2008. General government activities accounted for 14 percent of total GVA. Agriculture, forestry, mining and quarrying collectively contributed two percent of the city's GVA. Combining the economy's sectoral composition and the respective growth rates of sectors and sub-sectors makes it possible to measure the weighted contributions of each sector to the total growth in real GVA between 2003 and 2008. About two-thirds of the growth in the metro's economy came from just three major sectors – the aforementioned finance, insurance, real estate and business services, supplemented by manufacturing (17,4 percent) and wholesale and retail trade, catering and accommodation (14 percent). Although the construction sector showed the fastest average annual rate of growth over the period, its relatively small share of value added meant that it contributed less than six percent of the total change in real value added. This analysis highlights the opportunities to support growing sectors. Given the City's statement in terms of the importance of resilience, liveability and sustainability, certain sectors that may support these objectives – such as the green economy, manufacturing, and the wholesale and retail trade – are important for targeted growth. A cross-cutting view of the city's sectoral contribution to GVA is represented in the graphs below.

Graph 3.2: Johannesburg's sectional contribution to GVA 2003 to 2008



(Source: Quantec Data 2010)

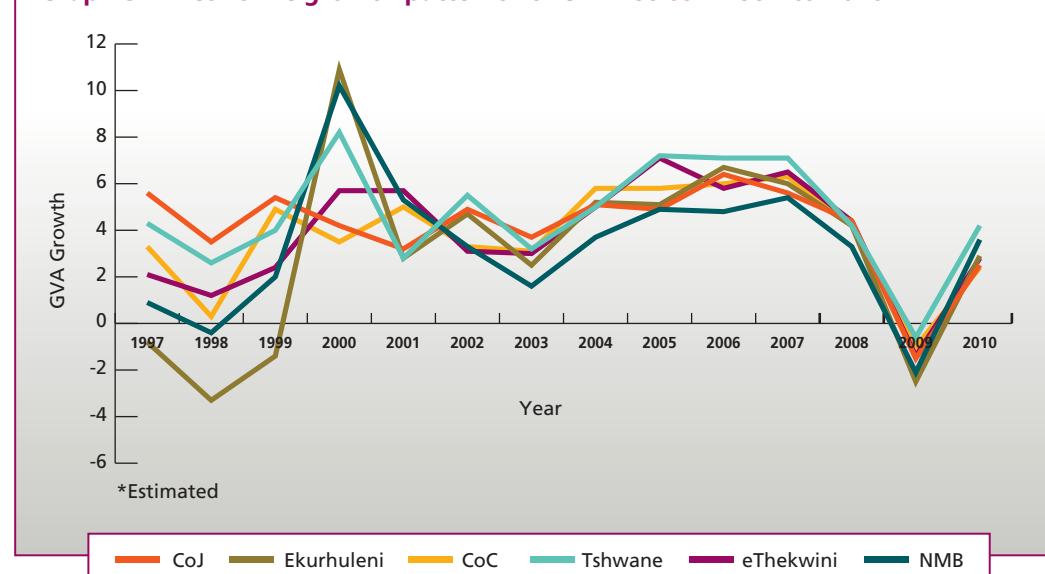
Graph 3.3: Johannesburg's average annual GVA growth of sectors



(Source: Quantec Data 2010)

A further perspective emerges when contrasting the economic growth of the city with that experienced in other metros. The graph below provides an overview of economic growth patterns of the six main metros between 1997 and 2010 (with further projections to 2014). It reflects a view of Johannesburg as a metro that has experienced heightened levels of GVA growth in relation to all other metros (barring Tshwane) over recent years.

Graph 3.4: Economic growth patterns for SA Metros – 1997 to 2010



(CoJ Department of Economic Development 2010)

Across the period from 1997 to 2010, Johannesburg continued to grow – with its financial services sector driving growth. However, the city was not exempt from the financial downturn of 2008, which resulted in the loss of 870 000 jobs in South Africa. Gauteng shed 108 000 jobs, while Johannesburg lost 90 000 jobs. Recovery has been fast, with projections indicating a GVA of 4,5 percent by 2014. But not all areas in the city are growing at the same pace – with regional growth disparities evident. This provides an opportunity for the City to consider mechanisms through which to support emerging sectors in those regions where growth is lagging. Balancing economic activity at a spatial level is critical, if the City is to play its part in addressing poverty – and building sustainable growth.

The economy however does face a number of critical challenges. The formal economy has not been able to create enough jobs. Between 2000 and 2008, the percentage of formally employed people increased by 31 percent, just under four percent year-on-year. Statistics indicate that the unemployment rate (based on a narrow definition¹²) in the city fell marginally, from 19,6 percent in 2006 to 19,2 percent in 2007. In 2009, the unemployment rate was 21,9 percent. Johannesburg has a key role to play in supporting emerging sectors that create jobs. In the context of the current national policy environment, it is an opportune time to build job intensive competitiveness. National and provincial incentives are creating opportunities for South African cities to drive more intensive economic job growth. This includes the establishment of a R9 billion fund job fund through the Industrial Development Corporation (IDC), R20 billion for tax breaks, and allowances for expansion and upgrade in manufacturing. Most recently, incentives are now available for the establishment of Enterprise Zones as part of the country's NGP. These incentives and policies provide a framework for increased growth.

3.5.3 Focusing on an economy with productive and decent employment

Driving productive, decent employment is a priority for a number of reasons. Firstly, there is the risk the city faces without these conditions – with this risk including the serious threat to the attainment of the aspirations contained within the Joburg 2040 GDS itself. Advantages noted in respect of the income associated with productive and decent employment include the potential of this income to contribute towards domestic demand, social insurance, and the ability of job holders to actively improve their own conditions, while addressing their needs (The Presidency 2011c).

In addition, the Presidency, in responding to the draft GDS, notes the role of productive employment in redistributing income from growth. National Treasury suggests that the proportion of working age adults with jobs may be the best measure of social inclusion in a modern society, to a far greater degree than any measure via Gini co-efficient (The Presidency 2011c). With the City's goal of inclusive and sustainable economic growth, productive employment of a greater proportion of the city's people is without doubt the primary route for focus, if the vision we hope to attain is to be achieved. The Presidency notes that on this measure, Brazil rates as a far more inclusive society than South Africa, with close to 70 percent of adults in Brazil holding jobs, in contrast with the approximately 40 percent of adults holding jobs in the South African context (2011c).

In driving a different approach, the following areas of focus are proposed by the Presidency:

- Reintegration of the poor into mainstream approaches;
- Addressing poverty and inequality simultaneously;
- Building solidarity across society – and thereby growing inclusive growth and opportunities;
- Addressing structural changes in society;
- Building a strong administration and bureaucratic capacity, to support growth; and
- Simultaneously focusing on non-economic factors that can enable and facilitate economic development. These include, amongst others: building a common civic culture driven by shared values; promoting tolerance and respect for differences; encouraging inter-group co-operation; building social solidarity; encouraging sound social networks and the growth of social capital; and building a greater degree of citizen attachment and place identity.

3.5.4 Youth unemployment

Youth unemployment is a critical challenge faced by both the nation and the city. Low education levels and slow formal sector growth are but two of the major causes of youth unemployment.

¹² This is official unemployment. According to the narrow definition, people who have given up looking for work after a certain period are excluded from the so-called official unemployment figure.

South Africa loses R550 billion a year on illiteracy (Business Report 2010) and ranks 137th out of 139 countries when it comes to the quality of maths and science education at primary school level (WEF 2010). When considering South Africa's ranking in 2008 in terms of youth unemployment amongst OECD countries (for those between 15 and 24 years), the nation ranks dismally, taking last place. The quality of education and its supporting facilities are blamed, in part, for this ranking. A total of 11 000 primary schools and 7 000 secondary schools are without libraries and computer facilities. In addition, there are more than 3 million people who are 'not in education, employment or training' (NEETs) in South Africa. A report of the ministerial committee on the review of the National Student Financial Aid Scheme indicates that an estimated 72 percent of people between 20 and 25 do not have matric, while 50 percent of those in the age category of '23 to 24' are NEETs. High youth unemployment has also been attributed to a lack of experience. To address this, a youth wage subsidy has been introduced through the Department of Finance, to decrease the cost of hiring young inexperienced workers. This has received mixed responses by organised labour and civil society groups.

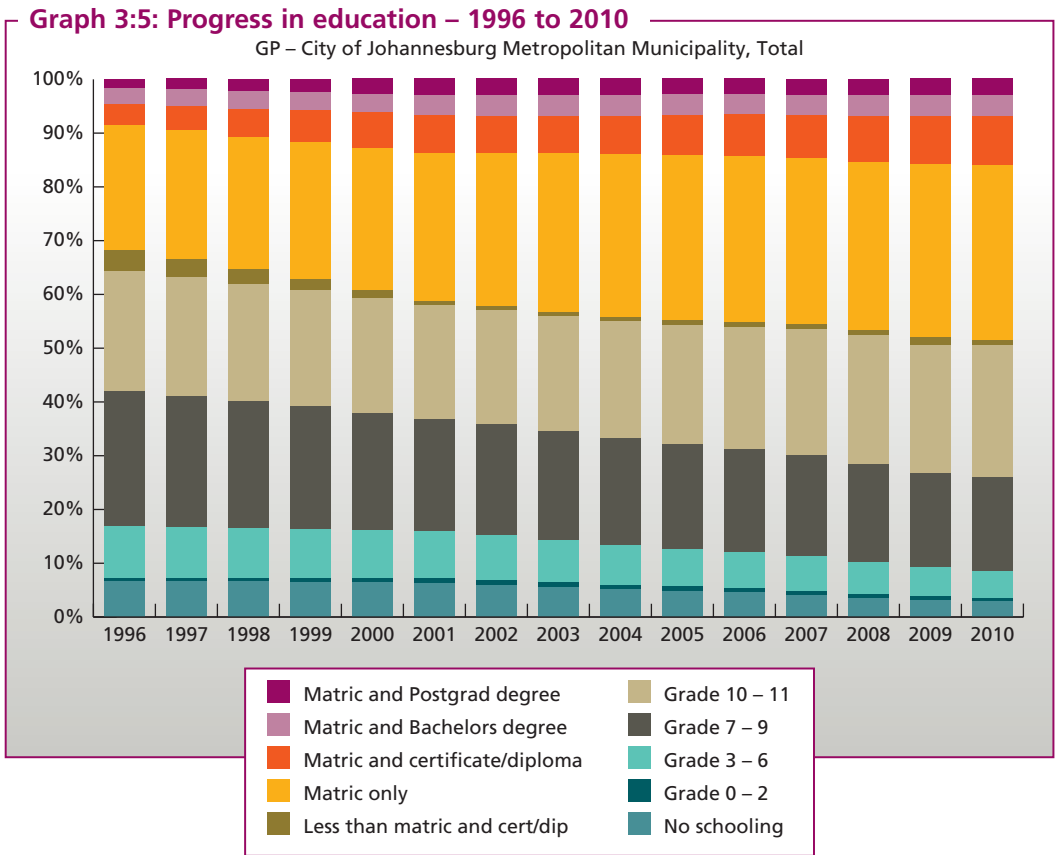
3.5.5 Unemployment and education

Johannesburg has been a slow starter in developing its knowledge economy, with consequences for its competitiveness. Worldwide, knowledge-creation and innovation are driving new forms of economic competitiveness. Education is a critical driver for these new forms of growth, yet higher education outcomes for the majority of young people in the city are low. A growing youthful population, combined with low job prospects, has created a significant level of youth unemployment.

Education is also a key determinant in improving the quality of life of citizens. Yet in Johannesburg, the vast majority of the youthful population only has a matric certificate and cannot access the labour market. The labour market is not creating enough jobs, and the supply of educated skilled professionals is lagging. The quality of education in many public schools is acknowledged as inadequate, while private education is unavailable to the vast majority of Johannesburg learners. The poor foundation skills provided by many public schools, in respect of maths and science, further debilitate learners when entering university. It is also noted that, of the 500 000 pupils who recently took part in matric exams nationally, only half of those wrote maths and science. In terms of tertiary education rates, and those associated with engineering in particular, South Africa and Johannesburg's engineering graduate rates are extremely low when compared to other large cities in India and China (taking the relative population size of these economies into consideration). China produces 600 000 engineering graduates a year, while India produces 400 000. In contrast, South Africa produces 1 500 – a total of 0,003 percent of the population. Johannesburg's population is small in comparison to the cities within the other countries that constitute the BRICS grouping. Given our low aggregate population, we have to ensure that we have a skilled and educated workforce in the future.

It is acknowledged that there are critical demand side constraints regarding the macro-economy, over which the City has no control. In addition, formal education is not a function of local government. The City of Johannesburg can, however, strengthen its current role in education and learning, by making a number of critical investments in educating and skilling its workforce, but also by opening up the economy to ensure that those who hold lower levels of skill can also access livelihood opportunities.

A further area of analysis when considering education and the link with unemployment relates to the shifts that have taken place, over time, in respect of differing levels of education held by the city's population. The graph opposite provides an overview of this, illustrating the improvements in respect of highest level of education attained. While illiteracy rates have decreased over the last 10 years, and substantial progress has been made with regards to the number of matriculants, the total share of persons with matric and bachelors degrees, and matric and post-graduate degrees, is extremely low when compared with other cities. The schooling system is producing matriculants with low numeracy and reading skills. Johannesburg's literacy level (when measured in terms of 'those above 20 years, who have completed grade seven or higher') is 87,3 percent, compared to the national figure of 73,7 percent. This improved from 86,6 percent in 2005. When considered in terms of race, the greatest proportion of the population with no schooling is among Africans (4,3 percent), while the smallest proportion is among whites (0,4 percent). Analogically, the greatest proportion of the population with a degree or higher is among whites (30,5 percent) and the least among Africans (4,1 percent).



(Source: Global Insight Data 2010)

Box 3.1: Jobs, skills, employment and education-related challenges faced by South Africa – and Johannesburg

In South Africa, more adults of working age are unemployed than employed. Labour force participation rates are among the lowest in the world, at 54 percent, while labour absorption rates are currently 40,5 percent (meaning that 60 percent of those between 15 and 64 years of age are not working – some because they are at school or university). But between 7 million to 11 million more adults could be working – or working on a more full-time basis. The formal sector only employs about 10 million of the 31 million people who fall within this age group. The official unemployment rate in South Africa is about 25 percent. By comparison, in Brazil, the unemployment rate (based on the narrow definition) is 6,2 percent; in Russia – 6,6 percent; in India – 10,7 percent; in China – 9,6 percent.

Each year, about 300 000 adults join the pool of South Africans who hold low levels of skill and literacy. This group has few prospects of employment, and join an estimated 3 million South Africans who would like to work, are able to work, but have never had a job. At current rates, by 2020, a total of about 6 million people over the age of 25 will fall into the category of 'never holding a job' (when taking into consideration all those within this category, from 1994 onwards).

3.6 Resource sustainability

Economic growth is strongly inter-related with the demand for water, electricity and liquid fuel. Managing limited natural resources and delinking economic growth from natural resource extraction is important. Johannesburg has the opportunity to move towards a low-carbon economy, benefiting from recent experience of other cities globally. There are considerable challenges, however, but also large opportunities to be gained from such a transition. The largest challenge is the cost of new technologies versus future benefit – and the potential losses (including job-related losses) associated

with a move away from the status quo of the nation's carbon-intensive, mineral dependent economy (NPC 2011a). The following section introduces two discussions on water and electricity – both in the context of the nation, and more specifically, the city. A further element added to the 'resource' debate is that of solid waste, emerging internationally as a further source of income – and as a resource that needs to be managed.

In working to address the challenges currently faced by the city and those who live in it, in relation to the critical resources addressed below, it is important to note that successful outcomes will only emerge with full participation by all, in a real programme of change. To work, education, ongoing communication, brainstorming, monitoring and evaluation of progress, policing, and careful planning – put into action – will be needed. In all the areas outlined below, it is both the small and the big things that make a difference. These are all areas in which citizens and residents can practice behaviour change on a daily basis, and contribute to resource sustainability, one person at a time.

These are also areas in which bold action is needed, for real impact to be felt. Investing appropriately and timeously in the right projects, without locking the City into options that are sub-optimal (and thereby denying the city the right to better outcomes) – will be important. However, action also has to take quickly – without endless deliberation. There is a limited timeframe – for the city's landfills; for the energy inefficient economy that characterises South Africa; and for the water security we need to achieve. Understanding lead times, risks, best options – and looking to technologies that have been put in place elsewhere, while also remaining open to new innovations – is essential.

3.6.1 Water

i. Johannesburg's place in the water network

Johannesburg is one of the few major cities not located on a major water source, with water scarcity and the increasing cost of water presenting a significant challenge. The city has become the motor of South African economy, accounting for more than a third of the GDP. Water is central to economic production and the well-being of our residents, yet most of the city's water is imported from elsewhere. Johannesburg's water comes primarily from the Vaal River System, with the establishment of mechanisms for complex Inter Basin Transfers (IBTs) over time, allowing more water to be introduced into the Vaal Dam. The majority of the water that is supplied to the three metros within the GCR is part of a much larger hydrological system that is connected across international borders, and includes countries in the South African Development Community (SADC) – including South Africa, Botswana, Namibia, Swaziland, Lesotho, Mozambique and Zimbabwe. This means that every river basin in South Africa is now hydrologically connected to every river basin across all these Southern African countries.

Johannesburg straddles a major watershed known as the Witwatersrand (translated literally as 'Ridge of White Waters'), which divides the continent of Africa into rivers that flow into the Indian Ocean to the east, and rivers that flow into the Atlantic Ocean in the west. As a result all of Johannesburg's water is imported, whilst return flows augment downstream river flows. The challenge for Johannesburg is to make the most efficient use of the water imported and ensure that the downstream quality of the rivers is not affected by poor quality effluent from wastewater treatment works, polluted stormwater runoff and overflowing sewage systems. Protecting water quality and ensuring that supply of water meets demand is the challenge for Johannesburg.

ii. Water supply, demand and quality

The Department of Water Affairs through the National Water Resource Strategy is responsible for the allocation of water within the country and through the construction of the major dams and inter-basin transfer schemes responsible for ensuring that sufficient water is stored to supply all consumers during periods of drought.

Rand Water purchases water from the Department at an abstraction point in the Vaal Dam purifies it and then pumps it to Johannesburg. The City of Johannesburg purchases the water and distributes it to the final consumers. It is therefore responsible for managing consumer demand. It purchases



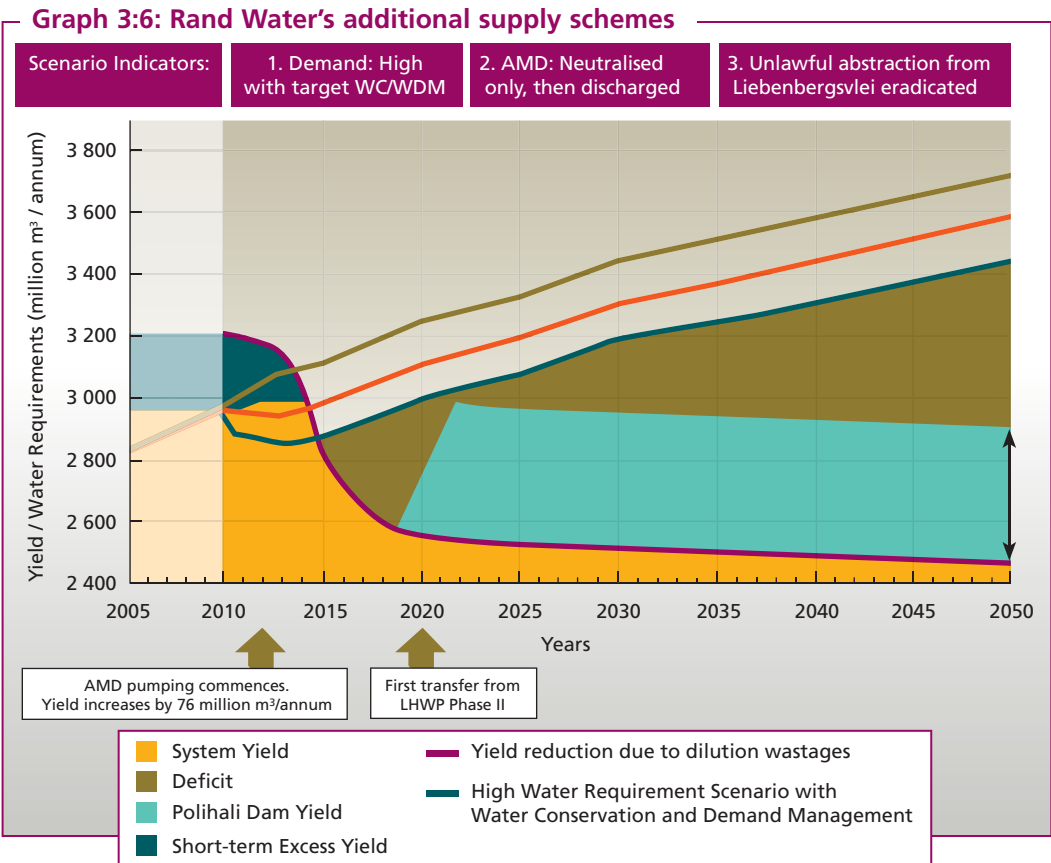
water from Rand Water and sells this water to its residents. It is noted that the first stable bulk water supply co-incided with the establishment of Rand Water Board in 1903. In the intervening 108 years, water demand has grown steadily. In 1920, Rand Water had to accommodate water demand of approximately 90 ML a day; today, demand has grown to approximately 1396 ML a day.

Three strategic issues affect Johannesburg's experience of water: water supply; water demand; and water quality. Managing supply is a complex issue, with droughts and erratic rainfall patterns affecting overall supply in the Vaal River system. Demand and supply are intricately linked. The Department of Water Affairs managed supply whilst Johannesburg manages real growth in consumption. Over time, Department of Water Affairs has established a number of storage and inter-basin transfer schemes from the Thukela River and Lesotho Highlands Project to meet the increasing demand. Since the 1980s, focus has also been placed on the water demand management (WDM), through the implementation of a range of conservation and demand-side management strategies.

The demand for additional water in the Vaal River System is linked to a number of variables, including:

- Losses due to illegal abstraction along the Liebenbergsvlei River;
- Leakage in the system;
- The extent of water conservation by consumers, with this influenced in turn by abolition of flat rate areas in the city;
- Economic growth; and
- The impact of Acid Mine Drainage – where, if the water filling mine voids is discharged in either untreated or only partially treated form into the Vaal River, dilution releases from the Vaal Dam become necessary.

The following graph shows that with high demand, aggressive WDM measures and eradication of unlawful abstraction, the system will remain in deficit even after the completion of the Lesotho Highlands Water Project. In years of drought, this will pose significant economic threat to Johannesburg's economy, due to the imposition of water restrictions.

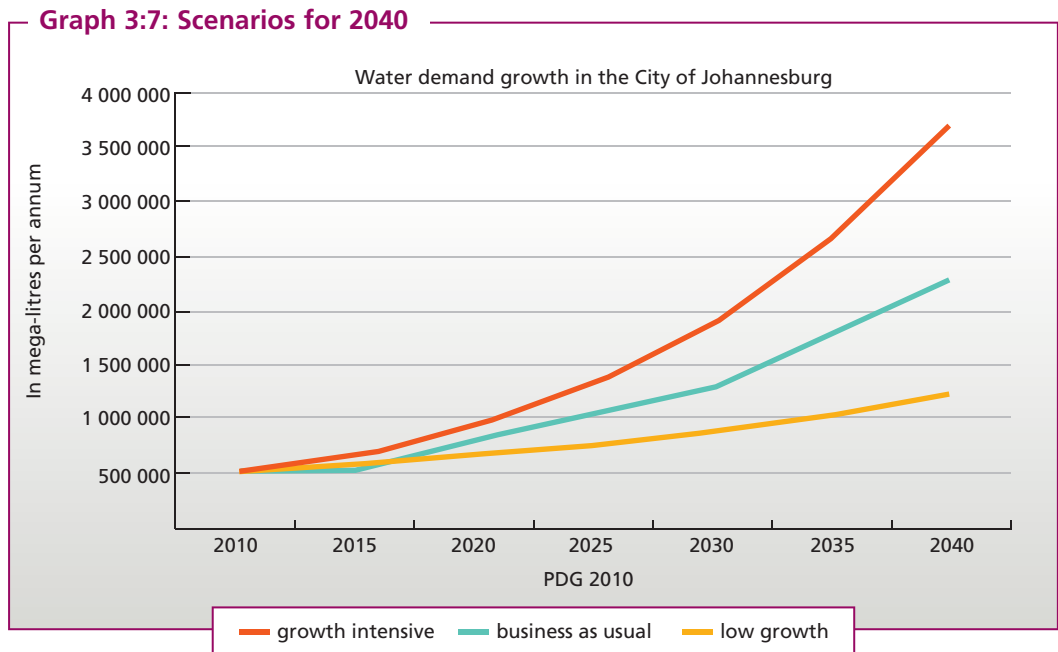


Source: Rand Water

Notwithstanding the complexities of supply and demand, the City of Johannesburg must conserve the Vaal River water resources. Water conservation and demand-side management are strategic imperatives. With Johannesburg's population growth slowing, this provides some relief for managing demand. But demand must be substantially decreased through the City's existing demand-side management program. One of the critical factors that do impact on demand is unaccounted-for water. The figure for unaccounted-for water in the city is high – over 30 percent. This category refers to water that is lost to the infrastructure system, through leaks in the reticulation system or through unbilled, unrecorded consumption. While most cities struggle with unaccounted for water, with London, for example, experiencing approximately 25 percent unaccounted for water (in the context of a city infrastructure that is considerably older than that of the city of Johannesburg), there are cases of success. For example, Tokyo's unaccounted-for water is approximately 3,5 percent (Reddy 2011). There are clearly lessons to be learnt from the rigour implemented in cities such as this. Action here is a priority. Apart from the loss of precious resources, water wastage in the Rand Water region, within which Johannesburg falls, amounts to hundreds of thousands of Rands.

The Municipal Services Financial Model was used to project future water demand in the city, based on economic and population growth estimates. Estimated demand for water is 5,2 percent per annum, in the absence of water conservation and demand-side management strategies. The City currently comprises an estimated 1 297 860 households, with this number projected to grow to 1 548 509 households by 2019 (based on an anticipated growth of an additional 200,000 households every 10 years). Using the current population growth rate, the estimate for Johannesburg's population in

2040 is roughly 6,5 million people. The anticipated impact of these figures on water demand – over the period leading to 2040 – is represented in the graph below.



Source: Rand Water

In this case, three scenarios are presented – representing future demand for water in mega litres (ML) per annum. These scenarios only give possible estimates for future demand – and should not be taken at face value. Based on a 'business as usual' model, which projects a 5,2 percent growth rate per annum, the demand for water by 2040 is anticipated to be over 2 million ML per annum. When this analysis of the estimated growth in Johannesburg's water demand is contrasted with the predicted growth in demand anticipated in respect of the geographic area supported by Rand Water, there is a clear indication that Johannesburg occupies a larger share than the total water demand catered for within the area addressed by Rand Water. Water security in the future is therefore dependent on water supply from the Department of Water Affairs. It must be noted that there is a finite limit to water resources in South Africa and the future economic growth will be dependent on using existing supplies more efficiently.

But water security is also about wide-ranging water management that may extend beyond Department of Water Affairs. Up until 2030 or so, the problem may be less about water scarcity (when taking into consideration the water that exists across the region's varied water sources, systems and rivers) than about water management that includes, beyond supply, water demand management and waste prevention. While water prices may increase significantly in the future, scarcity may be more about governance matters than the resource itself, for this initial period. The City of Johannesburg has a critical role to play in this process, particularly in the context of its location in the GCR, and the need for supply across this area (for a whole host of reasons, including issues of economic importance). Lobbying for improved institutional governance, in the context of all the various water-related role-players, may be part of this. The City of Johannesburg will also have to optimise its water conservation and demand-side management, to reduce overall demand.

It is useful to note that average growth in water demand over the last number of years has been lower than expected – with this being a positive, for demand-side management. The role of demand-side management is to curb water-demand and save water. If the City is able to implement a number of measures, the prospect of sufficient available water for future generations, by 2040, will be a real possibility. Water demand-side management is a complex issue. However, with a combination of both small and big things, considerable financial savings may be gained, alongside

the creation of localised opportunities for water savings. Measures will need to be wide-ranging, and will need to include actions that ensure, for example:

- A reduction in wastage – and a more significant focus on reducing water resource contamination;
- The repair and maintenance of existing infrastructure, and thereby, minimisation of leakages;
- Introduction of water efficiency measures (such as washing machines and toilet cisterns);
- Incorporation of more strategic water recycling, that institutionalises the urban water cycle of waste water, potable water and storm-water, and grey water re-use (particularly for new developments); and
- Water harvesting programmes – with these being implemented worldwide, through well-established mechanisms (although this approach would need to be practiced alongside others, given the obvious dependency of water harvesting practices on rain).

Small improvements in repairs and maintenance of the water infrastructure reticulation systems can achieve considerable savings. Joburg Water's current "Water Demand Management Strategy (Revision 1)" stated that "projections indicate that Gauteng will experience severe water shortages by 2013 which is six years ahead of the 2019 implementation target for Phase 2 of the Lesotho Highlands Water Scheme. As a result the DWA expects the Gauteng Province to achieve a 15 percent reduction in demand by June 2014, which translates into a saving of 22 percent for the City of Johannesburg alone. In light of the above findings, JW had to re-align the WC/WDM interventions to focus at achieving the Project 15 percent targets i.e. 110 Ml per annum. Loss management measures would include pressure management, retrofitting and the removal of wasteful devices" (CoJ 2011). Potential savings emerging from this strategy – in mega-litres per annum – are reflected in the table below. The data provides a clear indication of the average potential savings that may be gained through doing 'the small things first'.

Table 3.1: Average potential water savings in relation to intervention in mega-litres per annum (Source: CoJ 2008)

Type of intervention	Average potential saving/annum (ml/annum)	Percent contribution to potential saving/ annum (percent)
Direct measurable interventions		
Pressure management	4 794	4,4
Mains replacement	781	0,7
Active and passive leakage control	3 168	2,9
Retrofitting and removal of wasteful devices	76 405	69,9
Indirect measurable interventions	24 144	22,1
TOTAL SAVINGS/ANNUM	89 010	100,0

Water conservation can be achieved through multiple strategies: technical losses through effective asset management and maintenance can achieve considerable savings – as noted above. Effective billing based on accurate meter readings and precise consumption is vitally important, to ensure water supplied is not unaccounted-for or lost. Improving the billing system and making sure everyone contributes to payments for water will go a long way. This means the City must work to ensure water is valued and priced correctly. Demand can be reduced through changing behaviour, with this necessitating a programme of collaboration and engagement with residents.

There are also significant opportunities for companies to promote water savings, alongside opportunities for a manufacturing and service industry to be established, to support the rollout of water efficiency devices. Developing more green sanitation systems can create opportunities for businesses, while also reducing household consumption. Residents can benefit from a reduction in water consumption at a household level. Water recycling at scale also remains an important strategic imperative for our City – as commented on above. This involves a new way of designing and delivering water and sanitation infrastructure systems, as part of a citywide water recycling system, providing benefits for residents and opportunities for new industries.



Another critical issue of key concern is that of acid mine drainage. This issue is commented on below. The city recognises the need to address this risk, with potential options including the use of acidified water in commercial activities, preventing wasteful use of pure water.

Box 3.2: Protecting our water quality – acid mine drainage

Acid mine drainage has emerged in recent years as one of the many threats to the City's water quality. Pollution is from a number of sources which includes polluted storm water run-off, poor effluent from waste water treatment works and overflowing sewers all affecting downstream users. With Acid Mine Drainage (AMD) the major problem will be the discharge of untreated or partially treated AMD from mine voids that are rapidly filling up. There are 270 tailing dams or 'slime dams' in the Witwatersrand basin, covering an area of 400 km². Acid mine drainage is characterised by low pH and high concentrations of dissolved heavy metals, which exceed drinking water standards up to toxic level. The problem is a result of reclaimed mine dumps for gold residues. An estimated 70 mine dumps have been reclaimed from the Johannesburg area, with the tailings then pumped to disposal sites to the south of the city. Many of the tailings dumps have remained undisturbed in the Johannesburg area for almost a century, during which time they have been exposed to oxygenated rainwater. This has resulted in oxidation of the pyrite and other sulphides in the material, particularly an outer layer of the dumps, several meters thick. Oxidation is a process through which pyrite acidifies the water percolating through the dumps, then enters the ground water regime beneath the dumps. This has resulted in high contamination of the shallow ground water in Johannesburg's mining areas, to depths exceeding 18m below the surface. Where the groundwater table is close to surface, the upper 20cm of soil profiles are severely contaminated by heavy metals, due to capillary rise and evaporation of the groundwater. Acidified water from mine tailing dumps contribute to 20 percent of stream flow in the area.

Water quality management also requires careful attention to the issue of water contamination, beyond just acid mine drainage. Both compliance management and enforcement are key actions that require the City's support.

In conclusion, while there are many strategies through this to address the water issue, this is an area that requires immediate action – in terms of immediate daily behaviour, and the implementation of infrastructure and related changes, over the medium to long-term. Driving a different approach by those parties involved in this domain, while also gathering support from the private sector in delivering new and innovative approaches will be part of the solution. Inputs received from various parties during the GDS consultation process have been considered for inclusion – both in terms of the 2040 GDS strategy document represented here, and in terms of the City's more operational IDP.

3.6.2 Electricity

i. A national reality: Carbon-intensive production – with limited incentives to change

South Africa is the 15th largest emitter of CO₂ in the world, even though this is not reflected in the relative size of our economy (NPC 2011b). When considered in terms of the correlation between national GDP and emissions – a useful converter to assess how much CO₂ is emitted for every dollar produced – South Africa performs poorly, coming in as the eighth worst converter, alongside countries like the Ukraine, China, Iran, Egypt, Russia and India. While South Africa ranks as the 28th largest economy in the world, we produce goods at a high cost to the environment. When measured in terms of the amount of CO₂ emitted for every megawatt hour, our nation is the second worst emitter (Poland is the worst). The NPC notes that coal accounts for more than 90 percent of our nation's electricity (2011b). As our primary energy source – a source that generates three times as much CO₂ as natural gas – each mega-watt of electricity costs us 1,03 tons of CO₂. An over-abundance of coal has kept electricity prices very low and attracted a number of energy intensive industries. Peak coal production in South Africa by 2020 will see an overall reduction in greenhouse gas (GHG) emissions, but will have a catastrophic impact on the economy. South Africa's reliance on coal will compromise sustained economic growth in the future. And yet, historically, there has been no incentive for industry to change or improve its own conversion ratios (van Wyk 2010). Given the above – and Johannesburg's role in the national economy – this is clearly an area in which the City must take the lead.

ii. Energy in the context of Johannesburg

Johannesburg's economy mirrors the national reality in terms of sources of energy – and the extent of carbon intensity. When considering electricity in particular, a 2008 report noted that 66.7 percent of total CO₂ emissions within the city were from electricity - although many other forms of fuel type also contribute to the picture of emissions (please see the table below), with a number of these originating from coal. The two second largest contributors included below are petrol and diesel – with considerations in respect of these fuel types addressed within the transport section below.

Table 3.2: CO₂ emissions by fuel type (City of Johannesburg State of the Environment Report 2008)

Fuel type	CO ₂ emissions (tons)	Percentage of total emissions for COJ
Electricity	13 029 077	66,7 percent
Petrol	3 893 095	19,92 percent
Diesel	2 318 334	11,86 percent
Coal	102 425	0,52 percent
Paraffin	95 843	0,49 percent
Natural Gas	93 896	0,48 percent
Furnace Oils	7 976	0,04 percent
LPG	3 325	0,02 percent
TOTAL	1 954 971	100 percent

In terms of electricity source, the City purchases 80 percent of its electricity from Eskom. There are important reasons as to why Johannesburg should look to renewables to diversify its current electricity supply. Energy efficiency is important as a demand-side management strategy, but localised generation provides tremendous opportunities.

iii. Shifting our focus

South Africa, as a nation, lags behind the rest of the world in terms of energy production from renewable resources, but new legislation is set to change this. There are a range of options, with technology updates emerging that hold the promise to shift the way we generate energy. In 2007, South Africa's efforts accounted for just 0,07 percent of the global renewable electricity capacity. This must change – with cities increasingly having to play a role in renewable electricity generation. Government released an Integrated Resource Plan 2 (IRP2) in 2010, defining the country's energy mix to 2030. The proposed energy mix for 2030, as reflected in the plan, is 40 percent contribution from coal, 14 percent from nuclear power, nine percent from open cycle gas turbine, six percent from peaking pump storage, five percent from mid-merit gas and two percent from imported hydro-electricity. 2023 is the envisaged start date for the first 9 600 megawatts of new nuclear power.

But leaving these decisions to other spheres of government would be irresponsible, with Johannesburg presented with an opportunity to really make a difference, locally and nationally, through adopting cleaner and more efficient systems. Amongst others, options include hydropower, wind, solar energy, energy from waste, and bio-mass (NPC 2011b), and, as noted by participants in the Johannesburg GDS Outreach, compressed natural gas and hydrogen. This is an area in which there is much innovation, but also an area in which there are tested technologies that have been operational for decades. For South African cities, the late entry into renewable energies may provide important 'leap frogging' lessons, building on what has and has not worked in other cities. There is a tangible prospect of redefining our energy mix by 2040 – with it being important that consideration is given to a combination approach, to ensure economic growth powered in a sustainable manner. While the role of the City as a provider of electricity infrastructure has been strengthened over the last decade, it will need to build on previous experience, developing incentives and regulation for renewable energy uptake – while also driving responsible energy usage. In the section below on solid waste, particular focus is placed on the potential waste holds for energy generation, in the context of solid waste challenges faced by the city – and the potential for a dual solution, that is simultaneously able to address job creation and long-term environmental sustainability.

iv. Managing the energy infrastructure

The complexities faced by the City in respect of energy are not just about supply. One of the critical challenges the City faces is the cost and demands of constant maintenance and upgrading of the energy infrastructure within the city, to enable appropriate, secure and reliable distribution – with this challenge worsened by illegal connections, cable theft and vandalism. A pro-active approach is needed, supported by citizen involvement – with clear platforms established and advertised for raising events of theft or vandalism, and education provided in terms of the negative effects of the above on all members of the community.

Approaches need to be identified through which to minimise loss (e.g. securing sub-stations, to prevent easy access to cables; using smart technologies). Incorporating new technologies into future developments may also go some way to address energy management challenges. In addition, the implementation of Smart grids, as a way of managing energy use, is viewed as a critical area for consideration.

v. Education: the key to smart energy management

Many citizens are not aware of energy efficient practices that could be used in their own environments – with this lack of awareness (e.g. in terms of the stepped tariff structure) contributing to increased energy use. Active communication campaigns, education and appropriate engagement with citizens (e.g. via call centre communication or direct outreach processes) is a priority. Educating developers in respect of smart technologies and the use of energy-efficient materials and systems will

also aid in driving a new approach – alongside the encouragement of energy-efficient practices in the building approval process. As with all natural resources and their management, educational inputs must be provided for school-learners, to ensure a citizenry that understands the role of the collective, in driving sound energy management.

3.6.3 Solid waste

i. The national context of waste

Waste is everyone's problem. It impacts on the daily experience all people have of the city. It is a reality in places of work, and places of rest and relaxation. And it is also one of the pressing challenges facing South Africa today – with landfills across the country filling at alarming rates, in a context of spatial pressures and conflicting demands for land. Recognising this reality, the Polokwane Declaration targets a 25 percent reduction in waste to landfill by 2012, and specifies a target of zero waste to landfill by 2030. The Declaration is linked with a range of other pieces of legislation, supporting regulations, strategies and plans. The National Waste Management Strategy also sets clear targets for 2015, serving as a useful framework for alignment, while a host of other strategies have been established within other spheres of government. Amongst others, strategies and policies include Gauteng Provincial Government's "Integrated Waste Management Policy", and the City's "Integrated Waste Management" policy, plan and by-laws – although the latter is still in draft form (CoJ 2011a). Pikitup, the municipal entity through which waste management services are provided within the city, has also developed a Waste Minimisation Plan. With many of these only recently approved, the test will be in implementation.

Johannesburg's resource use intensity is represented here – in the volume of waste it generates. The City collects 1,8 million tons of garbage each year, with approximately 244 200 tons reflected in the form of illegal dumping, and 1 779 tons collected as litter from the streets. With an increasing population and a few primary sites, the city is running out of landfill space. An aggregate of eight years of landfill space remains, but this varies considerably across the City's regions. The City's Strategic Roadmap aims for a 50 percent reduction in waste to landfill by 2012 and zero waste to landfill by 2022 – although there is a long way to go before these targets are met. Current volumes of reclaimed or recycled waste vary by waste form, with Pikitup currently diverting 11 percent of its waste. A part of this 11 percent is represented in the approximately 61 140 tons of green waste that was reclaimed during 2008/09 via garden sites (with 42 such sites operated by Pikitup). Composting facilities at Panorama currently handle 40,000 tons of waste per annum, with capacity exceeded – and plans underway for a second composting facility at Linbro Park. In addition, an estimated 29,580 tons of dry waste was recycled during 2008/09 through private initiatives. In terms of net tonnage disposed of to landfills sites, versus waste disposed of through other forms, the following statistics were recorded for the 2008/9 financial year: total tonnage waste to landfill sites – 1 595 343; total tonnage recycled waste removed – 17 865; total tonnage of composted waste removed – 66 366.

About 91,8 percent of the Joburg households have their refuse removed either on a weekly basis or more occasionally. These refuse removal services include a cost, with the City introducing changes in refuse removal charges, to reflect property values within scaled tariffs. Owners in properties valued at R150 000 or less pay no refuse charges, but do pay a small City cleaning levy. It is noted that the general levels of satisfaction with refuse removal has improved over the years. However, discussions with community members during the GDS outreach process led to the identification of a range of other waste-related concerns. These included concerns relating to illegal dumping which, together with poor sanitation and poor drainage systems, has resulted in a scourge of rats, flies and other pests in parts of the city. A further difficulty noted relates to the lack of awareness many have, in terms of the consequences of their behaviour (e.g. littering). As with the management of all other resource forms, success will in part depend on education.

ii. The cost of waste

The damage caused by the waste we generate is significant, and often unseen. The average amount of waste generated in Johannesburg is approximately 1,2 kg per person per day (DGE 2010). To put

this statistic in context, the global per capita footprint dynamics reflect that the typical daily average is an amount of 2 kg/pp/day, which is three to four times that of many European cities. People in informal settlements generate approximately 0,16 kg/pp/day, while 2 kg/pp/day are not unusual in affluent areas. Consequently, landfill management costs are escalating more, as a result of affluence and wealth. One of the obvious forms through which waste-related costs are represented is in the city's landfills themselves – and the loss of geographic space within the city, through landfill presence.

But an approach of 'out of sight, out of mind' is not appropriate, with landfills generating vast quantities of CO₂ and other toxic gases, in volumes that are difficult to comprehend. Each ton of waste dumped in landfills generates 1,79 tons of CO₂ over its lifespan, as it decomposes. However, within the city, the damage incurred is also not only felt on the landfills and surrounding areas. As the urban edge expands, and the closure of various landfills forces transport of waste further from the point of origin, transport costs go up – as do the costs of damage to the road systems that large heavy waste trucks travel on. In Johannesburg's case, as the landfills at Marie Louise and Ennerdale close, there will be increasing pressure on other landfills such as Robinson Deep and Goudkoppies – with the risks noted above all the more applicable. Concentrated delivery of waste to fewer sites also increases congestion, causes delays. As waste to landfill processes are increasingly concentrated on fewer landfills, it also becomes more challenging to cover these landfills appropriately, resulting in risks of environmental pollution, such as windblown waste, smells and gas emissions (Olivier and Olivier 2011).

The damage from waste is also experienced in other forms and places, as evident in wider ecosystem damage on riparian habitats, wetlands, rivers, topsoil erosion and habitat degradation from dumping. Informal sanitation is a more significant problem in informal settlements, where adequate sanitation and refuse removal services are not always available, or where the City struggles to meet demand.

iii. Solutions with multiple benefits

Engagements during the outreach process confirm a truth recognised worldwide: addressing waste from an integrated perspective is best. Recommendations include the development of integrated waste disposal and treatment systems, and solutions that simultaneously address waste issues and the city's need for reliable, affordable energy (e.g. solutions such as mining of methane, and the use of waste-to-energy plants). Revenue generation benefits are also associated with many of these technologies, with waste being both a hazard, and a commodity with an attached value. The City has already initiated some work in this area, investing approximately R250 million in the development of its landfill sites, for stored methane gas to be tapped, and used in generating renewable power for the City's grid (CoJ 2011b). While a step in the right direction, there is still much more that can be done.

Actions that relate to a focus on waste management through addressing the waste hierarchy (through both reduction and recycling) will go a long way, particularly when supported by education (with emphasis placed on support in respect of separation at source, and similar interventions). Suggestions from the outreach also include the provision of greater support and guidance (with increased control, where needed) to assist the informal recycling industry, and an elevated prioritisation of engagement with various role players in respect of waste (e.g. business, the community and others), to raise the issue and encourage the adoption of different approaches. While the management of hazardous waste is a national competency, it is also been argued that there should be greater involvement in this area by local government, at the least in respect of monitoring and enforcement, given the pollution caused by this form of waste within the local context.

Olivier and Olivier note that the concept of an 'integrated waste management solution' "is frequently misused and seldom incorporates true integration of effective waste management and disposal with the many dimension of a truly world-class city" (2011: 5). They argue that a truly integrated solution should include a focus across the complete waste value chain. Aspects to be addressed include, amongst others: 100 percent waste collection; a move to zero waste to landfill (through appropriate recycling and waste reduction approaches); elimination of landfills through mining of

waste to generate energy; and the appropriate location of waste disposal sites, to contribute to the ideals of liveable urbanism. Solutions that allow the City to work with the private sector in ways that “balance...costs and revenue streams...with substantial CO₂ reductions, pollution control that exceeds all required standards, job creation and community development contributions” would be desirable (2011: 8). These would also allow the City to address waste management through solutions that support the City’s ideals. There are examples of integrated waste management solutions implemented in countries such as Brazil and the United States, that have successfully used innovative approaches and proven technologies, allowing for optimal benefit for all sectors, and the use of learning’s gained through practice.

3.7 The environment

The theme of the environment relates to a range of the daily realities experienced by the citizens, residents and visitors to the City. It also includes a variety of factors that are not fully understood. Because of the uncertainty associated with these factors, they conjure up fear and insecurity. Resilience and sustainability are two concepts that are fundamentally related to the environment. But the elements addressed here go beyond the material realities the city is faced with. Key themes include: environmental sustainability; the importance of building a resilient city in pursuit of a low-carbon economy; mitigating and reducing the potential impact of climate change; natural resource management in an ever changing urban landscape, and the role of citizens, in addressing one of the most significant risks of our time.

3.7.1 Building environmental sustainability

The City of Johannesburg recognises the importance of the concept of sustainable development, with the content of the 2006 GDS, and inputs received during the GDS outreach process, providing evidence of the awareness of this issue, in the context of the developmental agenda of local government. Maintaining the ecological integrity of the city’s natural resources is critical, if the City and its inhabitants are to succeed in sustaining human and economic development. While it is recognised that the City has made progress in its focus on the goal of sustainable development, with a range of policy frameworks developed, and public transportation re-emphasised, more needs to be done. Environmental sustainability is often viewed as an afterthought, but should, in essence, drive the City’s developmental and growth agenda. Changing the mindset of both external stakeholders and those who operate from within the City is essential, if the City is to realise its vision for environmental sustainability – in line with the vision articulated within the Joburg 2040 GDS. The challenges faced demand a reality where this mindset change is supported by a refined strategy, a pro-active programme with clear targets, indicators and funding, and strong political will.

3.7.2 Improved management of our natural resources – and the ‘free services’ they provide

It is suggested that the previous GDS failed to capture the intrinsic value of the ecological goods and services within the city. These services are certainly overlooked in municipal accounts, both on the expenditure and on the revenue side. Together with the investment in people and infrastructure that accompany them, they provide the backbone of the local economy and enhance human well-being in the City. Included here are the services provided by the ecological infrastructure, or natural assets, within the City. They are ‘free services’ from nature, which flow to both residents and visitors in the same way as the services provided by the Utilities. The ‘natural factories’ that produce these services also need appropriate and ongoing maintenance and, in the case of damage, repair.

To optimally manage our natural resources, and to prevent their further decay, it is imperative that the City introduces environmental and health-related priorities into other policies and standards on water, air, waste, and – in respect of urban agriculture – soil. Research on health and the environment must also be increased, to ensure a full understanding of the links – and measures that must be taken in this regard. Consideration of natural resource management should be included in all elements of the City’s delivery plan. Developers should be encouraged, through regulations, to explore ecological sanitation methods. Other innovative mechanisms that could be used to prevent over-use of natural resources could include implementation of a tax on resource-use.



In respect of water, input from the outreach process raised further views on how the quality, quantity and sustainability of water resources are fully dependent on good land management practices within the various catchment areas. The appropriate management of watercourses and reservoirs has a direct impact on both the nature of this natural asset, and other factors – such as the health of citizens. Appropriate management should encourage natural flow, which will help with storm water management and cleaning of the water – reducing the breeding grounds for mosquitoes and other pests. The issue of contaminated ground water in mines is addressed above, under Section 3.6.1 – with the proposal that this could potentially be used as a source of water for industry, with pure water, instead, saved for human and animal consumption. This contaminated water is not only a threat to surface water and soil, but is potentially a huge resource for the city. It is noted that if the City focuses on addressing recovery of this water for consumption, the technology to do so is available, although expensive.

3.7.3 Climate change realities – and Johannesburg’s expected future

11 of the last 12 years (1995 - 2006) rank among the 12 warmest years in the instrumental record of global surface temperature (since 1850), providing now undisputed scientific evidence that climate change is an inevitable part of our present reality. It is recognised that cities and their populations will be disproportionately affected by climate change in the future, and will have to allocate time, human capital and financial resources to develop mitigation and adaptation responses (UNIPCC 2007). Moving to a low-carbon economy means more than just becoming energy-efficient. It means producing goods and services that are not resource intensive. The net impact would reduce carbon emissions. When we reduce carbon emissions, we mitigate climate change, but we also become more resource-secure, as we save scarce natural resources.

Climate change discussions require consideration of how to both mitigate and how to adapt to change. There are no easy answers. Climate change is driving multiple crises across the globe. Environmental refugees now occupy an increasing share of global migration. Coastal flooding, desertification, melting permafrost are the causes of major population movements, with an estimated 25 million people globally acknowledged as climate refugees. These numbers will increase to about 200 million by 2015 (National Geographic 2009). Global temperature increases will give rise to increasing frequency and intensity of extreme weather events. The Mozambican floods of 2000, 2001 and 2007 displaced thousands of people, resulting in approximately 2000 environmental refugees entering South Africa every day. Assessment reports project that, by 2050, approximately 75 to 250 million people in Africa will be exposed to increased water stress, due to climate change. Environmental stresses resulting from climate change have already created the conditions for conflict to emerge. Scarcity of fresh water increases the propensity for conflict and urban instability, but may also be a catalyst for co-operation (UN 2009). Coastal cities, where most of the world's population are located, face extreme vulnerabilities due to significant weather events; flooding and rises in sea levels. Increasing urbanisation also raises vulnerability to disasters, as many mega-cities are located in extremely seismic areas, and on low elevation coastal zones that are prone to flooding.

The fifth UNIPCC Assessment Report is now underway. The focus this time is on understanding risks, vulnerability and adaptation options for regions across the world. Of particular importance is how climate change responses need to reflect a wider transition to sustainable development and the establishment of greater resilience of cities. Climate change will shift weather patterns and affect conditions for agriculture. As such, it will affect (and is already affecting) global food supply, and will impact on food security in urban areas.

While climate change cannot be linked to a single natural disaster event, it is recognised that fluctuations in global temperatures will affect the amount of energy in the climate system, and drive more intense and frequent weather events. Long-term changes over the last 100 years has resulted in widespread temperature increases across the globe, increases in sea-levels and the warmth of the oceans, decreases in snow and glaciers – that has in turn affected precipitation amounts in many regions, and extreme weather events – with these increasing in intensity and frequency over time. Inputs provided in Chapter Two also highlight the impact of weather related disasters – in terms of loss of human life, financial loss, and damage to physical assets.

Johannesburg, itself, has remained largely exempt from natural disasters, given a range of geographic factors. The city is not located on a coastline, nor is it in an area heavily affected by major weather-related natural disasters, such as hurricanes or typhoons. An assessment undertaken in 2008 by MasterCard Worldwide Insight 1 rated Johannesburg as the fourth best placed city out of 21 major cities, from Asia, the Middle East and Africa in terms of exposure to climate change-related risks (CoJ 2009). However, scientific evidence suggests that the country – and Johannesburg specifically – will face increasing changes to weather patterns in the future. Rainfall patterns over Johannesburg have shifted significantly over the last 50 years, with increased risk of flooding.

The climate change science may seem contradictory at times; however extreme fluctuations in weather patterns are, in themselves, an indication of the unpredictability of future weather patterns. Nevertheless, certain trends are anticipated, based on experience and analysis to date. Firstly, it is expected that the future climate of Johannesburg will be hotter and wetter. Temperature increases, based on a downscaled model, show a maximum day temperature of approximately 0,5°C for the Gauteng region. A decrease in the temperature of between 0,27°C and 1,26°C is anticipated for the months of April, May, June, and July. Minimum temperature increases anticipated in respect of the minimum daily temperature range between 0,6°C and 1,16°C, for all months of the year, with it anticipated that no regions will experience temperatures below 0°C. It is also expected that total annual rainfall will increase across all areas. Future annual rainfall is expected to range from 301mm to 758mm per annum. The majority of this rainfall is expected to fall during the summer months (December, January, February). An extension of the rainy season is also expected. The number of rain days per month is also expected to increase by between 1,036 and 2,188 days. This small change

in the number of rain days per month compared with the increase in rainfall demonstrates that the intensity of rain events and the possibly of severe rain events may increase. The lower limit of change shows a decrease in the number of rain days for the majority of the year; this may also be a likely possibility. The City recognises that these changes will impact all of the city's systems, with the risk of increased flooding, for example, impacting on existing storm water drainage systems.

Unlike coastal areas in South Africa that face increasing coastal storms, rising sea-levels and a number of weather related extremities, the primary outcome of climate change expected in Johannesburg will be increased temperature and rainfall. Increased rainfall events may lead to greater risk of urban flooding, but may also provide opportunities for water harvesting. The poor will be disproportionately affected by climate change, and related risks such as flooding in urban slums. The City has recently developed a flood risk assessment, highlighting areas of risk. Disaster management plans for each area are to be developed. Increased flooding will also impact our roads and storm water infrastructure. There are opportunities for developing multi-year budgets, to finance improvements in storm water capacity and to develop new 'natural systems' to minimise the impact of urban flooding.

3.7.4 Mitigating and reducing climate change

Mechanisms to mitigate and reduce climate change (such as, in terms of the latter, a transition to a low-carbon economy), are both key elements of a climate change strategy. Integration of climate change objectives into various policies and plans, in particular the City's energy policy and transport policy, is critical, if we are to play our part in this global effort.

Mechanisms that could be implemented at the level of the City to reduce climate change and to mitigate the risk include the following:

- A focus on the reduction of greenhouse gases, by means of specific measures to improve energy-efficiency, to make increased use of renewable energy sources, to promote agreements with industry in respect of changes in this regard, and to drive energy savings;
- Improving local food self-sufficiency through urban agriculture schemes, that makes use of resource-efficient methods
- The development of a new system for the evaluation and the risk management of climate change;
- The encouragement of non-motorised transport, by providing cycle and footpaths that are safe and shaded, and encouraging low-volume non-motorised public transport;
- The development of emergency strategies for dealing with the aftermath of severe storms (e.g. flooding, structural damage to houses and infrastructure because of wind and hail), while ensuring these strategies are backed up with resources; and
- Introducing local renewable energy networks in new (and where feasible, existing) residential developments, to reduce reliance on electricity from coal.

3.8 Transport

The city's transport system is central to its economy and its people. After years of underinvestment in public transport infrastructure during the Apartheid period – where separate systems were created for black and white commuters – the domain of transport is finally poised for a new future in the city. With the introduction of the country's first Bus Rapid Transit (BRT) system (the Rea Vaya BRT) and the Gautrain high-speed rail link (with a Johannesburg-OR Tambo airport route, and a Johannesburg-Tshwane route), transport holds tremendous potential for integrating a divided city. Public transport serves a number of purposes: Building a mass public transport system will also reduce the risk of global fuel price shocks, while driving the potential of a positive outcome for carbon emission reductions. In the following section, the important role of transport in supporting the city's economy is highlighted. In addition, comment is provided on the role public transport must play in addressing the spatial planning challenges created though the legacy of Apartheid planning. Furthermore, comment is provided on the role of transport in regional integration. Major risks to our transport sector arising from the increasing cost of petrol and diesel are also addressed.

While efficient and wide-ranging public transport systems may support a reduced carbon footprint, increased socio-economic performance and greater citywide inclusivity, they will only work if there is

an appreciation of their benefits, and an uptake in use, by the citizens and residents of Johannesburg. This issue is also addressed below.

3.8.1 Apartheid spatial planning and transport

Apartheid spatial planning created separate systems for commuters, based on race – with black township areas under-served, with inadequate transport infrastructure further compounded by long commuting distances from these areas to places of work. Public transport consisted of commuter rail and subsidised state buses.

In this context, private mini-bus taxis and private bus services emerged to address the gap left by an under-capacitated State service system – with these modes now the predominant transport system in operation. Historical trends provide clear indications of the change in modal use by those who fall within lower income groups, from publicly-owned public transport systems (i.e. bus and rail), to privately-owned public transport, in the form of taxis. The use of mini-bus taxis increased from three percent in 1975, to 41 percent in 2009 – with a similarly significant change in usage patterns (albeit a decline) in other modes over transport over the same period. Bus usage declined from 22 percent to four percent, while train usage declined from 20 percent to eight percent. In contrast with the flexibility associated with taxi routes, travel times and entry and exit points, travels times for bus and train services have remained static, and in some cases, declined.

The Johannesburg metro-rail system connects Soweto with the city centre and other satellite towns. The system transports large volumes of workers, but is recognised as not being safe or reliable. While the City of Johannesburg is not responsible for rail, the daily experience of many of those who live and work in the city is affected in significant ways by this network's underperformance and poor quality. The City does however run its own bus company, Metrobus serving about 90 000 passengers a day, it also faces problems of an ageing fleet.

Two important features characterise Johannesburg's transport system reality, with these features still reflective of our divided past. The majority of residents do not own cars and, left with no other choice, travel by public or private bus, public rail or private mini-bus taxis. In contrast, middle-income residents are resolutely car-oriented – with this truth witnessed through the impact on our roads, with an increase in travel times of nearly 60 percent since 1980 (Harrison 2011). There has however been no viable mass public transport system to facilitate a modal shift change of middle income residents, from private car to public transport. Continued urban sprawl has also created conditions for more intensive private car use (NPC 2011b). This is addressed further below.

3.8.2 Urban sprawl and traffic congestion

Congestion in the city has increased significantly over time, worsened by the predominance of private cars and private mini-bus taxis, with Johannesburg's sprawl contributing to this congestion (as noted above). The decentralisation of business from the city centre, to other locations such as Sandton and Midrand, has further compounded congestion around major business nodes, very often not designed for the current volumes. The movement of freight from rail to road has also had a major impact on our road system, both in terms of congestion and maintenance. In addition, Johannesburg's placement within the GCR means that there is a continual interface with other road networks and cities, with a constant flow of people and goods in and out of the city, as part of a daily commute.

The GCR's road network has to cope with an annual traffic increase rate of seven percent, with 1,8 million drivers and 2,8 million registered vehicles (Chakwizira 2007). This has seen an annual increase of traffic on the M1/N1 corridor of roughly seven percent, with this annual increase witnessed for the past ten years. The average travel time to work in the region has increased from 41,5 minutes in 1995, to 50 minutes in 2003 (i.e. a 17 percent increase over eight years). By 2040, it is anticipated that Johannesburg will have an extra 2,5 million inhabitants. The existing system, with its dominant mode of private vehicle use, is unsustainable. A larger population with more cars means more congestion – with negative effects for the quality of life of residents, let alone the impact on the environment and the sustainability of Johannesburg's infrastructure.

Box 3.3: The high cost of traffic congestion in Johannesburg

According to a recent IBM survey (the Commuter Pain survey – released in 2010 with a focus on the globalisation of traffic congestion), Johannesburg ranks worst in the world when it comes to commuters' experience of long commuter times. The survey focused on adult drivers in twenty major cities around the world, repeating similar surveys done in the United States alone, in May 2008 and August 2009. This survey, intended to gather drivers' opinions about local traffic and related issues, focused on drivers in Amsterdam, Beijing, Berlin, Buenos Aires, Houston, Johannesburg, Los Angeles, London, Madrid, Melbourne, Mexico City, Milan, Moscow, Montreal, New Delhi, New York, Paris, Sao Paulo, Stockholm and Toronto. There were 8 192 responses in the final data set – with at least 400 from each city. While a relatively small sample, the findings from the survey do reflect a sense of the experience of drivers within the city. When it comes to pain, it should be noted that perception is reality, and the commuters in this survey clearly felt that roadway traffic has become worse in the last three years. A total of 67 percent said it had become 'worse' or 'a lot worse'. Conversely, only 20 percent of those surveyed said the situation had improved at all, while only five percent said it had improved substantially. Interestingly, in the category that focused on the experience of 'substantial improvement', New Delhi and Beijing led the way, at 17 percent and 16 percent. This may be attributed to the manner in which new transportation capacity is being aggressively added in both these cities. The cities where it was argued that respondents were most likely to say that the traffic situation had worsened, either 'somewhat' or 'a lot', were Johannesburg (80 percent), Moscow and Toronto (64 percent), Mexico City (62 percent), Sao Paolo (61 percent), Milan (59 percent) and Buenos Aires (57 percent). When considering the traffic viewed to be most frustrating, a total of 66 percent of respondents noted that it was the experience of 'stop-start' traffic that they found the most frustrating.

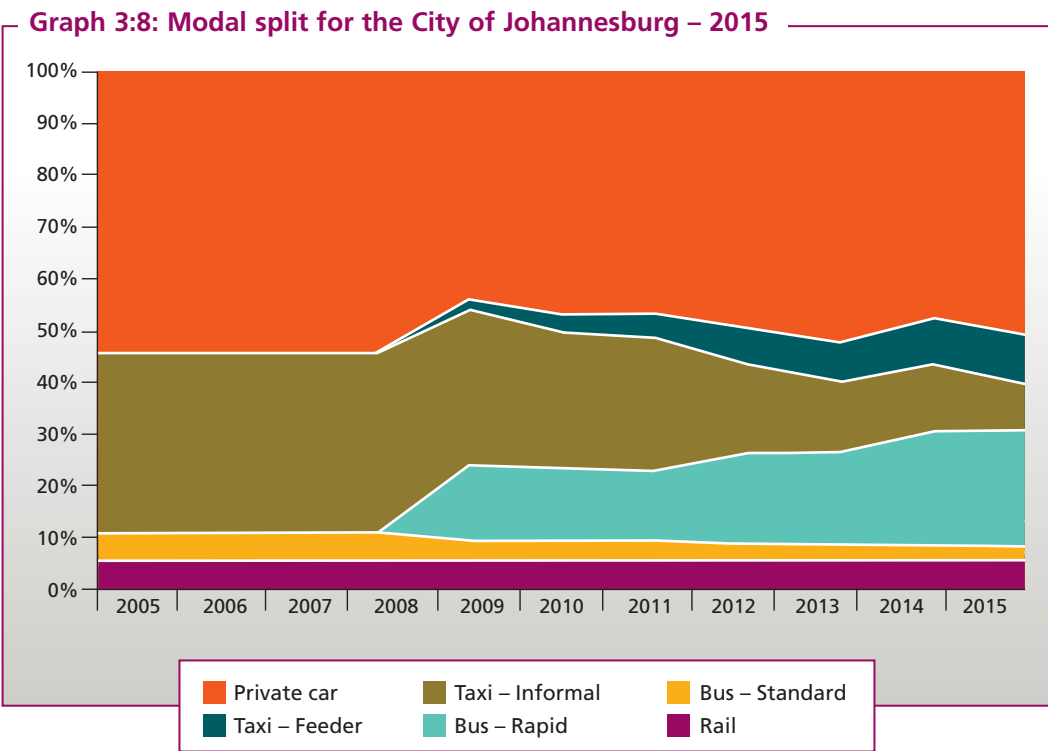
3.8.3 The increasing costs of transport

Rising fuel costs pose an ever-increasing challenge to road freight, the mini-bus taxi industry and private car users. Petrol and diesel prices in South Africa have trebled in nominal terms over the past five years. The wholesale price of diesel in Gauteng is now three times more than what it cost in 2002, while the price of fuel in South Africa has seen an increase of 761,8 percent between 1990 and 2009 (NAMC 2009). In terms of diesel and petrol demand in Gauteng, data from the oil industry (for the period 1995 to 2005) indicates an increase in demand for diesel of 88,69 percent, and an increase in the demand for petrol of 13,92 percent. The comparison with growth in national demand for the same products indicates that diesel growth in Gauteng was exceptionally high (Cooper 2007). With the cost of inputs into transport increasing, sectors such as road freight will be adversely affected (with this being both a major economic contributor, and a major cause of harm to our roads). The Gauteng Highway Improvement tolls will increase the cost of transporting goods services and people further, placing those already faced with challenges in addressing the cost of their daily commute, in greater difficulty.

Apart from increased costs, private cars also affect the environment and quality of air. Cars produce large amounts of air pollution, with liquid fuels recognised as major contributors to GHGs. Every litre of petrol burnt adds 2,30 kg of CO₂ into the atmosphere, while every litre of diesel adds a further 2,63 kg CO₂ (BP 2006). If an effort was made to reduce the 2005 consumption volumes of both petrol and diesel by 10 percent, this would result in a reduction in greenhouse gases by 1,48 Mt pa for Gauteng alone. Shifting commuters from private to public transport is therefore a matter of urgency. But this shift will only be achieved in the context of negative and positive incentives. To change from private to public transport, those commuters who have a choice must be able to understand the costs of not changing (i.e. the higher cost of private transport, relative to that associated with public transport). Likewise, they will also need to see and experience a qualitative change in the nature of the public transport system (in terms of its safety, reliability, efficiency, affordability and the extent to which each mode is part of an integrated system), for this shift may become a reality. While the Gautrain and Rea Vaya BRT have gone some way to addressing this, significant work needs to be done to ensure increased rider-ship. Further input on these systems is included below.

3.8.4 The future of public transport in Johannesburg

The city faces a number of transport challenges, although recent, key public transport interventions such as the Gautrain (a provincially led project) and the Rea Vaya BRT system (a City-led initiative) have laid the foundation for a new era of mass public transport. To mitigate against increasing petrol prices, the cost of maintaining road infrastructure and increasing air pollution, a modal shift change from private to public transport is the only answer for the future city of Johannesburg. The potential of modal shifts present a number of opportunities for economic development and improved city living. The graph below provides a representation of the assumed figures for passenger ridership (assuming that Phase 1 of the Rea Vaya BRT would carry 430 000 passengers a day). This assumption is modelled, reflecting the impact such a move would have on private vehicle use, and the use of other modes of transport. Even if this assumption was to be realised, the graph demonstrates that by 2015, private cars will still dominate. There are some indications from the rollout to date that further reductions in private cars could be achieved through the Rea Vaya BRT implementation. However, when projecting to 2040, it is argued that significant increases in the use of bus and rail should also be targeted.



Much work that is still necessary for the Rea Vaya BRT objectives are to be realised. The goal of Rea Vaya BRT is to place 85 percent of the City’s population within a 500 metre radius of a Rea Vaya BRT feeder or trunk route. Passenger numbers average 30 000 a day, and with better fuel standards, considerable reduction in carbons emissions may be achieved. Achieving the Rea Vaya BRT goals of increased ridership and decreased carbon emissions by 2040 will result in significant positive returns – both in terms of transport investments and social benefits accrued. Success is not a negotiable, given the cost of investments to date, and the future realities facing our city – although this will require a range of actions, including increased education and greater integration with other systems of transport.

Lobbying for a prioritised focus on improved safety and reliability of the metro-rail services will also need to form a core part of a wider public transport programme, as noted above. While not a City competence, this forms an integral part of a transport network, supported by other forms such as the Rea Vaya BRT, the Metrobus system and the Gautrain.



In terms of the Gautrain, it is useful to note that the system was not conceptualised as a panacea for mass public transit. Instead, it was developed as a high-speed corridor route to connect major cities with the GCR, with a system now emerging that involves high-speed modern rail, with linkages with major infrastructure systems and centres, supported by corridor bus services such as the Rea Vaya BRT, and smaller bus and mini-taxi feeder routes. Both the Rea Vaya BRT and Gautrain provide opportunities for corridor development and transit-oriented development, with these developments already underway in areas like Rosebank, Braamfontein and a number of other nodes in the city.

There are also opportunities for improving freight rail into the city. Where, historically, freight has shifted from rail to road due to an unreliable rail system and cheaper costs associated with road freight, new investments are improving the national rail infrastructure. In particular, it is critical to note the intended strategic freight corridor envisaged between Gauteng and Durban, with significant investment in research and planning already undertaken. This envisages the investment in strategic intermodal hubs (infrastructure to support the movement of goods and people from one mode of transport to another – with such shifts based on the suitability of each mode of transport for the next leg of the envisaged journey). Other factors noted as essential for optimal delivery include the need for integrated planning and implementation of plans through a partnership approach, with focus on both road and rail along the corridor, and alignment with urban planning considerations. Key partners already on board and championing this corridor include Transnet, the national Department of Transport, the Gauteng Provincial Government, National Treasury, SANRAL, eThekwin, and the Kwa-Zulu Natal Provincial Department of Transport (Transnet 2011). It is critical the City, as the prime driver and owner of spatial planning within the urban context of Johannesburg, engages critically with these plans, to ensure optimal outcomes aligned to other modes of transport – and the needs of the city.

Shifting transport patterns will also require a focus on opportunities for diversifying existing modes of travel, to include bicycling, walking, rail and bus, as noted above. Further issues relating to the linkages between transport planning and the urban form are addressed in the section on liveable communities, below.

It should be noted that the linkages between transport and city priorities such as inclusive economic growth and development should be highlighted. Large-scale transport improvement programmes offer an ideal opportunity through which to create employment opportunities, through which to promote scarce skills development and through which to provide experiential training opportunities (e.g. for young engineers) as well as empowering mini-bus taxi operators to become prosperous public transport operators. They also present opportunities for the empowerment of vulnerable groups (e.g. women and the youth) – through involvement in activities across the transport value chain. Careful consideration of how these opportunities should best be used must be part of the planning process, in the move towards building an improved transport system that supports our vision of the City in 2040.

Lastly, it should be noted that many valuable contributions emerged during the GDS outreach process. Not all of them are included here, as many are more operational in nature – to be incorporated in the City's IDP. However, the issue of driving a new set of values and culture in relation to transport is certainly a long-term project, and one of strategic importance.

3.8.5 Creating a new culture – shifting Johannesburg's mindset

Getting people to change their mode of transport – shifting from the convenience of private to public transport – is not just about logistics. As noted above, this is about driving a new transport culture. But citizen activism, in terms of voicing and supporting the transport system all desire, is also key. Proposals emerging from the Outreach process in this regard included the establishment of effective forums through which to collaborate with various partners, including citizens, the private sector and others, to promote road safety and drive a change in culture. A further proposal related to a long-term priority of building active engagement and involvement by all employees and employers within the city in shifting transport patterns – allowing for flexible travel arrangements and a focus on a change in work practices, to support a transport infrastructure that is under strain. Driving community ownership and partnerships, as mechanisms through which to understand localised transport needs and ensure maintenance and optimal upkeep, would also be key. But the need to establish a value-based culture – focused on the concepts of Batho Pele ('people first') – must be priority, given that this is needed to underpin the success of all other plans. The City recognises that the transport network must support the creation of social cohesion, allowing all to play their part in contributing to a system that is less environmentally harmful, and that connects the city and its people in an inclusive way. To achieve this, the City needs to ensure that all transport role players (government and private), especially those on the frontline, are well trained, knowledgeable, helpful and respectful to passengers – reflecting their role as service providers. In concentrating on culture change, it should be noted that this is not just about service providers within the transport sector. Participants in the outreach programme noted the need for the City to focus on building a core of transport activists across Johannesburg, prioritising, lobbying and actively engaging in building relationships, consulting, setting up forums and coalitions and planning for the transport system all acknowledge as necessary – through a focus on optimal empowerment and community ownership.

3.9 Liveable communities

In addressing issues relating to 'liveable communities', the starting point must be about definitions. While the initial research underpinning the Joburg 2040 GDS focused on broader definitions of liveability, the Outreach process resulted in specific questions being raised regarding liveability, in a Johannesburg – and more specifically – in an African context. What defines liveability for those who live in Johannesburg, and those who live in this region, and on the African continent? Arguments have already been that liveability as a concept is values and principles-based (with the following aspects raised: accessibility; equity; dignity; conviviality; participation and empowerment). On a practical level, liveability is considered to also be about other elements: the ability to access key infrastructure (e.g. transportation, water, sanitation and means of communication), food, clean air,

affordable housing, meaningful employment, and green parks and spaces – and the opportunity to be an active participant in democratic processes that address one's needs.

While all this is viewed as valid, what then is African liveability? In the context of Ubuntu, perhaps the input provided during the outreach process on 'humane settlements' is most useful, with the key elements presented (South African Institute of Architects et al. 2011) including the following suggested points of focus:

- *Change the zoning to allow mixed-use.* This will allow people to operate home-based enterprises
- *Allow for different scales of opportunity.* Recognise the need for small, medium and large-scale projects, with inclusionary housing and inclusionary retail, and a process of combining different and complementary uses within single areas.
- *Create one-hour walking neighbourhood.* The neighbourhood should be the unit of design – with most social amenities accessible within an hour's walk.
- *Activate the street edges.* This should be a condition of development approvals – with planning preventing long walls along which people are expected to walk.
- *All developments should be designed in ways that allow for phasing and adaptation.* With most developments facing a reality of insufficient money to build all at once, this will allow for prioritisation in allocating the defined spend.
- *Distribute decision-making.* With a different approach to decision-making that is more inclusive, this will lead to more public-private partnerships and stronger community engagement and involvement, with the neighbourhood serving as the locus for participation.
- *Encourage technological innovation.* While there is evidence of the potential of build 'greener' units, little has changed at the scale of the neighbourhood – with this needing focus.
- *Promote mixed incomes in our neighbourhood.* While the inclusionary housing policy encourages this, implementation is needed. This will involve a range of options in each neighbourhood. At present, each neighbourhood is dominated by one particular type of housing. The lack of a wider range of housing options undermines social inclusivity. A full range of housing options – freehold and rental, flats and houses, formalised back yard rooms, the insertion of social housing, the creation of neighbourhoods in informal settlements is argued as necessary, for this principle to be met.
- *Promote connectivity across the city.* Shift connectivity from being radial. Consider east-west connectivity, and explore public transport gaps.
- *Encourage greater linkages across green spaces in the city.*

Underpinning the above are principles of equity, access, integration, connection, democratic engagement, ownership, humanity and environmental awareness. These points find emphasis in a range of urban planning issues noted above: access to key infrastructure, access to food, clean air, affordable housing, meaningful employment, and green parks and spaces. Access to decision-making processes is also a key feature. Some of these issues are addressed below, in the context of 'liveable communities', and the necessary areas of focus for the City in moving towards a desirable 2040. Particular emphasis is placed on issues of the urban form, human settlements (including issues of cultural identity, the built environment and the green environment that may or may not surround these settlements), transportation in relation to city planning, access to key urban infrastructure and location of the city within the GCR.

Lastly, in the context of an African city, it is hard to imagine a view of liveability that does not take culture and cultural diversity into account. While the energy and fast pace of Johannesburg draws many to the city, this may not epitomise the concept of liveability for all – although it certainly reflects the characteristics many associate with Johannesburg, given its role as the economic powerhouse of South Africa. Consideration of culture and identity in the context of liveability – and the ways in which the urban context promotes a feeling of 'home' – is however important.

3.9.1 The urban form – a city characterised by urban sprawl

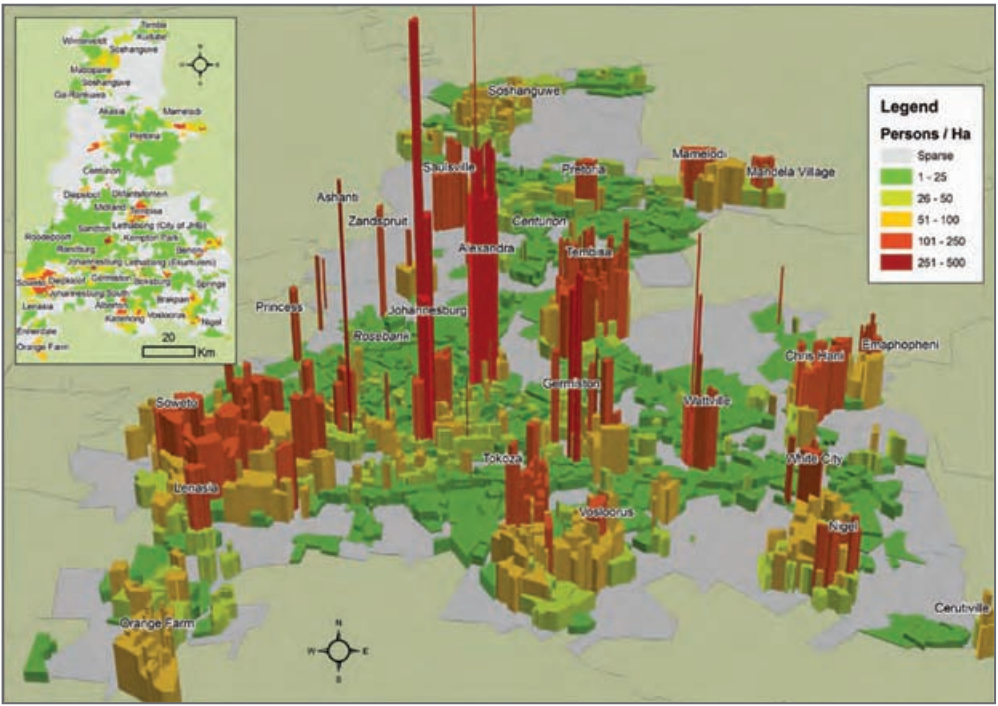
Johannesburg's urban form is a consequence of its history. The city grew with the automobile, extending its edges with the new found joys of motorised mobility. Apartheid planning contributed further to the urban sprawl, with race-based townships deliberately developed on the periphery

of the city, away from opportunity and resources. The legacy of Apartheid planning, the era of the automobile and capital flight to suburban neighbourhoods in the 1970s are all historical conditions that, over-time, have given rise to a sprawling city. Our sprawling city is also a divided city, with places of work that are far from where the vast majority of our population lives. The historical north-south divide has contributed considerably to increased travel times – given the reality where a large number of people live in the south of the city, commuting to jobs that are located predominantly in the north. The Inner City is centrally located, closer to economic activity in the north, with demand for housing steadily increasing and now outpacing supply.

Using urban density as a proxy for compactness, Johannesburg has some of the lowest urban densities – when compared to global cities. Average densities within the metropolitan region indicate 521 persons per square kilometre. There are large volumes of people within the Inner City with considerable overcrowding in particular neighbourhoods. Average densities in the Inner City are estimated to be 2 270 within a 10 kilometre radius, but this is likely to be an underestimation. With overcrowding comes a range of other stresses – related to safety, resources, livelihoods, and other factors that are stretched beyond capacity. Decisions relating to densification become key – with it all the more critical that these are managed in the context of a national, regional and local spatial plan, with due consideration of services, infrastructure and other fundamentals. Barker notes that, while municipal and provincial policies and strategies prioritise densification and intensification of urban development within existing urban areas, projects initiated by both of these spheres of government frequently do not uphold these policies and strategies, leading to the creation of new housing development opportunities in peripheral areas and outside urban development boundaries. This further compounds the problems faced by the poor (2011).

The map below provides a depiction of the GCR's population density – clearly demonstrating the focused areas of density, surrounded by large areas of low density. Careful planning is needed to address this reality appropriately, in the context of a growing population and the challenges distance creates when occurring alongside a poor transport network, that would otherwise be able to connect areas and drive accessibility.

Map 3.1 Gauteng City-Region population density – depicted from a south-north perspective



(Source: Mans and Turok, in South African Cities Network [SACN] 2011: 67)

3.9.2 People-centred transport planning?

Improved economic performance, greater human and social development and enhanced services are more difficult to achieve in the context of urban spread. However, in the absence of a changed urban form, one of the mechanisms through which distance can be addressed is transport. Multi-modal transport infrastructure will be critical for the goals of greater inclusivity and access to be realised. If appropriately implemented, the initiatives raised in respect of public transport (please see Section 3.8 above) will provide a sound base for developing a transport system that is more appropriate to the polycentric city of Johannesburg (as depicted in map 3.1). Where previously the city transport system was designed as a 'hub and spoke' system, with the city centre serving as a central station, new transportation plans developed at the level of the Gauteng Provincial Government and at the level of local government (via the City) are laying the basis for a system that appropriately acknowledges Johannesburg's poly-centric nature. Through this new approach, the needs of all those who work and live in this city will be addressed more fully.

But for planning to be more people-centric, the City should strive to reduce the need for transport and travel in the way it plans areas and approves developments. Being more pro-active in the development of mixed-use nodes, appropriately located across the City and the GCR, will also encourage the creation of environments where people can live, work and play – with all activities undertaken in close proximity. Transport nodes should be regarded as key areas for local economic development, with planning taking into consideration economic development factors, and the interests of prospective investors. Planning may include the development of nodes that can address transport needs, while simultaneously promoting reading, learning, access to technology and access to other aspects of the city – including arts, culture, and heritage.

For a truly community oriented and people-centric approach, it is important that transport planning is undertaken through consultation with communities in terms of their needs (both in respect of plans for urban areas, and in terms of integrated transport systems). The prioritisation of mass transit interventions against clear criteria, considered in the context of a national, regional and local spatial vision, is important.

The City will need to address urban planning within the context of a greater focus on alternative modes of non-motorised transport, encouraging a modal shift (e.g. to cycling and walking) through the design of streets and pathways that are pedestrian and bicycle friendly. This will need to be supported with infrastructure and systems such as bicycle storage facilities, and the provision of an active policing and monitoring capacity, to drive greater safety – thereby increasing use. Additional measures in this regard may include dedicated lanes, wide sidewalks and in respect of public transport, the inclusion of lay byes. Furthermore, planning should take into consideration possible shifts to the form of the Inner City and others central business districts. One route may include a process of ensuring that the Inner City is a pedestrian and public transport friendly area, through the implementation of policies that exclude cars at certain times, with parking restricted to the edges, and traders managed in a way that acknowledges their contribution but also enables pedestrian accessibility to the sidewalks.

Sustainable transportation planning interventions for the movement of people and goods requires good and consistent data, community feedback, performance standards and high levels of inter-governmental planning and co-ordination. Transport planning can also benefit from new technologies. In addition, transport planning needs to be holistic, taking issues such as parking management and the need for the provision of Park and Ride facilities into account.

3.9.3 Human settlements

The spatial DNA of a city plays an important role in creating liveability (Urban Age Report 2008). The design of the city – including elements like streets, buildings and spaces of work and play, are powerful determinants of liveability. Liveability is also created through the access citizens have to a range of cultural and social services and facilities. All of these issues require consideration when addressing the concepts incorporated into the national shift towards 'sustainable human settlements'. The policy framework on sustainable human settlements supports the creation of liveable places of work and rest that address spaces in a holistic manner – focusing on issues of accommodation, services, the built environment and the natural environment, alongside issues of cultural identity.

In this area, the City has faced many challenges. The City of Johannesburg has achieved high levels of service infrastructure coverage, with over 90 percent of its residents holding access to basic service infrastructure. The challenge, however, is still how to transform our Apartheid city, to build liveable communities and create a more humane city for all. Effective restructuring of the inefficient urban form of the city will require more than the simple management of city growth. There is a need to define, in clear and unambiguous terms, a series of spatial reconfiguration projects that pay careful attention to the form, morphology and structure of the city. A vision, followed by detailed planning equal to the vision and plan of the Apartheid city, is needed. Mobility, integration and access are important drivers to effect change. Mobility serves to counter distance and divisions, providing the means to access areas otherwise only available to the select few – with issues relating to this addressed in the section above. While a system like the Rea Vaya BRT is an important tool to address mobility, it is only one intervention – and needs to be supplemented in many other ways. The issue of access is about bringing people closer to jobs, markets, social networks and other opportunities that promote an improved life experience. This is both an important and a fundamental right – with equity of access a key driver.

A focus on integration is also critical, not only because the city faces increasing complications as the urban edge spreads, with careful land use management increasingly important in the context of land scarcity. But integration is also essential in a diverse city, where getting to know others is a step towards optimising the creativity and strengths our diversity brings. Integration in the context of housing and human settlements requires a focus on mixed settlements, and the use of other elements of liveability to create spaces and places that encourage interaction and harmonious living.

Many of the realities faced within the city are influenced, however, by the housing process – which up until now has been led by infrastructure development, which is in turn dictated through provincial government arrangements and the availability of cheap land. This has continued the realities of urban sprawl. The alternative option of waiting for some future point, when these settlements will be better supported by mass public transit lines, is not the answer. A low cost housing ownership model that destroys economic mobility can no longer lead infrastructure investment decisions. The damage is felt where this model has been followed, with communities holding home ownership, but with no easy access to livelihoods and the other resources that may be associated with the city. This model also places further pressure on new bulk infrastructure development. Strategic land-banking and release is a critical tool for the restructuring and integration of the city, and must be strategically approached. Addressing new developments and encouraging a shift in urban form there-in, will also be a key part of this – with it anticipated that greater densification in already-existing residential areas will be a slow process, given the city's footprint. Housing planning should also consider different forms of accommodation, including rental and ownership, with delivery close to places of work and transport nodes and corridors. Low-cost rental options are a priority, in the context of the economic conditions accompanying many who enter the city in search of work.

Addressing the Apartheid urban form over the past period has required a focus on two main forms of spatial exclusion. Firstly, exclusion by design, which was based on deliberate underinvestment in township areas and planned township dormitory towns. Secondly, exclusion by decline, with well-located Inner City areas such as Hillbrow, Berea and Yeoville experiencing historical decline as a result of a collapse of the Inner City property market. Inner City regeneration initiatives have done well to address some of the issues of Inner City decline, but cheap, affordable rental supply remains a challenge. Targeted investments in Soweto have broken the cycle of underinvestment in former townships areas – with visible improvement in these property markets. The introduction of the Rea Vaya BRT system has also supported these initiatives, assisting in making areas that were previously viewed as spatially dislocated, somewhat more accessible through transport. However, while we have focused on addressing 'exclusion by decline' and 'exclusion by design', new post-Apartheid exclusion forms have emerged. Urban crime and violence and private developer led housing projects have created islands of exclusion, adding another layer to the already fractured and divided Apartheid City. These have also extended the boundaries of the city, placing greater pressure on service delivery and infrastructure demands – in a context where maintenance of current systems is under pressure. A national survey on gated communities in South Africa indicates that Johannesburg has the highest number of combined road closures and security estates in South Africa, with the GCR municipalities also displaying some of the largest numbers of secure estates across the country (Landman 2003).



3.9.4 Placing the city in context: the GCR

The city is part of the wider GCR, with all the areas within this region attracting increasing numbers of migrants, both from within and beyond South Africa. Very often, these individuals are unable to access the urban centre, given higher costs and greater competition. The GCR has become characterised by a 'ring of fire' that surrounds the metros – where occupants remain at a distance, unable to benefit from the opportunities of the city. This reality has further embedded poverty within the urban context, sowing the seeds for further exclusion. Addressing this must become a priority for the city, to prevent a scenario of the city being viewed as an island of success, surrounded by a sea of poverty and deprivation. This is addressed further under the section focused on governance.

3.10 Community safety

Making Johannesburg a safer city, especially for its more vulnerable residents such as women, children, people with disabilities and those living in informal settlements, is a priority – and one that requires creative thinking and ideas in order to find effective long-term solutions. If Johannesburg is going to fulfil its vision of being the country's leading centre for business and industry, and a truly world-class African city that offers opportunities for prosperity and a better quality of life, then all its residents must be able to live and work in a safe, clean environment that they can be proud of. Community safety is not just about crime. It is about a multitude of factors at the level of the individual and the community that contribute to the well-being of the city's people – for example: traffic safety; hazards such as fire, weather-related, and environmental factors; crowding and conditions of deprivation; family systems; and community networks.

Many valuable inputs were gathered during the interaction between stakeholders and the City (including the Johannesburg Metro Police Department or JMPD, and other departments within the

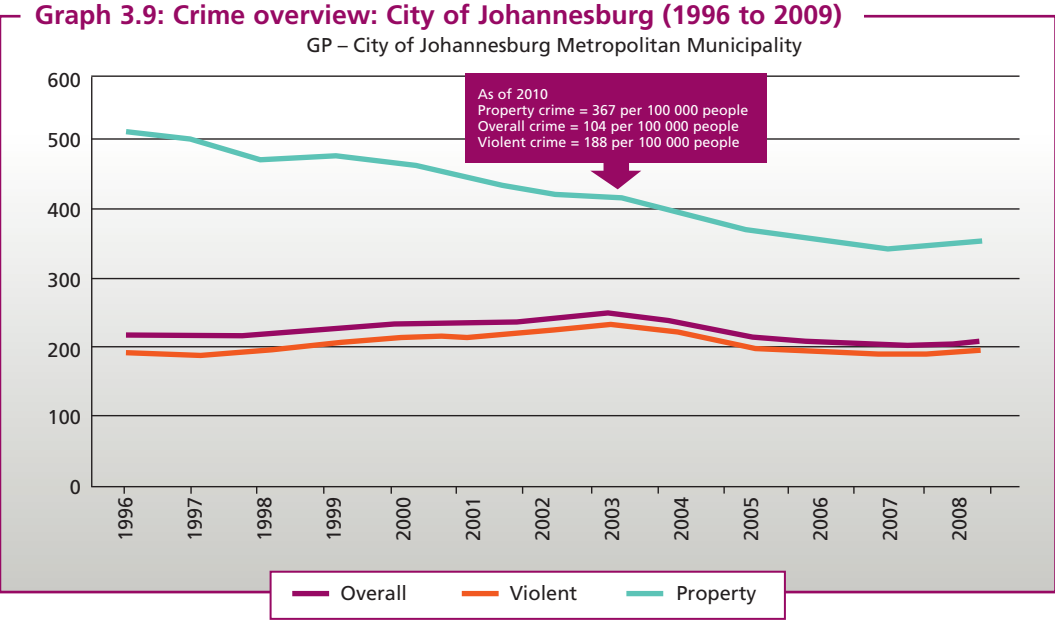
City) – with some of these represented below. Interesting and creative ideas were put forward by local residents during the Outreach process, with ideas raised in support of the reclamation of streets and communities – to make these safer places in which all can live, thrive, raise their families and contribute to society. Importantly, these engagements themselves serve as a tangible outcome of the call to action in respect of community safety, with empowered local residents and community groups and other key stakeholders collectively taking on this issue. Together, the City and its stakeholders can share a wealth of information, knowledge, expertise, and above all pride and passion for our local communities and the city itself – and thereby work towards the creation of a safer, healthier environment that make all proud to live in this great city of Johannesburg.

3.10.1 Placing community safety issues in context

The citizens of Johannesburg suffer from high levels of insecurity, with historical geographical, social and economic engineering and inequities, together with current stresses and poor economic opportunities, impacting significantly on the quality of life experienced – and manifesting in high levels of crime, violence and other forms of harm. The City of Johannesburg’s role in community safety is limited, but the City interprets its mandate to include an array of areas: investment in public safety through community development; urban design and management; the protection of vulnerable groups; infrastructure upgrades; improvements to by-law compliance and enforcement; and responding to emergency and disaster situations. Safety issues cannot be separated from other necessary social conditions for community well-being, such as health and poverty alleviation, education and skills development, an economy that is responsive to available skills and capacities, safe and reliable transport, food security and effective management of natural resources. Recent trends in urban safety highlight that systemic challenges, such as those associated with sanitation and waste disposal, are contributing substantially to poor levels of public safety. Conversations about safety cannot ignore the need for trusted and accountable policing and improved respect for the rule of law. Restoration of faith – in the delivery of criminal and social justice – and trust in service providers, such as the City – will only take place through actions and delivery.

3.10.2 A reality of risk

Crime in South Africa in general – and Johannesburg in particular – is a critical factor impacting on community safety. Data over a thirteen year period shows little improvement, with violent crime and the overall crime rate remaining constant, with 200 people in 100 000 affected on an annual basis. However, data provides evidence of a significant decline in property crime over this period – with trends for the 1996/1997 to 2008/2009 period reflected in the graph below.



(Source: Global Insight Data, 2010)

Within these statistics, the element of ‘stranger crime’ (where the perpetrator and the victim do not know one another) is represented at inordinately high levels. Crimes that fall within this category include theft, burglary, robbery, car hijacking, assault and murder (with these crimes often occurring in combination with one another). Examples of interpersonal crime and violence, where the victim knows the perpetrator, include: assault, murder and/or domestic abuse. Records indicate that young men (between 15 to 29 years of age) are disproportionately involved as victims and as perpetrators, while the homicide rate of women killed by their intimate partners is especially high. The social dynamics that underpin violence include widespread poverty, unemployment and income inequality; patriarchal notions of masculinity that valorise or reward ‘toughness’, risk-taking and the defence of honour; exposure to abuse in childhood and weak parenting; access to firearms; widespread alcohol misuse; and weaknesses in law enforcement. All of these issues require dedicated focus if the City is to address the community safety issues and challenges it faces.

Safety in Johannesburg is a key challenge, but, as noted above, it is often perceived as only being about crime and violence. Insufficient attention is given to a number of other dimensions of safety, at the level of individuals and the community. These include the hazards associated with road traffic accidents, fire and environmental risks. In recent years, Johannesburg has witnessed an increase in injury or death due to fires, especially in the context of crowded Inner City slums and informal settlements. The city has also witnessed an increase in the number of individuals who have drowned in streams due to flash floods in both suburban and township areas, alongside greater flooding of houses due to inadequate storm water systems. South Africa’s injury death rate associated with intentional and unintentional injuries (injuries relating to, for example, motor vehicle accidents) is recorded as 157,8 in 100 000 people – a rate that is almost double the global average. A disproportionate number of victims of road traffic accidents are pedestrians, due to both motorists’ negligence and pedestrians’ lack of education in respect of road safety, or alternatively, lack of care.

3.10.3 Proposals emerging in respect of community safety

The challenges faced in respect of safety leads to a great sense of insecurity and vulnerability amongst many. The related issues are many – including, for example, issues of resilience, urban management, regulation and law enforcement, justice, fairness and community safety approaches and engagement. The city is not perceived or experienced as safe. Continued focus on the vision of a safe, peaceful and just city critical for the path ahead is critical in the context of current realities. To address the challenges faced, a number of key long-term approaches are necessary, to deliver a different future for the city by 2040. These are addressed below.

i. Build trust and active engagement of all

One of the mechanisms through which community safety may be improved is through active collaboration, engagement and communication between service providers such as the JMPD, and individuals, community members and other interested parties. Building trust and respect held by the public in respect of the Johannesburg Metro Police Division and the Emergency Management Services is pivotal, if these bodies are to deliver effectively. Perhaps the most significant role for the City in delivering sustainable safety is to provide leadership through transparent, service-driven, consistent and respectable policing and support. In promoting Johannesburg as a place where people ‘do the right thing’, it is critical that these sections serve according to a clear code, with serious consequences for corruption, negligence or poor performance.

There is no doubt that civil society as a whole needs to be engaged in the dialogue and debate around community safety if real, sustainable change is to be achieved for the benefit of all. Active engagement with communities, to create a shared vision of safe and sustainable neighbourhoods, is also critical. One part of this solution should include community and neighbourhood policing, as well as the provision of platforms for local residents’ voices to be heard when dealing with community safety and crime prevention issues. Mechanisms through which local residents and other key stakeholders are able to better collaborate on a regular basis to share ideas, information and expertise on implementing community safety initiatives should be implemented. Effective partnerships such as these are critical in ensuring the City and its stakeholders are able to find effective solutions to improve the safety of all our communities.

ii. Creating sound spaces that promote community safety

As part of process of engaging a wider range of community members and stakeholders in addressing community safety, experts in particular specialist fields must be part of the debate, particularly in respect of issues such as how to practically design and manage more innovative urban spaces that can support more effective crime prevention. Architects and urban planners, working together with practitioners, academics and students bringing innovative ideas from both academic institutions and practice, need to collaborate with the city to conceptualise and create safer, cleaner urban communities that stimulate local pride and well-being, while deterring crime. Beyond the design of spaces within the city, focus should also be placed on issues of by-law enforcement and control, to create safer and cleaner communities for residents to live and work in. Improved maintenance of public spaces also instils a greater sense of pride, further acting as a deterrent to acts of vandalism that destroy the value of local community landscapes and amenities. In terms of these issues, all residents, and the communities they constitute, have a role to play in maintaining the quality of their living spaces and the access they have to meaningful, quality services and amenities.

Partnerships have also proven to be a critical mechanism through which community safety and the quality of spaces can be addressed – with examples of successful business, community and government authority and agency partnerships to date including the City Improvement/Management Districts. Related processes of collaboration include the Sojo Business and Tourism initiative, which has enabled improved management and maintenance of urban areas through arrangements between the City, its entities and other parties, and pro-active participation and engagement with business, community and authorities through forums discussions and projects. A further example is represented by KlipSA, which has played a range of roles, including pro-active engagement with investors and developers to ensure sustainable development and a focus on value of bio-diversity, natural and cultural assets (Barker 2011).

iii. Shift alcohol use and abuse patterns – building a different society

During the outreach process, alcohol emerged as a key obstacle to safety in the city. While this is a broader issue relating to alcohol consumption within South African society, it has a direct impact on the city. There are site-specific strategies that could reduce the harm and cost of alcohol abuse for the city and its residents, with programmes to change the culture and actions of citizens viewed as important. During the outreach process, it was argued that the City needs to take a stand against active advertising that promotes a link between alcohol consumption and an enhanced life style – with the City's responsibilities in respect of billboards being one area through which it could play a role. In addition, it was noted that the City could be pro-active in restricting zoning rights for alcohol sales, engaging communities to serve their best interests in this regard while also being rigorous in maintaining the guidelines for where the sale of alcohol should or should not be zoned. In this regard, ensuring alignment with the long-term vision of the Gauteng Provincial Government (GPG) is also critical. While liquor licensing is managed at the level of the GPG, the City must work in a more structured way with the province, to influence the issuing of licenses. It has also been argued that the City must be an active partner in the new liquor licensing process, with clear roles to be defined for the future. In respect of alcohol and other forms of substance abuse, community participants argued that better communication and problem solving should be encouraged at grass roots level between all vulnerable residents and those who are looking to achieve more effective crime prevention in local communities. Where crime is ignited at a community level due to these elements, communities must play a more active role.

iv. Focusing on the youth

The City needs a new strategy to build the asset value of youth, while recognising that they are a high-risk group with special needs. This is partly due to their own tendency to behave, at times, in risky ways, but is also a factor that emerges in response to the sometimes-low expectations held of them, and inadequate opportunities for advancement and for pro-social activity. A multi-pronged approach of data gathering, engagement, skills development initiatives and support provision are necessary. Efforts need to be made to support the creation of public places where young people can safely gather and engage in collective activities.

v. Addressing the needs of the vulnerable

The city is home to many vulnerable groups, with vulnerability exacerbated by poor access to safety services. There is a need to target vulnerable individuals and groups, to address their unique needs and circumstances. Some locations within the city are considered to be of concern from a safety perspective (e.g. the informal settlements), but also from a security perspective (e.g. as a result of the absence of proclaimed land in informal settlements). Immediate responses to the needs of those affected, while also focusing on the prevention of violence, should be ensured – in co-operation with other city departments. There is a fine line here, with the establishment of a shared ethos amongst members of the City's team critical to ensuring sound delivery, without negative or unanticipated consequences. Often, vulnerable groups lack information about where and how to access services. This is a further area in which the City should provide support, through addressing targeted campaigns to enable access and reduce vulnerability.

vi. Addressing other issues of harm – fire, floods, environmental hazards

As noted, community safety goes beyond crime alone. To address safety issues relating to traffic, fire, other environmental factors and those associated with overcrowding, the City will need to actively engage in education campaigns, by-law enforcement, community awareness activities, the implementation of further risk management mechanisms, and the encouragement of active citizenry. It is only with a fully engaged citizenry that the city will become truly safe for all.

3.11 The 'smart city'

3.11.1 The value of the 'smart city'

A 'smart city' can be defined as a city that uses Information and Communication Technology (ICT) as an enabler, to merge dimensions of smart utilities, smart mobility, smart economy, smart environment, smart education, smart people, smart living, smart health, smart planning and smart governance. The City of Johannesburg strives to become a smart city, by providing services that are easy to access and use, while being efficient, responsive – in open and transparent way – and ensuring sustainability and the inclusion of environmental considerations.

The 'smart city' concept brings together all the characteristics associated with organisational change, technological advancement, economic, social development and other dynamics of a modern city. It is predicated on the idea that the optimal deployment of ICT can play a critical role in a city's development; and indeed, it may permit 'leapfrogging', allowing the city to shift to a qualitatively higher state of development. However, in the context of South Africa, only 15,8 percent of households have access to computers and even fewer households (seven percent) have access to the internet (The Gaffney Group and SALGA 2011). This gap is even more significant in respect of access to broadband networks, where broadband has been a driver of growth and development across the globe, improving community development, ensuring access to economic opportunities and knowledge and allowing for greater access of services. In Johannesburg, a significant minority enjoy high-speed access via corporate networks¹⁴, domestic connections and wireless 3G networks. Broadband networks are clustered in the main urban economic nodes, effectively excluding township areas, informal settlements and non-urban/agricultural areas. This 'digital divide' mirrors the broader socio-economic disparities that our Apartheid legacy has bequeathed on contemporary South Africa.

At the same time, there is strong evidence that the majority of households – indeed, the vast majority of adults – have access to cell phones, reflecting a global trend of massive uptake of cell phone usage. Smart phones are increasingly ubiquitous, including among the urban poor, and serve as a useful tool through which people can access the internet. This means that there are important opportunities for bridging the digital divide through the use of wireless broadband networks. These opportunities have as yet not been optimised by the State, to improve its service offerings to the citizenry. There are opportunities for government, across all spheres, to provide seamless support in certain areas to all citizens in a given locality.

Use of ICTs by the City of Johannesburg itself has been quite uneven across the municipality's different departments and functions. In some cases, the City has invested heavily in ICTs, with the billing and revenue collection systems representing one example. Unfortunately, these cases have translated in some cases into significant customer dissatisfaction. At the same time, the rapid development of

¹⁴ A broadband connection is typically one where the connection is in excess of 2 mega bits per second (Mbps).

technology may offer solutions for current challenges, such as intelligent infrastructure – as well as future improvements in areas characterised by failed ICT implementation.

At quite a different level, the economy of the Joburg area is dominated by sectors such as financial services, which are among the most intensive users of ICTs. The headquarters of four of South Africa's largest commercial banks are located in the city centre, with heavy reliance placed by these organisations on their in-house IT departments and the wider software development industry, which provide support in respect of ongoing innovations on their e-services. There are therefore opportunities for strengthening the nascent ICT sector for the overall socio-economic development of the city. The City has a critical role to play in addressing ICT as a strategic matter, not only as an internal system, but as a service to the stakeholders within the city. Where such an approach has been followed elsewhere, this has often been accompanied with a further period of investment, as companies move to areas in which services and systems promote better performance.

3.11.2 Requirements for implementation, actions and further possible areas of delivery

While the benefits are evident – and the importance of a 'smart city' approach is clear – there are challenges and requirements. Challenges to be addressed in initiating smart practices include the need to commit funding – where this is scarce in the context of the City – and the need to address skills shortages in respect of those critical skills required to support the adoption of new technology.

Smart cities make use of a broadband infrastructure – with application of this concept requiring implementation of a widely available and affordable broadband infrastructure for all, in developed and underdeveloped areas. While the resource requirements for delivery in this regard will be significant, Johannesburg has started investing and rolling-out broadband. While there are various solutions available for the City of Johannesburg in respect of the 'smart city' concept, it is critical that the City defines a clear framework and strategy – both in respect of broadband and other areas. The 'smart city' should also have a designated home or co-ordination centre, from which all the City's initiatives and efforts – across all departments and MOEs – are co-ordinated and driven. A clear roadmap must also be completed to craft the journey ahead.

It should be noted that a 'Smart City' programme will need to be a cross cutting programme. This is not only about the infrastructure, but also about the solutions available to bring services closer to the community, to positively contribute to the environment and to build a sustainable City. It is imperative that the citizens are part of this change, and understand how the changes will impact their lives. A Smart City programme will bring about changes to how the City communicates with its citizens. In this area, the City must be ready to respond promptly and efficiently – to prevent citizen discomfort or mistrust. With a wide selection of solutions available, a thorough process has to be undertaken to determine the priorities – and how these will assist in fulfilling the objectives set out on the GDS. Examples of some of the solutions include the use of greater public access to internet and libraries, through which to drive the knowledge economy, a focus on 'smart citizenship' approaches through which the City can address, amongst other needs, the increased demand by citizens on government to be flexible and efficient in the manner in which services are provided, and the application of the smart city concept in respect of safety. In terms of the later, the city may choose to adopt some of the following:

- *Smart crime fighting* – preventing crime by enabling law enforcement agencies to better understand criminal activity patterns, while bolstering capacity to detect and prevent fraudulent activity in the City. For this to be optimised, law enforcement agencies must understand the technologies used in perpetrating criminal activity.
- *Emergency management* – providing quick real-time information to relevant authorities, improving situational awareness and enabling geographically dispersed teams to collaborate seamlessly.
- *Criminal intelligence* – collaborating and sharing information between agencies, while allowing for the verification of identities and relationships between entities, through enhanced analytics and trends.

3.12 Governance

The Oxford dictionary speaks of governance as "an act or manner of governing... The system by which a state or community is governed." The fundamental principles of good governance, as reflected in the Constitution of the Republic of South Africa, include the rule of law, accountability, accessibility, transparency, predictability, inclusivity and a focus on equity, participation and

responsiveness to people's needs. The former UN General Secretary noted governance as the most critical factor in eliminating poverty and driving development. Governance underpins everything the City does – and without it, inclusivity and sustainability is not possible – and nor is continued delivery of services and goods. Key themes of critical relevance to the concept of governance include, amongst others: community participation; engagement and consultation; oversight; risk management; and related controls (e.g. in respect of financial matters and delivery); reporting arrangements; and issues of co-operation and engagement – with one of the key aspects of relevance to Johannesburg being that of the GCR. Monitoring delivery and ensuring accountability should be the role of all – officials, political representatives and ward councillors, citizens and residents, non-governmental organisations (NGOs), business, and other stakeholders.

There are certain governance qualities that must be recognised and strategically strengthened, for optimal outcomes. These include, for example, the need for consistent compliance and enforcement of by-laws, policies and other regulatory requirements, and a focus on ensuring stronger and more significant consequences and penalties in cases of non-compliance, to serve as deterrence. Establishing a better understanding of participation opportunities, through developing an improved definition and understanding of the dimensions and nature of public participation, is also key (International Association for Public Participation, cited in Barker 2011).

3.12.1 Why does governance matter?

The establishment of appropriate structures, systems, policies and processes – underpinned by a sound set of values and ethics – is fundamental for successful delivery by local government. Tensions characterise the domain of government, and local government in particular. Governance arrangements provide a more predictable and commonly understood approach through which to mediate these tensions. As noted by the Deputy Minister of Co-operative Governance and Traditional Affairs (CoGTA), Dr Y Carrim, in his address to the Joburg 2040 GDS Conference on 4 October 2011: "governance...even in the most stable of countries in the most prosperous of times, is about managing tensions that flow from the different needs, interests and aims of a variety of groups and constituencies. There are also tensions between now and the future; between what's possible and what's desirable; between ideas and practice. And there are tensions too between government and governance" (2011: 1). Governance forms the mechanism through which to manage the many tensions that challenge cities – with some of the many tensions outlined below.

3.12.2 Tensions in the context of city governance

While there are numerous tensions experienced across all the spheres of government, some of the tangible tensions noted by Y Carrim in respect of local government include those between:

- Ideas and practice in respect of community participation: with the task of ensuring sound and ongoing community participation a challenge for all municipalities. This requires:
 - o Internalisation of the value and importance of community participation by councillors and officials;
 - o Sufficient capacity and resources to ensure rollout of the concept – and delivery on commitments;
 - o Provision of support and resources to adequately capacitate organisations and residents – thereby ensuring that they are skilled and have the necessary tools (including simple summaries of key documents and strategies) to meaningfully engage with the City; and
 - o An appreciation of the fact that many communities cannot be represented by one voice or one representative – with informal settlements, in particular, divided, with "highly contested, complex and multi-layered, with fluctuating leaderships, with different strata or factions constantly competing for hegemony" (Y Carrim 2011: 3). This latter point makes engagement and participation all the more essential.
- Different role-players in the City, each with their interests and areas of responsibility: This includes tensions between proportional and ward representation councillors, between the role of Mayor and that of the Speaker, between full-time versus part-time councillors, and between administrators and councillors. It is argued that these issues will in part be addressed by amendments made through the Municipal Systems Amendment Act.
- The issues and responsibilities residents hold metros accountable for – and the "limited powers, functions and resources" held by metros (Y Carrim 2011: 4). While residents expect delivery by metros on all issues – from housing, to education, health and basic services – many of these

responsibilities do not rest with local government. Where elements of these functions are devolved, a further tension arises in those cases where the necessary capacity and resources have not been provided, to support devolved functions. For residents, it is irrelevant who the delivery agent is. Local government is the most immediate and accessible form of government, in the context of city issues – and is therefore often held to account for delivery on functions not within its ambit of control. Here, there is a responsibility to communicate and engage, even if inputs are then be fed to other spheres of delivery.

- The need to plan and govern in a context of “slow economic growth, high unemployment, significant poverty, constant in-migration and uncertain climate changes” (2011: 4). These are noted as structural issues, largely beyond the control of cities. And yet, given the reality that people migrate to cities in search of opportunity, it is this sphere of government that is responsible for a disproportionate quantum of South Africa’s challenges – with significant stresses experienced in respect of services, infrastructure, and financial and other resources.
- The respective powers and functions of local, provincial and national government – with this tension noted as particularly of relevance to Johannesburg, given its size of population, budget, responsibilities – and the role it must play in respect of the national economy. While legislation has imposed a ‘one-size-fits-all’ approach, it is argued that a differentiated approach to municipalities would be preferable, allowing for municipalities to exercise “different powers and functions from a common menu, according to their capacity, spatial characteristics, economic and revenue base, funding and other resources” (Y Carrim 2011: 4).
- The role of cities in supporting national economic growth and development, and the absence of a supporting policy addressing national urban development.
- Metros and their municipal entities, where these have been established – with the objective of ensuring improved delivery by means of a municipal entity juxtaposed with a new set of governance challenges. These challenges relate to tensions in relationships between councillors and the Boards of entities, between developmental imperatives of councillors and the more commercial imperatives of the Boards of entities, and between the need for cohesion – and the need entities may have for autonomy.

These matters provide a brief view into the challenges that necessitate governance, at all levels and across diverse issues, within the City of Johannesburg. They also highlight the need for an integrated system of co-operative governance between the spheres of government, to facilitate the provision of more effective support for cities and other municipalities by national and provincial government. This requires less focus on attributing non-delivery to local government, and more focus on supporting the best outcomes through the provision of requisite capacity and resources – within the context of co-operative governance.

3.12.3 Building a network of supporting governance arrangements and practices

The tensions raised above highlight the governance complexities faced within the context of local government. For effective delivery that takes account of all stakeholders – while ensuring a constant, unwavering focus on the mandate of the City and those it is bound to serve, there is a need to mediate these tensions. The City has made some significant progress in the area of governance. This area has been supported by the implementation of refined governance and institutional arrangements during last term of office (2006 to 2011), with these arrangements enabling improved oversight (in respect of both municipal entities and City departments), greater scrutiny and increased accountability of the Executive to the Council (where the latter represents the Legislative component of the City). Systems have been implemented or adapted to support these arrangements – including those pertaining to Oversight Committees and their delegations, performance management policies and practices, and reporting requirements. There have also been increased levels and intensity of engagement with citizens through processes of consultation and communication, with the GDS outreach process in itself being representative of this deliberate focus. However, despite high levels of engagement, the city has witnessed a significant volume of service delivery protests, with it acknowledged that further – and different – work must take place in this regard. In addressing some of the challenges and tensions going forward, the following areas have emerged for action:

i. Facilitating meaningful stakeholder collaboration, participation and engagement

The participation of South African citizens in local governance issues is rooted in a range of legislative arrangements, including – amongst others:

- The South African Constitution (Act 108 of 1996);
- The 1998 White Paper on Local Government (which argues for the importance of affording organised civil society the opportunity to enter into partnerships and contracts with local government in order to mobilise additional resources);
- The Municipal Structures Act of 1998, which clarifies the role of the ward committee in enhancing participatory democracy in local government; and
- The Municipal Systems Act (Act 32 of 2000) – which requires local government to develop a culture of governance that supports and complements formal representative government participatory governance systems – allowing for consultation on issues relating to the quality, level, range and impact of municipal services as provided. This is augmented further by amendments, as noted above.

While participation has often been characterised by the involvement of those with political affiliations, it should ideally be characterised by involvement of all – to provide meaningful input for a pro-active and responsive local government. Key recommendations through which to promote enhanced participation include: greater civic education and opportunities for mutual learning; the use of technology to enhance participation; and the provision of support and encouragement of participants – thereby allowing for well-functioning civil society groups, business and other interest groups, as well as ward and regional structures. Community and stakeholder participation in planning and budgeting has been one of the areas of concern for the City – with focus placed on addressing mechanisms for enhanced community engagement through the GDS Outreach itself. As noted above, this is an area requiring ongoing focus, education and commitment from all parties. It also requires ongoing communication with citizens and stakeholders, alongside a recognition that this is not only about the City delivering for citizens. There is an increasing need for greater participation by citizens and residents, in terms of both the resolution of their own problems, and their role in serving as responsible citizens – and understanding and delivering on their rights and duties in this capacity.

Service delivery protests are viewed as one of the ways in which social and economic alienation is expressed, and serves as another reminder of the actions necessary in the realm of governance – as well as the importance thereof. Addressing the root causes of service delivery protests will in part include mechanisms to ensure citizens feel part of decision-making and planning processes. The other elements are more fundamental – and include issues such as access to basic services, livelihood opportunities, homes, safety, education and good health, with accountability for many of these issues not resting with local government. This demands greater co-operative governance – as noted above.

ii. Co-operative governance – across the spheres of government, and within the GCR itself

As reflected above, one of the critical tensions – and challenges – facing the City pertains to the issue of co-operative governance. Citizens do not distinguish between responsibilities at different spheres – instead focusing on whether or not delivery has taken place. It is imperative that greater co-operation is fostered, for the good of the city – and thereby, the nation. This requires a change in terms of language and practice – with national, provincial and local government representatives speaking the same language in terms of deliverables at a local level, so that commitments made in terms of local government mandates match local government capabilities and planning. Promises by other spheres of government, that will then need to be overseen by ward councillors who are responsible for delivery, cannot be made in a vacuum. The dislocation between national and provincial priority and policy setting and local government realities at the site of implementation need to be addressed. Co-operative governance is essential, to ensure seamless service delivery from all spheres of government and other social partners. The City also has an obligation, given its size and role in the national economy and social context, to work alongside other spheres of government and municipalities in influencing legislative reviews and ensuring an enabling legislative framework – where this is not present.

Considerations relating to co-operation demand a focus on the GCR, of which the city is a part. It has already been noted that the GCR is increasingly attracting migrants –with these individuals often unable to access social and economic opportunities. As the GCR economy continues to grow, with

complex social and political interactions continually changing, greater co-ordination will be necessary to promote liveability, co-ordinated growth and development across the region. The Joburg 2040 GDS provides the City with an opportunity to support the creation of a governance model for the GCR – given that, to date, the varied and detailed ideas have not been realised. To address the governance needs of the GCR, the following requirements should be addressed:

- Optimal political and administrative leadership arrangements – to strengthen the city-region and focus on development at a regional level;
- Establishment of a shared, clear strategy and vision for the GCR, to bring various role-players together in working towards achieving common goals;
- An effective institutional frameworks for decision-making and co-operative governance, with a clear delegation of powers between all spheres of government;
- Consideration on those areas of delivery where a regional approach rather than a localised approach will best suit delivery needs, and address financial, capacity and other constraints; and
- A focus across all involved stakeholders on providing citizens with high quality services and access to urban activities (to achieve both social and economic progress), and enabling improved competitiveness of firms, and investment in high-quality technology, skills and knowledge sharing.

While the GCR concept and reality has grown in prominence and strength through the force of momentum, rather than through active structuring, the time has arrived for a more concerted effort in this regard. This will require a more formalised City of Johannesburg position in terms of the GCR (e.g. in respect of governance arrangements). It will also require the establishment of structures for decision-making purposes (as noted above), thereby embedding powers and functions, and through the GCR and the City's place within it, initiating a 'Joburg African' and 'south-south' agenda – enabling the City to serve as a global player. Inter-governmental relationships and structures in the region should be optimised, to enable integrated and efficient service delivery. This may include strengthening of inter-governmental technical forums, programmes and projects – in respect of a range of areas, such as:

- Roads and transport – as represented in the Gauteng Provincial Government's (GPG's) 25-year integrated Transport Plan and the Department of Transport's envisaged transport corridors);
- Inter-regional waste, water, sanitation and electricity forums;
- The green economy; and
- Multi-jurisdictional service utilities.

iii. Supporting and improving oversight within the City – driving delivery and a service orientation

While the City has worked hard in this area, further work is required. The City has made significant strides in its performance management system, oversight and reporting arrangements. However, oversight committees need additional support and capacity to perform their responsibilities effectively, as does the Audit Committee. There is also a more fundamental need to address shortcomings in respect of the sub-optimal functioning of certain departments and municipal entities, and the need for public and customer oriented staffing. It is suggested that the Audit Committee should oversee integrated reporting, with a combined assurance model applied to provide a co-ordinated approach to all assurance activities.

Driving an appropriate service orientation is essential if the City is to deliver appropriately. This requires greater focus on training and mentoring for the delivery agents (both staff and political representatives) – to ensure a customer orientation, and to embed a culture of performance and innovation. It is critical that further mentoring and training is extended to councillors, beyond what is currently provided, to ensure ward counsellors understand the planning and budgeting issues themselves, commitments made there-in, and their accountabilities to the constituencies they represent (thereby separating themselves from party politics). In addition, a critical component of stakeholder oversight, and a sound service orientation, is the establishment of improved systems for filtering and communicating messages and input from the public and other stakeholders to the relevant arms of the City, to drive delivery and ensure responsiveness. Lastly, other mechanisms and structures may support greater oversight – e.g. establishment of a dedicated Oversight Committee for the Mayoral Office and Legislature, through which input from civil society in respect of Legislature performance and delivery against the IDP can be gathered and addressed.

iv. Enabling effective representative governance

Some of the complication noted in respect of ward committee structures have already been noted above. While these structures need greater support so that they are better enabled in their roles relating to development advocacy, communication and reporting, other activities such as education of the public and ensuring accessibility of public engagement platforms (both in terms of time of day and place) will go a long way to drive greater effectiveness in representation.

v. Building financial and delivery sustainability and resilience

Ensuring financial – and thereby service delivery sustainability is a non-negotiable, as witnessed through recent experiences of the City itself. This requires a focus on finances, fraud prevention and the requirements for a clean audit. In terms of focusing on financial matters, it is suggested that the City should learn from other cities – while also considering if the impact of the recession on economic growth of Johannesburg is reflected in the financial sustainability model. With the recession still not over, there are implications for the City's ability to collect revenue (and its approach to tariff setting) – especially in the context where customers are often not able to make ends meet. Mechanisms to address financial sustainability must therefore anticipate the risk of a shrinking tax base. Some of the key considerations in respect of financial sustainability include a focus on:

- Strategic procurement and contract management (to derive better value for money);
- Strategy-aligned budgeting, following a robust process of resource allocation;
- Ethical financial practices for effective and efficient financial management;
- Consideration of long-term funding requirements (and long-term borrowing approach); and
- A focus on alternative funding sources (such as partnerships and new forms of taxation).

In terms of fraud prevention, it is acknowledged that the City's leadership and management must design and implement appropriate, transparent and fair processes to prevent fraud. These should address some of the issues that are perceived as contributing to fraud – e.g. mal-administration; misuse of Council property; and tender irregularities.

Lastly, in terms of the focus on a clean audit, it is important to note that this is not only about compliance with sound financial management requirements. Clean audits are only possible in the context of sound quality and capacity – across a range of parameters – with delivery on these parameters a good marker for ongoing sustainability of the City. To drive a clean audit, it is noted that risk management mechanisms need to address group-wide strategic risk identification, management and mitigation.

3.12.4 A sound base

The City has a sound base in respect of governance issues – established over years of delivery, practice, development of new and refinement of existing models. With a 63,2 percent poll attained in the most recent May elections, the City also has a significantly better than the average base of active, engaged residents, from which to draw participation. This serves as a sound foundation for the GDS, to be built on further in future governance activities and initiatives.

3.13 Conclusion

The analysis contained here-in provides a holistic perspective of the challenges – and opportunities – that lie ahead. These inputs, while clustered in the context of the nine themes, tie directly into the areas highlighted within the GDS paradigm – with the concepts of resilience, sustainability and liveability cutting across, and providing a focal point towards which all targeted interventions within which the City can aim.