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# STRATEGIC INTEGRATED TRANSPORT PLAN FRAMEWORK FOR THE CITY OF JOBURG

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DRAFT FOR DISCUSSION - 13 MAY 2013

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## INTRODUCTION

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The City of Johannesburg's First *Integrated Transport Plan (ITP)* – 2003-2008, was approved by Council in August 2003. It was updated three times - in 2004, 2006 and 2007.

Work on a new ITP for 2013-2018 began in 2012 and a different approach is being adopted by the Transport Department. Instead of a single document, the following components will be developed.

The first component is this document, which we have called a Strategic Integrated Transport Framework. The aim of this document is to highlight the status quo and give an overview of some of the major developments and shortcomings in the last ten years; then to set out the City's objectives and vision for its transport system and the strategies which it intends to pursue to achieve them. Outputs, outcomes and indicators that will be used to measure the City's performance are set out, as well as standards for transport infrastructure and public transport services that can be expected by the public. A high level spatial network has been developed which shows the main corridors and routes for public transport, freight and cycling and walking.

The Database component is taking the form of a Johannesburg Household Travel Survey – being carried out during the first half of 2013 – and a Transport Information Register, for which data collection took place in 2012 and 2013. Following these components, and guided by the data and the Framework, the Transport Department will be preparing an Integrated Transport Network showing the public transport corridors and routes the City will be investing in, and a ten-year plan for its main interventions to expand the network. The fourth element, Detailed Strategies or Operational Plans, will be developed as and when the planning needs to be done, i.e. in relation to particular projects or programmes.

These four components are illustrated in Figure 1, while the relationship between the ITP and the *Joburg 2040: Growth and Development Strategy (GDS)*, as well as relevant statutory plans, is shown in Figure 2.

FIGURE 1: CITY OF JOHANNESBURG INTEGRATED TRANSPORT PLAN PLANNING PROCESS

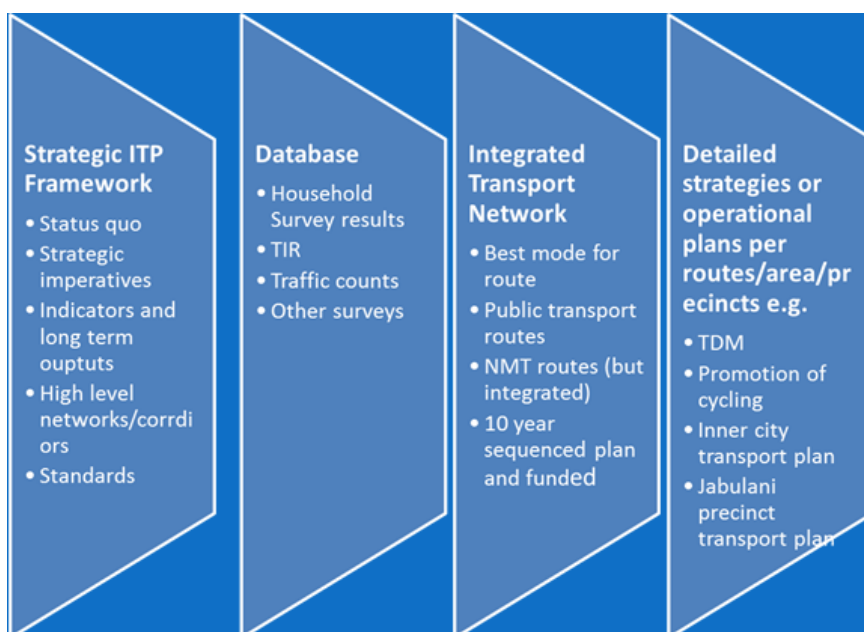
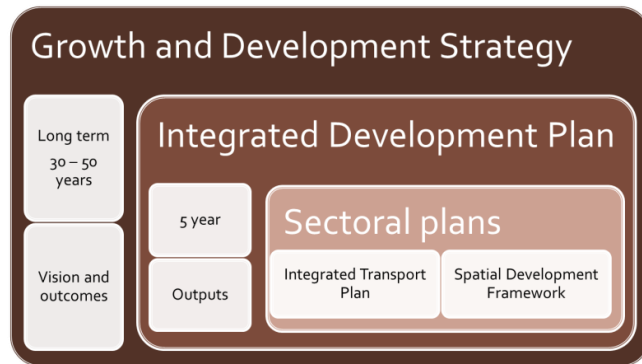


FIGURE 2: RELATIONSHIP BETWEEN ITP, JOBURG 2040 GDS AND OTHER CITY PLANS



## CITY AND TRANSPORT FACTS AND FIGURES

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### JOHANNESBURG DEMOGRAPHICS

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Johannesburg had a population in 2011 of 4 434 827 people, compared to 3 225 812 ten years earlier in 2001. The average annual growth rate was thus 3,2%. Johannesburg residents make up 36% of Gauteng's population, and 8% of the population of South Africa. The city's population is young – a third of its residents are under 35 years of age.

There are 1 434 856 households, 62% of them male-headed and 36% female-headed. Racially, the population is 76,4% African (compared to 73% in 2001), 12,3% white (16% in 2001), 5,6% coloured (6% in 2001) and 4,9% Indian (4% in 2001).

At 1644 km<sup>2</sup> the density of Johannesburg is 2 698 persons/km<sup>2</sup> compared to 1962 persons/km<sup>2</sup> in 2001.

A major change in the demographics of the City in the last ten years is the extent of migration from other parts of South Africa and from other southern African countries. While the majority – 93% - of Johannesburg residents in 2001 were born in Gauteng, only 52% were in 2011. Residents born outside South Africa comprised only 3% in 2001, but made up 13% in 2011. Most international migrants have come from other southern African countries.<sup>i</sup>

Based on current trends, the *Joburg 2040 GDS* expects Johannesburg's population to reach between 6 and 8 million by 2040.<sup>ii</sup>

Most residents – 74% - stay in formal accommodation – either a formal house on its own stand, a townhouse, cluster or a flat in a block of flats. Seventeen percent of residents live in informal accommodation – either a shack in an informal settlement, or a backyard shack (compared to 20% in 2001). The remainder of people stay in a backyard house, flat or room (8%) and 1% in tents or caravans.

Johannesburg has high levels of unemployment and poverty and one of the highest levels of inequality in the world. Of the economically active population in Johannesburg, 72% are employed (1 696 520 people) while 28% are either unemployed (564 970 people) or discouraged workseekers (105 882 people). Of the people employed, 78% or 1 328 219 people described themselves as occupied in the formal sector, 8% or 143 859 people as informal sector employees and 13% or 223 302 people as being employed in private households. Average household incomes by race in Johannesburg in 2011, according to the census, were: African households R68 000; Coloured households R142 000, Indian/Asian households R259, 000 and white households R360 000.<sup>iii</sup>

Transport accounts for 31% of SA's energy consumption (in cities transport accounts for 56%) and 16% of CO<sub>2</sub> emissions.<sup>iv</sup> Johannesburg is a relatively energy-efficient city in global and national terms but relatively inefficient in relation to some cities in developing countries. Johannesburg's latest calculation of its city-wide carbon emissions is 19 543 372 metric tons of carbon dioxide equivalent (2007). The population was 3 888 182 in 2007 which gives a per capita figure of 5,02

metric tons. Comparable figures in other cities and countries have been calculated as 5.1 in Seoul, 3.5 in Jakarta, 1.9 in Rio de Janeiro, and 1.4 in Sao Paulo.<sup>v</sup>

## TRANSPORT SYSTEM IN JOHANNESBURG

### INSTITUTIONAL RESPONSIBILITIES

All spheres of government play a significant role in Johannesburg’s transport system. The national sphere is responsible for the freeways (N routes), passenger and freight rail. The provincial Department of Roads and Transport builds and maintains various provincially-owned roads in Johannesburg, is the contracting authority for various bus services in Johannesburg, for administering economic regulation of public transport through the issuing of operating licences, for vehicle licencing and for the Gautrain high-speed rail system in the province, and builds public transport infrastructure on provincial roads.

Johannesburg runs a municipal bus service called Metrobus and the Rea Vaya Bus Rapid Transit (BRT) system, it builds and maintains the roads owned by the City, including two freeways (M1 and M2), and builds public transport infrastructure on city-owned roads and off-street. The Transport Department is also responsible for all transport planning in the city.

### THE ROAD AND STORMWATER NETWORK IN JOHANNESBURG

The Johannesburg Roads Agency (JRA) is a private company established by the City in 2000. It derives its mandate from the Service Delivery Agreement it has signed with the City. The JRA is responsible for the construction, maintenance, and management of infrastructure networks associated with roads, bridges, road reserves, storm water, footways, railway sidings and traffic mobility management. This includes traffic regulatory infrastructure (traffic signals, road markings, road signs and regulatory operating system); road infrastructure (roads, bridges and culverts, road reserves including verges and footways, guard rails, fencing and billboards, infrastructure development and maintenance) and storm water catchments development and maintenance. The JRA’s priorities are:<sup>vi</sup>

- Resurfacing of the road network
- Bridge rehabilitation
- Stormwater management
- Traffic mobility (congestion management)
- Surfacing of gravel roads
- Information management systems, including financial management and human resources

The extent of the road and stormwater infrastructure network in the City of Joburg that is managed by the JRA, per administrative region, (as of February 2008) is shown in Table 1.<sup>vii</sup>

TABLE 1: EXTENT OF ROADS AND STORMWATER INFRASTRUCTURE IN CITY OF JOHANNESBURG

Infrastructure component	Region							Total
	A	B	C	D	E	F	G	
Paved roads (km) - CoJ-Owned	<b>678</b>	<b>1408</b>	<b>1298</b>	<b>1462</b>	<b>1245</b>	<b>1534</b>	<b>700</b>	<b>8324</b>
Gravel roads (km)	<b>376</b>	<b>1</b>	<b>180</b>	<b>39</b>	<b>10</b>	<b>6</b>	<b>384</b>	<b>997</b>

Intersections	4569	4900	6558	8849	5104	6548	7324	43852
Stormwater channels/culverts (km)	17	56	50	16	40	70	39	288
Stormwater pipes (km)	220	382	412	383	519	477	172	2565
Stormwater pipes (unknown) (km)	4	37	15	12	24	35	25	153
Stormwater kerb inlets	3392	6705	6547	7401	8634	10302	3228	46209
Stormwater inlets (other)	3487	6701	5005	5179	8200	8253	2396	39221
Stormwater manholes	1386	5953	3385	3286	5978	5111	1578	26677
Stormwater inlets (unknown) (km)	335	1450	275	123	1027	565	0	3775
Bridges (CoJ-Owned)	64	87	89	45	117	204	10	616
Bridges (not CoJ-Owned)	66	87	73	21	69	160	73	549
Bridges (Ownership unknown)	128	29	55	46	46	55	66	425
Dams (JRA)	0	2	5	1	0	2	0	10
Signs	0	177	80	0	1089	788	0	2134
Motorway (Lane Kms)								398

## THE RAIL SYSTEM

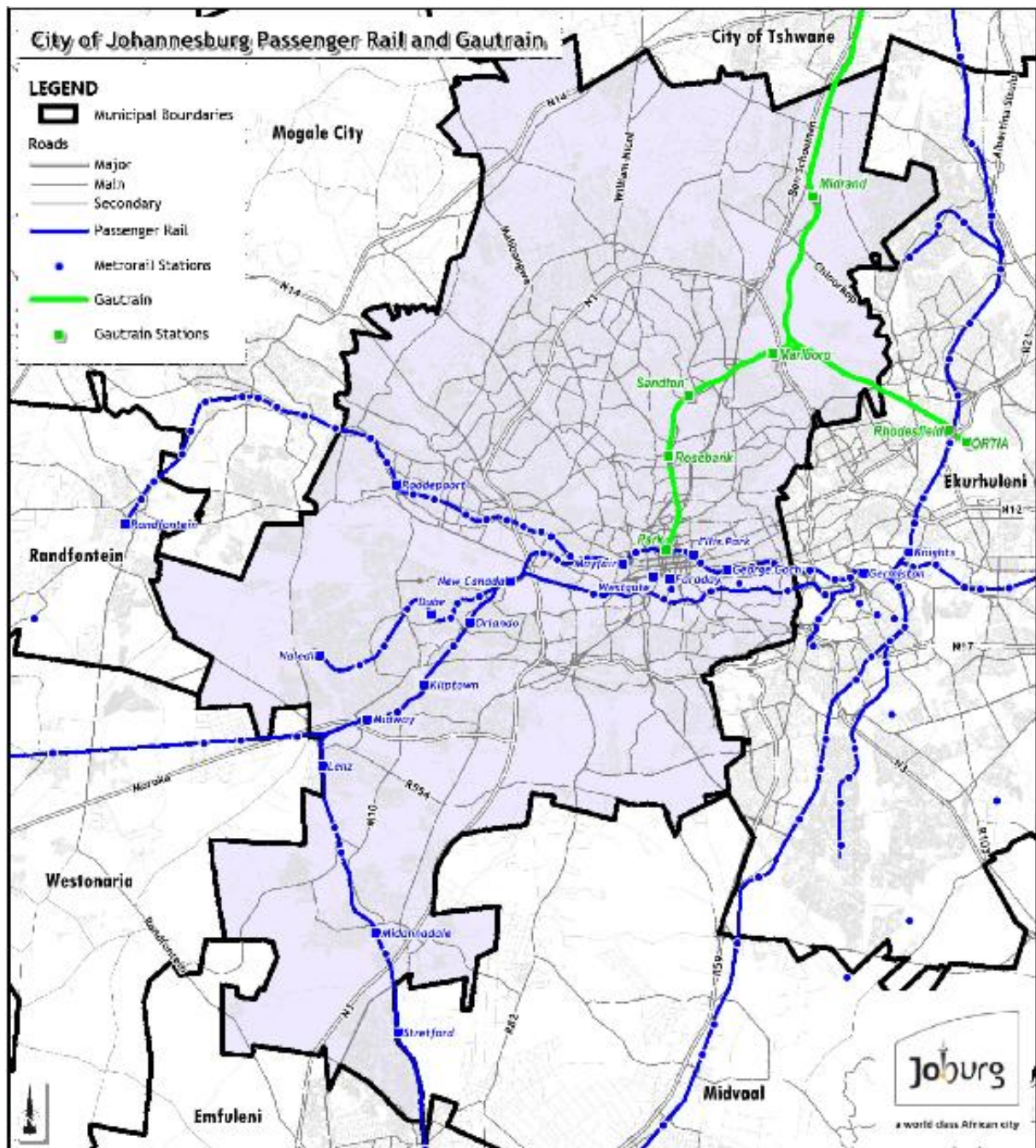
The Johannesburg rail system is not run by the City but by the national Passenger Rail Authority of South Africa (PRASA). Its commuter rail operator is Metrorail. The rail network chiefly connects Soweto, Randfontein and Vereeniging with the city centre, and the Johannesburg city centre with Ekurhuleni (Springs and Daveyton), Tembisa and Leralla, and Tshwane via Kempton Park, including the Pretoria CBD, Mabopane and Soshanguve. Long-distance destinations are served from Johannesburg Park Station such as Cape Town and Durban. The network does not fit entirely with present day residential and economic nodes and is east-west aligned and concentrated in the south and south west of the city. Some major destinations are not served, such as OR Tambo International Airport, Midrand and Sandton (although all are now served by Gautrain).

The PRASA Metrorail network is shown in Figure 3 (along with the Gautrain network). There are 55 railway stations, the busiest being Johannesburg (Park Station), New Canada, Langlaagte, George Goch and Stretford. There is overcrowding on the Midway – New Canada section and on the Naledi lines.

It is generally acknowledged that the traditional rail system is run-down, offers a poor quality service which is not safe or reliable, and that the network and rolling stock are in need of refurbishment. Its journey times are uncompetitive with other modes. Other problems include peak overcrowding on some corridors, unreliable rolling stock leading to a reducing ridership, limited off-peak services, lack of integration and interchange with other modes, fare evasion, and low-comfort coaches.

Passenger numbers continue to decline due to poor rolling stock and unreliability. The customer base in Gauteng decreased by 30-40% during 2010 compared with the previous year, similar to the results for other Metrorail areas.<sup>viii</sup>

FIGURE 3: PRASA METRORAIL AND GAUTRAIN NETWORKS AND STATIONS



### THE BUS SYSTEM

Johannesburg has a widespread network of bus services. The commuter bus routes in the city are shown in Figure 4.<sup>ix</sup> Average route length is 27,2km. The regular commuter bus services are all subsidised and are provided by the City’s own Metrobus company, and through services contracted and subsidised by the Gauteng Department of Roads and Transport. These are the Putco Soweto contract, the Eldorado Park contracts, the South Western Areas contracts and the Katorus/Boksburg contracts. Altogether these services including Metrobus are run by 1 200 buses.



Of these 490 are operated by Putco Soweto (2011) – compared to 250 in 2007 - and 455 are operated by Metrobus (2012 figures).<sup>x</sup>

Apart from the subsidised bus services, there are numerous other unscheduled bus operators providing services within, to or from Joburg. These unscheduled operators provide a variety of services, including private hire services for specific events, learner transport, as well as inter-city coach services.

A total of 4 935 buses and midibuses for use in public transport are licenced in the City of Johannesburg according to the national Department of Transport's e-NaTIS system.<sup>xi</sup> However, not all of these necessarily operate in Joburg – they could be licenced in Johannesburg because the company's head office is located in the city, but operate elsewhere.

### THE MINIBUS-TAXI SYSTEM

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The dominant public transport mode in the City of Johannesburg is the minibus-taxi. There are 32 taxi associations controlling at least 1 013 different routes (counting both directions), operated from at least 450 different starting points. During the last comprehensive survey of all taxi routes in Johannesburg, in 2002, it was estimated that there were 12 300 short distance minibus-taxis.<sup>xii</sup>

There are substantial long-distance taxi operations to and from the City, mainly from the Joubert Park area (80% of the operations) but also from other inner city ranks, Randburg, Alexandra and Baragwanath. They operate to about 100 different destinations, including international.<sup>xiii</sup>

The taxi route system is shown in Figure 5<sup>xiv</sup>. Average taxi route length is 17,8km. It is a very radial network focused on the CBD. Many passengers are able to make their trips using one taxi all the way (about 65%) but 24% require a taxi-taxi combination and 11% involve transfers to trains or buses.

FIGURE 4: THE BUS ROUTE NETWORK IN THE CITY OF JOHANNESBURG (ALL OPERATORS)

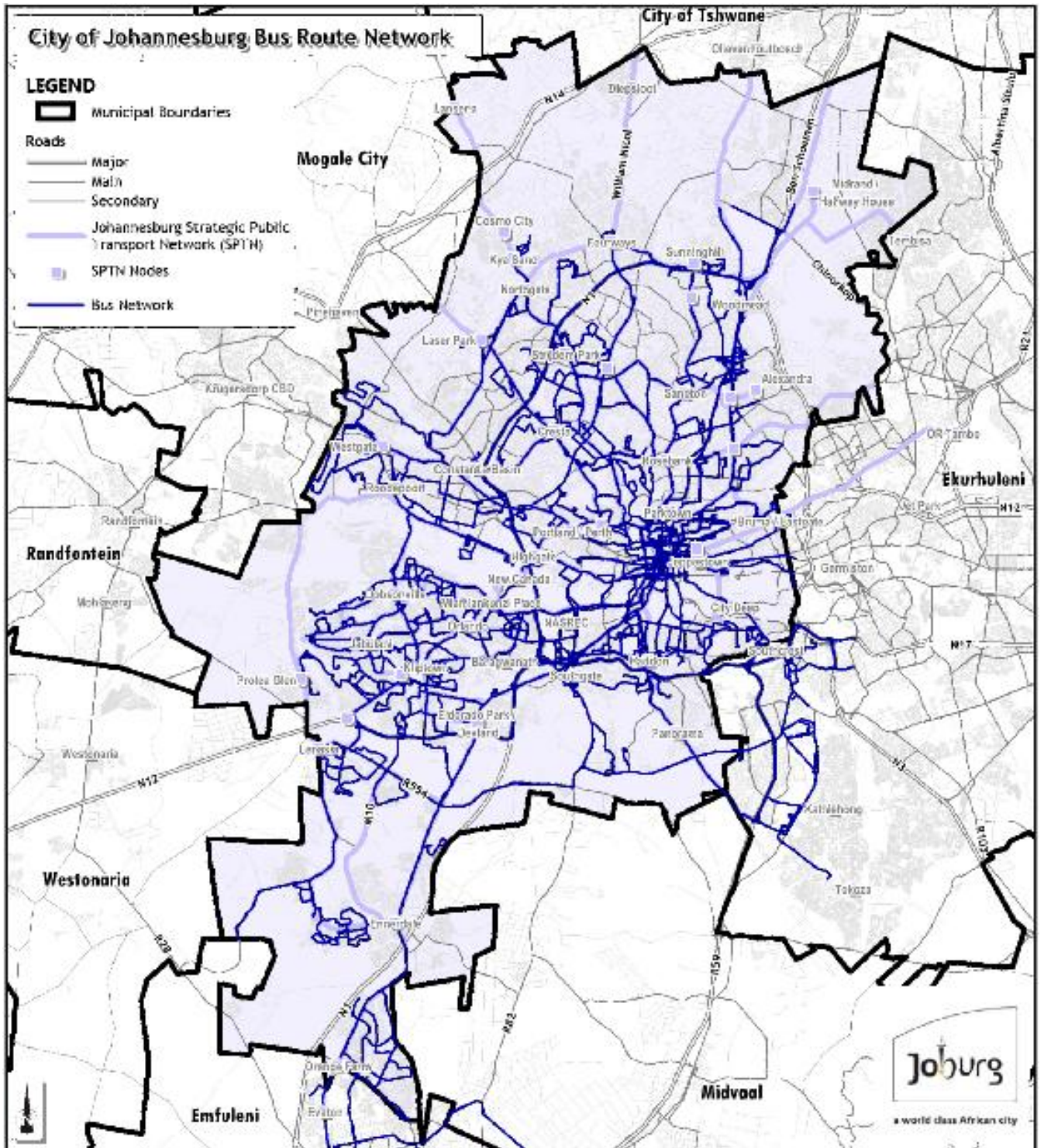
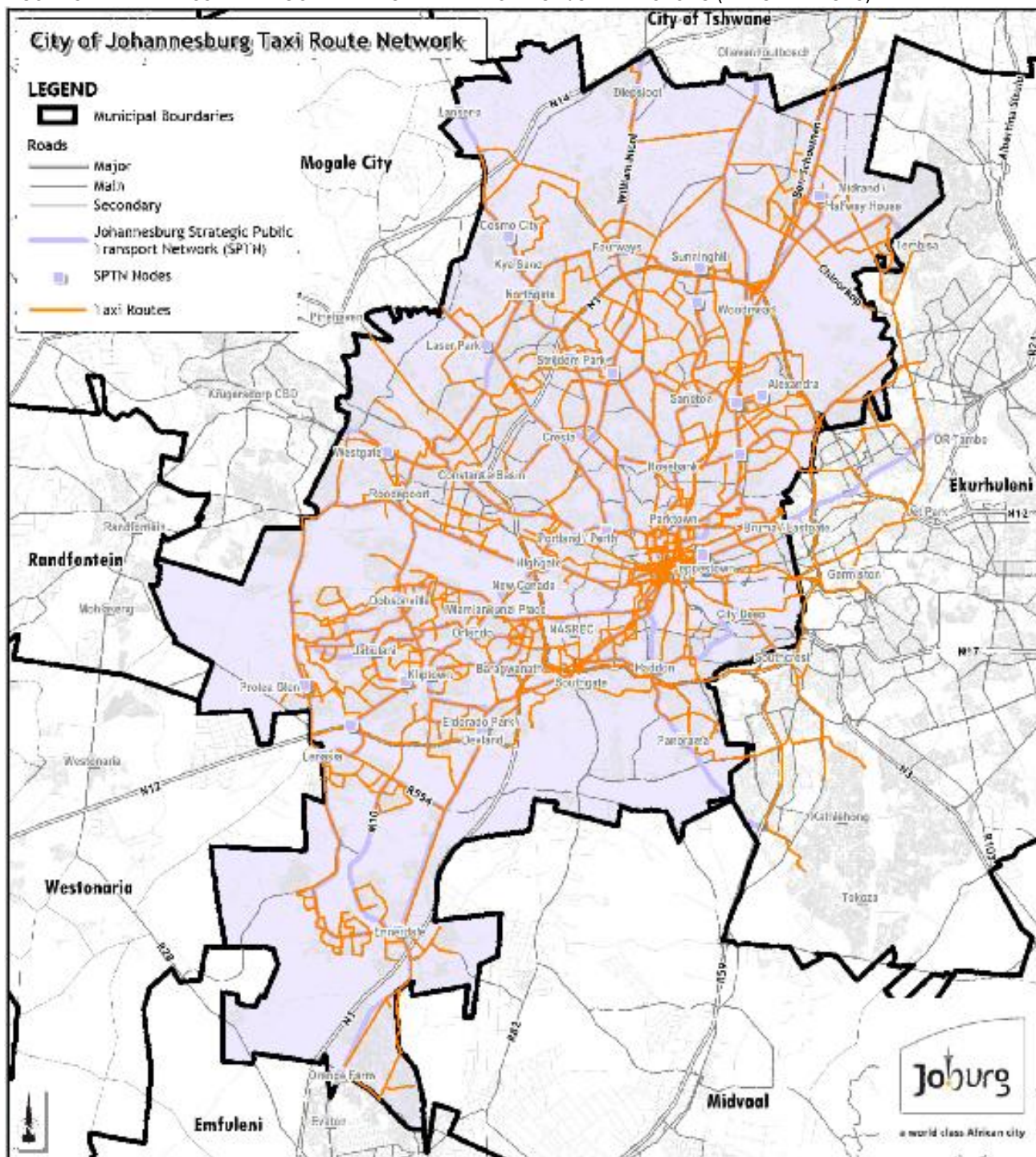


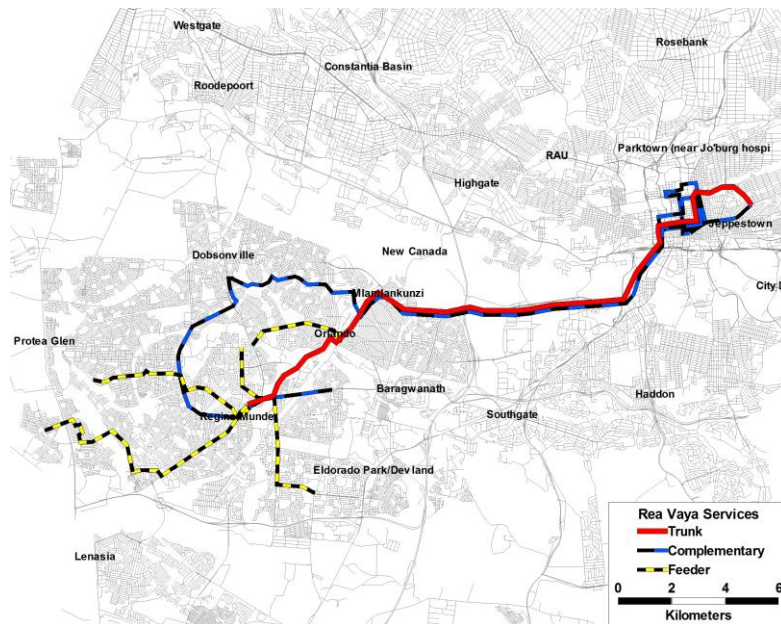
FIGURE 5: THE MINIBUS-TAXI ROUTE NETWORK IN THE CITY OF JOHANNESBURG (ALL OPERATORS)



## THE REA VAYA BUS RAPID TRANSIT SYSTEM (BRT)

The City has been introducing bus rapid transit corridors into the City since developing an operational plan for a Phase 1 BRT system in 2007. Currently Phase 1A is completed, and was brought into operation in stages between 31 August 2009 and February 2011. The route network is shown in Figure 6.

FIGURE 6: REA VAYA PHASE 1A ROUTE NETWORK



The system features the following:

- 41 modern, new articulated buses and 102 solo, double-sided door buses in operation
- Thirty-one staffed, enclosed stations, in the central median
- Average weekday passenger trips of 40 000, over 1 million passengers per month
- The trunk route carries 5 760 passengers per direction per hour in the peak.<sup>xv</sup>
- New company formed called Piotrans (Pty) Ltd, 100% owned by 313 shareholders who previously operated taxis on the routes, and who withdrew 585 taxis (many of which were scrapped)
- Twelve-year gross cost contract signed between the city and Piotrans to operate the Rea Vaya Phase 1A services after a successful 14-month negotiation to form the company and agree the contract. Payment is by scheduled km operated, not per passenger carried.
- Former taxi drivers offered employment in new system - all bus drivers are former taxi drivers
- Automatic fare collection system using smartcards with EMV microchips (compliant with the national regulations on interoperable fare systems), gated access control at stations, and turnstiles on buses, to come into operation in the first half of 2013
- Real-time information about bus arrivals or next station is provided to passengers at stations and on buses respectively
- Stations are monitored at a control centre using CCTV
- A control centre uses GPS to observe and communicate with buses via GPS and to monitor adherence to schedule

- A new state of the art bus depot has been built in Dobsonville and Piotrans leases it from the city
- In a customer survey in 2012, 80% of customers were satisfied or very satisfied with the service<sup>xvi</sup>

Phase 1B has been built and will be brought into operation in late 2013, while the plans for Phase 1C have been approved and are in the business planning stage. Details on Phase 1B and 1C are provided later.

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## METERED TAXIS

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Johannesburg has an estimated 1 800 to 2000 metered taxis. There are a range of services with several formal large companies but also many individual “no-name” taxis, i.e. their rooflights indicate “Taxi” rather than a company name. These comprise about 44% of metered taxis. While some CoJ metered taxi operators maintain high standards, others operate vehicles in a state of poor repair, employ drivers with poor knowledge of their area of operation, and operate without meters (about 50%), without radio or GPS control (about 43%) or operating licences (proportion not known). 44% of them are ‘no-name’ taxis. These factors have a negative effect on the image of the industry as a whole, as well as tourism.<sup>xvii</sup>

Legally, it is compulsory for metered taxi vehicles to be equipped with a sealed meter in good working order, to measure the cost of the trip. Metered taxi associations and their members are required to register with the Gauteng Provincial Transport Registrar, and various obligations accompany this. The MEC may also regulate their fares, prescribe a grading system for metered taxi services and prescribe tests that drivers must pass (e.g. demonstrating topographical knowledge). Metered taxis are also required to have an operating licence that sets out the area in which they may operate.

Approximately 200 ranking places for metered taxis were identified in detailed surveys in 2004<sup>xviii</sup>.

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## TUK TUKS

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Several tuk-tuk operations have been licenced by the Gauteng Operating Licencing Board (GOLB) to operate in Johannesburg and have been a source of both novelty and concern. However, Johannesburg had no policy in its former ITP about these vehicles or other two- and three-wheelers’ use in public transport (e.g. pedicabs or motorcycles – which are becoming increasingly common in west and east Africa for last-mile journeys).

The concerns have been about conditions of safe operation, their competition with existing metered taxis, potential violent competition between each other, competition with minibus-taxi services with the threat of violence, their potential uncontrolled proliferation and their ranking needs.

The National Land Transport Act no. 5 of 2009 (NLTA)<sup>xix</sup> provides that tuk-tuks may be used for public transport services where relevant transport plans allow for this. It provides that where a tuk-tuk is so used, the operating licence must stipulate the urban route, road network or area on or

within which it must operate, as shown in the relevant integrated transport plan, and a maximum speed of operation.

## NON-MOTORISED TRANSPORT

Walking is the second most important main mode of transport in Johannesburg, after the car. It is the mode used for 31% of all trips made in the morning peak period according to the 2003 GHTS (car accounts for 37% and minibus-taxis for 23%). The average walk trip was 23 minutes (25 minutes for work trips and 22 minutes for walking to schools and other educational institutions).

The other Non-Motorised Transport (NMT) mode, cycling, accounts for 0,2% of trips (3 165 trips). Average travel time spent cycling to work is 42 minutes and to education is 16 minutes. In addition, walking is the most significant feeder mode for access to public transport (to railway stations, bus stops and taxi ranks).

The majority – 90% – of the walkers and cyclists are “striders” – people who walk or cycle out of choice. However, about 10% or 50 000 people are regarded as “stranded” in that they walk or cycle for longer than 30 minutes because they cannot afford motorized transport.<sup>xx</sup>

## VEHICLE OCCUPANCY AND UTILISATION

Public transport has poor average occupancy, mainly because of poor off-peak demand, and one-directional demand. Detailed all-day vehicle occupancy surveys were carried out in 2009 of buses, minibus-taxis and cars at numerous survey points, in both directions, in the area of influence of the planned Rea Vaya BRT Phase 1. This was to prepare baseline, pre-BRT environmental transport data to support Rea Vaya’s application to register on the Verified Carbon Standard database.<sup>xxi</sup>

The findings are shown in Table 2.

TABLE 2: AVERAGE VEHICLE OCCUPANCY IN CITY OF JOHANNESBURG (2009)

Time of day	Average occupancy (Persons per vehicles)		
	Minibus-taxis	Buses	Cars
06:00 to 09:00	7.43	23.01	1.53
09:00 to 15:00	5.54	12.44	1.58
15:00 to 18:00	7.33	221.58	1.73
<b>Occupancy</b>			
Average	6.8	19	1.61
Capacity	16	80	-
Occupation rate	42%	24%	-

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## AGE AND FUEL TYPE OF THE JOHANNESBURG VEHICLE POPULATION

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The vehicle fleet in Johannesburg is quite old, which has negative impacts regarding both greenhouse gas emissions and air pollution. As part of the same baseline study 2009 vehicle registration data for Johannesburg on the e-NaTIS system was analysed. This reflects vehicles registered at the end of June 2009 in all the CoJ vehicle registration centres on eNaTIS. The number, age and fuel used is shown in Table 3 while a detailed age breakdown is shown in Table 4.<sup>xxii</sup>

TABLE 3: COJ VEHICLE POPULATION: SIZE, AGE AND FUEL TYPE

Vehicle type	No. registered at CoJ licencing centres on eNaTIS	Weighted average age in 2009 (years)	Fuel type	
			Petrol	Diesel
Minibus-taxis	43 570	11.4	91%	9%
Buses/midibuses	4 935	8.1	11%	89%
Passenger cars	802 189	10.1	94%	6%
Motorcycles	35 829	6.6	100%	0%

TABLE 4: AGE PROFILE OF COJ VEHICLES

Vehicle type	Age of vehicles				Total
	>20 years	11-20 years	6-10 years	0-5 years	
Minibus-taxis	19%	31%	15%	35%	100%
Buses/midibuses	9%	20%	19%	51%	100%
Passenger cars	12%	26%	21%	41%	100%

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## TRAVEL BEHAVIOUR, CHARACTERISTICS AND ATTITUDES IN JOHANNESBURG

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### SYSTEM CHARACTERISTICS

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The City conducted a Johannesburg Household Travel Survey in the first half of 2013 in Johannesburg. This will yield a large amount of information about the characteristics of travel behaviour and the system's characteristics. A very similar survey, the Gauteng Household Travel Survey (GHTS), was conducted in 2002, which was the basis for the first ITP of 2003 and subsequent updates. This is currently the most recent data available on certain system characteristics. Progress over the last ten years will be tracked when the results of the 2013 household travel survey become available.

The Gauteng Global City-Region Observatory (GCRO) carried out a Quality of Life survey in Gauteng between August and December 2011. Some 16 729 interviews were carried out, in every ward of

Gauteng, and 80% of wards had 20 respondents or more. Respondents had to be 18 years or older. Some of the transportation findings are included as well in the following sections and they provide more up to date information – for 2011.<sup>xxiii</sup>

### TRIP PURPOSE 2011

In the 2011 GCRO survey, respondents were asked what trip they regarded as the most frequent trip they made. Note that the survey was restricted to over-18 year olds so school trips will not be reflected. The Johannesburg results were as follows:

TABLE 5: TRIP PURPOSE IN JOHANNESBURG OF MOST FREQUENT TRIP DURING THE DAY (2011)

Trip purpose	Percent	No. of respondents
To go to work	39.5%	2270
To look for work	8.9%	513
To go to the place where I study	5%	288
Shopping	13.7%	787
Taking children to school	1.4%	79
To go to a place of leisure / entertainment	1.3%	74
Other purpose	7.5%	433
I never make any trips	22.7%	1303
Total	100%	5747

### MODES OF TRANSPORT 2002 (PEAK TRIPS) AND 2011(ALL DAY TRIPS)

The following were the main modes of transport used in the morning peak period in 2002 (all trip purposes):

TABLE 6: MODE OF TRANSPORT FOR PEAK PERIOD TRIPS (ALL TRIP PURPOSES) IN JOHANNESBURG (GHTS) 2002

Transport Mode	No. of Trips	Percentage of All Trips	Percentage of Public Transport Trips	Percentage of Motorised Trips
Car	580 988	36.6%	-	53%
Walk	491 018	30.9%	-	-
Minibus-taxi	371 737	23.4%	72%	34%
Train	71 979	4.5%	14%	6.6%
Bus	44 002	2.4%	9%	4%
Other Mode Combinations	24 392	1.5%	5%	2,2%
Bicycle	3 166	0.2%	-	-
Motorbike	1 321	0.1%	-	0,1%
Total	1 588 603	100%	100%	100%



In the 2011 GCRO survey, respondents were asked about the main mode of transport used for their most frequent trip made during the day. Replies are summarised below:

TABLE 7: MAIN MODE OF TRANSPORT USED IN JOHANNESBURG FOR MOST FREQUENT TRIP, ALL-DAY PERIOD, 2011 (GCRO)

Mode	No. of respondents	Percentage
Taxi	2132	49.2%
Car as driver	1085	25%
Car as passenger	301	6.9%
Lift club	33	0.8%
Motorbike	10	0.2%
Other type	17	0.4%
Walk	367	8.5%
Bicycle	16	0.4%
Train	222	5.1%
Gautrain	5	0.1%
Bus	118	2.7%
School bus	15	0.4%
BRT / ReaVaya bus	10	0.2%
Total	4332	100%

Modes of travel to work in Joburg in 2002 (GHTS) and 2011 (GCRO) are compared below and show an apparent increase in trips to work by minibus-taxi at the expense of rail.

TABLE 8: MAIN MODE OF TRAVEL TO WORK IN JOHANNESBURG

	2002 Gauteng Household Travel Survey	2011 Gauteng Quality of Life Survey
Car driver/passenger	42%	42%
Minibus-taxi	35%	42%
Walk	9%	7%
Train	8%	5%
Bus	4%	4%
Bicycle	<1%	<1%
Other	2%	<1%
Total	100%	100%

The main change in school transport over the last ten years appears to be an increase in school bus trips, at the expense of walking, otherwise mode share has remained more or less the same.

TABLE 9: MAIN MODE OF TRAVEL TO SCHOOL IN JOHANNESBURG

	2002 Gauteng Household Travel Survey	2011 Gauteng Quality of Life Survey
Car driver/passenger/lift club	25%	23%
Minibus-taxi	14%	15%
Walk	55%	46%
Train	2%	1%
Bus	3%	12%*
Bicycle	<1%	2%
Other	<1%	<1%
Total	100%	100%

\*Made up of 9.1% school bus, 2,2% other bus and 0.3% Rea Vaya.

### GROWING USE OF CARS 1995 TO 2002 COMPARED TO 2011 MODE SPLIT

- In 2002 mode share of private and public transport (excluding non-motorised transport) during the morning peak was 53% and 47% respectively. Equivalent figures for previous years were 40% and 60% in 1995, 43% and 57% in 1998 and 49% and 51% in 1999.
- 63% of households in 2002 did not own any cars, 19% of households owned one car, 13% two and 5% three or more.
- While the 2002 Gauteng Household Travel Survey found that in the morning peak period, 53% of Joburg residents were in private cars and 47% on public transport, the GCRO 2011 survey indicates that only 37% of motorised trips are made by car and 63% by public transport. The results are not directly comparable because the 2011 survey was asking passengers about their tripmaking at any time of the day, not only the peak period. It also only included people of 18 years or older, thus excluding schoolchildren. Nevertheless it may indicate a positive trend to growing public transport useage. **Furthermore, the data on mode used for trips to work and to school (which are peak period trips) both indicate that car use has at least stayed the same and not increased in the last ten years.**

### ACCESS TO PUBLIC TRANSPORT 2011

Walking time to the nearest point of public transport in Johannesburg according to the GCRO 2011 survey was:

- 65% - ten minutes or less
- 13% - between 11 and 20 minutes
- 8% walked for 21 minutes or longer
- 14% did not know

### LEVELS OF DISSATISFACTION WITH TRANSPORT 2002 AND 2011

Levels of dissatisfaction were high in 2002 with certain aspects of public transport as indicated in Table 10.

TABLE 10: REASONS FOR DISSATISFACTION PER MODE: GHTS 2002

Reasons for dissatisfaction	Train users dissatisfied	Bus users dissatisfied	Taxi users dissatisfied
Cost	13%	36%	48%
Distance from home	46%	18%	24%
Travel time	35%	24%	20%
Crime at ranks/termini/stations	51%	32%	57%
Crime on bus/train	55%	11%	-
Taxi industry violence	-	-	49%
Safety from accidents	19%	16%	66%
Frequency peak	38%	30%	38%
Frequency off-peak	46%	42%	35%
Punctuality	50%	29%	33%
Facilities at termini	24%	49%	62%
Overall quality	27%	14%	43%

In the 2011 Gauteng Quality of Life Survey:

- 67% of Johannesburg residents indicated they were satisfied or very satisfied with the roads in the City, while 5% were neutral and 28% were dissatisfied or very dissatisfied.
- 75% of Johannesburg residents were satisfied or very satisfied with public transport in the City, while 10% were neutral and 14% were dissatisfied or very dissatisfied.
- The single biggest problems with public transport cited were:

TABLE 11: SINGLE BIGGEST PROBLEM WITH PUBLIC TRANSPORT IN JOHANNESBURG GCRO 2011:

Single Biggest Problem	Percentage of respondents
Expensive	14%
Rude drivers and/or passengers	14%
Unreliability	13%
Reckless driving	12%
Unroadworthy vehicles	11%
Lack of comfort	9%
Long wait at stop/station	4%
Crime/security	3%
Long walk to nearest stop/station	2%
Insufficient service at night	2%
Insufficient service at weekend	1%
Other	16%
Total	100%

The GCRO 2011 survey asked respondents about whether they used public transport or not. Two thirds - 66,5% - of respondents said they did use public transport, while 33,5% said they did not. The reasons for not using public transport in Joburg are given in Table 12.

TABLE 12: REASONS FOR NOT USING PUBLIC TRANSPORT IN JOHANNESBURG 2011

Reason for not using public transport (2011)	Percentage
Not available in my area	10%
Too far	8%
Wait too long	5%
Worry about crime/safety	8%
Worry about accidents	2%
I can afford a car	15%
I get to work/school on time in my car	10%
I can take unplanned trips in my car	8%
I drop off friends or family on the way	2%
I use a lift club	1%
I walk or cycle	2%
I cannot afford public transport	4%
I don't want to use public transport	15%
Other	11%
Total	100%

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## CHANGES IN JOHANNESBURG TRANSPORT SYSTEM OVER THE LAST TEN YEARS

This section highlights some of the changes in Johannesburg's transport system in the last decade, with reference to the previous ITP as well as subsequent initiatives, with a focus on the major improvements, some of the planned improvements, as well as some key aspects that did not experience change. It also describes some significant planned improvements in respect of Rea Vaya roll-out, and traditional rail upgrading.

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### THE STRATEGIC PUBLIC TRANSPORT NETWORK (SPTN) PROPOSALS AND PHASE 1A, 1B AND 1C OF THE REA VAYA BRT BUS RAPID TRANSIT (BRT) SYSTEM

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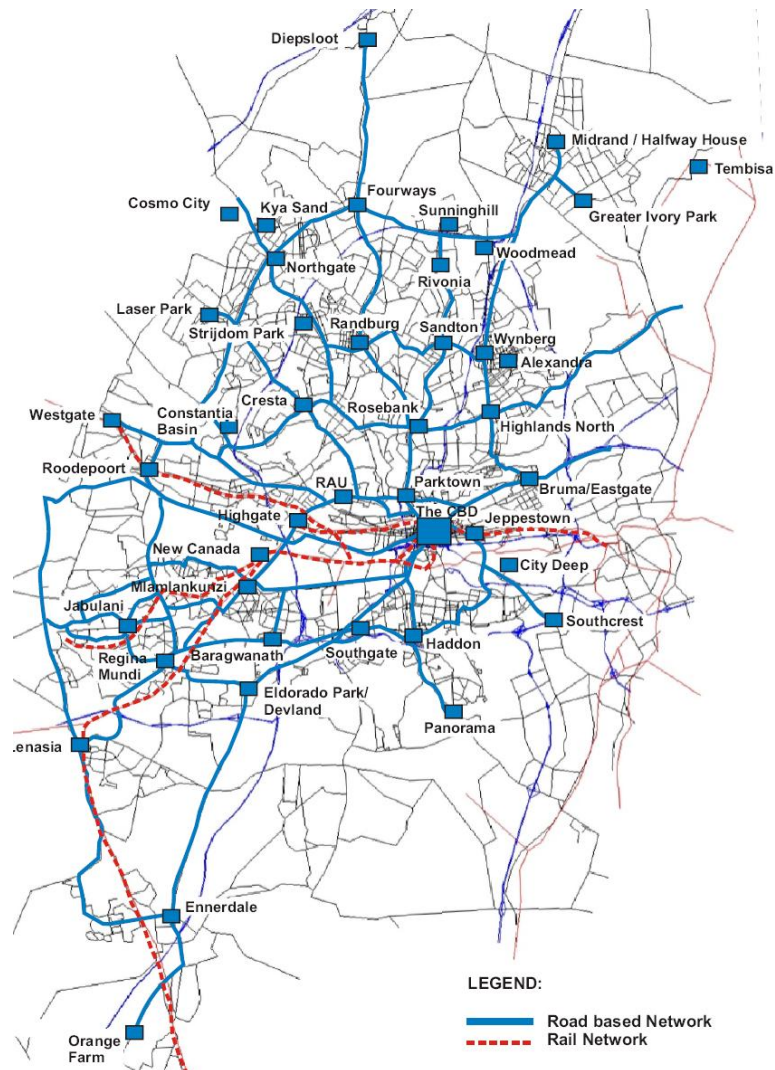
#### THE STRATEGIC PUBLIC TRANSPORT NETWORK

The major thrust of the City of Johannesburg's *Integrated Transport Plan (ITP) – 2003-2008* was to shift from the historic emphasis on improving mobility for cars, to an emphasis on improving mobility and accessibility for people, chiefly through improvements to the public transport system. The major recommendation of the ITP was that the City create a Strategic Public Transport Network (SPTN). This is shown in Figure 7.

The SPTN was both a network and also a concept of operation. As a network plan, the overall aim of the SPTN was to identify the major public transport connections that needed to be made. This was designed with the aim of supporting a compact, multi-nodal city form, by providing a legible permanent public transport 'grid' of focused high-frequency public transport routes connecting key high-density nodes and also dense residential areas. Once on the grid, all the important destinations could be accessed through the public transport system because of the overall continuity of connections. It was designed as a lattice of public transport routes, 325km in total

length, connecting the 45 or so development nodes in the City to each other along major mobility spines.

FIGURE 7: STRATEGIC PUBLIC TRANSPORT NETWORK



Operationally, reserved kerbside lanes were proposed on the busier links for the exclusive use of buses and minibus-taxis. A few large terminals were proposed at route starts and ends, and many smaller passenger facilities along the routes, particularly at points where routes intersected, and where passengers could switch from one service to another. Park and ride facilities were proposed too, focused at hubs on the SPTN in areas of high car ownership.

The logic was that the City had developed over the years towards a multi-nodal structure. While the CBD remained the most important single node, it was not the only node. In fact only 26% of commuter trips in Joburg had the CBD as their final destination. However, rail, bus and taxi routes all tended to converge on the CBD. There were also too many routes, dispersed across the network, operating at relatively low frequencies.

The primary network of 325km was intended to be supported by a secondary network of feeder and distribution routes around most of the 45 nodes on the grid were envisaged to provide deeper coverage. The recapitalised 18-seater minibus was seen as the most cost-effective mode for this

task in most cases, and an estimated 1 500 minibuses would need to service the nodes once the network was fully operational.

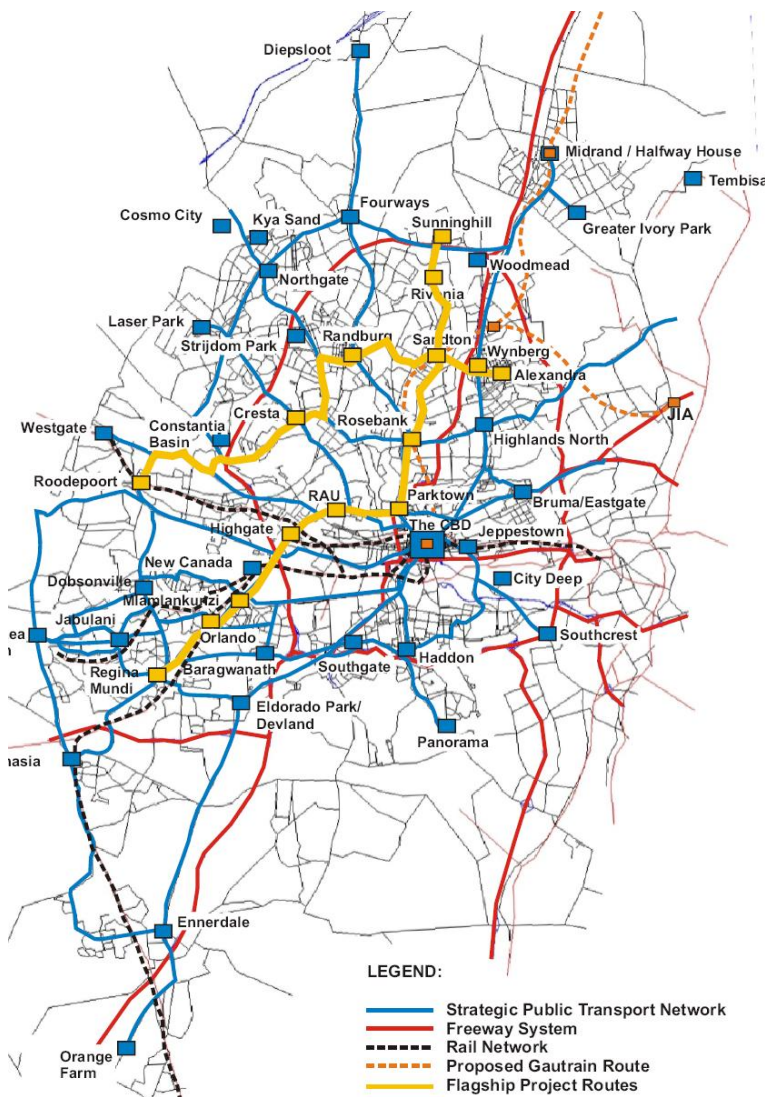
Having a permanent clear public transport network was also seen as enabling the City to adopt a far more effective and focused approach to:

- provision of public transport signage, passenger information displays, shelters, street furniture, landscaping and dedicated stops, which would give the corridors a visible and noticeable identity;
- measures to make public transport services and infrastructure more accessible for people with disabilities;
- safety and security measures, focused at the hubs, such as 24-hour retail activity, excellent lighting, and closed circuit television surveillance;
- law enforcement measures;
- routing of subsidised services, which should be confined to the SPTN;
- all-day services
- integrating services, e.g. fare systems.

Two flagship routes were also selected for implementation (see Figure 8):

- one from Soweto to Sandton via University of Joburg and Parktown
- Alexandra-Sandton-Randburg, to Cresta and Roodepoort

FIGURE 8: SPTN FLAGSHIP ROUTES



The Transport Department, with funding from the Public Transport Infrastructure and Systems (PTIS) Grant, began building a kerb-side bus and minibus-taxi priority lane on the first flagship route of the SPTN from Soweto to Sunninghill via Parktown, Rosebank and Sandton along Oxford Road in 2005. Considerable progress was made in negotiations with the taxi industry to operate the Soweto - Sunninghill route as a joint venture between ten taxi associations.

The selection of South Africa as the venue for the 2010 FIFA Soccer World Cup, however, brought about some changes. There was an increase in funding available and a determination to leave a significant public transport legacy. There was concerted advocacy by international NGOs in favour of raising the sights for the SPTN to full Bus Rapid Transit (BRT). There was the promise that this was achievable in time for the World Cup deadline. There was strong support for quality rapid systems, particularly BRT, from the national Department of Transport, particularly after its new *Public Transport Strategy and Action Plan* was approved by Cabinet, enabling the funding and building of BRT systems in the country's biggest cities.

#### REA VAYA BUS RAPID TRANSIT PROJECT PHASE 1A AND 1B

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As such, the city took a decision in November 2006, following a brief scoping study<sup>xxiv</sup> which looked at where passenger demand warranted full BRT, and a study tour to Latin American BRT systems by politicians, officials and the bus and taxi leaders in the City, to plan and build a BRT system to be called Rea Vaya in Johannesburg. It also adopted this as the City's choice of mode in corridors requiring a mass transit solution, and as the solution to the ever-growing problems of growing car use, congestion and poor mobility and accessibility between the different parts of the city. The vision expressed in the National Department of Transport's *Public Transport Action Plan*<sup>xxv</sup>, also embraced in the *Rea Vaya Scoping Study*, was to develop a system that placed over 85% of a metropolitan city's population within 1 km of an integrated rapid public transport network trunk or feeder route.

The operating concepts for Rea Vaya BRT are different to the SPTN concept in the following ways:

- Median busways rather than kerbside bus lanes;
- Closed, staffed median stations instead of kerb-side passenger stops;
- Pre-boarding fare collection and access control;
- Larger and new vehicles to better match supply to demand rather than existing buses and minibus-taxis;
- A centralised control centre using vehicle control technology ;
- Operator compensation based upon vehicle-kilometres travelled rather than number of passengers and the City contracting bus operating companies via gross cost contracts. These would be a first for the City in that all contracted services involved the province;
- Independently concessioned fare collection system that collects the fare revenue on behalf of the City;
- Operations by new companies to be formed, owned by the displaced operators, not the existing operators in their current form; and
- Fares set by the City, not the operators.

An operational plan was developed in 2007 for Rea Vaya Phase 1<sup>xxvi</sup>. This encompassed the SPTN flagship corridors articulated in the 2003 ITP, namely: a north-south route between Sunninghill and Soweto and an east-west route between Alexandra, Sandton and Randburg, but also a Soweto-Ellis Park route via the Soweto Highway, connecting to the World Cup stadia at Nasrec and Ellis Park.

Phase 1A and Phase 1B of Rea Vaya have been built to date comprising the following infrastructure:

TABLE 13: COMPLETED REA VAYA INFRASTRUCTURE (PHASE 1A AND 1B): APRIL 2013

<b>Infrastructure built by April 2013</b>	<b>Phase 1A (in full operation since Feb 2011)</b>	<b>Phase 1B (due to open in second half of 2013)</b>
Bi-directional busways (km)	22	14.8
Single-lane busways (km)	8.68	1.9
Bi-direction busways in transit-only roads in operation (km)	4.15	0
Mixed traffic lanes used by complementary buses (km)	25.6	15.6
Mixed traffic lanes used by feeder buses (km)	29.1	36.6
Stations	31	17
Rea Vaya Bus Depot at Dobsonville		
Rea Vaya Control Centre and ITS systems		

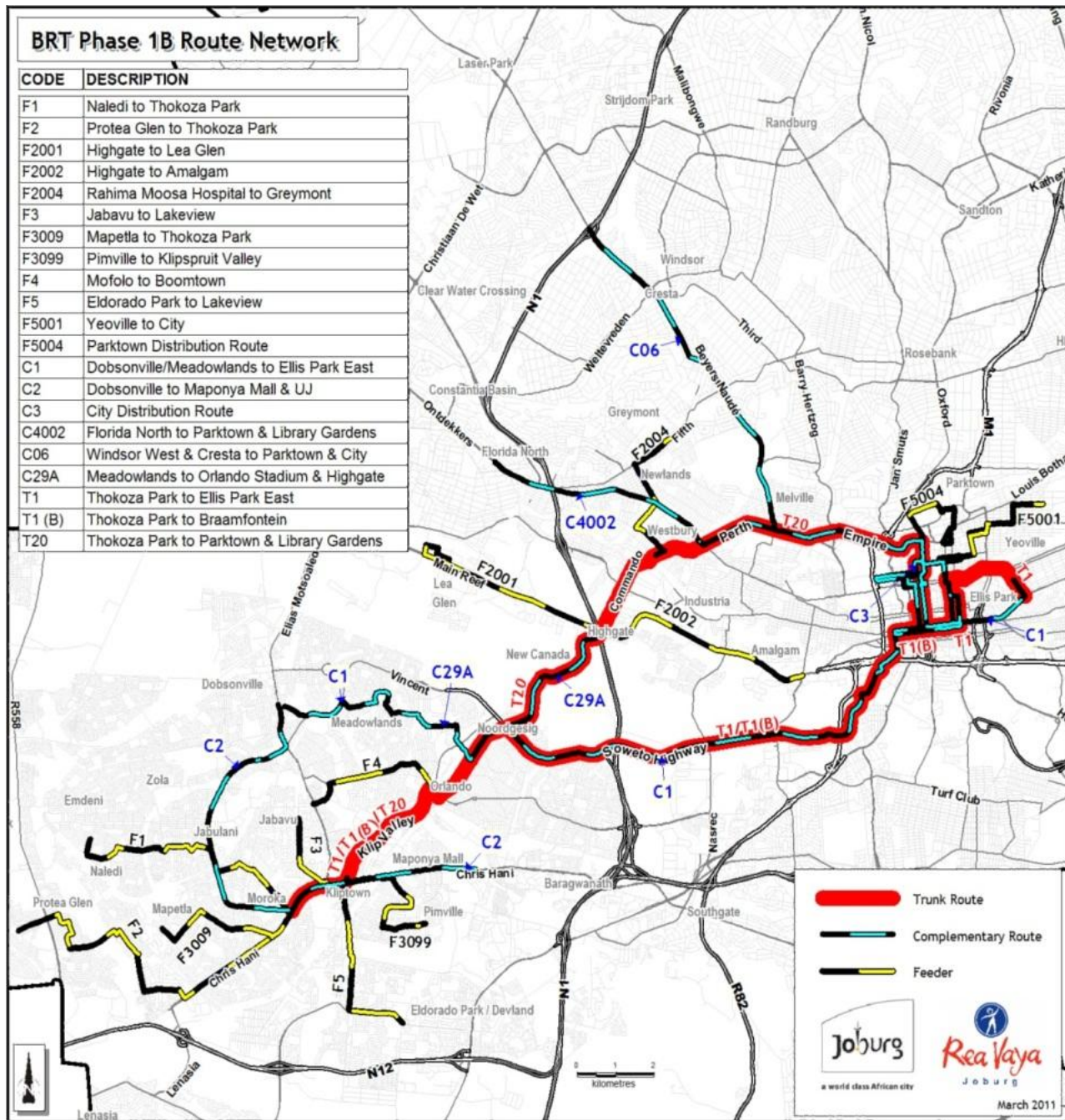
The first part of Phase 1, called Phase 1A, was successfully built and brought into operation in stages between 31 August 2009 and February 2011 (see details earlier).

Phase 1B will become operational in the second half of 2013. The buses were ordered in January 2013 – 41 articulated and 93 solo 13-m double-sided door – and negotiations are in progress to form a Phase 1B bus company from among the affected operators, including Putco and ten different taxi associations, to run the new services.

The Phase 1B network is shown in Figure 9.



FIGURE 9: REA VAYA BRT PHASE 1B (INCLUDING PHASE 1A ROUTES)



REA VAYA PHASE 1C

The Rea Vaya Phase 1C proposals were approved by the Mayoral Committee on 2 May 2013 after a sustainability study was conducted to establish whether BRT is the most sustainable mass public transport mode in the City and how to improve its sustainability.

The Rea Vaya Phase 1C service will require 69 articulated buses and 171 standard buses (over and above the 277 buses operating in Phase 1A and 1B), a total of 240 extra Rea Vaya buses in the system, and will run along the following routes:

- T06C BRT trunk between Alexandra (Old Pretoria Road) and Sandton CBD;
- T34 BRT trunk between Alexandra and Westgate on Louis Botha;
- C53 complementary between Sunninghill (Megawatt Park) and Westgate using Oxford-Rivonia;
- F1024 feeder between Alexandra and Rosebank via Corlett;
- F1026 feeder between Longmeadow and Wynberg

The study also proposed a long-term network for the north-east quadrant of the city and integrating with Ekurhuleni which would require 297 articulated buses and 97 standard buses (over and above those operating in Phase 1A and 1B), a total of 394 extra Rea Vaya buses in the system.

The routes that the long-term network will service are proposed as follows:

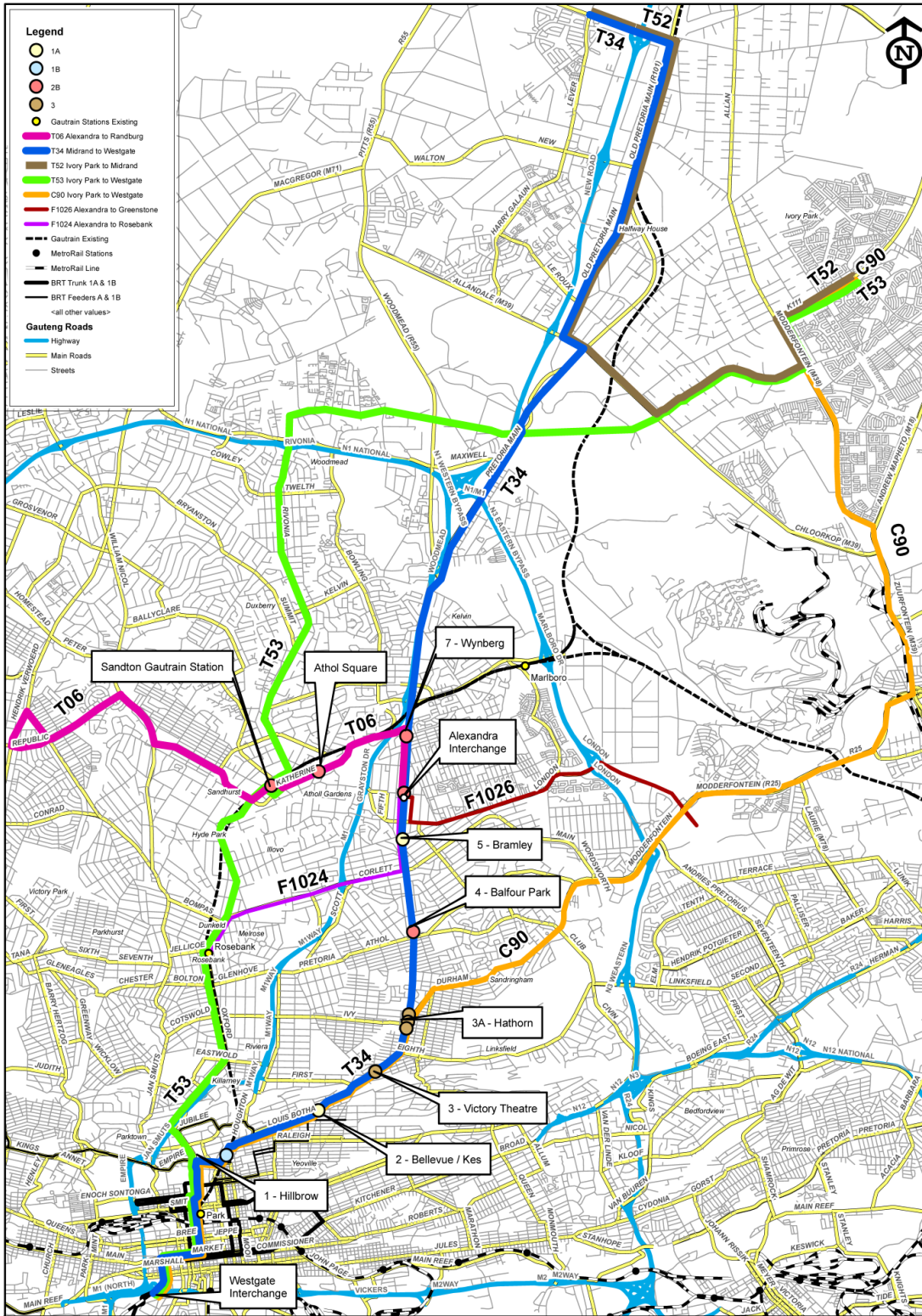
- T06C BRT trunk between Alexandra (Old Pretoria Road) and Randburg CBD;
- T34 complementary between Noordwyk and Westgate using Old Pretoria Road and Louis Botha trunk;
- T35 BRT trunk between Alexandra and Rosebank using Louis Botha-Corlett Drive-Oxford Road trunk;
- T53 BRT trunk between Westgate and Ivory Park using Allandale Road-Old Pretoria Road-K60-van der Bijl-Rivonia Road-Oxford Road;
- T52 BRT trunk between Ivory Park and Noordwyk, using BRT trunk on Allandale Road-K101-R562;
- C90 complementary in mixed traffic between Ivory Park and Longmeadow, using Republic Road-Modderfontein Road-R25;
- F1026 feeder between Longmeadow and Wynberg

The 2016 scenario and services are shown in Figure 10 and 2037 in Figure 11.

Rea Vaya Phase 1C will see a number of changes being introduced into the Rea Vaya model in respect of infrastructure, operations and integration with other modes, which will be discussed later in the *Framework*.



FIGURE 11: PROPOSED PHASE 1C NETWORK FOR REA VAYA BRT (2037 SCENARIO)



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## GAUTRAIN IMPLEMENTATION

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The construction of the Gautrain and service commencement is another of the major new features of the transport scene in Johannesburg.

It is a provincially-implemented modern, high-speed rail connection linking Johannesburg, Tshwane and OR Tambo International Airport (ORTIA). It came into operation in three stages: the Sandton-ORTIA line and the commuter line from Sandton to Rhodesfield (June 2010), the Rosebank-Pretoria service (August 2011), and the Park Station-Rosebank service (June 2012).

The 80km network comprises two lines: a link between Hatfield, Tshwane and Park Station, Johannesburg and a link between ORTIA and Sandton. Of the ten stations, five are in Joburg: Johannesburg Park, Rosebank, Sandton, Marlboro and Midrand. The route network and stations were shown earlier in Figure 3. Access to and from stations is through park and ride (with 10 000 parking bays provided at stations altogether) and via a feeder/distribution network of up-market buses serving a 5km radius of each station, operated by the Bombela Concession Company.

The objective of the Gautrain was to provide a quality intercity and airport service to attract private car users to public transport as well as being a transit-oriented development intervention to crowd investment and growth around the Gautrain station nodes. Thus the Gautrain fares are significantly higher than other public transport modes.

The Gautrain transports 48 000 passengers on its trains on an average weekday and 14 000 to 16 000 per day on weekends (March 2013 figures). Average weekday ridership of the feeder buses is about 19 000. About 30% of the train passengers use the buses. Of the bus passengers, 93% transfer to or from the Gautrain. On an average weekday, about 8 000 cars enter the park and ride facilities (there are 10 000 available bays). Parking at Pretoria, Centurion, Midrand and Rhodesfield stations is fully utilised.<sup>xxvii</sup>

To facilitate the integration of the Gautrain with other modes a study was done in 2005 and another in 2009, which resulted in some flexibility being built into the contract with the Concessionaire, with respect to the provision of feeder and distribution services to stations and prevented a duplication of services between Rea Vaya BRT and Gautrain buses. Various Rea Vaya Phase 1B routes have also been designed to include the Gautrain Park Station, where there is also a Rea Vaya station (in Rissik Street). However, there remains very limited integration due to significant difference in fares as well as the rigid nature of the public private partnership signed between the Gauteng Province and the Bombela Concession Company.<sup>xxviii</sup>

Gautrain customer satisfaction surveys, done on a monthly basis, reveal high levels of satisfaction (between 9.1 and 9.5 out of 10 in March 2013) on all criteria, which are: value for money, service staff, information provision, ease of use and speed, cleanliness, comfort, safety/security, train punctuality and bus punctuality. Train availability (in terms of the schedule) averaged 99.65% in the year to end January 2013, while average train punctuality was 98,6% in the same period.<sup>xxix</sup>

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## USING TRANSPORT CORRIDORS TO RESTRUCTURE THE CITY

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Since 2003 Johannesburg has made a concerted effort to develop transport and land-use plans that support the spatial restructuring and integration of the city.

The City's Spatial Development Framework (SDF) has advocated investment in mass public transport systems as a key lever of spatial transformation and inclusive access to the city. It has aimed to attract new developments around public transport infrastructure, especially higher density residential uses. It initially focused on the two flagship corridors in the SPTN as key areas to which to attract new and denser development. In subsequent updates the SDF focused on the Phase 1 Rea Vaya BRT corridors as the defining development corridors and nodes. In 2013/14 revisions were being made to incorporate the new Rea Vaya Phase 1C alignment, namely the proposal to build a trunk corridor between the CBD and Alexandra along Louis Botha Avenue as Phase 1C, instead of the originally planned corridor between the CBD and Sandton along Oxford Road.

The fundamental strategies in the SDF to restructure the city's fragmented form have consistently been:

- Increased densification of strategic locations
- Ensuring strong viable nodes
- Supporting an efficient movement system
- Initiating and implementing corridor development
- Containing urban growth within the urban development boundary, which was defined in 2003, to create greater density
- Ensuring housing is in appropriate locations
- Supporting sustainable environmental management

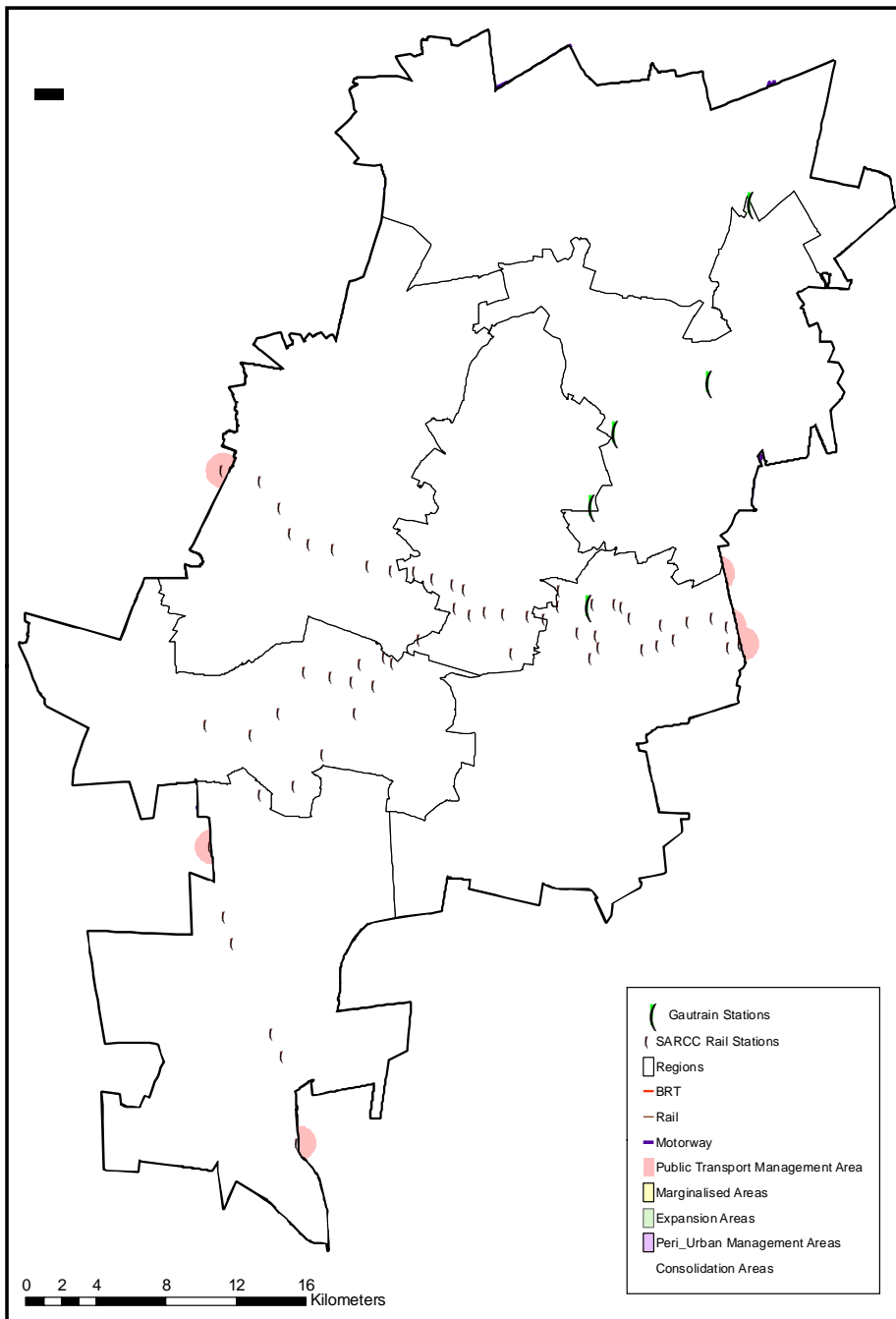
Transit Oriented Development (TOD) was formally adopted as a planning strategy in 2008, and the focus shifted to providing TOD incentives and packaging development opportunities in TOD precincts. TOD Guidelines are currently (2013) being developed for residential and non-residential development (industrial, commercial, retail and home-based SMME) and to link rates policy with the spatial priorities.

The SDF is supported by the Growth Management Strategy, development strategies, the density policy, and the Capital Investment Framework. The SDF itself comprises also Regional SDFs and Precinct Plans and Urban Development Frameworks (UDFs) at a more fine-grained level. UDFs have been developed for the Gautrain, Rea Vaya and the Metrorail precincts as well as for the marginalised areas of the City, namely Alexandra, Diepsloot, Ivory Park, Orange Farm and Soweto. Supportive design codes and land use guidelines have also been developed.

The consolidated SDF prior to the revision of Phase 1C is shown in Figure 12.<sup>xxx</sup>

The Sustainable Human Settlement Urbanisation Plan (SHSUP) approved by Mayoral Committee in 2012 has considered a more robust approach to accommodation needs and demands. By 2030 it is estimated that Joburg will need to accommodate almost one million households based on current backlogs and future demographic projections. The plan draws on both informal and informal typologies in considering how to meet this demand. It provides strategies for residential densification, possible locations for future housing development and models infrastructure requirements to achieve the plan's proposals. SHSUP will guide where the city will invest in residential development. This will be important for considering the future public transport network, as it will determine where additional residential units are likely to be located.<sup>xxxi</sup>

FIGURE 12: GROWTH MANAGEMENT AREAS IN THE CONSOLIDATED STRATEGIC DEVELOPMENT FRAMEWORK 2012/13:



A Deprivation Index has been developed, using indicators including employment and income levels, health, education and living conditions. These have been consolidated and spatially represented. This gives a detailed understanding of deprivation levels. Apart from Alexandra, Soweto, Orange

Farm and Diepsloot, areas such as Zandspruit and Cosmo City in the north west, the Inner City and its extensions east towards Ekurhuleni are also displaying high levels of deprivation and need.<sup>xxxii</sup>

The city's high priority areas for capital projects are the above-mentioned marginalised areas, the Inner City and the development corridors. The public transport corridors that are included among the City's Capital Investment Priority Areas are<sup>xxxiii</sup>:

- The Soweto Public Transport Corridor
- The Soweto Highway
- Louis Botha Avenue
- Diepsloot-Randburg
- Bruma
- Perth-Empire Road
- Randburg-Marlboro-Linbro
- Roodepoort-Randburg
- Turffontein

Some of the results of these efforts to restructure the City over the last decade are described below<sup>xxxiv</sup>:

- The overall density of Johannesburg has improved to 2 698 persons/km<sup>2</sup> in 2011 compared to 1962 persons/km<sup>2</sup> in 2001.<sup>xxxv</sup>
- Consolidation areas to the north of the City are still the preferred areas for private developers. A vast disparity remains in terms of growth in the north versus the south of the city.
- The Public Transport Management Areas (PTMA) are the City's highest priority, along with the Marginalised Areas, for attracting investment and re-investment - within established nodes such as Johannesburg CBD, Sandton, Rosebank and Midrand, as well as in establishing nodes such as Jabulani, Kliptown and Baralink. The PTMA has remained a major investment area for the private and the public sector, and secondary to the Consolidation Areas. 60% of applications for higher residential densities fell within PTMA areas in 2009/10.
- Investment along BRT routes is not as intensive as that being stimulated around Gautrain stations. There has been no conclusive evidence that there is a shift to the Public Transport Management Areas as per the SDF rationale.
- Development in the Marginalised Areas is mainly residential, in the 30 – 80 m<sup>2</sup> bracket, implying it is still public-sector led, and they remain largely underdeveloped. They house many unemployed people and lack any significant centres of economic activity. There are however a number of private investments in these areas leveraged by public investment aimed at transforming them into economically viable and sustainable settlements.
- Almost all commercial, office and industrial applications take place within the Public Transport Management Areas in the Consolidation Areas in the northern areas of the city
- Almost all new greenfields development has primarily located on the northern and north-western periphery of the Consolidation Areas. There has been ongoing pressure for development on the north-western boundary of the City.
- The bulk of new private investment is from residential development, which remains concentrated in the Consolidation Areas, i.e. north of the City. In 2009/10, 94% of the R17,5bn in new private investment in residential developments was in the Consolidation and Public Transport Management Areas.
- Private investment in the form of densification, urban renewal, redevelopment and new infill development has been taking place in the public transport nodes and corridors but mainly in the north of the city. Johannesburg CBD, Rosebank, and Sandton and Gautrain



stations in these areas have been attracting very large private sector developments. Near to Midrand Station is the proposed Old Mutual development called Zonk'izizwe, with shopping, entertainment, office and residential development that is envisaged to be one of the largest development nodes in South Africa.

- The Urban Development Boundary appears to have limited investment in the peri-urban management areas.
- The city centre has densified dramatically to nearly 39 000 persons/km<sup>2</sup>.<sup>xxxvi</sup> The GDS 2040 says that demand for housing in the Inner City, which is centrally located and closer to economic activity in the north, and in the city itself, has steadily increased and now outpaces supply. There is in fact considerable overcrowding in particular neighbourhoods. While the overall average metropolitan density is 521 people per square kilometre (very low by global city standards), that in the Inner City is conservatively estimated in the GDS to average 2 270 per square km over a 10km radius.<sup>xxxvii</sup>

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## UPGRADE OF HEAVY RAIL CORRIDORS IN JOBURG

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The last ten years have seen no positive change to the quality of the rail system, despite a plan to upgrade the system developed in 2006. However, the Passenger Rail Agency of South Africa (PRASA) completed a new National Strategic Plan<sup>xxxviii</sup>, as well as a Gauteng Regional Strategic Plan<sup>xxxix</sup>, in December 2012, to guide all future investment in the rail system to 2050. Its stated goal is to upgrade the existing rail network in high-volume corridors so that it can play a key role in transit-oriented development in the city and act as a quality mass carrier.

Interventions will consist of:

- Purchasing new rolling stock, to replace the life-expired current fleet. It will also allow new seat configurations to be introduced (more seating on long routes, and more standing capacity – which will assist with overcrowding – on shorter routes. The service proposals will require an increase in the number of multiple-unit train sets operating in Gauteng from the present 124 to 229. The fleet increase will take place over time, driven by demand growth.
- Developing the off-peak market by increasing services, and using discounts so as to increase ridership and reduce the extreme peak travel figures.
- Introducing new security facilities at stations
- Introducing a regular-interval, standard-hour timetable.
- Increasing frequency and speed on some sections.
- Improving modal interchange facilities at key stations to increase catchment area.
- An upgraded ticketing and access-control system.
- Infrastructure upgrades to improve network and asset resilience and support timetable and capacity enhancements, including line-speed improvements; such as construction of additional bay platforms including at Naledi, additional tracks on certain corridors – such as four-tracking between Knights and Germiston to alleviate a bottleneck on the main line, and capacity/junction and line-speed improvements at various locations.
- New routes, including extending services from Pretoria, Leralla and Springs beyond Park Station, where they currently terminate, to Dube, Naledi and the Krugersdorp line.
- New stations, including one at Orange Farm (between the Stretford and Midannadale stations).

All rail corridors were reviewed and classified into Priority A (clear case for rail, with passenger numbers ranging between 20 000 and 30 000 per hour); Priority B (rail still justified, although the capacity required is lower); Priority C (case for rail uncertain and further review needed) and Priority D (no case for rail at present).

Johannesburg corridors were classified as shown in the following table.

TABLE 14: PRASA GAUTENG REGIONAL STRATEGIC PLAN JOHANNESBURG RAIL CORRIDOR PRIORITIES

Corridor	Priority	Characteristics
New Canada-George Goch-Johannesburg (Park)-Germiston	A	This is the central core of the Gauteng network and attracts very high passenger numbers
Naledi – New Canada	A	High passenger numbers
Midway – New Canada	A	High passenger numbers with high levels of overcrowding and strong growth forecast
Randfontein – Langlaagte	B	Journey times are uncompetitive, resulting in relatively low passenger numbers
Vereeniging – Midway	C	Further review required: low passenger numbers owing to uncompetitive journey times
Oberholzer - Johannesburg	C	Potential case for rail based on forecast growth.

PRASA is proposing three “Modernisation Corridors” in the country where a range of integrated improvements will take place to increase speed and comfort. In Gauteng the Mabopane – Pretoria – Johannesburg – Naledi corridor will be the modernisation corridor. Some trains will be run as fast regional express services between the two cities, allowed by the fact that the corridor is 4-track for most of the way. The requirement to increase capacity to up to 20 tph in peak required to meet the vision means that power supply upgrades may be needed. The current re-signalling proposal by Siemens will concentrate all controls onto one Gauteng IECC and will increase route capacity and resilience. Overall this corridor is complex, but fulfils a vital role in both Tshwane and Johannesburg and links both cities together. The project will deliver a much improved service, will reduce journey times on key parts of the corridor, and will increase rail’s capacity to move large numbers of passengers reliably and comfortably each day.

The PRASA plans identify the need for improvements at many stations, in particular Johannesburg Park and Germiston, but also Midway and New Canada (in Johannesburg) and Kempton Park, Elandsfontein, Tembisa, Isando, Leralla, Llimindlela, Oakmoor and Dunswart. The improvements planned at Johannesburg Park Station are aimed at improving the quality of the passenger environment, the modal interchange facilities, the passenger information within the station, the signage to platforms and the waiting areas.

Some possible extensions are also being considered to the rail network in the medium term. The highest-priority schemes in South Gauteng, which will be the focus of PRASA are: Daveyton to Etwatwa and Kwatsaduza, Kwesineto Angus and Zonkizwe, OR Tambo International Airport-related extensions, Tembisa to Ivory Park, Baralink – Nasrec, and Lenz to Krugersdorp.

The Baralink proposal is to upgrade the existing rail link between Nasrec and the New-Canada-George Goch main line, currently a single-track section operating only for major events. Once upgraded it could also be served by a park and ride at Nasrec, in conjunction with Rea Vaya services. PRASA is also looking at the possibility of connecting southern Soweto to Nasrec by a new heavy rail

link. The Lenz to Krugersdorp new rail corridor proposal is to make a connection between these two areas which are about 30 km apart on different rail corridors. To make the connection currently, passengers need to travel eastwards to Langlaagte to interchange.

Regarding long-distance rail links between Johannesburg and other cities, the plan discusses a potential very high-speed (400kph) link between Durban and Gauteng to encourage mode shift from air to rail. It also talks of the potential for increasing the speed of the existing lines between Gauteng and Limpopo, Free State and Mpumalanga to 160km/h. Demand to the Northern Cape and North West was found to be lower than other provinces and so alternative solutions were likely e.g. coaches. There is no plan for passenger services from Johannesburg to the Eastern Cape because of capacity issues and the plan instead proposes introducing an improved coach service between De Aar and Port Elizabeth.

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### SUSIDISED BUS CONTRACTS RATIONALISATION

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It has been the intention to restructure and rationalise the bus contracts in Joburg over the last ten years. The City developed a Rationalisation Plan in 2003 for the Putco Soweto services, the Eldorado Park services and the Metrobus services. Furthermore, the Gauteng Department of Roads and Transport (GDRT) which contracts the Putco Soweto, South Western Areas and the Eldorado Park services, initiated a separate project to re-design subsidised bus services in the province in late 2005. Subsequently the province developed Integrated Rapid Public Transport Network (IRPTN) plans for each municipal area in Gauteng as the basis for re-designing the bus contracts in the context of the national *Public Transport Strategy and Action Plan*, and in the light of BRT implementation projects such as Rea Vaya.

However, none of these City or provincial plans have been implemented. Metrobus introduced some new services independent of the plan. One of these, Soweto to Sunninghill, caused the collapse of the negotiations in progress in 2005/06 for the development of a new joint venture SPTN taxi route along the same alignment.

The main change has been that the provincial bus contracts have been converted into short-term, kilometre-based contracts. This followed a court case where bus operators successfully took the department to court for non-payment. The national Department of Transport (DoT) required that the number of kilometres required per route in the contracts be fixed, so that the cost of the contracts became more predictable and could be adequately budgeted for. This has enabled better financial control and monitoring. However, all the contracts are being renewed regularly on a short-term basis, a situation likely to persist until holistic plans can be developed for their restructuring.

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### MINIBUS-TAXI NETWORK RE-ORGANISATION AND LEGALISATION

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The City adopted an Operating Licence Strategy (OLS) in 2003, which envisaged re-regulation and re-organisation of the minibus-taxi short-distance services in Joburg. Some 80% of Joburg's minibus-taxi operators did not hold the required permits or operating licences at that stage. The national minister of transport also required that old permits all be converted to route-based operating licences by 31 May 2006.

Some progress was made with regularising the situation in that:

- The provincial Registrar of Taxi Associations, the city's Transport Department and the relevant taxi associations met and agreed on a route description for each route in the City. This began in May 2006 and was completed in 2007. However, some areas of disagreement remained, and final sign-off did not occur.
- The Transport Department developed standard procedures to be applied in dealing with Operating Licence (OL) applications referred by the Board for its approval. It also developed a specification for an information system, named the Johannesburg Operating Licence Administration System (JOLAS).

As regards route re-organisation:

- The OLS said that 80% of the current taxi route network in the City was well matched to desire lines of the passengers, although on some of these the supply needed to be adjusted up or down. Actual numbers were proposed in the OLS for the different routes. Some slight route-adjustments were also proposed to use an SPTN road instead of a parallel road.
- It also made proposals for 20% of taxis in the City (2070) to be moved to new routes, based on the analysis of taxi passenger origins and destinations. They were aligned to the SPTN network, and described in detail.

However, little has been achieved over the last ten years. Firstly, the implementation of Rea Vaya took precedence over any re-organisation of the taxi routeing system as it was initially envisaged that taxis would be replaced by Rea Vaya buses over time and the transformative focus shifted in this direction.

Secondly, legalisation has not taken place because there has been a moratorium on new operating licences being issued. This was meant to be ended once the conversion of permits to route-based operating licences was completed. However, the conversion process was, seven years after the minister's deadline, only halfway through. The Board had by 2013 only approved 22 679 of a possible 42 451 applications for the conversion process (and rejected 4 229 applications).<sup>xl</sup> However, despite the moratorium, the Board allowed inactive permits to be transferred to owners with active vehicles, thus legalising them.

The Gauteng Department of Transport and Roads (GDTR) has now closed down the Board and established in its place a Provincial Regulating Entity (PRE) in terms of the National Land Transport Act of 2009. This will be administered by GDRT officials and does not have a quasi-Tribunal role which was the way the original Boards were designed. It is the intention that this will be better capacitated to deal with the issuing of taxi and bus operating licenses, converting permits to operating licenses and regulating public transport operators.

Thirdly, the full-scale national programme of recapitalisation of minibus-taxis that had been envisaged to take place by 2010 did not happen and the average age of minibus-taxis in Johannesburg according to an analysis done in 2009 was 11.4 years. According to the taxi scrapping administrator, 11 100 taxis have been scrapped in Gauteng between inception of the Recapitalisation program and 2012.

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## NEW PUBLIC TRANSPORT FACILITIES

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A considerable amount of public transport infrastructure has been built in Johannesburg in the last ten years.<sup>xli</sup>

- The major infrastructure has been the completion of Phase 1A and 1B of Rea Vaya BRT, including 48 Rea Vaya stations, the 25,5km trunk busway from Thokoza Park to Ellis Park in Phase 1A, and 16,7km of busways in Phase 1B, as well as the permanent depot in Dobsonville (see Table 13).
- In addition, the Ellis Park and Nasrec precincts were significantly upgraded for the 2010 Soccer World Cup. Road upgrades were implemented around these two stadia, including the N17 and Golden Highway near Nasrec, and the New Doornfontein Transport Square and the Narec Pedestrian Promenade and Nasrec public transport hub were among the precinct projects implemented. Ellis Park and Doornfontein rail stations were upgraded, and PRASA built a new railway station at Nasrec, inside the stadium precinct.
- A five-phase upgrading by the Johannesburg Development Agency of the Baragwanath public transport facilities began in 2002 and was completed in 2008.
- The Wynberg/Alexandra Pan Africa public transport facility was developed as part of the Alexandra Renewal Project.
- Taxi ranks were upgraded in the Lenasia town centre in 2008.
- A public transport facility for buses and taxis has been built at Cosmo City.
- The Midrand public transport facility was expanded in 2009 and renovated further in 2011/12, to improve capacity and access, to provide a roof, to repair ablution facilities, to install CCTV cameras, to provide a holding area and to upgrade trader stalls.
- Long-distance taxi holding facilities were created at Trump Street in 2010, and the Westgate facility was expanded.
- A new facility for cross-border buses was established at Fleet Africa which, however, fails to adequately service cross-border operators and passengers. A plan for a high-quality International Transit and Shopping Centre Facility at Park Station was developed in 2005 but never implemented.
- Long-distance taxi holding areas have been created on Transnet land along Carr Street and using leased post office land opposite the Kazerne Long-Distance Holding Facility, which is planned to be demolished.
- The Diepsloot minibus-taxi rank built by JDA as part of the Diepsloot Renewal Programme was opened in July 2012.
- The province built a R32m bus and taxi facility at Zandspruit, which opened in April 2013 and has built cycle lanes in Zandspruit from the facility and nearby trip attractors.

The Transport Department developed a new model design for public transport facilities in 2011, which was approved by Mayoral Committee and which is being piloted in Roodepoort. This new model is intended to be low in maintenance, enables integration between modes and improves the safety and security of commuters through the way it has been designed.

The Department has also awarded a contract for the rollout of a new standard roadside commuter shelter for all road-based modes, which will have passenger information relevant to the shelter location, seating, and be universally accessible. The contract for these will be rolled out incrementally over the next two years and is funded by advertising rights on the shelters. The contract is for nine years and 11 months.

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## DESIGNATION OF PUBLIC TRANSPORT FACILITIES

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To support the City's ability to enforce policies and by-laws, a process to legally designate all recognised public transport ranks, holding areas, stops and laybys was initiated in 2005. A step-by-step procedures document about how to legally establish and designate public transport ranks and

holding areas (off-street) and stops and laybys (off-street) and associated consultation procedures was approved by Council in 2005. The designation process involves advertising for public comment.

By 2008, the designation process of facilities had been completed, involving 150 Rea Vaya stops, 150 other public transport stops and laybys and 20 formal taxi ranks.

All commuter stops are being re-designated as locations are confirmed or as new locations are identified for the above-mentioned standard and common commuter shelters. It is envisaged that as many as 1 400 new stops will be designated over the next two years.

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## ROAD NETWORK INFRASTRUCTURE

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The *Road Hierarchy Project* developed a roads masterplan in 2009 which was approved by the Mayoral Committee.<sup>xliii</sup> The project re-classified the entire road network of Johannesburg in line with the national Road Infrastructure Strategic Framework of South Africa (RISFSA) criteria for the 2009 base year, and also developed a 2015 and 2020 future road network classification. The road network had previously been classified in 2004.

Functional road classification refers to the process of classifying roads according to the characteristics of traffic service and the function that they are intended to provide. This determines the significance of roads within a network. Roads are assigned to a Class according to the relative amounts of traffic mobility they provide on the one hand, and the amount of land access they provide on the other. The RISFSA road classes are:

Class 1: Primary distributor

Class 2: Regional distributor

Class 3: District distributor

Class 4: District collector

Class 5: Access roads

Class 6: Non-motorised access ways

The RISFSA methodology required each road to be assessed against criteria including:

- Function of the road (the broad land uses and movement between the land uses)
- Traffic volume/day/direction (from traffic model)
- Access spacing (km between interchanges)
- Geometric (no. of lanes, physical separation of lanes, shoulders, width)
- Public transport (SPTN and Rea Vaya Phase 1 roads were used)
- Pedestrian access and type of provision made for pedestrian crossings
- Freight – access provided by road to freight terminals

The report for the 2009 base year records the 2004 classification and 2009 re-classification of all Class 1 to 4 roads in Johannesburg.

For the future year scenarios, an updated Functional Road Hierarchy was developed. The objective was to guide the future road upgrading and road building in Johannesburg, as well as the protection of road development corridors and the acquisition of land for expanded road corridors.

The project modelled, evaluated and ranked 92 of the proposed road projects contained in the Consolidated Infrastructure Management System (CIMS). It prepared first-order cost estimations

for proposed implementations, and considered land costs for the future year road. Travel time savings of the various projects were modelled, and cost-benefit analysis performed. The project then developed a RISFSA-classified, appropriate road network that would serve the needs of the City for the next five and ten years (2015 and 2020). A 2015 and 2020 future road network were developed and mapped and will be the basis for new road development by the JRA. All the roads projects in the future network are contained in Tables 23 and 24 later in this document.

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## THE GAUTENG FREEWAY IMPROVEMENT PROJECT AND E-TOLLING<sup>xliii</sup>

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Phase 1 of the Gauteng Freeway Improvement Project (GFIP) which began in May 2008 was completed in 2011 at a cost of R21 billion. This a major road expansion project to increase the capacity of the freeways in Gauteng, developed by the South African National Roads Agency Limited (SANRAL). Upgrades of significance to Johannesburg include the N1 from Soweto to the N4, the N3 from Alberton to the Buccleuch Interchange, the N12 south of Johannesburg, as well as sections of the N12 to the East Rand and sections of the R21. The upgrading is mainly in the form of modification of the interchanges and ramps as well as road widening and the incorporation of an intelligent traffic system. In general the upgraded routes received an extra lane in each direction, to effectively increase the carriageway size in each direction from three lanes to four. The intelligent traffic system will make use of various Closed Circuit Television (CCTV) cameras and sensors. This system will inform drivers of conditions on the road and also aims to alleviate congestion by controlling the flow of vehicles onto the freeway from various ramps by means of traffic signals (“ramp metering”).

The improved routes will be subject to electronic tolling via 49 gantries, of which 17 are in Johannesburg on the N1, N3 and N12. The metropolitan motorways, the M1 and the M2, are not part of the tolling scheme.

Prior to the toll road declaration being gazetted in March 2008, Johannesburg had raised many concerns with the proposals to toll roads in or around the periphery of the CoJ area. The Mayoral Committee had recommended that the new lanes should be HOV lanes, and that SANRAL should mitigate negative effects on the city’s road network. It also required the Transportation Department to engage with SANRAL on issues of concern on an ongoing basis.

As regards HOV lanes, SANRAL carried out a study and found that a 2+ HOV lane would reduce the capacity of the freeway overall and enforcement would be very difficult. SANRAL said that the ultimate and most optimal solution and goal was to work towards increasing the public transport vehicles using the freeway network, which in turn would warrant the implementation of dedicated public transport lanes (as opposed to HOV lanes), thus maximising the utilisation of the road asset.

As regards traffic diversion to the secondary network, i.e. the City roads, SANRAL did a study and concluded that there would be a reduction in daily traffic loading on the secondary road network and that any increases were generally small and localised. JRA supported this conclusion. However, this prediction is sensitive to the toll price. The routes most likely to be affected by diversion are the M1 and M2, William Nicol Drive, Rivonia Road, Jan Smuts Avenue, Beyers Naude, and Marlboro Drive. However, all are quite congested and potential savings in toll fees are offset by the fuel costs of these diversion routes.

Regarding pricing impacts on private vehicles and public transport the City's and SANRAL's studies both indicated that while there may be an initial diversion effect, after a while motorists would return to the freeways and pay the tolls because of time benefits.

Following the significant public outcry to the proposed tolls after SANRAL announced the tariffs in February 2011, the Minister of Transport agreed to put the process on hold subject to the formation of a Steering Committee which inter alia looked at providing commuters with viable public transport choices, and in which Johannesburg officials participated. In April 2011 it made a submission to the Gauteng Freeway Improvement Scheme Steering Committee on the impact of tolling and public transport alternatives.

The Transport Department's submission summarised Johannesburg's assessment as follows:

- In the context of high private vehicle use in Joburg and its impact on carbon emissions and climate change, all measures to discourage excessive vehicle use are encouraged. The toll scheme had the potential to reduce car use, promote behavioural shift to public transport and manage travel demand.
- The majority of private car users in Joburg would not be significantly impacted by the tolls. However, those car users travelling significant distances daily within Gauteng would be significantly impacted and may require public transport alternatives. These alternatives existed but needed to be expanded, improved and better communicated (province-wide by Gauteng DTR because of the intercity nature of the GFIS impact).
- HOV lanes were no longer recommended, but public transport dedicated lanes were recommended to be introduced in the long term. The City and Province should propose how the public transport network for inter-city and intra-Gauteng public transport could take advantage of the GFIS infrastructure, and SANRAL needed to partner with them on initiatives such as public transport lanes on the freeways, and park and rides along the freeway system. Public transport routes that can run express and do not need to stop would be the only suitable kind of routes to put on the freeway network, which will limit the extent to which the GFIS can be used for public transport. Park-and-rideshare sites could assist car users who are significantly impacted.
- Freight operators were likely to pass the costs of the tolling system onto the consumer, but this should be limited by encouraging freight to move at night when tolls are discounted.
- Diversion of vehicles could occur onto Joburg's road network, and possibly for only a limited period, and thus should be monitored, especially in relation to the M1/M2. It was possible that pressure could be alleviated from some of Joburg's secondary and tertiary roads. This should be monitored, as per the Mayoral Committee's requirements, and if there is a negative impact on local roads, to take action. Traffic counts prior to construction, during construction and on implementation needed to be carried out using JRA's traffic monitoring programme.
- Public transport operators should pay only 25% of the toll provided they had an e-tag and operating licence. (Public transport is now completely discounted.)



## JOHANNESBURG TRANSPORT VISION, MISSION AND GOALS

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This *Strategic Framework* has been developed so as to be consistent with current government policies and objectives. The main ones are described below.

### TRANSPORT DEPARTMENT OF THE CITY OF JOHANNESBURG

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The Transport Department of the City of Johannesburg has developed this *Strategic Framework* and bears the main responsibility for its implementation. It is responsible for transport planning, policy development, project implementation and services. It is responsible for providing infrastructure and services that support walking, cycling and public transport, for fostering behavioural change to improve road safety, and for enabling mobility, including that of freight.

The Department's vision, mission and goals are:

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#### VISION

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"A people-centred transport system that is transformed."

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#### MISSION

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"Our mission is to implement in a co-responsible and innovative way transport infrastructure and systems to improve the quality of life for present and future generations of residents of Joburg and which will contribute to the City's goals of:

- Nation building and social cohesion;
- Poverty alleviation, job creation, local manufacture and economic growth; and
- Human development and environmental sustainability."

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#### GOALS

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"Our goals are:

- Building a leading, responsive and activist transportation sector in the City which works in partnership with stakeholders and residents;
- Planning, policies and co-ordination for integrated and sustainable transport;
- Promoting public transport, walking and cycling as modes of choice in Joburg;
- Building co-responsibility and a value-based culture to enable behavioural change towards transport issues;
- Providing high quality, safe, accessible, affordable and environmentally friendly public transport services;
- Building, maintaining and managing our road infrastructure and systems to ensure safety, accessibility and mobility for all road users including pedestrians;
- Transforming the construction, maintenance and management of storm water to respond to climate change and water scarcity and ensure the safety of residents and infrastructure; and
- Building, maintaining and managing public transport and non-motorised transport infrastructure to support walking, cycling and the use of public transport."

The City of Joburg developed its first Growth and Development Strategy (GDS) in 2006 as an articulation of Johannesburg's long-term development path. It also serves as the conceptual foundation for the five-year Integrated Development Plan. A review was initiated with the new political term of office in 2011, resulting in a refined Joburg 2040 GDS, which was approved on 20 October 2011. This long term strategy outlines the City's vision, mission, principles, outcomes and long-term outputs and indicators. It is not a statutory plan, but rather it provides a set of defined strategic directions that frame the other medium-term plans for the infrastructure, housing and transportation sectors. A GDS roadmap has been developed to deliver on the strategy.

The Joburg 2040 GDS vision is:

"Johannesburg – a World Class African City of the Future – a vibrant, equitable African city, strengthened through its diversity; a city that provides real quality of life; a city that provides sustainability for all its citizens; a resilient and adaptive society."

The Joburg 2040 GDS mission is:

"The City of Johannesburg commits itself to pro-active delivery and the creation of a city environment in 2040 that is resilient, sustainable and liveable. It aims to achieve this through long-term 2040 plans, targeted programmes, services and enabling support that drives economic growth, optimal management of natural resources and the environment, the development of society and the individuals within it, and the practice and encouragement of sound governance, in all the City does."

The Joburg 2040 GDS describes four drivers of the three key concepts of resilience, sustainability and liveability:

- Governance
- Economic Growth
- Human and Social Development
- Environment and Services

The Joburg 2040 Strategy identified four outcomes:

- Outcome 1: Improved quality of life and development-driven resilience for all.
- Outcome 2: Provide a resilient, liveable, sustainable urban environment – underpinned by infrastructure supportive of a low-carbon economy
- Outcome 3: An inclusive, job-intensive, resilient and competitive economy that harnesses the potential of citizens
- Outcome 4: A high-performing metropolitan government that pro-actively contributes to and builds a sustainable, socially inclusive, locally integrated and globally competitive GCR.

The Transport Department, together with other departments, is the cluster is responsible for outcome no. 2, i.e. "A resilient, liveable, sustainable urban environment - underpinned by infrastructure supportive of a low carbon economy".

The primary output defined by the Joburg 2040 GDS under this outcome is 'eco-mobility'. This refers to environmentally sustainable and socially inclusive ways of local mobility, combining the use of NMT means such as walking, cycling and wheeling with the use of public transport and light

electric vehicles from renewable energy resources”.<sup>xliv</sup> The Transport Department has interpreted as its long-term goal, needing to be achieved by two long term outputs namely:

- Promoting public transport, walking and cycling; and
- Transport infrastructure and movement.

More specifically Transport seeks to:<sup>xlv</sup>

- Make public transport, walking and cycling the mode of choice for all Joburg residents. This is to be achieved firstly by reducing congestion and high transport costs through the provision of quality public transport services including Rea Vaya , Metrobus and improving public transport infrastructure and transfer points;
- Improve mobility and accessibility to enhance economic growth and development; and
- Provide quality transport infrastructure including roads which can serve all road users including public transport users, pedestrians, old and young.

This will be achieved through partnership building, fostering behavioural change and collectively reclaiming Joburg roads as public spaces.

In 2012/13, the City developed a Joburg 2040 GDS Roadmap to set out clear and specific outcomes by decade. Decade 1 (2011-2020) focused on scaling up service delivery, initiating smart practices, preparing for new growth, accommodating urbanisation and the safeguarding of Johannesburg and its people. Decade 2 (2020-2030) will concentrate on accelerating implementation and the scaling up of smart practices. Finally, in decade 3 (2030-2040) the City will realise its goal of being a smart world-class African city that is resilient, sustainable and liveable.<sup>xlvi</sup>

One of the outcomes of the *Roadmap* was the identification of ten priorities, confirmed at the Mayoral Lekgotla in October 2012:

- Financial Sustainability and Resilience
- Agriculture and Food Security
- Sustainable Human Settlements
- SMME and entrepreneurial support
- Engaged Active Citizenry
- Resource resilience
- Smart City
- Investment attraction, retention and expansion
- Green economy
- Safer cities

In the draft *2013-16 Integrated Development Plan (IDP)*, the Decade One deliverables set out for Transport fall under “sustainable human settlements” and are:

- “BRT subsequent phases”, and
- “Universal access to mass transit system in a manner that integrates multiple nodes in a manner that reshapes City morphology”.

## NATIONAL DEVELOPMENT PLAN

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On 15 August 2012, the National Planning Commission handed over the *National Development Plan* (NDP), the vision of the country for the next 20 years, to the President. The NDP offers a long-term perspective and defines a desired destination including the identification of the role different sectors of society need to play in reaching that goal.

The NDP aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and reduction of inequality. The core elements of a decent standard of living identified in the plan are:

- Housing, water, electricity and sanitation
- Safe and reliable public transport
- Quality education and skills development
- Safety and security
- Quality health care
- Social protection
- Employment
- Recreation and leisure
- Clean environment
- Adequate nutrition

In respect of local government, the Plan highlights the need to strengthen its ability to fulfil its developmental role, including in respect of spatial planning, infrastructure and basic services.

The National Development Plan vision for transport is:

“By 2030, investments in the transport sector will ensure that it serves as a key driver in empowering South African and its people, enabling:

- Improved access to economic opportunities, social spaces and services by bridging geographic distances affordably, reliably and safely.
- Economic development, by supporting the movement of goods from points of production to where they are consumed, facilitating regional and international trade.
- Greater mobility of people and goods through transport alternatives that support minimised environmental harm.

The Plan sees the state functioning as a capable navigator. It will oversee a transport system that serves the interests of society; establish a holistic view of national transport realities; and prioritise, plan and provide basic infrastructure where needed. Government should recognise where competing service providers would best meet transport needs, and enable licensing where appropriate, all within a framework of strong, effective regulation of public and private transport.

Moving towards 2030, the National Development Plan envisages South Africa’s transport system supporting economic development, job creation and growth, providing equitable access to opportunities and services for all and reducing poverty. “While some forms of private transport, such as the car, will still be used in 2030, a marked change to public transport will emerge through concerted effort, strong leadership, consistent messages and actions, and public system alternatives that work. By 2030, public transport will be user-friendly, less environmentally damaging, cheaper and integrated or seamless. Better monitoring of emissions – and apportioning cost to origin – is also likely to be a major contributor in moving to a low-carbon future.”<sup>xlvii</sup>

It states that “Leading up to 2030, transport authorities will be challenged to translate the vision for getting South Africa to work in effective transport. Providing sustainable transport services that are efficient and inclusive is inextricably linked to the need for spatial change in South Africa’s cities and related transport corridors. Users will adjust to pricing that is supported by greater transparency, with full costs associated with each service, including costs linked to environmental impact.”<sup>xlviii</sup>

It sets out the following priorities in three periods:

2010-2015: Consolidation and Selective Expansion

- Public transport and infrastructure must be managed better by removing duplicated functions, refining powers and functions, imposing accountability and enhancing governance and decision-making processes. It is crucial that all parts of the existing road-based commuter services function properly, as many commuters depend on bus and minibus-taxi services. New public investments have offered a glimpse of how better performing public transport can improve people’s commute. Transport authorities should focus on enforcing sector-wide compliance and encouraging contracted operators and independent service providers to invest and provide a more commuter-friendly experience.
- Stabilise existing rail services and begin the renewal of the fleet to high-capacity new rolling stock (probably a 15-year process), with station upgrades and improved facilities to link better to road-based services.
- Intensive application of information technology – highway traffic control systems - will increase use and flow rates on the road network and boost the use of existing infrastructure, which can be achieved more rapidly than building new roads.

2016-2020: In step with evolving land-use changes

- After institutional reforms for public transport have been completed, regional transit authorities should be established in metropolitan areas to streamline institutional arrangements.
- Transit-led growth should be the focus, guided by plans for the urban form. This will help increase concentration in urban settlements, while improving the economic scale for transport modes.

2021-2025: Energy Efficiency

- Increase energy efficiency and the resilience of transport networks, drawing on progress in establishing renewable energy resources.

2026-2030: Mid-life upgrades

- Review progress and make tactical adjustments to overcome problems
- Planning should provide for refits to transport systems to incorporate technological improvements.

## DOT PUBLIC TRANSPORT STRATEGY

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A significant new *Public Transport Strategy* for South Africa was approved by the Cabinet in March 2007 which incorporated Johannesburg’s new initiative to build a bus rapid transit system (BRT), phase by phase, to provide a quality public transport system within reach of at least 85% of its residents. This national strategy and an accompanying action plan set out an agenda to radically

transform public transport in Johannesburg (plus 11 other cities and six districts) from a low-quality system in decline, used only by people with no alternative, to a user-friendly, high quality, car-competitive system for both public transport users and current car users. It seeks to move from operator control to public sector control. It seeks to move from uni-modal routes to fully integrated mass rapid public transport networks. It argues that some of the current initiatives, such as taxi recapitalisation or upgrading rail, while important, will not manage on their own to halt the ongoing switch to cars. Achieving the transformation of public transport will require government to act as a “network authority” exerting strong public regulation, management and network control.

The *Public Transport Strategy* sets out a plan to upgrade priority rail corridors to “rapid network quality” and to upgrade road-based services to BRT or BRT-type quality. It envisages public sector control over integrated networks and a maximum stake for existing minibus-taxi and bus operators in the rapid public transport network operations. By 2014, the aim is to have a functioning network in at least 12 cities – including Johannesburg – and six districts.<sup>xlix</sup>

## THE TRANSPORT THRUSTS, STRATEGIES AND PROGRAMMES

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Transport strategies and programmes have been developed which seek to meet the policy objectives and outcomes of the City's Joburg 2040 Growth and Development Strategy as well as the imperatives described in other key government plans such as the National Development Plan and the national Public Transport Strategy.

These strategies and programmes have been organised into nine topics or "thrusts". The current status, plans and progress made in each of these thrusts has been discussed in the first part of this document. The following sections describe for each thrust the desired outcome, a brief statement of the current reality, the policy and objectives, and the strategies and programmes that will be pursued to move the city's transport system closer to the envisaged outcome, both in the short term (next five years) and the longer term (to 2040). The nine thrusts are:

- Thrust no. 1: Restructure and integrate the city
- Thrust no. 2: Improve and expand provision of quality public transport and use of non-motorised transport
- Thrust no. 3: Maintain, improve, extend and integrate transport infrastructure
- Thrust no. 4: Support economic growth through improving freight mobility
- Thrust no. 5: Manage congestion, travel demand and parking
- Thrust no. 6: Actively engage citizenry in improving the transport system
- Thrust no. 7: Transform the transport sector and encourage new, efficient and profitable transport enterprises and employment creation
- Thrust no. 8: Plan and regulate the transport system
- Thrust no. 9: Resource and finance the transport plan

### THRUST NO.1: RESTRUCTURE AND INTEGRATE THE CITY

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#### CONTEXT

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The desired outcome is an efficient, city-wide public transport system located predominantly along high-density, mixed land use corridors.

The current reality is very different. Johannesburg's urban form is sprawling, low-density and polycentric. As a relatively young city its shape and form was driven from its earliest days by the availability of cars, allowing sprawl and low density suburban development. Colonialism and racial segregation, compounded by apartheid planning, created race-based dormitory townships at considerable distances from the economic core of the city. Social and economic exclusion caused by the country's apartheid legacy are evident in the long distances many people travel from where they live to where they work or seek work, or obtain health care and other government or social services. From the 1960s onwards, the motorway and freeway building programme accelerated the sprawl, and spurred the development of secondary CBDs like Sandton, Eastgate, Fourways, Rivonia, and Sunninghill and new industrial areas such as Kya Sands.

Since the end of apartheid, state-subsidised housing has continued to be located in peripheral areas, due to limited budgets and the escalation of land prices in Johannesburg. Poverty in Johannesburg is thus geographically concentrated, with stark spatial differences in poverty levels. There is a pronounced south-north divide, with many people living south of the city and needing to travel to places of work in the CBD and the smaller CBDs to the north. All this has had negative transport effects – increased travel times, structural car-dependency for many, and stranded poor people – evidenced in the high number of residents – 23% in a 2011 survey<sup>i</sup> – who say they make no trips at all (see Table 5 earlier).

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## POLICY AND OBJECTIVES

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Providing sustainable transport services that are efficient and inclusive is thus inextricably linked to the need for spatial change in South Africa's cities and related transport corridors. There is a need to establish more economic opportunities where people live, or create new settlements close to centres of work.

The Joburg 2040 GDS also lays extensive emphasis on spatial restructuring as a key to a better functioning city. It says that equitable access - bringing people closer to jobs, markets, social networks and other opportunities – requires improved mobility but also integration through mixed settlements and the creation of spaces and places that encourage interaction. The location of new housing is key to inclusion and equitable access in the city: delivery should be close to places of work and transport nodes and corridors. Low-cost rental options are a priority. Crime and private-developer led housing projects have created new islands of exclusion, adding another layer to the already fractured and divided apartheid city. Johannesburg has the highest number of road closures and security estates in South Africa.<sup>ii</sup>

From a policy perspective, a great deal of consensus has developed in government and the planning community, supported by academic research, that the most efficient urban form is compact, mixed-use, with extensive public transit systems, combined with attractive environments for walking and cycling. There is huge inertia in the form and functioning of cities, and the question is how quickly the restructuring of cities can achieve change.<sup>iii</sup> One study suggests that an energy saving of 7-10% below current trends can be achieved by 2050 if 60% of new development is shifted to a compact, transit-related form.<sup>iiii</sup> This is a good indicative proxy for the type of effort it will take to achieve the much-sought increases in transport efficiencies that more efficient urban form promises.

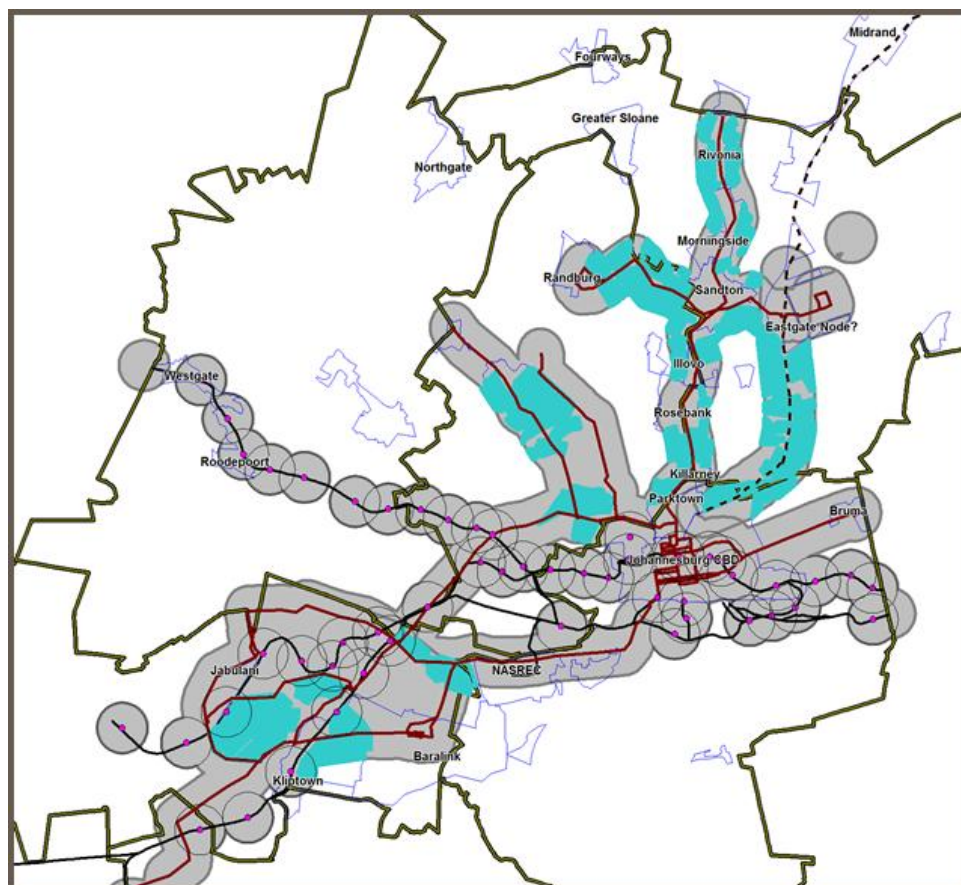
The City formally adopted Transit Oriented Development (TOD) as a planning policy in 2008, and later a Growth Management Strategy to focus development opportunities in TOD precincts.

Investments in public infrastructure, in particular mass public transportation systems, are expected to form the backbone of the spatial TOD interventions. The Transport Department will identify the key TOD priority corridors and nodes through the current ITP work, and the Department of Development Planning will compile Strategic Area Frameworks for them.<sup>lv</sup>

The current ToD network and nodes including the revised Phase 1C corridor along Louis Botha Avenue are shown in Figure 13.



FIGURE 13: TRANSIT-ORIENTED DEVELOPMENT NETWORK AND NODES, 2012/13



From a transport perspective the numerous benefits in promoting transit-oriented development, density in corridors and nodes, and mixed-use developments at nodes in the corridors include the following:

- A mixture of land uses along a corridor, instead of zones of mono-functional land uses, means that there are not only boardings at the start of public transport routes, and alightings at the end of routes, but rather both ons and offs for the full length of the route. This “ridership turnover” is a key driver of lowering the cost per passenger carried in public transport. Revenue modelling in Rea Vaya Phase 1A indicated this as the most significant variable in better financial performance. If each seat was occupied twice on each trunk, peak period bus trip, instead of the current estimated 1.1 times, Rea Vaya’s annual revenue would increase by 50%.
- A mixture of land uses along a corridor also means that the public transport route can pick up passengers in both directions of the route. In Rea Vaya Phase 1A, as of 2011, only 13% of the daily passengers are travelling in the minor or reverse direction of the route. If routes had more even two-way activity, revenue would also increase significantly. For example if the 13% increased to 50%, then Phase 1A revenue would increase by 20%.
- In general higher numbers of passengers per bus km mean better revenue:cost ratios.
- It becomes feasible to run services at high frequencies in the corridor because of demand being concentrated there. This means better service for passengers. This in turn leads to higher ridership.
- Lengthy feeder and distribution services are minimised because of the proximities created by the concentration of activity in the corridors.

- The modes of walking and cycling, for either feeder routes to public transport stops and stations, or as the main mode for the shorter and convenience trips in the corridor, can play a far greater role in a denser corridor because of shorter average trip distances.

## STRATEGY AND PROGRAMMES

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The key strategy is Transit-Oriented Development (TOD), which is to create strong high-frequency public transport corridors and to promote residential density along them and complexity of land use in the nodes on these corridors through attracting density and mixed-use developments to them.

The high-level programmes the Transport Department will pursue over the next five years and in the longer-term to support TOD are:

- Identify and map the whole network of public transport, freight and walking and cycling corridors and nodes, and identify the most appropriate modes, routes, and services that will be contracted or licenced to operate in each corridor.
- Implement over time the identified public transport corridors, which in the next five years are:
  - the operationalization of Rea Vaya BRT Phase 1B which is the trunk route from Noordgesig to Parktown (by October 2013) and
  - the planning, construction and implementation of Rea Vaya BRT Phase 1C which is the trunk route from Parktown to Alexandra and then Sandton, with complementary services to Ivory Park (to be initiated in 2016).
  - The extension of the Phase 1C route to Randburg by 2018 and the possible extension of the trunk route from Soweto Highway to Dobsonville enabling feeders to service areas such as Braamfisherville.
- Develop integrated transport hubs and improve the surrounding public environment, in particular the pedestrian and cycling environment, in and around the significant public transport nodes where the environment is unsafe or unattractive, so as to attract mixed use development including inclusionary housing.
- This includes:
  - public transport nodes in the inner city, in particular around Park Station and Westgate;
  - rail station precincts as and when upgrading occurs – the key stations in the PRASA Gauteng Regional Strategic Plan of 2012 are Park Station, New Canada and Midway Stations, which are intended to become key multimodal interchanges and investment points.<sup>iv</sup>
  - the Gautrain stations of Rosebank and Sandton; and
- Incentivise spatial restructuring through the way in which public transport fares are structured, i.e. through incorporating a distance component in the fare structure.

## THRUST NO. 2: IMPROVE AND EXPAND PROVISION OF QUALITY PUBLIC TRANSPORT AND USE OF NON-MOTORISED TRANSPORT

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### CONTEXT

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The desired outcome is that public transport and walking and cycling become modes of choice, and to reach a stage where the majority of trips are made using public transport or non-motorised transport. The aim is to link all people into a network of walking and cycling so they can access nearby destinations, and into a network of affordable, quality public transport for their more distant destinations.

This will require improving existing services and expanding the provision of new quality public transport, such as Rea Vaya BRT, and intervening in various ways to make walking or cycling very convenient for shorter trips.

An important aspect of “quality public transport” is convenience, and **integration** between different public transport services (and also non-motorised access) is important. There is almost no integration between the different modes and services operating in Joburg. “Integration” has many components, including:

- Integration of route network and services
- Integration of fare structures (sometimes referred to as fare harmonisation)
- Integration of fare medium (or integrated ticketing)
- Integration of infrastructure
- Integration of passenger information
- Integration of timetables;
- Integration of branding

“Quality public transport” must also be **universally accessible**. This means it must be designed to be useable by all people, to the greatest extent possible, without the need for adaptation or specialised features.

The current reality is that very little of public transport in Johannesburg can be regarded as “quality”. A third of city residents say they do not use public transport, and the reasons are generally because the public transport offerings in the city are not car-competitive, for example are not available where they live or are regarded as unreliable, unsafe or insecure. The prevailing attitude seems to be that if you can afford a car, you will not use public transport.

As evidenced in the satisfaction ratings in the Status Quo section earlier, many passengers regard the dominant public transport mode in the city, minibus-taxis, as unsafe, their drivers rude, the fares expensive, and the facilities as poor and insecure. Bus passengers regard facilities as poor and bus availability outside the peak period as unsatisfactory. Rail passengers regard trains and their stations as insecure and the service as poor.

On the other hand, the Rea Vaya BRT, is designed to offer a quality service which is affordable. It operates between Soweto and the CBD presently, and will open a new corridor in 2013 from Soweto and the inner western suburbs to the CBD via the University of Johannesburg, Wits, Parktown and Braamfontein. It will be further extended in 2016 when Phase 1C is introduced and then rolled out in further phases beyond that. Although its share of the Johannesburg travel market

is presently small, it does offer a glimpse of what can be achieved. Passenger satisfaction levels are high with almost all quality aspects, and its fares are set at reasonable levels.

Gautrain is also designed as a quality service and passenger satisfaction is also very high. However, the fares of the system put it out of the price range of most people and the target market is people who presently use cars.

As regards walking and cycling, there is almost no provision at present for cycle lanes in Joburg, and NMT modes remain unprioritised in the streetscape. This is particularly the case at conflict points such as intersections and bridges. Pedestrian paths are prevalent in some areas but not in others and are often not continuous or fail to reflect pedestrian desire lines.

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## POLICY AND OBJECTIVES

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Creating a modal shift change in Johannesburg towards the majority of trips being made on public transport or by non-motorised means such as walking and cycling is one of the most important things the City can do to improve the quality of life for its residents and visitors. This requires a mindset change and also a significant effort to provide a quality public transport system and good walking and cycling environment. The imperatives and benefits are wide-ranging and include the following:

- Most households (66%) in Johannesburg do not own a car<sup>lvi</sup> and good availability of public transport is essential to ensure that they have equal opportunity as more privileged car-owning residents to get around the city. Furthermore, if Johannesburg can attract a significant number of car users to public transport it will be able to mitigate its congestion and pollution problems.
- The long distances many people in Johannesburg must travel from where they live to where they work or seek work, or find health care or other services, results in social and economic exclusion and isolation. Improving mobility in Johannesburg, i.e. suitable means for people to move about the city efficiently, safely and cost-effectively – will broaden social and economic access, and alleviate poverty.
- The GDS 2040 envisages a city characterised by social inclusivity and enhanced social cohesion. Widespread use of public transport also contributes to social cohesion. The National Development Plan has also noted that public transport and NMT modes “may foster a different culture” in that they encourage social interaction, healthy practices and street-level movement, which create a sense of space and social inclusion that South Africa needs”.<sup>lvii</sup>
- Making new and convenient connections across the city by means of quality public transport, can play a role in integrating a city historically divided physically by apartheid, and the more recent development of peripheral and marginalised settlements.
- One of the key contributors to stabilising carbon emissions at a sustainable level and moving to a low-carbon and climate-resilient economy is investment in an efficient public transport system. The NDP requires that by 2030 a “substantial proportion of the low-carbon infrastructure should be in place or at an advanced stage of planning, particularly in the energy and transport sectors.”<sup>lviii</sup>
- A widely-used public transport system will protect Joburg residents from global fuel price shocks and at the same time lower the city’s carbon emissions. The fuel price in South Africa

increased by 762% between 1990 and 2009, making individual transport in cars increasingly expensive. This is also positive in that the expense will act as a disincentive to growing private car use.

- Increasing use of public transport significantly reduces pressure on road maintenance and building budgets.
- A growth in cycling can create both local economic development and tourism opportunities.
- Cycling instead of walking will reduce trip times for those who are too poor to afford public transport.
- More trips by walking and cycling brings health and leisure benefits.

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## STRATEGY AND PROGRAMMES

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### STRATEGY FOR CHOOSING BETWEEN DIFFERENT MODES

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This *Framework* will develop a high-level public transport, NMT and freight network plan. It will be informative about the varying levels of passenger demand on the various corridors and roads of the city. The next step in the ITP process (see Figure 1) is the Integrated Transport Network Plan (ITNP) project. This is intended to determine the best mode for the routes, the public transport routes the City will be investing in, the NMT routes and a 10-year sequenced plan indicating funding requirements.

In assessing the role of each mode of transport in the present and future public transport system, the most important criteria are capacity – modes must be able to carry the passenger volumes over the required distance – and capital and operating costs - modes can be selected on the basis of least cost over the distance operated, to ensure that over the long run the total investment of public resources is optimised.

Generally speaking, from a cost and capacity point of view, minibus-taxis should play a major role over lower volume, shorter-distance routes where good levels of local accessibility are required, while conventional buses and bus rapid transit (BRT) should provide services along longer, medium-to high-volume corridors. Rail is preferred in very high-volume commuter corridors, or BRT where the full range of BRT features can be applied. However, there is no one correct mode, and the decision depends upon an array of factors. There will often be more than one mode suitable for a situation.

From a cost sustainability point of view, including also capital costs of the fleet and infrastructure, the following vehicle types are suitable under Johannesburg conditions:

- A 15 or 18-seater minibus will be least costly for one-way passenger volumes of less than 800 passengers/day.
- The standard bus is the least costly for one-way passenger volumes between 800 and 20 000 one way passengers/day.
- The articulated bus is the least costly for one-way passenger volumes between 20 000 and 40 000 one-way passengers/day.
- The train is the least costly mode for passenger volumes above 40 000 one-way passengers/day.

The cost of the way assumed that an exclusive lane is provided for road-based modes once the number of peak hour vehicle trips they make uses more than 25% of lane capacity.

Other aspects in decision-making about the appropriate mode for a route include the travel speed, image for the city, attractiveness to car users, passenger preference, comfort and the convenience of the mode. In selecting appropriate modes their ability to promote other objectives such as achieving a certain service quality to attract car users, may also be taken into account. The following table is based on a decision matrix in the *BRT Planning Guide 2007*,<sup>lix</sup> with some adaptations and additions for Johannesburg.

TABLE 15: PUBLIC TRANSPORT DECISION MATRIX

Mode/Technology	Demand Requirements	Advantages	Disadvantages
Metro Rail/Elevated Rail	High to very high passenger demand (30 000 to 80 000 pphpd)	<ul style="list-style-type: none"> <li>• Superior image for city</li> <li>• High commercial speeds (28-35 kph)</li> <li>• Attracts discretionary public transport riders</li> <li>• Uses relatively little public space</li> <li>• Low local air emissions</li> </ul>	<ul style="list-style-type: none"> <li>• Very high infrastructure costs</li> <li>• Poor revenue recovery during off-peak</li> <li>• Long development and construction times</li> <li>• Complex integration with feeder services</li> </ul>
Light Rail Transit	Moderate passenger demand (5 000 to 12 000 pphpd)	<ul style="list-style-type: none"> <li>• Provides good image for city</li> <li>• Attracts discretionary public transport riders</li> <li>• Quiet ride performance</li> <li>• Can be fitted to narrow streets</li> <li>• Low local air emissions</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately high infrastructure costs compared to BRT.</li> <li>• Limitations with respect to passenger capacity compared to rail</li> <li>• Require operating subsidy in Joburg conditions</li> </ul>
Bus Rapid Transit	Low to high passenger demand (3 000 to 45 000 pphpd)	<ul style="list-style-type: none"> <li>• Low infrastructure costs for exclusive right of way (compared to rail)</li> <li>• Good average commercial speeds (20-30 kph)</li> <li>• Ease of integration with feeder services</li> <li>• Moderately good image for city</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately high infrastructure costs (compared to conventional bus/taxi) - R35 million/km in Jhb for bi-directional lanes excl stations</li> <li>• Require operating subsidy in Joburg conditions</li> <li>• Encroachment on busways requires enforcement</li> </ul>
Conventional Bus	Low passenger demand (500 to 5 000 pphpd) in mixed traffic	<ul style="list-style-type: none"> <li>• Low infrastructure costs</li> <li>• Relatively low operating costs</li> <li>• Appropriate for small cities/corridors with low demand</li> </ul>	<ul style="list-style-type: none"> <li>• Often lacking in basic customer amenities and comfort</li> <li>• Regularly loses mode share to private vehicles</li> <li>• Require operating subsidy in Joburg conditions</li> </ul>

			<ul style="list-style-type: none"> <li>• Low average commercial speeds (mixed traffic)</li> </ul>
Minibus taxi/paratransit	Low to medium passenger demand (upto 4 500 pphpd – assuming one in eight vehicles on a two-lane per direction road in mixed traffic are taxis).	<ul style="list-style-type: none"> <li>• Small size allows more extensive door to door operation and more agile operation in traffic than conventional buses</li> <li>• Low infrastructure costs</li> </ul>	<ul style="list-style-type: none"> <li>• High number of vehicles because of small vehicle capacity which causes traffic pressures and more noise and air pollution than bigger modes</li> <li>• Average commercial speeds same as mixed traffic</li> <li>• Typically poor road traffic behaviour and safety record</li> <li>• Lacking in basic customer amenities such as timetables and passenger information and business model typically leads to underinvestment in vehicle replacement and maintenance.</li> </ul>

Regarding competition on the same routes, parallel services should not be allowed in corridors with a rail service carrying less than 100 000 one-way passengers / day using trains. Parallel service can be permitted in certain circumstances for road-based vehicles. These circumstances are defined by the number of passengers being transported without the parallel service, the number of passengers that will be lost to the parallel service, the cost structure and the fare to be charged. A detailed guideline, adopted as part of the *2003-08 ITP*, has been developed for assessing particular situations.<sup>lx</sup>

**Walking and cycling** are the appropriate and the preferred modes for short-distance, learner and convenience-related trips within the city. International standards recognise distances of 500 m to 1 km as representing a fair walking distance. Reasonable recommended trip times are 30 minutes to jobs/school and 10 to 15 minutes for trips to shops or services. Most destinations should be within a maximum of 10km for cycling. As many trips in Joburg are longer, NMT routes also need to help people reach the motorised network.

Transit-oriented development (ToD) is intended over the longer term to increase the number of short-distance trips. School trips are particularly suitable for NMT. Cycling enables a rate almost three times faster than walking, and schoolchildren walking long distances to school will thus especially benefit. Cycling can also reduce trip times for very poor people who walk long distances because they simply cannot afford motorised public transport.

Among the factors making cycling and walking less popular than they are is the association with poverty, and the association of car use and car value with the status of individuals. Significant promotional efforts will be made to change these perceptions.

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**CONTRACTED AND NON-CONTRACTED SERVICES STRATEGY**

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The Transport Department has broadly speaking four types of relationships with public transport operators active on routes in the city:

- The operator is a city-owned company contracted through the city's shareholder unit via a Service Level Agreement, and the Transport Department plays an oversight, compliance monitoring role (Metrobus)
- The operator is a private sector company contracted by the Scheduled Services Management Agency (SSMA) in the Transport Department (Piotrans (Pty) Ltd, the first BRT operating company)
- The operator is not on a contract but operates in terms of an operating licence, issued by the province (the Gauteng Operating Licencing Board, and soon to be by the Provincial Regulatory Entity PRE), and by law required to be on conditions such as routes and validity period stipulated by the City through its Transport Department. Effectively the Transport Department can veto the issuing of an operating licence as they may not be issued unless the planning authority has agreed to the granting.
- The operator has a contract, concession or service level agreement with another sphere of government (Gautrain concessionaire Bombela has a contract with the provincial Gautrain Management Agency, Metrorail is contracted by the Passenger Rail Authority of SA and various bus operators have contracts with the Gauteng Department of Roads and Transport (Putco Soweto contract, Eldorado Park contract, SW Areas contracts).

Rea Vaya's quality is tightly controlled by the Scheduled Services Management Unit in the Department of Transport while the degree of control over quality is much lower in respect of Metrobus, which is also a city-owned service, since there is no performance contract with penalties. Losses have to be picked up by the city, so there is no incentive for efficiency, although the Service Level Agreement and quarterly reporting requirements are an attempt to exert some control.

In the case of traditional rail, minibus-taxis, Gautrain and provincial bus services, the city has very low levels of control over their quality. This is because other spheres of government contract them (the buses and trains) or because they run without contracts and without operating subsidy (the minibus-taxis). Other spheres have varying degrees of control over the quality of buses and trains – in the case of the bus contracts, the GDRT does have performance-based contracts with monitoring and penalties; Gautrain's hallmark is high quality so standards are set very high; and in the case of rail, the services are state-owned, there are no performance-related contracts, and service quality is poor.

Strategically, the City wants to have increasing control over quality so as to be able to guarantee its residents quality public transport and so that public transport can play a critical role in transit orientated development, improving the quality of life of residents and increasing the economic competitiveness of the City. Public transport needs to be integrated and of high quality to make it a realistic choice.

Also important are travel demand management measures and encouraging a modal shift away from private car use. The increasing price of fuel also serves to play this role.

In the next sections we explain the strategy in respect of the various public transport and non-motorised modes operating in the City in light of the role of the different modes, and the emphasis on improving the quality of public transport. The following section will focus on the strategy to integrate the different modes.



## CITY STRATEGY IN RESPECT OF RAIL: PRASA AND GAUTRAIN

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The PRASA rail upgrading and corridor modernisation strategy for the rail network in Johannesburg was described earlier in this document. When implemented, this will significantly contribute to the aim of expanding the provision of quality public transport in Joburg.

The City will actively support the improvement programme and ensure that it is aligned to the Integrated Transport Network Plan, playing the role of a mass mover where high volumes of passengers need to be transported and also supports the City's TOD programme.

Specific strategies will include:

- Working with PRASA and its station management components (PRASA CRES and Intersite) for rail stations to become intermodal hubs and where appropriate centres around which mixed use retail and residential development can occur;
- Ensuring that road based modes service rail including for so called 'last mile' transport needs;
- Providing pedestrian and cycle paths leading from stations to nearby residential and retail areas as well as public amenities such as clinics and police stations; and
- Integrating ticketing and passenger information.

Stations to prioritise will include Westgate, Park, Naledi, Jabulani, Dube, New Canada and Roodepoort.

Co-operation with PRASA will take place through good inter-governmental relations and specific Memoranda of Understanding or Agreement on specific projects. The City will also support present studies on the possible devolution of rail to provincial or local level and will evaluate the feasibility of doing so, once the studies are completed.

In respect of Gautrain, the City will work to achieve the following:

- Integration between the fare medium of Gautrain and Rea Vaya. Gautrain is presently using a Mifare smartcard but will need to switch to an EMV-based smartcard in terms of the national regulations. This must be interoperable with the Rea Vaya AFC card readers. This will enable Gautrain passengers to use Rea Vaya services for feeder and distribution from Park Station more readily (plus Rosebank and Sandton Gautrain stations when Rea Vaya services extend there in Phase 1C);
- Fare harmonisation and getting Gautrain to allow non-rail users to use its buses at more affordable fares. (Currently the fare is R20 for non-Gautrain users and R6 for Gautrain users). The emptiness of the buses is a waste of resources that is visible to the public. The increase in ridership is likely to make this more cost-effective than the present situation. Once there is more widespread integration of fare media this will become even more imperative;
- Continue to plan Rea Vaya and other future city public transport contracts so the network integrates closely with the Gautrain stations (service design as well as infrastructure); and
- Improve and manage providers of transport services from Gautrain stations such as metered taxis and tuk tuks.

## REA VAYA BRT STRATEGY

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Rea Vaya BRT is the city's choice of mass public transport mode for its busier corridors and where it can play an active role in transit orientated development and urban regeneration.

The City's strategies in respect of Rea Vaya BRT are the following:

- To develop a long term Rea Vaya BRT roll out plan on the basis of the Integrated Transport Network plan referred to earlier;
- To roll out future phases of Rea Vaya BRT, at the rate of one phase every two to three years;
- To roll out each phase drawing on the lessons of the previous phase but also recognising the unique circumstances of different corridors;
- In respect of bus contracting, to continue to negotiate contracts for the first 12 year contract with affected operators and to provide for transformation or empowerment when previously disadvantaged operators are involved;
- Continue to review and develop ways in which buses are procured to ensure that the operators own the buses and that the fuel source of the buses and the manufacture of the buses maximises job creation and local content;
- Continue to review the contracts between the bus operating companies and the City so that risks are appropriately allocated and that the City can get benefit as more kilometres are contracted, e.g. if the off peak market is expanded; and
- Continue to integrate BRT with other modes including the mini and metered taxis and non-motorised modes at a strategic and operational level.

## CONVENTIONAL BUS STRATEGY

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Conventional bus with some limited public transport priority measures such as the dedicated lane for Metrobus down Eloff Street is an important mode in the City of Johannesburg, particularly to strengthen public transport corridors and extend existing services to new areas of captive car users in the South, North and North West of the City .

The most appropriate routes to be serviced by conventional bus will be set out in the Integrated Transport Network. The primary operator to service these routes will be Metrobus which will be restructured in the first instance to have a performance-based management contract with the City through the Transport Department's Scheduled Services Management Agency (SSMA). In the longer term it could be packaged into several gross cost contracts that could be negotiated or put out to tender.

With respect to the provincial bus contracts, primarily with Putco, the NLTA provides that the management of all bus contracts can be devolved to the metropolitan level. Now that the SSMA is in place, this becomes a practical possibility.

However the starting point would be to evaluate the present routes operated against the Integrated Transport Network to establish whether they should best be converted to either minibus-taxi services, Rea Vaya services or new re-packaged and tendered bus contracts put out by the City's SSMA, especially if they only operate in the City, or whether they should remain at provincial level.

## MINIBUS-TAXI STRATEGY

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Minibus taxis are an integral part of the transport system in the City of Joburg providing what one could call the 'sho-left' service – highly convenient although not always safe and reliable.

Where, after an assessment of the demand profile of the network and the particular circumstances of an area, minibus-taxi services are the preferred mode of transport, the City aims to ensure that they provide a quality safe, reliable and affordable service and that the operators and drivers of mini bus taxis are more prosperous and have greater job security.

The key interventions to achieve this will be:

- Assisting the city's taxi industry to re-fleet, in particular to switch to greener vehicles. Initially there will be a taxi industry pilot using alternative green sources of fuel. Potential funding sources for the re-fleeting will be examined, including the national recapitalisation strategy scrapping allowance programme and the Public Transport Infrastructure and Systems Grant funding.
- Piloting and expanding the incorporation of minibus-taxis into the EMV-based integrated fare system.
- Incorporating minibus-taxi services into integrated passenger information provided by the city about all services.
- Improving the regulatory environment to ensure that unsafe vehicles do not operate and that there is a match between supply and demand.
- Stronger law enforcement to ensure law-abiding road traffic behaviour by minibus-taxis.
- Providing safe, secure, attractive and accessible facilities for minibus-taxi users (commuters and drivers) such as shelters, ranks and holding areas (see later). Improved facilities and better passenger information will be able to attract non-traditional users of minibus-taxis.

Where appropriate minibus-taxis will be contracted and scheduled. Such contracting will be performance based as with other bus contracts including in relation to safety and reliability.

## METERED TAXI STRATEGY

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Metered taxis have a diverse role to play including in relation to the tourism sector, the young and the elderly. They are also an important feeder and distribution service for individual travellers wanting to access mass transit routes.

The strategy for metered taxis is:

- Develop a positive and recognized identity for the metered taxi as a distinct mode of transport in Joburg.
- Bring the City's metered taxis into line with legal requirements including having meters, using properly designated ranks, possessing operating licences and adhering to the area in which they are permitted to operate.
- Formally designating the metered taxi ranking points, striping the bays and erecting signage.

- Working with the regulatory authority which at this point is the PRE, to ensure uniform and consistent fares, that such fares are displayed and that all taxis have functional calibrated meters.

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## TWO- AND THREE-WHEELERS INCLUDING TUK TUK STRATEGY

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There is role for two or three wheeler public transport such as tuk tuks and pedicabs in certain areas such as in tourist areas, small CBDs where parking is not easily accessible and for certain services such as events. These vehicles can be seen as having application in the personalised public transport service mode family, along with services such as metered taxis or dial-up limousine services. Their role is to respond to individuals with ad hoc trip requests, as opposed to collective commuter type transport. This is an important role, not only for tourists and visitors who typically make use of such services, but for city residents who may not own cars and have trip needs not served by the regular public transport services.

The City would want to ensure that they operate safely, operate in an orderly fashion, and perform the role for which they are suited and do not encroach into other roles better filled by other modes.

The City would prefer these modes to be as green as possible, either using alternative fuels (including solar powered electricity) or being non-motorised.

The City will work with the provincial regulatory authorities and law enforcement to ensure that:

- Normal regulatory conditions and road traffic laws apply such as drivers having a Professional Public Driving Permit;
- There is consultation with other affected operators before a new service is introduced; Appropriate conditions are enforced such as in respect of the maximum number of kilometres that they may travel from their base ranking point while in service, and the maximum trip length they may transport a passenger. This is essential to ensure they do not start encroaching onto for example commuter routes and that they play the envisaged short trip, last-mile kind of role.
- There are proper safe and secure arrangements for ranking and holding.
- The vehicles display their tariff card, their route or area of operation and the distance limitation applicable to their operation, as well as the number of passengers they are licenced to carry.

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## CYCLING STRATEGY

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The City is committed to increasing cycling as a commuter mode of transport as well as increase the number of learners that can safely cycle to school. Presently under 2% do so.

The City will support and promote cycling through the following interventions:

- **The creation of a dedicated network of high quality pedestrian and cycling routes.** This is discussed under Thrust 3.
- **Integrating cycling at public transport nodes.** All Gautrain, Metrorail and Rea Vaya stations as well as significant taxi facilities will have safe bike storage facilities and could also have bike service stations for bike repair. Investing in the public realm in the immediate vicinity of such facilities such as upgraded lighting, CCTV, public conveniences etc can also support cyclists. The broader movement patterns to and from the Rea Vaya, Metrorail and Gautrain

stations and major taxi ranks will be identified and the relevant paths and streets upgraded with pavements, signage, lighting etc

- **NMT projects focusing on university and school learners** need to be implemented. Given that cycling is not an established part of Johannesburg’s tripmaking culture, a focus on learners can change this. If the focus is on children between 6 and 13 now, then one can forge a new bicycling generation. By 2040, today’s six-year olds will be 33-year-olds, and there will be a sizeable proportion of people up to the age of 40 who grew up depending on cycling for mobility and a habit formed in their childhoods. The *NMT Framework* identified education institutions which accommodate a population of learners greater than 1500 and focused on these for a range of NMT measure, including making bicycles available through the national government bicycle donation to learner programme Shova Kalula, improving the route network and programmes such as Safe Routes to School.
- **Increasing the availability of bicycles.** This will happen through identifying suitable bicycles for Johannesburg conditions and discussions about how to increase their availability with manufacturers and wholesalers; exploring micro-financing and donation schemes; making more use of Shova Kalula, a bicycle repair enterprise programme, and consideration of public bike (also called bike share) programmes. Certain classes of municipal staff have work suited to cycling (e.g. community-based health workers and JMPD) and consideration will be given to a city-initiated demonstration project in which they are given bikes to carry out their work.
- **Making cycling cool through awareness and mindset change.** Commuter cycling is not part of Johannesburg’s transportation culture. Various awareness and communication measures will be used to promote the popularity and status of cycling. The Open Streets programme (see Thrust no. 6) is part of this.
- **Amending relevant technical roads standards and planning requirements. In this regard,**
  - The “Complete Street” standards (see Thrust 3) will include guidelines for the provision of cycling.
  - The Department of Development Planning will support NMT through a range of measures including:
    - Review NMT provision requirements as part of Land Use Applications.
    - Amend parking standards and the revised Town Planning Scheme to incorporate standards per land use for cycle parking and associated facilities (e.g. showers and lockers within workplaces).
    - Require that NMT provision be indicated on Site Development Plans, reinforced through development conditions.
    - Require transport assessments submitted in support of a development proposal to include NMT as part of the assessment.
    - Seek developer contributions for NMT from development proposals falling within 2km of a planned NMT route and develop bulk contributions requirements per land use accordingly.
    - Require all new developments to incorporate footpaths through the development site and immediately adjacent to the site boundary.

Some of the above also reflect steps to promote walking.

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## PARK AND RIDE STRATEGY

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Johannesburg had several park and ride facilities linked to municipal bus services, but these fell into disuse many years ago.

The City will begin to promote them again as a result of the focus on attracting car users to public transport. They are particularly important to attracting additional ridership to Rea Vaya and thus reducing congestion in the remaining mixed traffic lanes on Rea Vaya routes.

Park and Rides combined with ridesharing also has the potential to provide an alternative to private car users wanting to avoid the tolls on the GFIS.

To promote park and rides the City will identify suitable sites – those that are well-located close to Rea Vaya BRT, rail and the Gauteng freeways to provide lots of parking and determine how best they can be utilised as park and ride sites including through partnerships with the private sector. Malls that have under-utilised parking during the week may be put to use for park and ride purposes. Park and ride sites will accommodate secure bicycle storage so that they serve too as cycle-and-ride sites.

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## INTEGRATED FARE SYSTEM AND TICKETING

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In the long term, fares should be uniform across all modes and related more or less to distance travelled. This should be coupled with a mechanism to improve affordability for those who live on the periphery of the City due to the urbanisation policies of apartheid.

National regulations on interoperable fare medium standards make it possible to integrate all public transport services on one fare medium. The City will continue to build out from the Rea Vaya EMV-based smartcard fare system, which is currently the only fare system in Gauteng that meets national Department of Transport regulations for interoperability.

The system will be extended to Metrobus, and Gautrain will also need to switch in terms of the above-mentioned regulations. Integration of the fare medium is discussed under previous sections on Gautrain, Metrobus and minibus-taxis as well.

Integration of fares themselves (fare harmonisation) across different operators is more difficult to achieve and will generally require that they be contracted in terms of gross cost contracts by the same authority, or by authorities that have revenue distribution agreements in place between them, or that the operators have agreements on revenue sharing between each other. The advantage of integrating fares is that passengers pay only once for their initial boarding, and that subsequent journeys add on only the cost of the additional distance travelled. In other words, they do not pay a premium (or “transfer penalty”) each time they change to a different mode or service. While a common fare medium such as an EMV-based smartcard gives some convenience (not having to top up and hold different fare cards) the integration of the fares themselves is what is particularly useful to passengers because it makes public transport more seamless and more affordable.

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## INTEGRATED PASSENGER INFORMATION

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Integrated passenger information is one of the key success factors to thriving and well-integrated public transport systems internationally.

The City will:

- Establish a single website and trip finder with information across modes and services available (Gautrain, Rea Vaya, Metrobus, Putco, minibus-taxis etc). Information and maps relevant to how to cycle and walk to particular destinations will also be included.
- Provide passenger information relevant to each commuter shelter that is also integrated across the modes and services available from that point.
- Introduce improved wayfinding and other static signage at and around the formal public transport facilities in the City; and
- Publish on-line or printed maps showing preferred cycle routes: location of cycle lanes, shared lanes, parking; and roads which have a steep gradient

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## INTEGRATED ACCESSIBLE TRANSPORT STRATEGY

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The City is committed to ensuring that all public transport and transport infrastructure is universally accessible.

The City will apply universal design principles to the greatest extent possible. A barrier-free built environment will become the norm and not an exception as it is at present.

The key areas where universal accessibility will be implemented include:

- Provision of passenger information;
- Sidewalks to public transport facilities ;
- Stops, stations and interchanges; and
- Public transport vehicles.

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## THRUST NO. 3 MAINTAIN, IMPROVE, EXTEND AND INTEGRATE TRANSPORT INFRASTRUCTURE

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### CONTEXT

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The outcome of the strategies and programmes under this thrust is for the City's transport infrastructure to be well-built, maintained and managed to that it supports the mobility needs of all its users in a safe and efficient manner, so that the value of the assets are preserved, and so that pedestrians, cyclists and public transport users are prioritised.

Transport infrastructure includes roads, bridges and storm water and public transport facilities. Roads include all classes of roads, infrastructure in the road reserve including footways, street lighting and signage, traffic lights and other installations in the road that regulate traffic etc.

The stormwater infrastructure needs to be constructed, maintained and managed so that it responds to climate change and water scarcity, and so that residents' safety is ensured.

Johannesburg's transport infrastructure has suffered from underfunding and underinvestment, particularly in the areas of road maintenance including elements like street markings, street names and signage. The number and duration of traffic signal outages in Johannesburg is an ongoing

problem. Further, the design of the roads and system in general has prioritised the movement of people in cars. The management of public transport facilities has been another challenging area, particularly because of resistance to paying user fees.

The amounts allocated to maintenance and preservation of the road network assets have for several years been less than the actual amounts needed as indicated by the JRA's Pavement Management System (PMS) and Bridge Management System (BMS). The net result is that the overall condition of roads has deteriorated, with increasing potholing and the disintegration of an increasing proportion of surfaced roads, which can only be addressed by totally reconstructing them.

The backlog with respect to the maintenance of the road network owned by the City as of 2012 was estimated by the JRA at R7 730 million, broken down as follows:

TABLE 16: BACKLOGS IN THE FUNDING OF THE CITY'S ROAD NETWORK

Item	Backlog (R'millions)
Road maintenance	745
Road resurfacing/reconstruction	1500
Road construction and upgrades	174
Upgrade of stormwater networks and stormwater catchments	900
Improvement projects	154
Gravel road surfacing in prioritised areas	1536
Gravel road surfacing in other areas	1032
Construct pedestrian bridges (12)	160
Upgrade road markings	80
Installation of road traffic signs to comply with SARTSM	25
Traffic signal upgrade to SARTSM	24
Installation of LED traffic signal heads	30
Upgrade major arterials with thermoplastic road marking paint	23
Gravel road maintenance and stabilisation	500
Signals at warranted intersections	150
Geometric upgrades	20
Service Delivery Enablers	677
<b>Total Investment Backlog</b>	<b>R7 730 million</b>

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## STRATEGIES AND PROGRAMMES

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### PUBLIC TRANSPORT AND NON-MOTORISED TRANSPORT (NMT) INFRASTRUCTURE

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The City will ensure that it plans, designs and builds quality public transport and non-motorised transport (NMT) infrastructure, as required by transport demand, to make these the modes of choice. The main elements in this infrastructure are shown in Table 19.



TABLE 17: THE ELEMENTS OF JOHANNESBURG'S PUBLIC TRANSPORT AND NMT INFRASTRUCTURE

<b>Item</b>	<b>Definition</b>
<b>Managed Lanes</b>	
Managed Lanes	Road lanes whose general use by traffic is restricted in some way so as to reduce travel demand, manage the flow of traffic, exploit spare capacity in some lanes, or extract more person-carrying capacity from the lanes
BRT Dedicated Lanes	Dedicated lanes reserved for BRT buses
Dedicated Public Transport Lanes	Dedicated lanes reserved for public transport modes including buses and minibus taxis, but excluding BRT buses, contra-flow lanes
Contra flow lanes	Lanes that are demarcated/constructed to flow in the other direction to improve mobility. Can include all vehicles or certain vehicles classes e.g. freight or public transport.
By-pass lanes	Priority passing lane at large intersections and BRT stations for public transport modes
<b>Public Transport Facilities</b>	
BRT Stations	Enclosed stations for BRT buses located alongside or between BRT running lanes
BRT Station Precincts	The area within a 500 metre radius of a BRT station
BRT Depots	The facility at which BRT buses are housed for purposes of overnight parking, washing, maintenance, driver sign-on and dispatching
Park and Ride Facilities	Off street parking facilities adjacent to major public transport facilities/stations which include rail, BRT stations and Taxi ranks
Large Public Transport Facilities	Fully fledged off-street public transport facility which includes trading stalls, holding facilities, loading bays for buses and taxis, metered taxis, wash bays, offices where applicable, commuter square, ablution facilities, control room with CCTV cameras, waste bins, tower clock, destination boards, intercom, joint management by the City and operators
Small Public Transport Facilities	Public Transport facilities mainly on large road reserves. Depending on the size of the reserve, the facility may include loading and few holding bays, few trading stalls, tower cloak, waste bins, destination boards, possible joint management by the City and Operators
Commuter Stops and Related	Public Transport lay-bys, commuter shelters with passenger information.
Walk-in Centres	Facility run by the City to provide public transport-related customer services such as smartcard replacement, lost property claims etc.
Holding Facilities	Off-street holding facilities for public transport linked to major public transport facilities
Transfer Facilities	Interchange facilities for buses, taxis, metered taxis, BRT buses and rail. This could be linked to one of the above
<b>Complete Streets</b>	
Side walk improvements	Wide side walks (2.5m) for walking by the public, these will include street furniture like bins, benches, public art, greening, proper stormwater management, lighting, signage, bollards and universal

<b>Item</b>	<b>Definition</b>
	access
Cycling Lanes	Robust bicycle lanes, side by side with traffic lanes (or following desired lines for cyclist), separated from traffic lanes
Traffic Calming	A variety of measures including roundabouts, traffic cycles, table tops, textured roads, narrow roads, narrow meandering streets, pedestrian only roads, zebra crossings, rumble strips
Parking Solutions	Demarcation and or possible construction of bicycle parking, proper demarcation of loading zones, parking restrictions, Goods loading/offloading time restrictions, on street/off street parking management, congestion charging zones.
<b>Way Finding and Signage</b>	
BRT Passenger Information Signage	Directional and tourist signage pointing passengers towards BRT stations or stops or from BRT stations towards major destinations in the vicinity of the station.
Public Transport Information	Signage demarcating dedicated public transport lanes, direction signs to public transport facilities, destination boards or VMS, Names of Public Transport Facilities. Information signs for bicycle lanes
<b>Public Transport Information Technology</b>	
ITS communications	A range of Intelligent Transport System hardware such as GPS units, variable message signs and CCTV systems located in the public transport control centre, on buses and at stations allowing the movement and operations of buses to be tracked and monitored, the interior of stations to be observed and for real-time information about services to be provided to passengers on buses and at stations.
AFC	The automatic fare collection system comprising fare gates at stations, turnstiles on buses, and smartcards used by passengers to access the public transport station or vehicle
APTMS	Advanced Public Transport Management System refers to the intelligent transport systems placed on buses being tracked and monitored and in the control centre carrying out the monitoring, as well as the systems for scheduling the vehicles and relaying information between the public transport control centre and the bus depot.
VMS	Variable message signs which display real-time information for passengers about next station (on the bus) or time of arrival of buses (at stations)
CCTV	Closed circuit television cameras placed in stations, along roadways and on buses
<b>Reserved Land</b>	
BRT Land	Land required to be purchased to enable the construction of BRT running lanes, stations and passing lanes, depots or terminal facilities.

Item	Definition
Public Transport Facilities Land	Land required to be purchased for public transport facilities, holding facilities or park and ride facilities

Some of the key transport infrastructure strategies and programmes are described below.

### COMPLETE STREETS

The current streetscape and environment does not prioritise pedestrian (or cycle) movement. When streets are designed and constructed for all road users, they become safer, and also more attractive and useable. The City has thus introduced the Streets Alive programme which has an infrastructure component called “Complete Streets” and involves an increased focus on sidewalks, dedicated lanes/managed lanes for public transport, cycling and freight; traffic calming, urban functionality and management, attractive public spaces, and different stormwater design, including harvesting of stormwater.<sup>lxi</sup>

Complete Streets are streets which are safe, comfortable and convenient for travel for everyone, regardless of age or ability, and mode of movement. They are also aimed to be built in labour-intensive ways. Joburg aims for all its streets to be “complete” in the long term.

Complete streets are designed for:

- **Safety:** Move people and goods safely
- **Access and Mobility:** Accommodate all street users, giving priority to the most energy- and space-efficient modes
- **Context:** Respond to neighborhood character
- **Livability:** Create a vibrant public realm with high-quality public spaces
- **Sustainability:** Contribute to a healthier and more sustainable environment
- **Visual Excellence:** Create coherent and harmonious streetscapes
- **Cost-Effectiveness:** Provide the greatest possible value to the public

There are streets in many areas which can be called complete streets and where already some of the features mentioned above do exist. However there is potential for many more. All new roads will also be required to incorporate complete street standards as appropriate, guided by detailed standards.

JRA will become the main implementer and custodian of complete streets while the Transport Department will develop standards and guidelines and do some demonstration or pilot projects. Over time the JRA will build capacity to become a centre of excellence in respect of building streets for all road users.

The JRA will also ensure that when other spheres of government or the private sector build streets they adhere to complete street standards. JRA will increase their engagement especially with public sector housing projects to ensure that there is appropriate scheduling and that from the design level, complete street standards are incorporated.

Attention will not only be given to the road surface but also to the storm water system. It is possible to collect the storm water in a different way from the current method and channel it into landscaping and greening.

The detailed *Complete Streets Standards and Guidelines* will be developed with acknowledgement that different kinds of streets will require different interventions as set out in Table 20.

TABLE 18: PROPOSED COMPLETE STREET INTERVENTIONS

Kind of street	Kinds of interventions
Streets in large CBDs	<ul style="list-style-type: none"> <li>• Pedestrian malls/walkways/semi or full pedestrianisation of streets</li> <li>• Widening of sidewalks and reducing on-street parking</li> <li>• Landscaping and greening</li> <li>• Introduction of street furniture</li> <li>• Pedestrian treatment of crossings e.g. wide, raised zebra crossings and possibly pedestrian bridges</li> <li>• Closing streets on certain days/times</li> <li>• Cycling lanes</li> <li>• High levels of enforcement and pointsmen</li> <li>• Improved signage</li> <li>• Provision of loading zones in appropriate areas</li> <li>• Restricting freight off loading / loading to certain time of the day</li> <li>• Provision of public transport drop-offs or lay-bys</li> </ul>
Streets in small CBDs and main streets	<ul style="list-style-type: none"> <li>• Widen sidewalks and provide (in an organized way) for businesses to expand onto sidewalks e.g. hawker stalls, sidewalk cafes</li> <li>• Pop up parks/plazas along/in road reserve</li> <li>• Landscaping and greening</li> <li>• Curved roads</li> <li>• Ensuring that at all malls and shopping centres there is public transport priority, kiss and rides</li> <li>• Public transport facilities and signage/wayfinding to public transport</li> <li>• Wider medians and steps to ensure safe crossings</li> <li>• Partnerships with business city improvement districts for maintenance and management</li> <li>• Provision of loading zones in appropriate areas</li> <li>• Restricting freight off loading / loading to certain time of the day</li> <li>• Provision of public transport drop-offs or lay-bys</li> </ul>
Residential areas near schools	<ul style="list-style-type: none"> <li>• Raised pedestrian crossing</li> <li>• Scholar patrols</li> <li>• JMPD, parents volunteering or private pointsmen at peak times</li> <li>• School safety programmes</li> <li>• Cycle paths and safe routes to school plan</li> </ul>
Established residential	<ul style="list-style-type: none"> <li>• Curved roads</li> <li>• Introduction of 'gateway's: Change of surface texture/colour , width of road to indicate entering into a residential area</li> <li>• Restrict certain vehicles to enter an area (either through narrowing road or enforcement)</li> </ul>

	<ul style="list-style-type: none"> <li>• Street painting</li> <li>• Community art, greening, adopt a sidewalk</li> <li>• Signage</li> </ul>
New residential	<ul style="list-style-type: none"> <li>• Strong development control to prevent illegal land uses</li> <li>• Circular and shared roads and limiting roads (rather pedestrian and cycling paths)</li> <li>• Provision for public transport – lay byes, super stops, shelters</li> </ul>
Informal settlements/formalizing settlements	<ul style="list-style-type: none"> <li>• Do not design for road functions – rather for pedestrian and cycle paths with a single boulevard/linear market on main access road but keeping in mind the need for efficient and effective access for emergency vehicles</li> <li>• Cobbled/cement streets vs. asphalt</li> </ul>
Class 1 roads	<ul style="list-style-type: none"> <li>• Cycle options on certain days</li> <li>• Widen shoulders for cycling</li> <li>• Landscaping</li> <li>• Road reclassification to be considered – to boulevard</li> </ul>

#### DEDICATED NETWORK OF PEDESTRIAN AND CYCLING ROUTES

In addition to aiming for streets to be “complete” there will be a focus on creating continuous routes and networks through the cycling and pedestrian infrastructure that is created in the complete streets programme. The aim is to create a dedicated network of high quality pedestrian and cycling routes. The City’s *Framework for Non-Motorised Transport* (2009)<sup>lxii</sup> has mapped ten priority networks, using multiple criteria for designing the routes. The priority areas for this network are as follows:

- Area 1: Soweto Priority Network
- Area 2: Inner City Priority Network
- Area 3: Alexandra - Wynberg – Sandton- Linbro Park Priority Network
- Area 4: Rosebank Priority Zone
- Area 5: University of Johannesburg Priority Route
- Area 6: Zandspruit / Cosmo Priority Route to Northgate
- Area 7 : Diepsloot Priority Route to Fourways
- Area 8 : Ivory Park Priority Route to Midrand
- Area 9: Orange Farm Priority School Zones
- Area 10: Braamfontein Spruit Priority Route

#### REA VAYA BRT INFRASTRUCTURE PROGRAMME

BRT has an enormous range in capacity, depending on the particular conditions and features applied. For BRT to be optimised as a mass mover, particular attributes need to be included, principally<sup>lxiii</sup>:

- Use of articulated buses with a capacity of 160
- Stations with multiple stopping bays
- Passing lanes at stations and double lanes on some runways to allow express and limited-stop vehicles to pass local services
- Multiple permutations of service options including local, limited stop and express services.

- Intersection treatments such as banning of turns across the busway
- Short station dwell times of 20 seconds achieved by at-level boarding and alighting, three sets of large double doors on each vehicle and pre-board fare collection, verification and access control

In Johannesburg, many of these features have been applied to Rea Vaya in Phase 1A. However, the width of the road reserves in Joburg is not sufficient in many situations to achieve passing lanes at stations (without expropriation and demolition) or double lanes per direction along the runways.

The capacity that can be achieved thus needs to be calculated for the particular conditions of the corridor that is being built.

The initial key infrastructure components for BRT were median-aligned trunk busways, median stations with passing lanes, and depots. Some of the median stations were single module while others were more than one module and in the inner city one-way busways and stations were developed.

In Phase 1B, the infrastructure components were extended to include some traffic calming on Phase 1B feeder routes and measures such as road colourisation were introduced to improve the visibility of the dedicated lane.

In respect of 1C and future phases, a sustainability study<sup>lxiv</sup> was undertaken and a number of new or improved infrastructure features were identified which will be planned for and implemented going forward.

These include:

- Introduction of integration with other modes (rail, bus, minibus-taxi and other Rea Vaya routes) at key interchange stations (Pan Africa, Sandton and Westgate)
- Some public transport priority measures on the mixed traffic sections of the complementary routes at crunch points, such as queue jump lanes and signal priority.
- Rea Vaya-aligned look and feel for the complementary and feeder routes
- Traffic calming measures on the complementary and feeder routes where warranted, widened sidewalks, and reduced on-street parking
- Extensive NMT network: improved sidewalks and footways leading to BRT routes and stations, including lighting if required, and dedicated cycling lanes connecting the Rea Vaya stations to the surrounding area
- Minimum 3-metre wide sidewalks alongside busways and stations
- Park and rides strategically positioned to increase switch from private car use
- Bike storage at each station
- Improved universal access
- More aggressive traffic interventions to improve speed, namely traffic signal prioritisation, elimination of more right turns across busway and possible road closures) and elimination of on-street parking
- One-way paired busways (as were built in the CBD) will be avoided, as will traffic circles

To respond to the specific circumstances of Alexandra township with its high density, high unemployment and narrow street typology, BRT will only pass through a small section of Alexandra but as part of the BRT project, extensive walkways and cycle paths will be provided within Alexandra as well as to the neighbouring industrial and commercial nodes of Wynberg and Sandton.

## MANAGED LANES STRATEGY

The City's *Managed Lanes Policy* refers to lanes whose use by general traffic is restricted in some way so as to reduce travel demand, manage the flow of traffic, exploit spare capacity in some lanes, or extract more person-carrying capacity from the lanes.

The following are the main types of managed lanes that will be implemented in terms of the policy:

- High-occupancy vehicle lanes
- Exclusive lanes

High-occupancy vehicle lanes will restrict use according to the number of occupants in a passenger vehicle such as two or more, or three or more, and generally include public transport vehicles. They can be used to encourage the travel demand management (TDM) strategy of ridesharing.

Exclusive lanes will give certain vehicles, most commonly buses or freight vehicles, an exclusive operational lane from which other vehicles are banned. In the case of freight the objective is often a safety one, to reduce conflicts between truck and passenger car traffic. Bus Rapid Transit systems take exclusive lanes to their highest level by placing them in the median along with passenger facilities, and applying other measures to enhance operation such as banning right-turning of general traffic across the lane. The Strategic Public Transport Network concept of operation as described earlier was based on creating exclusive lanes on the kerbside for the use of buses and minibus-taxis, from which cars would be banned, as well as public transport by-pass lanes at intersections. A detailed manual for the design and implementation of these lanes in Joburg was developed in 2006. On many public transport routes, as on non-BRT bus and taxi routes as well as on the BRT complementary or feeder routes, sections of exclusive lanes are warranted by the volumes of vehicles and passengers.

By-pass lanes for the exclusive use of public transport vehicles may be created at major intersections so they can by-pass traffic jams and reduce delay to their passengers. They are also in place at BRT stations in the form of passing lanes to allow some buses to run express.

Exclusive pedestrian facilities are streets closed to all vehicular traffic and reserved for pedestrians only (with limited access for delivery or refuse collection vehicles, but unlimited access for emergency service vehicles). They can be one or more blocks long, may occupy a precinct of several blocks or may also be a continuous walkway comprising alleys, laneways, arcades through buildings, and lobbies in buildings.

All the above are measures that will be applied in Johannesburg to give better mobility to preferred modes of transport (e.g. high-occupancy vehicles as in liftclubs or public transport vehicles), to protect pedestrians and cyclists from vehicles, to improve air quality and decrease emissions caused by traffic congestion, and to improve the flow of traffic.

At least one managed lane will be implemented per annum to reduce congestion and increase public transport mobility.

## PUBLIC TRANSPORT FACILITIES

Public transport facilities will be available for all modes in an integrated way and be universally accessible. In Table 19 above, the range of public transport facilities has been listed, from a public transport stop to a large holding facility or terminus.

The backlog in public transport facilities will be addressed which should lead to a reduction in illegal on-street parking especially in the inner city and other CBDs. Public transport facilities will be part of the 10-year funded plan.

Over time, the City will ensure that all public transport facilities have a similar look and feel and similar branding and that there are minimum standards of maintenance and management. Emphasis will be placed on sustainability including in the use of materials, design and management bearing in mind the high footfall in these centres.

On-street facilities will be able to be used by any road-based mode (all bus and minibus-taxi operators) and where appropriate also by metered taxis and new modes such as tuk tuks.

Attention will not only be placed on the facility itself but also on the access to the facility. As mentioned earlier, proper attention will be given to pedestrian and cycle access at all rail and Rea Vaya stations as well as large minibus-taxi ranks. All facilities should include passenger information and signage which will be regularly updated.

Making public transport facilities safe, secure and attractive is critical if they are to perform the function of 'attractors' in transit orientated development.

The City has developed a new model design for medium-sized off-street and smaller on-street public transport facilities. This design comprises trading stalls, holding facilities, loading bays for buses and taxis, metered taxis, wash bays, offices where applicable, a commuter square, ablution facilities, a control room with CCTV cameras, waste bins, a tower clock, destination boards, and an intercom system. The smaller on-street facilities, where road reserve allows, may include loading bays, some holding bays, some trading stalls, a tower clock, waste bins, and destination boards.

All public transport routes will be equipped as far as possible with kerbside commuter shelters at regular intervals, with laybys for the buses or taxis to pull into or bulb outs which can prioritise public transport over private car users. Integrated passenger information about all the public transport services that are relevant to the particular stop will be displayed.

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## PUBLIC TRANSPORT FACILITY MANAGEMENT

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The City will ensure that all public transport facilities are well managed. Management of facilities is critical to ensure that they are attractive, clean, safe, secure and do not get run down. Well managed facilities shows respect for public transport users and attracts new users to public transport.

Well managed facilities is also a form of support to unsubsidised public transport operations and for this reason the City will review the policy that taxi industry operators should pay user fees for use of City owned public transport facilities.



The following principles and strategies will be applied:

- The City will retain ownership of all public transport facilities and also retains ultimate responsibility for their management.
- Rea Vaya BRT stations will be maintained in terms of a tendered maintenance contract. Cleaning and security will also be carried out in terms of a tendered contract. The stations will be staffed by Transport Department permanent employees (station managers, passenger marshalls and fare collection staff). Fixed-period user agreements will be entered into between the Transport Department and the representatives of operators making use of each large off-street facility. Third parties may also be party to these agreements, such as representatives of the community within which the facility is located. A standard agreement will be drawn up, which may be modified according to particular local circumstances and will allocate roles and responsibilities, set out which operators may have access to the facility, management and maintenance standards.

These strategies will be implemented by the Transport Department and the Johannesburg Property Company who is responsible for facilities management.

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## ROAD NETWORK STRATEGY AND PROGRAMMES

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### GENERAL ROAD NETWORK AND STORMWATER PROGRAMMES

Table 21 sets out the focus areas and activities that comprise the JRA programmes for traffic regulatory infrastructure, road infrastructure and stormwater infrastructure. <sup>lxv</sup>

TABLE 19: JOHANNESBURG ROADS AGENCY PROGRAMMES AND ACTIVITIES

KEY PILLARS	FOCUS AREAS	ACTIVITIES
Traffic Regulatory Infrastructure	<ul style="list-style-type: none"> <li>✓ Traffic Signals Management</li> <li>✓ Road Sign &amp; Markings Management</li> <li>✓ Road Safety (infrastructure)</li> <li>✓ Network Monitoring</li> <li>✓ Intelligent Transport System</li> <li>✓ Traffic Engineering (Geometric Improvements))</li> <li>✓ GIS and Accident Management Systems</li> <li>✓ Traffic Signal Operations</li> <li>✓ Overload Control</li> </ul>	<ul style="list-style-type: none"> <li>• Signals, road signs and markings maintenance and upgrades</li> <li>• New signal/signs installations and markings</li> <li>• Installation of UPS and Solar</li> <li>• Convert halogens signals into LED's.</li> <li>• Quality control and monitoring of signal failures</li> <li>• Traffic signal phasing's design and synchronization</li> <li>• SARTSM compliance upgrades</li> <li>• Awareness and Education</li> <li>• Safety investigation (hot spots)</li> <li>• Congestion(Traffic Flow) management</li> <li>• Incident management (TMC)</li> <li>• Real time traffic information dissemination</li> <li>• Traffic Management System (TMS)</li> <li>• Remote monitoring and control and CCTV Systems</li> <li>• Complete street retro-fit upgrades to support road safety.</li> <li>• Traffic counts and impact studies</li> <li>• Develop an overload control strategy</li> <li>• Linkage with CoJ and Provincial Joint Command Centre (JCC)</li> </ul>
Roads Infrastructure	<ul style="list-style-type: none"> <li>✓ Roads Assets Management Systems (RAMS)</li> <li>✓ Planning</li> <li>✓ Design</li> <li>✓ Maintenance</li> <li>✓ Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Maintenance; inspection and quality control</li> <li>• Gravel roads and complete street retrofit programme.</li> <li>• Reconstruction and rehabilitation of public road infrastructure</li> <li>• Develop Designs, Research and Standards</li> <li>• Annual Visual Condition Index (VCI) assessments</li> <li>• Update PMS, BMS conduct regular inspections</li> <li>• 10-Year Capital Infrastructure Plan and Budget</li> <li>• Sidewalk management – including reinstatements</li> <li>• Rehabilitation, restructuring, fog sprays, slurries etc. backlogs as per VCI</li> <li>• Road Hierarchy Management</li> <li>• Gravel roads maintenance programme</li> <li>• Rehabilitation of economic/social/public transport roads</li> <li>• Development of a 10-year Roads Development Framework and Plan</li> </ul>
Roads Infrastructure	<ul style="list-style-type: none"> <li>✓ Strategic Assets</li> <li>✓ Development Control</li> </ul>	<ul style="list-style-type: none"> <li>• Geotechnical Intelligence and Freight Logistics</li> <li>• Review road quality standards (resources-materials)</li> <li>• Capacity building for strategic assets</li> <li>• Ensure high standards of new developments, and minimal impact due to developments.</li> <li>• Upgrade of GIS, PMS, BMS and implement asset management systems.</li> <li>• Wayleave management and reinstatements.</li> </ul>

<b>Stormwater Infrastructure</b>	<ul style="list-style-type: none"> <li>✓ Flood line and master planning:</li> <li>✓ Stormwater maintenance:</li> <li>✓ Stormwater network development planning:</li> <li>✓ Development control</li> <li>✓ Dam safety management</li> <li>✓ In house designs (capacity building)</li> </ul>	<ul style="list-style-type: none"> <li>• Catchment management/ local stormwater master plan</li> <li>• Pro-active flooding plan and floodline determination</li> <li>• Embanking protection/ erosion control</li> <li>• Pollution traps systems and EIA management</li> <li>• Silt management (vegetation)</li> <li>• Seasonal based KI and pipe cleaning programs</li> <li>• Raising of kerb lines</li> <li>• Upgrading and provision of new networks (including motorways)</li> <li>• Stormwater infrastructure backlogs</li> <li>• reduction of flooding areas (special plans – flooding areas)</li> <li>• Conversion of open channels</li> <li>• Quality standards (investigate new alternative materials, given loss due to theft and vandalism)</li> <li>• Research best practices for storm water management</li> <li>• New stormwater infrastructure and expansions</li> <li>• Hydraulic and Hydrologic Designs and upgrades</li> <li>• Quality Control and routine maintenance</li> <li>• Dam rehabilitation and establish partnerships with water authorities</li> <li>• Approval of stormwater designs/drawings and reports</li> </ul>
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Table 22 indicates the main categories of projects that the JRA implements. It gives the percentage of its budget allocated to each project category in the 2013/14 draft Business Plan to illustrate the priority of each area. The JRA's total budget in 2012/13 was R547,6 million and it is an estimated R737 million for 2013/14.

TABLE 20: JRA PROJECT CATEGORIES AND BUDGET PRIORITY

<b>Category of project</b>	<b>Allocation of budget</b>	<b>Types of projects</b>
Gravel Roads	22%	The Gravel Roads upgrade involves the surfacing of gravel roads in the Agriculture Holding areas, Bram Fisherville, Diepsloot, Doornkop, Ivory Park, Klipfontein, Lawley and Orange Farm
Storm water	14%	Cleaning and unblocking of stormwater kerb inlets, upgrading and repairing stormwater, closing open drains or placing them underground,
Road Rehabilitation	35%	Retrofitting of Complete Streets, replacement of guardrails, road reconstruction and resurfacing, provision and maintenance of roadmarkings, installation and maintenance of street name signs.
Bridges	10%	The Bridge program involves the construction or upgrading of bridges according to priorities in the Bridge Management System
Mobility	14%	Traffic signals, Intelligent Transport Systems, Traffic Management Centre and signage
Other	5%	Dams, Depot Upgrade, IT Equipment, Archive Facility, Paint Store Upgrade
<b>Total</b>	<b>100%</b>	

## SIGNALISED INTERSECTION MANAGEMENT STRATEGY

The JRA will improve signalised intersections by:

- Replacing the old traffic signal controllers and cabling with new equipment and cable.
- Installing remote monitoring systems so that traffic and traffic signal faults can be monitored from the Traffic Management Centre (TMC).
- Giving priority to the City's 200 main intersections in terms of rolling out critical remote monitoring.
- Installing uninterruptible power supply (UPS) to the traffic signals, alternative power and longer-lasting LEDs.
- Improving co-operation with power supply authorities (City Power and Eskom) and adjust Service Level Agreement with City Power.
- Improving co-operation with JMPD to undertake manual traffic control where necessary.
- Increasing technical staff and skills to attend to faults within the shortest possible time.

## ROAD NETWORK MAINTENANCE AND DEVELOPMENT STRATEGY

To maintain the economic competitiveness of the City, the road network needs to be of a high quality. Uncared-for roads also negatively impact on the image of a City.

The City will introduce a comprehensive approach to the maintenance, development and expansion of the City's road network. There will be a balanced attention between road infrastructure that supports economic development and general mobility and that which supports social development such as the upgrading of gravel roads.

The JRA will:

- Develop and implement a number of long-term development plans which, on the basis of data gathered in systems such as the Pavement Management System, Bridge Management System and Stormwater Management System, will be able to prioritise interventions for the sustainable redevelopment and maintenance of the road and storm water network;
- Capacitate and resource its depots for effective service delivery;
- Look at new labour-intensive ways of delivering some services at a local level such as basic road maintenance;
- Introduce performance contracts and improve quality assurance with contractors who work on the road reserve;
- Work with the JMPD in respect of overloading and with Joburg Water in respect of water leaks to prevent the unnecessary deterioration of the road network;
- Be more pro-active and impose higher penalties on contractors and utilities who work in the road reserve (such as to install fibre optic cables) and who do not reinstate the road properly; and
- Introduce a new approach to Developer Contributions to ensure that more revenue is available for the road upgrading that is necessary in the catchment area of a development that generates additional vehicular traffic.

## POTENTIAL NEW ROAD-BUILDING PROJECTS

The focus of the City is not on building new roads but on completing the existing streets for all road users and shifting private car users in the peak to use public transport. However, there is a need for a limited number of new roads to improve mobility and accessibility in the City.

The priority road-building projects that are proposed for completion by 2015 and 2020, and their estimated costs, are shown in Tables 23 and 24. These arose from the Transport Department's Road Hierarchy Project of 2009, which re-classified the road network of Johannesburg roads according to the characteristics of traffic service and the function that they are intended to provide (see detailed description earlier). The project evaluated all the proposed road projects in the City's Consolidated Infrastructure Management System (CIMS) and then developed an appropriate road network that would serve the needs of the City for the next five and ten years (2015 and 2020).

These proposed roads projects will be reviewed by the JRA as part of the development of a long-term roads plan.

TABLE 21: ROAD HIERARCHY PROJECT 2009: PRIORITY ROAD PROJECTS FOR 2015

Rank	Region	Project	Project Description	Project Cost	Cumulative Cost
1		9	Extension of project D1 (the Westlake Rd extension) to Vincent Rd (Meadowlands Zone 1).	R 6 995 520	R 6 995 520
2		11	Eastern extension of Rand Show Road to Dorado Avenue	R 33 221 760	R 40 217 280
3	C	D1	West Lake Road Extension between Main Reef Road and Meadowlands Zone 1	R 26 671 680	R 66 888 960
4	G	G5	New link 2 lanes per direction in Ennerdale between R557 and Broad Street	R 51 716 560	R 118 605 520
5	C	B4	New link and upgrading	R 30 562 560	R 149 168 080
6	E	JRA7	M1 Motorway capacity improvements: creation of an additional lane. From Braamfontein through to Grayston.	R 56 316 960	R 205 485 040
7		14	New link from M1 (Forest Town) to Rivonia Road (Illovo)	R 58 519 200	R 264 004 240
8	D	D2	North-facing on- and off-ramps from Soweto highway onto N1	R 13 129 200	R 277 133 440
9	B	28239	N17 - Crownwood Road to Nasrec Road	R 90 448 680	R 367 582 120
10		5	Upgrade of Jacaranda Road between Pres Fouché and Cumberland Av.	R 27 972 000	R 395 554 120
11	B	F1	Future widening of 8th Street to 4 lanes per direction	R 5 453 280	R 401 007 400
12	D & F	D13	Class 3/4 2 lanes add to Main Road from Columbine Ave (Southgate) to Golden Highway	R 27 972 000	R 428 979 400

13	E	E11	Dualling of Jan Smuts Avenue - from 7th to Bompas	R 42 307 200	R 471 286 600
14	B,C,D	JRA22	Upgrade of Main Road (New Cananda Rd) and realignment of section at Putco Depot	R 86 736 000	R 558 022 600
15	A	A8	Extension of K33 from Witkoppen to Inchangea Road	R 50 668 800	R 608 691 400
16	D	D7	New link From Main road (Johannesburg Prison) to Dynamo Road (Power Park)	R 87 500 560	R 696 191 960
17	E	E2	Widening (and Bridge) of Ballyclare Drive from Willim Nicol to Outspan Drive	R 87 734 400	R 783 926 360
18	D	D16	Add 1 lane per direction – Protea Blvd between Protea Glen and Protea North	R 19 393 920	R 803 320 280
19	A	A4	Maxwell Drive – upgrade to 2 lanes per dir (East of R55 up to R101)	R 37 240 320	R 840 560 600
20	B	JRA23	Upgrade sections of Mollie Street/Long Street.	R 24 382 560	R 864 943 160
21	E	E3	Outspan Road from Rivonia Road (Rivonia)	R 64 147 200	R 929 090 360
22	E	JRA38	Richards Drive upgrade, Halfway House Estate AH.	R 43 742 880	R 972 833 240
23	D	JRA31	Vincent/Mmila upgrade to 2 lanes per dir from Elias Motsoaledi/Koma to Mabitsela St	R 79 032 000	R 1 051 865 240

TABLE 22: ROAD HIERARCHY PROJECT OF 2009: PRIORITY ROAD PROJECTS FOR 2020

Ranking	Region	Project	Project Description	Project Cost	Cumulative Cost
24	D	D3	Chris Hani road Interchange	R 6 797 280	R 6 797 280
25		6	Upgrade of Republic from Judges to Barry Hertzog.	R 41 416 320	R 48 213 600
26		4	Upgrade of Douglas Drive from Witkoppen Rd to N1	R 24 171 360	R 72 384 960
27	B	JRA6	Extension of the M2 Highway.	R 19 061 280	R 91 446 240
28	B	29728	Extension of Atom Road and the link with Main Reef Road (Over Rail Siding)	R 23 026 080	R 114 472 320
29	E, B & F	E12	Dualling of Oxford Road between Riviera and M1	R 47 349 120	R 161 821 440
30	A	JRA10	Construction of Alexandra Road between N1 and Van Heerden Road.	R 17 408 440	R 179 229 880
31	D	JRA42	Upgrading/Widening of Nicholas Rd including pedestrian facilities.	R 11 970 240	R 191 200 120

32	D,F & F	JRA16	K122/K130: to provide east-west access and to open up Golden Highway Triangle.	R 257 391 680	R 448 591 800
33	B & C	JRA15	Improving the carrying capacity of 14th Avenue/Weltevreden/Pendoring from the N1 to Cresta	R 83 973 840	R 532 565 640
34	F	JRA24	Upgrading/development of the K47.	R 235 173 120	R 767 738 760
35	A	A12	K46 - upgraded to K route standards	R 414 336 000	R 1 182 074 760

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## THRUST NO. 4 SUPPORT ECONOMIC GROWTH THROUGH IMPROVING FREIGHT MOBILITY

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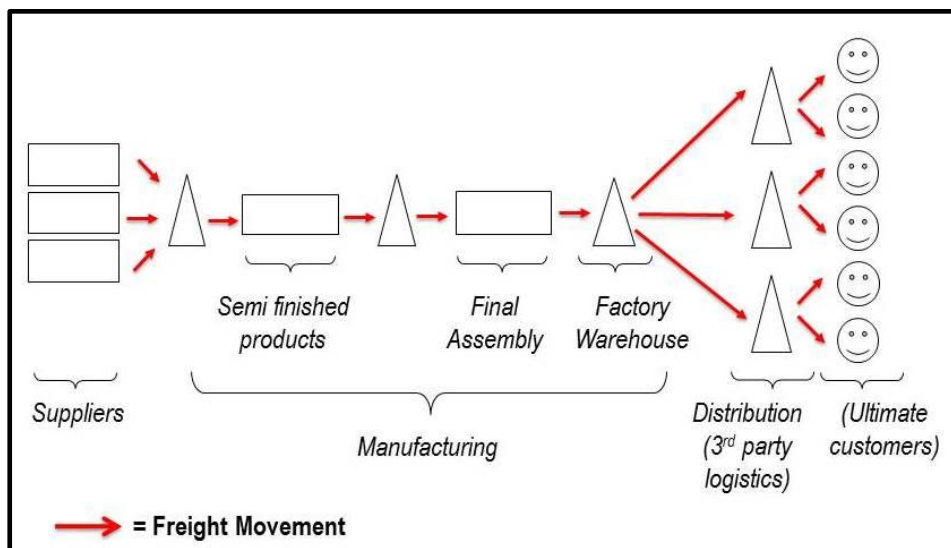
### CONTEXT

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One of the outcomes of a proper transport system should be *mobility* to move freight. The end-result of this mobility should be improved *economic growth*. The objective is that freight movement in the CoJ will be safe, reliable, and efficient to support the city's economy and be in balance with the needs of other transport users, the environment and quality of life.

Freight transport is vital in the supply chain process to accomplish the cost-effective flow and storage of raw materials and finished goods from point-of-origin to point-of-consumption. This flow is shown diagrammatically in Figure 15.

FIGURE 14: TRANSPORT MOVEMENT LINKS IN THE SUPPLY CHAIN PROCESS



The movement of goods in the supply chain involves costs. Nationally, freight logistics costs are equal to 12.7% of GDP.<sup>lxvi</sup>

Freight movement plays a positive role in servicing and retaining industrial and trading activities which are essential for economic growth and make a positive contribution to the competitiveness of the industries in the city. Urban freight movement is fundamental to sustaining existing life styles and it is also a major employer in its own right.

It is estimated that the transport sector contributes about 7.4 per cent towards the Gross Domestic Product (GDP) of South Africa. In the case of the CoJ the transport sector thus generated approximately R 24 billion in 2012. Approximately 40 per cent of this amount is generated by the movement of freight, in other words R 9.5 billion.<sup>lxvii</sup> In the year 2011, approximately 1 446 million tonnes of freight was moved by road in South Africa of which 798 million tonnes moved in the



metropolitan areas.<sup>lxviii</sup> Based on CoJ’s GDP as a percentage of the national GDP it is estimated that approximately 150 million tonnes of freight was moved in Johannesburg during 2011.

There are different kinds of freight movement that the City is concerned about. These include:

- Inter-city freight movement: Normally over a direct route and usually with a single destination.
- Urban freight movement: Distribution of goods at the end of the freight logistics chain. These loads are relatively small and are distributed over a range of routes and involve interaction of variables such as vehicle type, mix of commodities, destination type and logistics.

Goods from Durban to City Deep is an example of inter-city freight movement, whereas distribution of these goods from City Deep is regarded as urban freight movement.

Cities need freight, but they tend to neglect the planning of urban freight movements. This planning “anomaly” resulted in road networks which are designed primarily for the movement of cars moving people people and not for the movement of goods. Poor freight planning leads to:

:

- Residential areas being used as freight movement routes;
- Congestion;
- Damage to roads and bridges; and
- Network restrictions

In Johannesburg road is the dominant mode for freight movement, especially for intra-city freight because the trip distances are short and trucks offer flexible, cheap and easily adaptable urban solutions. In the long term, the City would like to see long-distance freight moving increasingly to rail and that intra-city freight movement be more varied – smaller vehicles, energy efficient and less polluting as well as possible “freight bikes” to move small volumes and to collect waste such as plastics and tins.

Transnet’s 2050 Vision forecast that by 2020, freight volumes from Durban to Gauteng would increase by 38 per cent, but that 70 per cent would still be carried by road in comparison to the current 82 per cent.

Deteriorating road conditions have negative effects on a country’s logistics activities and costs. Table 25 shows how vehicle maintenance and repair costs increase when the road condition deteriorates from good to bad. It also shows that the logistics costs increased by approximately 2.5% and 10% respectively. The International Roughness Index (IRI) values are used as an indication of the road condition. The IRI of a good road should typically be below 2.7. The IRI of a fair road varies from 2.8 to 4.0 and a bad road’s IRI is more than 4.0.<sup>lxix</sup>

TABLE 23: SUMMARY OF POTENTIAL INCREASES DUE TO WORSENING ROAD CONDITIONS

ROAD CONDITION	MAINTENANCE & REPAIR COSTS	INCREASE IN COSTS	INCREASE IN LOGISTICS COSTS
Good	R 0.96	-	-
Fair	R 1.24	30.24%	2.49%
Bad	R2.11	120.94%	9.97%

To accommodate freight in and around Gauteng in future the proposed Gauteng freight strategy includes<sup>lxx</sup>:

- Development of intermodal facilities with supporting services on the periphery of Gauteng;
- Establishment of freight roads around the CBD;
- Identification of roads to link the intermodal facilities; and
- Development of sufficient road capacity for the distribution of freight to and from the intermodal facilities.

City Deep handles 84 per cent of all containers destined for the Reef. Its strategic location and good access to freeways and railway lines will continue to make it a dominant intermodal freight facility in Gauteng.

A major negative economic effect of freight movement is its contribution to traffic congestion and resultant air pollution and carbon emissions. Although it is a popular perception that freight vehicles cause congestion, it is often the case that the congestion is caused by motorcars (because there are too many of them on the streets; or they are parked illegally in loading zones).

The negative social impact of freight movement includes the physical consequences of pollutant emissions on public health (death or illness), the injuries and death resulting from freight traffic accidents, noise, visual intrusion, and other quality of life issues (including the loss of greenfield sites and open spaces in urban areas as a result of freight transport infrastructure developments).

Pollutant emissions including greenhouse gas (CO<sub>2</sub>), the use of non-renewable fossil-fuel and waste products such as tyres and oil are all negative impacts on the environment. It is estimated that transportation is the second highest contaminator in the world at 23 per cent. In cities freight vehicles are responsible for 40 per cent of greenhouse gases.

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#### LACK OF URBAN FREIGHTTRANSPORT DATA

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The availability of data on urban goods movement in South African cities is generally rather poor. CoJ needs statistical data on urban freight movements in order to decide about local measures and policies for future planning as well as for the monitoring of urban freight movements. A successful implementation to improve freight movement in Johannesburg would not be possible because there is no or not enough data available.

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#### LOADING BAYS

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Some of the negative effects caused by loading and off-loading of freight vehicles, such as double parking, can be addressed if the authorities provide sufficient loading bays. Some of the difficulties that freight vehicle operators and drivers face are that these bays are not properly designed. In many cases they are too short. The minimum length of a bay should be 12m. In other cases these bays are illegally used by motorists. Proper policing of these facilities is required.

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#### EXTERNALITY COSTS

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Externality costs are those induced by logistics (specifically transport) that are not reflected in the financial statements of the users of the logistics system. The total transport externality costs in South Africa are estimated at R27.8 billion.<sup>lxxi</sup> This is significant as it is a yet unaccounted-for cost in

the South African logistics system. Pro rata the transport externality costs in CoJ are approximately R 5 billion.

From a macroeconomic point of view these costs should be included in an analysis of logistics costs and should inform trade-off decisions. From a strategic supply chain point of view it is clear that some of these costs will be internalised through taxation and other similar mechanisms in the near future and should therefore not be ignored. The methodology used to calculate the externality costs due to emissions has been iteratively refined over the past two years, but methodologies to calculate the other externality costs are still in a draft stage.

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## LAW ENFORCEMENT

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Freight movement law enforcement will be required for purposes of the Road Traffic Quality System (RTQS) and Overloading

Law enforcement in the freight movement industry is not negotiable. Many accidents, often fatal, are attributed to brake failure, burst tyres and other vehicle defects which is a sure indication that operators are not fulfilling their duties in respect of the roadworthiness of vehicles. Some vehicle testing stations are also guilty of issuing Certificates of Roadworthiness to unroadworthy vehicles.

In the highly competitive environment in which the transport operators have to function, their prime concern is to minimize the cost per ton-km of haulage. Thus, there is a trend towards the use of larger and heavier vehicles, which, as a result of improvements in road transport technology, tend to have a capacity rating in excess of legal load limits. Current overload control statistics from 15 provincial and municipal weighbridges in Gauteng indicated that up to 38 per cent of the heavy vehicles weighed at these weighbridges were overloaded. It is therefore of paramount importance that an effective overload control plan should be developed for the CoJ's road network. The objectives of such a plan are:

- Cost-effective protection of the road infrastructure;
- Successful apprehension and prosecution of transgressors; and
- Improved road safety.

Challenges facing the control of overloading on the CoJ road network by conventional static weighbridges are the availability of land to build these weighbridges and the fact there are various escape road possibilities for overloaded vehicles. Virtual Weigh Stations (VWSs) would be a more practical solution. A VWS is made up of Weigh-in-Motion (WIM) sensors, image cameras and automatic number plate recognition (ANPR) equipment. It provides vehicle records for enforcement, traffic surveillance and/or data collection in real time and provides a way to unobtrusively monitor heavy vehicle traffic.

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## STRATEGIES

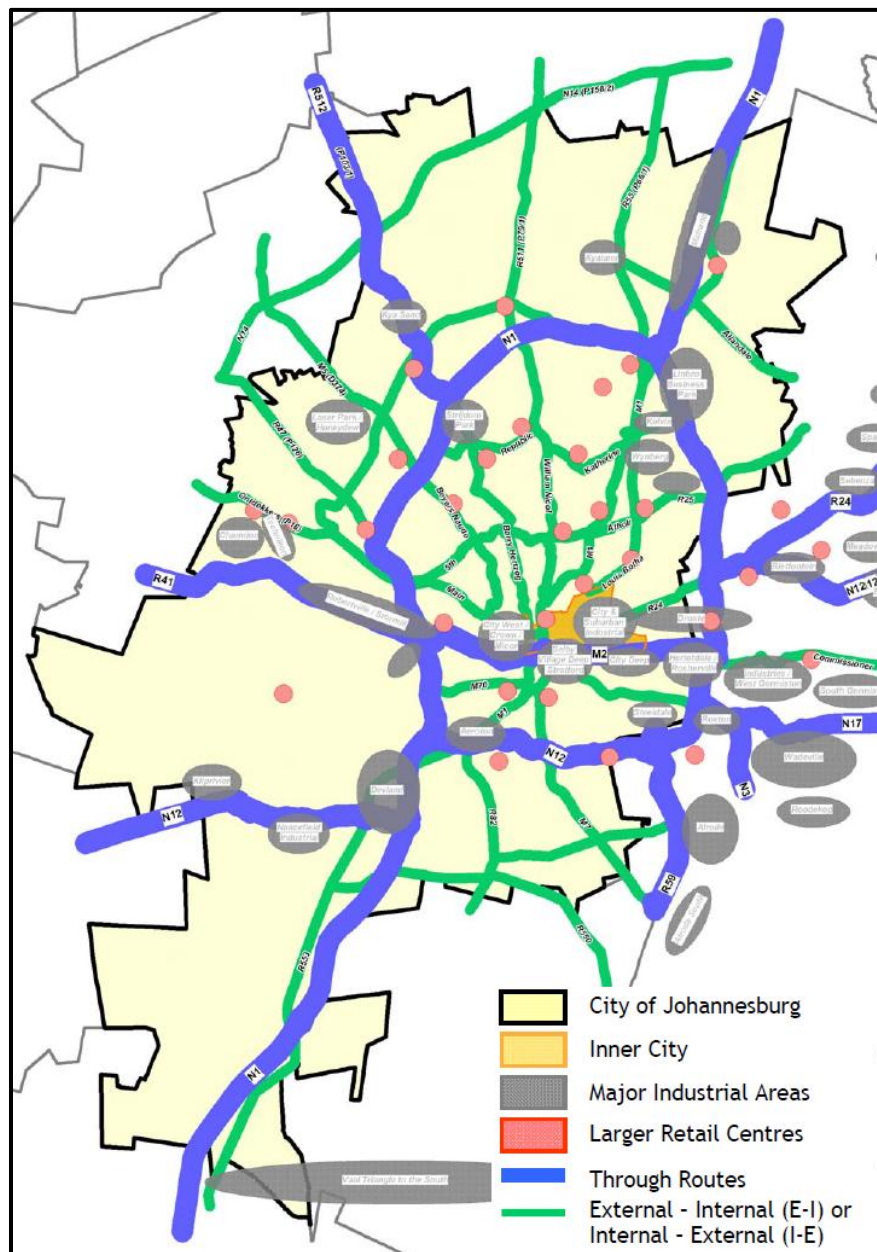
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The following strategies and initiatives will be pursued in the **short term** for freight movement.

- Increased capacity for freight planning and logistics know-how will be developed within the City Transport and Economic Development Departments and the JRA.

- A database on urban freight transport in CoJ will be established. The data will be used to review and finalise the road freight network which was proposed in the *CoJ Freight Network Study* in 2007 (see Figure 16). The condition of the reviewed network will then also be determined from road condition surveys which were done by the JRA. At the same time roads on which dangerous goods will be allowed will be identified.

FIGURE 15: PROPOSED FREIGHT NETWORK



- Formal co-operation among all the stakeholders involved in urban freight movement in CoJ will be created through a Freight Quality Partnership (FQP). This will enable the city to work with businesses, freight operators, environmental groups, the local community and other

interested stakeholders to address specific freight transport problems and to develop freight movement strategies and initiatives that enjoy broad support.

- Based on data from the proposed CoJ freight database, the possibility of introducing computerised time regulations on freight vehicle access and loading, particularly on roads or areas that are very sensitive to road traffic such as the inner city, will be investigated. Access time regulations are an instrument that can be used to prevent vehicles from entering a road or area at particular times of day, or restrict the times at which vehicles can load or off-load at kerbsides. They can be imposed on all road freight vehicles or only on freight goods vehicles of a certain size or weight.
- Urban freight movements in the CoJ area will be monitored by means of technology (ITS and cameras) and on-the-ground policing. In this respect, the Transport Department will enter into discussions with the JMPD to determine how enforcement and monitoring activities to support urban freight transport can be enhanced (particularly enforcement of the time regulations regarding access and loading). The establishment of a special freight control unit within the JMPD should be investigated. The way forward on the control of overloaded freight vehicles will be determined in collaboration with the JRA.
- The development of the Durban-Gauteng Freight Corridor is a national Strategic Investment Project (SIP) and the CoJ will therefore, in collaboration with the other stakeholders involved at City Deep, apply sound access management on existing arterials to enhance the efficiency of freight distribution to and from City Deep.

The following strategies will be pursued in respect of freight movement and its environmental impact in the **longer-term**:

- Low Emission Zones (LEZs);
- Environmental-friendly vehicles (EFVs);
- Road pricing systems;
- Real-time freight information and maps;
- Night deliveries; and
- Urban traffic management and control systems.

## THRUST NO. 5: MANAGE CONGESTION, TRAVEL DEMAND AND PARKING

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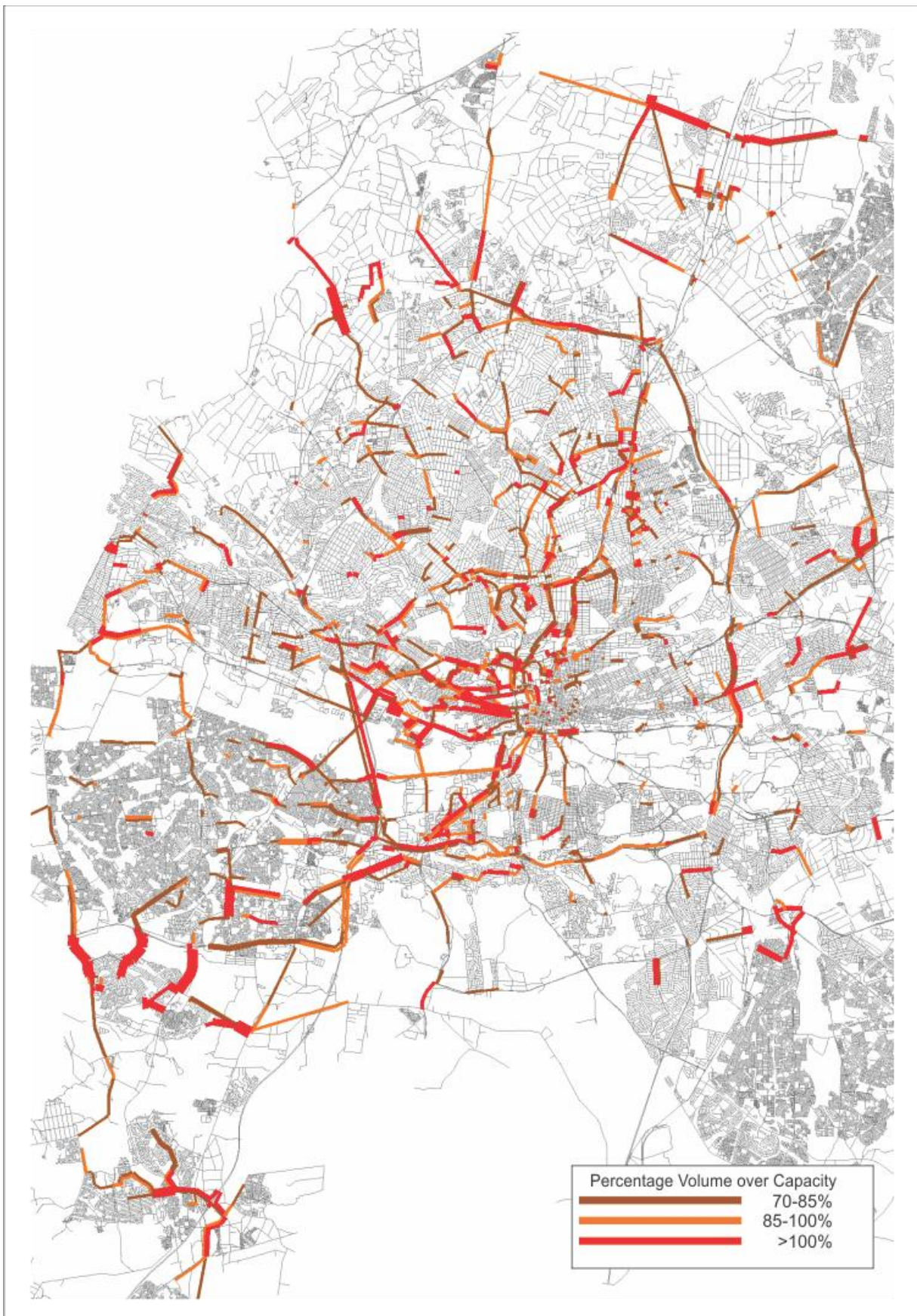
### CONTEXT

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The desired outcome is improved mobility and reduced congestion on the city's road network, so as to make Johannesburg a more liveable city and to boost economic growth.. The Joburg 2040 GDS identifies the reduction of congestion as a critical objective for a more liveable city.

The current reality is that traffic congestion in Johannesburg is quite severe and mobility is quite compromised on many of the arterials and freeways in peak periods. Figure 17 illustrates the hotspots on the Johannesburg road network as estimated by the City's Emme transportation model. These are road sections where the ratio of demand volume to capacity is greater than 85% and over 100%. Sections approaching 85% utilisation (70% to 85%) are also shown.

FIGURE 16: CONGESTION ON THE JOHANNESBURG ROAD NETWORK IN THE PEAK PERIOD



A 2011 survey estimated that 78% of 3.8 million drivers on Joburg roads are stuck in severe traffic jams daily.<sup>lxxii</sup> An IBM survey in 2010 (the Commuter Pain Survey) of global traffic congestion interviewed at least 400 drivers in each of 20 major cities and Johannesburg ranked worst out of the 20 cities in commuters' experience of long travel times. 67% said roadway traffic had become worse or a lot worse in the last three years.<sup>lxxiii</sup> Indicative of the growing congestion is that since 1980 there has been an increase in travel times in Johannesburg of nearly 60% for private car users.<sup>lxxiv</sup>

By 2040 Johannesburg will have an extra 2.5 million inhabitants. Based on current patterns, more people means more vehicles and more congestion, coming with negative effects including:

- Poor urban air quality;
- Increasing road injuries and fatalities which add to the public health bill of the nation.
- Increased greenhouse gas emissions which impact negatively on climate change; and
- Increases in travel time having an impact on the competitiveness and attractiveness of the City and quality of life of residents.

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## POLICY

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The City's approach to reducing and controlling traffic growth is to focus on mobility for people and goods, not vehicles per se. The solution to the city's growing congestion problems is not to build more roads, which only generate new traffic, but to:

- Use the strategy of transit-oriented development (TOD) to reduce travel demand.
- Improve public transport to the extent that car users regard it as a realistic, quality alternative, and increasingly use it, especially for peak period regular trips to work and school.
- Encourage more trips by walking and cycling.
- Reduce the relative convenience of private car use through prioritising the movement of public transport vehicles on the roads.
- Increase the cost of private car use (through measures such as tolls and higher licence fees, along with ever-rising fuel prices).
- Manage travel demand thus reducing the need to travel in the peak, and reducing car use, especially single-occupancy vehicle use.
- Get more out of the existing capacity in the road system (e.g. through Intelligent Transport Systems, managed lanes and better traffic management systems).

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## STRATEGIES AND PROGRAMMES

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Two key approaches to congestion management are to improve the public transport coverage and usage in the City, and to attract new developments to public transport corridors, nodes and hubs. These are discussed earlier. The topics discussed below are Travel Demand Management including ridesharing, employer trip reduction plans, precinct trip reduction plans, restricting vehicles in certain places or at certain times and parking management; and ITS and traffic management approaches.

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## TRAVEL DEMAND MANAGEMENT<sup>lxxv</sup>

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Travel Demand Management (TDM) refers to policies, strategies and measures that change travel behaviour to increase transport system efficiency. TDM measures and strategies do this by reducing

the demand for transport in peak periods, and by reducing reliance on cars, especially the use of single-occupant-vehicles (SOVs).

Tolling of urban roads is one mechanism for increasing the costs for private car use and pushing car users towards public transport. However, public transport alternatives need to be in place (the positive side) to make this fair and practical as an incentive. Good public transport is in fact a key pre-requisite for all successful TDM.

The key proposed TDM strategies are:

- Promoting ridesharing to increase the number of individuals per private car;
- Promotion of flexi time, variable working hours and other employer policies to reduce private car use in work to home trips;
- Restricting entry of certain vehicles into certain areas and/or at certain times; and
- Various forms of parking management.

The strategies are discussed in more detail below.

### RIDESHARING (LIFTCLUBS)

Ridesharing or “carpooling” or “liftclubs” are particularly suitable for commuters living near each other, sharing a common routine destination, and who have limited access to public transport. The incentive to share rides is the saving in travel costs. In Canada and the United States, ridesharing represents 8% and 11% of the transport modal share respectively. In Johannesburg the figure is currently just under 1%.<sup>lxxvi</sup>

Ongoing increases in the fuel price may give a boost to ridesharing as well.

### CHANGING EMPLOYER POLICIES

Employers have a powerful influence on their staff’s tripmaking behaviour. They can greatly reduce travel demand in the peak, and single-occupancy car useage by:

- Introduction of variable and flexible working hours where possible;
- Introduction of work from home or telecommuting if possible;
- More use of video-conferencing and tele-conferencing;
- Reducing the availability of free or reduced cost parking for employees;
- Offering employees the option of a public transport allowance instead of paid parking;
- Providing pool cars for work trips as opposed to a private car subsidy scheme;
- Arranging employee transport for the ‘last mile’: from a public transport hub/station to and from the employer’s door;
- Assisting employees to rideshare, e.g. by doing a staff survey to establish who lives in the same areas.
- Providing cycling facilities at the workplaces (lockers and shower facilities)

The introduction of variable working hours can especially benefit women, who need more flexibility to attend to non-work-related obligations such as child-care and household management. It is also important to ensure that there is public transport available outside of the peak period if working hours are spread outside of it.



The successful implementation of TDM measures rests in partnership with relevant stakeholders.

The TDM strategies will be promoted through two forms of partnership:

- Workplace level where a large number of employees are gathered in a single place: Employee Trip Reduction Programmes; and
- Precinct level where a large number of employees are working in a precinct, generally well served by public transport: Precinct Trip Reduction Programmes.

**Workplace Level:** Employee Trip Reduction Programmes are more suitable for large employers where a significant percentage of their employees are located on a single site such as, in the City of Joburg, banks and other financial institutions and utilities such as Eskom and Telkom. The provincial and municipal government workplaces in the city are also suitable.

The City would like to engage with these large employers (including the City of Joburg as an employer) and partner with them, to firstly determine and understand employee travel patterns, employee needs and preferences, employer requirements for employees to have vehicles (e.g. for sales) and then to determine what the appropriate measures are that a particular employer can take to reduce home to work trips, and trips by single-occupancy vehicles. The City can assist by:

- Making available good, high-quality information on public transport options and other relevant services to employers who are initiating such a programme;
- Co-operate in the provision of relevant City services if appropriate e.g. to designate a new commuter stop or introduce a lay bye;
- Facilitate engagement between the employer and other public transport operators such as Gautrain or Metrorail;
- Providing guidelines on how employers can make policy shifts; and
- Provide public transport infrastructure in close proximity to employers

The advantages for the employer can include the need to provide less parking, reduced spill over parking impacts, employees who arrive at work on time, less freight travel time which can lead to higher productivity as well as being able to play a role in contributing to lessening vehicle accidents, congestion, air pollution and greenhouse gas emissions.

**Precinct Level:** Precinct trip reduction programmes can be a co-ordinated effort to improve options and reduce trips at a precinct level. These are referred to in some countries as “transport management areas”. It is proposed that in the context of Joburg, the City Improvements Districts could be considered as partners to develop precinct based trip reduction programmes.

Measure that could be introduced and co-ordinated at precinct level could include:

- Shared parking pools;
- Ride sharing;
- Short term car hire;
- Cycle or pedi cab paths for the ‘last mile’ from the nearest public transport hub;
- Agreeing to close or restrict certain areas in the precinct to certain vehicle classes;
- Parking Management.

The role that the City of Joburg can play is similar to that with big employers. In addition, the City can be able to change the precinct by introducing non-motorised transport services in partnership with the private sector, restricting access to the area and parking management.

Other support roles that the City of Joburg would like to play include:

- Establish, facilitate or support the establishment of website(s) where potential car sharer's can meet each other; and
- Enable the establishment of park and rides at public transport hubs/points where car users can easily access public transport or meet to continue their journey sharing a vehicle (see Thrust 2 for more detail on the park and ride strategy).

At least one large employer or precinct level programme should be introduced each year.

### RESTRICTING ENTRY OF VEHICLES INTO CERTAIN PLACES OR AT CERTAIN TIMES

Restricting the entry of vehicles into certain places or at certain times can have a number of benefits including road safety and reduced air pollution. It is also a TDM strategy since it forces vehicle users to consider other ways of reaching their destinations.

Forms of such restrictions can include:

- Restricting freight vehicles from entering the CBD during the day time. This would reduce congestion and also prevent conflict between car users, pedestrians, public transport users and freight vehicles.
- Restricting vehicles that weigh a lot and are high polluters from entering identified areas such as conservancies, heritage, arts, culture and educational areas. This enables the road space to be redesigned for public transport, pedestrians and different street materials such as cobble stones can be used.
- Restricting vehicles from entering certain parts of the CBD and converting road use for limited car use and increased pedestrian use. This can be permanent or can be only on weekdays. Public parking can be provided on the outskirts of the City and people can be transported from such places with public transport or non-motorised transport such as Pedi cabs.

In this regard, the measures the City intends to implement are:

- Develop policy and regulations in consultation with the relevant stakeholders to enable restriction of vehicles in certain areas;
- Ensure strong law enforcement when such measures are put in place; and
- Where necessary change the road space through engineering interventions in terms of the managed lane policy or complete street approach.

### PARKING MANAGEMENT

If parking was charged at its real economical rate, many car users would consider alternatives. Parking in many parts of the City is not charged at the full cost. The widespread metering of parking in the CBD, major nodes and smaller CBDs was allowed by the City to fall into disuse some years

ago, since when on-street parking has been free (except for payment to an informal caregiver in most commercial areas). Employers subsidise parking as an 'employee perk' and mall owners do so to increase patronage. If long-term parkers used alternatives, such as public transport or ridesharing, then the opportunities for short-term parkers are also improved, which is certainly an objective to be pursued in the CBD and major nodes.

Another parking issue is that malls, shopping centres, and large recreational facilities are typically designed for the convenience of people travelling to them in cars, rather than by public transport or on foot.

Parking also uses up valuable public space, and parking lots are an unattractive use of public space, especially in tourist or recreational areas. Parking spaces are also heat islands and change runoff patterns with negative environmental consequences.

Parking management measures the City intends to pursue are:

- Encouraging employers to increase the cost of parking provided to employees (as discussed above)
- Developing comprehensive plans to address on-street parking in the CBD and all major nodes. While the City intends to restore a system of paid on-street parking in the CBD and all major commercial nodes, other nodes may require different solutions to ensure that they are accessible. Such a plan will be subject to public consultation.
- Amendments to land use and zoning policies in respect of what is required by developers in terms of parking. A number of amendments have been proposed to the City's new Consolidated Town Zoning Scheme to facilitate improved parking management to support TDM. The key recommendations are that:
  - Maximum parking provision limits should be introduced in public transport priority areas in terms of the City's Growth Management Strategy (GMS);
  - Lower maximum parking requirements should be introduced around upgraded public transport corridors and in the marginalised areas in terms of the GMS;
  - Lower off street parking requirements in the inner City and regional nodes as defined by the Consolidated Town Zoning Scheme should be introduced;
  - A shared parking concept - where the same parking spaces can be used for different land uses at different times - should be introduced for mixed land use developments; and
  - The designers of shopping malls, other large retail facilities and office parks should be required to make provision for public transport vehicles, metered taxis and decent pedestrian access, as well as shared parking.

The proposals will be put out for public comment and finalised proposals included in the Zoning Scheme if and when certain legal challenges to this scheme are successfully addressed.

### MANAGED LANES

The City's *Managed Lanes Policy* was discussed under Thrust 3, highlighting high-occupancy vehicle lanes and exclusive lanes for public transport or pedestrians. It is also a TDM-type strategy in that lanes are managed to restrict their use by general traffic in some way so as to reduce travel demand, exploit spare capacity in some lanes, or extract more person-carrying capacity from the lanes.

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## TRAFFIC MANAGEMENT AND INTELLIGENT TRANSPORT SYSTEMS

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The Johannesburg Roads Agency (JRA) has been implementing some aspects of its Mobility Plan using Intelligent Transportation Systems (ITS) to improve mobility in the city since 2007. Its primary purpose is to improve the operation of the road network, through measures including:

- The remote monitoring of signalised intersections from the Traffic Management Centre (TMC) at the JRA building and operation of the Urban Traffic Control system.
- Monitoring of the city motorways using CCTV cameras so that traffic conditions can be observed on screens at the TMC
- Incident detection (and related incident management) on the motorways
- Provision of real-time information about traffic conditions to drivers through variable message signs and web-based information so that dynamic decisions can be made, thereby taking the pressure off congestion hotspots.

The policy and investment focus for the City shifted towards ITS instruments to enhance the operation of the city's public transport network, and the Rea Vaya network, stations and buses and control centre in particular. This will continue to be a priority.

Improving the operation of the general road network will also be a priority, through the implementation of the following measures in the JRA's "Mobility" programme:

- Extending remote monitoring of signalized intersections using the Urban Traffic Control system, recabling at signalized traffic intersections, and installation of new traffic signals
- Upgrading the traffic signal controllers with new traffic signal adaptive controllers
- Revision of signal phasing at major intersections to reduce delay
- Implementation of signage upgrading to comply with the SA Road Traffic Signs Manual (route markers, tourism signs, directional signs, regulatory/warning signs)

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## THRUST NO 6: ACTIVELY ENGAGE CITIZENRY IN IMPROVING THE TRANSPORT SYSTEM

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### CONTEXT

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"Shifting from the convenience of private to public transport is not just about logistics... this is about driving a new transport culture."  
*Joburg 2040 Growth and Development Strategy*

The strategies set out in this *Framework* require behaviour, culture and mindset change. This thrust is aimed at ensuring the success of the various strategies and improving the transport system through the involvement and support of the city's residents. Key outcomes sought are an improvement in road safety, an improvement in safety from crime within the transport system, a shift towards greater use of public transport and NMT, and willingness by employers and employees to support TDM strategies.

Participants in the Joburg 2040 GDS suggested the City should build a core of transport activists across Johannesburg to actively lobby for change and to build community ownership.

One of the most important outcomes that can benefit from the support and involvement of residents is road traffic safety. Johannesburg, along with the rest of South Africa, has a poor transport safety record by international standards. Every day an average of 36 lives are lost in South Africa due to road accidents. Of these 15 are pedestrians, and 3 are killed in taxi-related incidents. More than 90% of crashes are due to lawlessness. In Gauteng (2009) there are 180 000 unroadworthy vehicles, 118 000 unlicensed vehicles and there were 2196 fatal crashes, causing the deaths of 2 485 people, of whom 1 126 were pedestrians. In Johannesburg (2003) there were 107 740 accidents (295 a day), of which 2 731 involved serious injuries, and 623 were fatal.

Traffic safety is a serious problem for private motorists, pedestrians, cyclists and public transport users alike – fear for their safety is the main source of dissatisfaction among minibus-taxi users (66% are dissatisfied).

In respect of engaging residents and stakeholders, the Transport Department has maintained a high level of engagement with all the interest groups and stakeholders that characterise the transport sector, in particular public transport operators. It has set up many different structures, either ongoing or project-related.

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## STRATEGIES

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### DATA ON SAFETY AND CRIME IN THE TRANSPORT SYSTEM

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A factual, data-based understanding of road safety and transport security is an important tool for improving safety and security in the City, and also for being able to monitor and measure the impact of the Streets Alive Programme over time. The Transportation Safety Management Information System (TSMIS) is a valuable tool for understanding transport safety and security, for identifying hotspots, and for measuring and monitoring change and improvement. It will be updated and maintained on an ongoing basis by the Transport Department as an in-house activity. It will also enable the Department to prioritise its budget so that it can make the highest impact by understanding which are the most hazardous locations on a factual basis.

### TRAFFIC CALMING, WARD-BASED COMMUNITY ROAD SAFETY PLANS AND STREETS ALIVE

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The chief programme under this thrust is the ongoing implementation and mainstreaming of the Streets Alive approach.<sup>lxxvii</sup>

Johannesburg's *Traffic Calming Policy for the City of Johannesburg* (December 2002) was placed under review at the end of 2006 owing to contradictions found in it and practical implementation difficulties experienced by the JRA. A new approach was adopted instead which was to develop Ward-based Community Road Safety Plans. These are intended to be holistic, and to include not only physical interventions to slow down traffic, but to also apply enforcement, education and awareness measures.

Since the approval in June 2007 by Mayoral Committee of this approach, the Transport Department has encouraged communities to identify priority road safety problems and propose solutions, which

the Department investigated and if feasible and warranted, implemented. The central transportation concern presented to local government by neighborhood residents is that of too many speeding vehicles within their neighborhoods, jeopardizing their safety. During 2008/09, the department attended to the no. 1 problem in each ward, followed by communities' priority two in 2009/10 and priority three during the 2010/11 financial Year. Due to funding constraints the predominant intervention was the building of speed humps.<sup>lxxviii</sup>

In the 2011 term of office, a shift away from isolated interventions to holistic and integrated solutions implemented in partnership with communities was sought and a new programme called "Streets Alive" introduced. This is aimed at ensuring that road space is enjoyed by all including motorists, cyclists and pedestrians and that roads are claimed back as holistic public spaces was adopted in 2012.

The Streets Alive Programme will apply a range of interventions that will make streets safer, namely changing the standards for upgrading and building roads (Complete Streets – see the Infrastructure section earlier), other engineering interventions, law enforcement, scholar patrols, landscaping, and education and awareness to promote behaviour change. It also aims to bring recreational uses back to the streets – the Open Streets Programme, which involves closing certain streets to vehicle traffic on certain days of the year, and instead events are arranged for people to walk, cycle, dance, skateboard, or street markets are arranged, and other recreational activities.

The introduction of a range of activities in the street has a marked impact on safety. In American cities it has been found that when protected bike lanes are installed, crash related injuries for all road users have dropped by as much as 40% and in some cases the decrease has been even more significant. American cities have also found that introducing bike lanes, landscaping and wider medians tends to stop speeding, while drive times have remained more or less the same. Further, the slower and better driving attracts more people to come out to walk and cycle – creating a virtuous circle. The London School of Hygiene and Tropical Medicine investigated the effect of 20 mph (32 kph) speed zones on road casualties in London and found that it led to a 41.9% reduction in road casualties and that the percentage reduction was greatest in younger children.

Transport values and behaviour change are also a component of the Streets Alive programme. The Transport Department introduced a "Transport Values" programme in the 2006-2011 term of office. This project identified five key values – respect, accountability, honesty, co-operation and Ubuntu. The overall objective was to promote these five values amongst all road users so as to promote road safety and the sustainability of transport infrastructure, for example, by drawing attention to vandalism and theft of road infrastructure such as man hole covers, littering in storm water drains, painting of graffiti on road signage, and so on.

The five "values" were each associated with a symbol and these have been placed in various parts of the transport system. It is intended that they will be put on the new commuter shelters. They are shown in Figure 18.

FIGURE 17: TRANSPORT DEPARTMENT VALUES



The Transport Department and Community Safety run awareness and education programmes focused on school children and road users using a mascot called the “Pedestrian Angel”, a mobile unit and industrial theatre to promote behavioural change.

Law enforcement by JMPD which is responsible for apprehending, fining and arresting drivers who violate road safety rules is the fourth leg of the Streets Alive programme. JMPD also supports scholar patrols, community patrollers and other community based initiatives aimed at improving the safety of road users.

The implementation programme for Streets Alive<sup>lxxix</sup> is shown in Table 26.

TABLE 24: STREETS ALIVE PROGRAMME COMPONENTS AND PROJECTS

Programme component	Projects
Complete Streets	The Transport Department and JRA will develop a set of standards and guidelines on what Complete Streets in Joburg should look like and which will be applied on all new roads or when roads are upgraded including the JRA gravel roads upgrading programme.
Values and awareness	The Transport Department will continue to carry out ongoing education and behavioural change programmes using pedestrian angel and industrial theatre.
Ward-based action plans	The Transport Department, JRA and JMPD will continue to work with communities to develop ward-based action plans – inter alia arising from petitions and other community initiatives.
Training and capacitation	This new approach will require training and capacitation of officials, councillors and community activists, requiring action from the transport and safety sector and the legislature.
Open Streets	Community-based as well as regional events will be arranged in partnership with communities to close streets on identified days for recreational activities. The objective is to eventually have regular open streets events.
Johannesburg Road Safety Council	The Department will establish a forum to support and monitor road safety in general and the implementation of the Streets Alive programme.

The candidates for Street Alive projects in any one year should be determined through the IDP process as well as with reference to the Traffic Safety Management Information System (TSMIS) with reference to the following kinds of criteria:

- Use of road: e.g. a road which carries a lot of pedestrian traffic and has a high number of pedestrian-vehicular conflict points;

- Number of road accidents/fatalities;
- Presence of a school;
- Whether it is a public transport corridor;
- Whether the site is in one of the poverty deprivation areas identified by the City;
- Potential for partnerships to maintain facilities; and
- Petitions from residents.

The JRA will continue to consider certain petitions and if measures such as introducing a signalized intersection, pedestrian crossing, or traffic circle are warranted, then these should continue within the existing procedures and processes of the JRA.



## THRUST NO. 7: TRANSFORM THE TRANSPORT SECTOR AND ENCOURAGE NEW, EFFICIENT AND PROFITABLE TRANSPORT ENTERPRISES AND EMPLOYMENT CREATION

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### CONTEXT

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Promotion and support to small business and entrepreneurship growth (informal and formal economy) is an important *Joburg 2040 GDS* outcome. Large-scale transport improvement programmes offer an ideal opportunity for job creation, through which to promote scarce skills development and through which experiential training (e.g. for young engineers) can be provided. They also offer opportunities to involve young people in activities across the transport value chain.

<sup>lxxx</sup>

The Transport Department's Rea Vaya BRT project has resulted in considerable progress in meeting some of these strategic objectives. It has resulted in the establishment of the Phase 1A operating company, Piotrans (Pty) Ltd, owned and managed by 313 shareholders who previously operated minibus-taxis on the Rea Vaya routes. The company employs 220 drivers and 17 other staff. All the drivers were previously minibus-taxi drivers, and now enjoy formal working conditions with regular salaries and benefits, unionisation, and salaries about three times what they earned previously.

The construction of Rea Vaya Phase 1A and 1B had created 21 785 jobs in infrastructure – as of the end of March 2013 (where the definition of a job is 55 days of continuous employment).<sup>lxxxii</sup> The Rea Vaya stations (just Phase 1A) employ 502 people on an ongoing basis (managers, marshalls, cashiers, cleaning and security staff).

The JRA has similarly created hundreds of jobs each year in including through the Expanded Public Works Programme and the application of labour intensive technologies. There is considerable potential for increasing community-based jobs in the areas of road and sidewalk maintenance.

The taxi operators affected by Phase 1A and who participated in Rea Vaya have formed nine Taxi Operator Investment Companies (TOICs) with the intention of pursuing further business opportunities in the transport sector. They have secured the cleaning and security contract for the Phase 1A Rea Vaya stations,

Further phases of Rea Vaya will also each create a new bus or public transport operating company from among the affected bus and taxi operators, additional stations requiring staffing and a range of contracted services.

The Scheduled Services Management Agency (SSMA) in the Department of Transport will manage various road-based, gross-cost contracts in the future, including Metrobus, and other scheduled public transport contracts.

The promotion of cycling will provide opportunities for small businesses supporting bike share programmes as well as the maintenance and repair of the bicycles. Park and ride initiatives also lend themselves to new enterprise formation.

### STRATEGIES

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The strategy in the transport sector is to recognise the many opportunities for jobs creation and new enterprise development in the sector through the expansion of the quality public transport

system, transport infrastructure development and the development of a green economy, and to actively enable that these are fully exploited.

The City will pursue the following major areas of job creation and enterprise development going forward:

- Labour intensive construction and the implementation of the Expanded Public Works Programme (EPWP) where jobs and skills training will be maximised in the construction of road infrastructure including complete streets, sidewalks and bicycle lanes and rail upgrading.
- New enterprise development and the formalisation and growth of existing enterprises in the public transport sector including in respect of Bus Operating Companies (BOCs) with Rea Vaya contracts, other scheduled services contracts, operation of park and ride sites, etc
- Creation of new enterprises in the promotion of a green economy. Two areas stand out here – firstly, introducing new fuel sources such as bio gas and bioethanol can create jobs in waste collection and the agricultural sector. Secondly, in respect of cycle promotion including in the manufacture, assembly, sale, repair, rental and maintenance of bicycles.
- New modes of transport such as tuk tuks and pedicabs.
- Associated job creation in the transport value chain such as bitumen for roads, and components for buses. For example for each direct construction job created in Rea Vaya construction, two further jobs are indirectly created in the construction sector in South Africa.
- Job creation, especially for young professionals as we continue to innovate in the public sector and expand the public sector’s role in transport regulation and contracting.

## THRUST NO. 8 PLAN THE TRANSPORT SYSTEM

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### CONTEXT

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The Transport Department as the transport planning authority of the City has considerable statutory responsibilities in terms of the National Land Transport Act (NLTA) of 2009 to plan the private, public and freight transport system and to regulate it.

The NLTA also creates options for metropolitan planning authorities to take on additional responsibilities currently carried out at provincial level, including the bus contracting function and the public transport regulation function (issuing of operating licences), and the national rail function. The act has various statutory planning requirements, including the development of a Comprehensive Integrated Transport Plan. The act also provides for the establishment of a Transport Fund at metropolitan level.

The national *Public Transport Strategy and Action Plan* and related funding from the Public Transport Infrastructure and Systems Grant (PTISG) has greatly expanded the implementation responsibilities of the City since 2007. The existing planning tools in the Department such as its Emme Strategic Transportation Model and its GIS system, as well as the databases on minibus-taxi and bus routes, supply and demand collected in the 2002 ITP process have provided invaluable support to planning various phases of the BRT system. The data was also very useful in the negotiations with the Phase 1A operators about affected taxi routes and the number of affected operators, and enabled agreement on this aspect to be quickly reached.

However, many of the systems and the model contain old data and have not been updated for some time. There are not procedures in place or responsibilities allocated for the regular maintenance of the databases or systematic storage of data and information. In general, further value can be extracted from the extensive data and knowledge possessed by the Department if some attention is given to its programming and management.

The National Land Transport Act of 2009, supported by the *Public Transport Strategy*, created the space for municipalities to not only plan public transport, but to regulate and contract public transport services as well in line with their plans. The National Planning Commission has come out in strong support of this, stating that “Transport benefits from subsidiarity, where the lowest level of government capable of effective delivery is given authority and aligned funding. Government policy to devolve transport management to local government will succeed if there is a simultaneous strengthening of institutions and alignment of legislation, policy and practice. Where metropolitan municipalities are adjacent, a regional transport authority may be appropriate to support integration.”<sup>lxxxii</sup>

The Gauteng government and its associated municipalities are considering such a regional transport authority bearing in mind the highly urban and connected nature of the Province. For this strategy to be effective, institutional frameworks for decision-making and co-operative governance with clear allocation of powers has still to be addressed. Consideration needs to be given, as the GDS points out, on those areas of delivery where a regional approach rather than a localised approach, will best suit delivery needs, and financial, capacity and other constraints need to be addressed.<sup>lxxxiii</sup>

As regards public transport regulation, the system of regulating non-contracted public transport services in Joburg is very poorly administered and enforced. A Provincial Regulatory Entity (PRE) in terms of the NLTA has been set up and the approach of the province is that regulation should remain at provincial level even though the NLTA enables cities to set up a Municipal Regulatory Entity (MRE).

Finally, the work of the Transport Department demands extensive working with other departments and MOEs in Johannesburg, the provincial sphere and the national sphere. Generally intergovernmental and interdepartmental relationships are strong and well-maintained through a variety of regular project-related forums as well as formal city structures and the cluster approach.

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## STRATEGIES AND PROGRAMMES

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### DATA COLLECTION

The GDS 2040 says that: “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.”<sup>lxxxiv</sup>

In the light of the Transport Department’s considerable and growing responsibilities, its planning capacity will be expanded and consolidated. There will be more systematic data collection, analysis

and storage and regular updating of information. Planning tools including the Emme Model and the Transport GIS system will be maintained in an updated and functional state.

The Transport Department will maintain and update at least the following data sets, surveys or systems on a regular basis:

- Manual and automatic traffic counting programme (roads, cordons and screenlines)
- Transport Safety Management Information System
- Transport Information Register (TIR)
- Household Travel Survey (every ten years)
- Annual customer surveys of scheduled services
- Emme strategic transportation model
- Monitoring of Rea Vaya Phase 1A and 1B to comply with mandatory requirements of registration on Verified Carbon System so carbon credits can be sold.

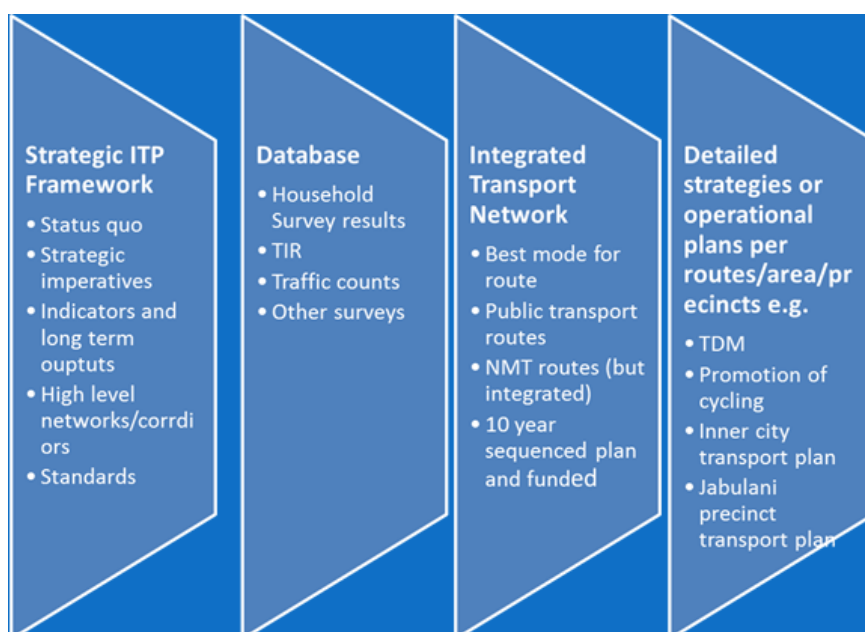
### DEVELOPMENT OF THE INTEGRATED TRANSPORT PLAN

The Integrated Transport Plan for 2013-18 is being developed as four components, instead of a single document, as discussed in the Introduction to this document. These components are:

- A Strategic Integrated Transport Framework, i.e. this document.
- A Database component comprising a Johannesburg Household Travel Survey and a Transport Information Register.
- An Integrated Transport Network showing the public transport corridors and routes the City will be investing in, and a ten-year plan describing the main interventions to expand the network.
- Detailed Strategies or Operational Plans will be developed as and when the planning needs to be done, i.e. in relation to particular projects or programmes.

These four components are illustrated in Figure 18.

FIGURE 18: CITY OF JOHANNESBURG INTEGRATED TRANSPORT PLAN PLANNING PROCESS



## ADMINISTRATION OF OPERATING LICENCE APPLICATIONS

As regards public transport regulation, the provincial sphere will continue issuing operating licences for services planned and managed at the municipal sphere. Wherever the administrative and issuing function sits, the responsibility for making the actual decision about each application remains by law with the local planning authority, in this case the Transport Department. Decisions will be informed by the Integrated Transport Plan’s network plans. A good decision-making support system will be put in place, incorporating a database. This will compare required supply of vehicles in any mode with the licenced supply (according to the PRE’s Operating Licence Administration System) per each road-based public transport route. The system will thus indicate the extent of over- or under-supply on routes, and inform where applications can be approved or turned down.

Standard procedures will be developed to evaluate each application for an operating licence that comes from the PRE, using the database as well as consultation with stakeholder structures. These will cover the conditions that will be attached to operating licences for various modes. The database will have an interface with the OLAS so that applications can be tracked and so that information is regularly synchronised.

## THRUST NO. 9 RESOURCE AND FINANCE THE TRANSPORT PLAN

### HUMAN RESOURCES

#### CONTEXT

One of the goals for the Transport Department in the City of Joburg is to “build a leading, responsive and activist transportation sector in the City which works in partnership with stakeholders and residents.” The Transport Sector in the City of Joburg is made up of three entities – the Transport Department, the Johannesburg Roads Agency (JRA) and Metrobus. There is an MMC for Transport who has political responsibility for the above entities.

Altogether 2 585 people were employed in the transport sector as of the end of June 2012 with the following gender, racial and job category breakdown per entity:

TABLE 25: TRANSPORT DEPARTMENT STAFF BY OCCUPATIONAL LEVEL, RACE AND GENDER (JUNE 2012)<sup>lxxxv</sup>

<b>Categories</b>	<b>Male</b>				<b>Female</b>				<b>Total</b>
	<i>A</i>	<i>C</i>	<i>I</i>	<i>W</i>	<i>A</i>	<i>C</i>	<i>I</i>	<i>W</i>	
Executive Directors								1	1
Directors	2	1		2					5
Deputy Directors	6		1	1	1				9
Assistant Directors	1			1	1				3
Managers	8				9		1		18
Technicians Operator/Specialists	4	1		1	7			1	14

Accountants Semi skilled staff/Officers	2								2
Snr bus station controller	11	1		1	1				14
Officers	3			1	8			1	13
Ops managers	2				2			1	5
PA					2				2
Executive secretaries					3				3
Senior secretaries					4				4
Office Assistant		1			2				3
Messengers	3								3
<b>Total</b>	<b>42</b>	<b>4</b>	<b>1</b>	<b>7</b>	<b>40</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>99</b>

Note: A – African, C – Coloured, I – Indian, W - White

TABLE 26: JRA STAFF BY OCCUPATIONAL LEVEL, RACE AND GENDER<sup>lxxxvi</sup>

Occupational levels	Male				Female				Foreign nationals		Total
	A	C	I	W	A	C	I	W	Male	Female	
Top management	3	1	0	1	2	0	0	0	0	0	6
Senior management	30	1	2	14	14	0	0	4	0	0	65
Professionally qualified and experienced specialists	66	2	5	36	39	1	0	8	3	0	160
Professionally qualified and experienced specialists and mid-management	66	2	5	36	39	1	0	8	3	0	160
Skilled technical and academically qualified workers	72	4	0	8	43	4	0	13	0	0	144
Semi-skilled	255	4	1	12	44	5	0	8	0	0	<b>329</b>
Unskilled and defined decision making	673	4	1	7	199	0	0	0	0	0	<b>884</b>
<b>TOTAL PERMANENT</b>	<b>1098</b>	<b>15</b>	<b>9</b>	<b>78</b>	<b>340</b>	<b>10</b>	<b>0</b>	<b>33</b>	<b>3</b>	<b>0</b>	<b>1586</b>
Temporary employees	<b>2</b>	<b>2</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>11</b>
<b>GRAND TOTAL</b>	<b>1100</b>	<b>17</b>	<b>9</b>	<b>82</b>	<b>342</b>	<b>10</b>	<b>0</b>	<b>33</b>	<b>4</b>	<b>0</b>	<b>1599</b>

TABLE 27: METROBUS STAFF BY JOB CATEGORY, RACE AND GENDER (2012)<sup>lxxxvii</sup>

Category	African Males	African Females	Coloured Males	Coloured Females	Indian Males	Indian Females	White Males	White Females	Total
Executive Management	2	1	0	0	1	0	1	0	5
Human Resources	9	10	2	0	1	0	1	1	24
Marketing	6	7	2	1	0	0	0	2	18
Finance	24	18	1	1	1	1	2	3	52
Technical	154	16	8	1	2	0	19	0	200
Operations	455	78	38	1	4	0	11	1	588
<b>TOTAL</b>	<b>651</b>	<b>130</b>	<b>51</b>	<b>4</b>	<b>9</b>	<b>1</b>	<b>34</b>	<b>7</b>	<b>887</b>

The National Development Plan lays a great deal of emphasis on the importance of a capable public service and good technical leadership. *Joburg 2040 GDS* requires that city government transport staff, especially those on the “frontline” are “well trained, knowledgeable, helpful and respectful to passengers, reflecting their role as service providers.” It envisages “a high performing metropolitan government” that is responsive, accountable, efficient and productive. It emphasises strong leadership.

Some of the human resources challenges identified in the Transport Sector have been:

- Experience is not widespread among staff and tends to be concentrated in too few people. More experience and skills are needed to deal with difficult stakeholders and conflict situations.
- Junior and too few staff have to take on large responsibilities of a complex nature.
- Scarcity of professional and technical engineering, transport planning, freight, financial and bus operational and contracting skills especially for BRT operations.
- Difficulties in attracting and retaining experienced staff including due to financial constraints of municipalities.
- Tertiary training institutions involved in the transport arena are not able to keep up with the demand for graduates with the appropriate skills as the City shifts from old approaches to new areas of work such as BRT, complete streets, etc.
- High levels of labour instability and conflict amongst bus drivers.
- An aging unskilled work force, especially in respect of the JRA.

While valuable new skill sets have been developed through the Rea Vaya project in BRT infrastructure construction, BRT station management, bus operations, bus procurement, intelligent transport systems for public transport, automatic fare collection and contract monitoring, these skills need to be reproduced and the numbers of people with such skills extended to ensure the ongoing sustainable roll out of BRT systems. There is also increasing pressure on the City to share skills and experience with other cities as well as across the continent.

One of the key thrusts of this Strategic Framework is behavioural change, particularly in areas relating to road safety and switching to public transport use. This requires capacity building and training beyond City officials. There is a need for ‘transport activists’ at a community level to be pro-active in respect of road safety, support scholar patrols, be active in transport user committees such as the Metrobus User Committee or user committees linked to public transport facilities.

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## STRATEGIES

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The Transport sector going forward will be giving high priority to developing the high quality human resources within and outside of the City not only to be able to sustainably implement the transport strategies but to be able to share our experiences across the City, the country and the continent.

The Transport sector of the City aims to become a centre of excellence through implementing the following:

- A quality staff training and development programme which will include in addition to statutory requirements the hiring of interns, mentoring of young professionals, financial support to post-graduate study and local and international partnerships with institutes and institutions of higher education.

- Pro-active knowledge management and knowledge sharing.
- A specific staff retention and attraction policy aimed at scarce skills in transport.
- Capacitation of ward transport representatives and other local level stakeholders to be able to address transport issues at a ward or sector level such as road safety, prevention of vandalism and commuter activism.

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## REVENUE SOURCES AND FUNDING

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### CONTEXT

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In the draft *2013-16 Integrated Development Plan (IDP)*, the City acknowledges that its financial resources are limited while the demand for the goods and services that it provides is increasing. With this in mind, the City has prioritised financial sustainability and specifically, maximising financial efficiency. This has included exploring alternative sources of funding and establishing partnerships for infrastructure and social investment. The National Development Plan envisages new pricing strategies in the transport sector. Leading up to 2030, it envisages that “Users will adjust to pricing that is supported by greater transparency, with full costs associated with each service, including costs linked to environmental impact.”<sup>lxxxviii</sup>

Transport sector infrastructure and public transport operating costs are very big budget items for government. For example, the 80 km Gautrain system asset value had a historical cost at the end of March 2012 of R 29,2 billion, of which Work-in-Progress was valued at R 26,06 billion.<sup>lxxxix</sup> The Gauteng Freeway Improvement System Phase 1 involving 185km of road cost R21 billion.<sup>xc</sup> Rea Vaya BRT Phase 1A with 25.5 km of trunk route cost R1,9 billion and Phase 1B will cost an estimated R1,8 billion. The total Phase 1C scenario has an estimated capital cost of R4,5 billion. The basic backlog in Johannesburg’s road infrastructure will cost more than R7 billion to address.

Public transport operating costs are subsidised to the tune of hundreds of millions of rands each year.

Rea Vaya infrastructure and other capital costs such as all the systems have been totally funded to date by grants from the Public Transport Infrastructure and Systems Grant, a conditional grant made by National Treasury in terms of the Division of Revenue Act (DORA) each year. The Phase 1B buses will also be financed using this grant, in addition to all capital and systems costs.

The costs of running a quality, affordable public transport system and maintaining an efficient transport infrastructure network for the City are thus high. The objective when the Rea Vaya BRT was initiated was to place 85% of households within reach of a Rea Vaya feeder or trunk route. An estimate was made in 2011 that this would require approximately 300km of trunk network and associated supporting network, which would cost approximately R25 billion in capital costs or R830m per annum (in 2011 prices) if the project was spread over 30 years. Based on the Phase 1A actual recurrent costs, and modelling of those for Phase 1B and the original Phase 1C, it was estimated that the recurrent annual costs of the total system would be in the region of R4,4 billion. (This reflects full costs, including city staff salaries, Rea Vaya station management, control centre operations, fare collection, compensation to existing taxi owners, fleet repayment, full operating costs, security, fare collection services etc.) After fare revenue, this would result in a cost to



government of R2,65 billion per annum. However, it was also noted that the benefits to the City would be extremely high across numerous objectives, including complete formalisation of the taxi industry, and giving the entire city population a quality, affordable public transport system.

Thus, as the quality public transport system expands the recurrent funding needs will grow. The City also needs additional funding to address backlogs in the maintenance, upgrade and preservation of the road network and provide for effective freight movement to maintain and enhance the competitive nature of the City.

#### SUSTAINABLE NEW SOURCES OF LOCAL REVENUE

Various studies have been done in the city on alternative sustainable new sources of local revenue, including one in 2005 and another in 2009. These have identified sources such as an increase in the fuel levy and expanded share to metropolitan government, bulk development contributions, increased vehicle licencing fees, and increased parking fees, as well as smaller sources such as traffic fines and advertising revenue.

The key lucrative sources identified in the 2009 study were a new Local Business Tax and an expanded share of the fuel levy. This is continuing to be pursued through the South African Local Government Association (SALGA). Tolling or congestion charging is another potential source, and also serves as a TDM measure. However, the high levels of public anger about the Gauteng Freeway Improvement System e-tolls have created an unfavourable climate for extracting further funding from motorists by way of fuel levies or licence fees.

A city tax on non-residential parking bays has also been explored. If 150 000 bays were taxed at R5 per day, it would generate R274 million per annum. There are however implementation difficulties – a database would need to be established, and the fact that it is in essence a form of property tax. However, to the extent that property owners could recoup the levy from the parking users, it would constitute a form of tax on motoring.

#### GRANT FUNDING

Significant grant funding through the national Public Transport Infrastructure and Systems (PTIS) Grant has enabled the City to build Phases 1A and 1B of the Rea Vaya BRT, and the City will continue to pursue this as a source of funding for CAPEX and buses.

The national government has also introduced a new Public Transport Network Operations Grant. This will pay for 50% of the significant recurrent subsidies that the system requires (and 70% in the first two years). Local government is expected to pay the other 50%. The national grant will also cover compensation to existing operators replaced by the system. Fare revenue (or local government sources) is expected to cover all direct operating costs.

The City will thus need to fund at least half of the recurrent costs of the system, after excluding direct operating costs, out of its own sources including the fare revenue, namely the payment of the bus operating companies, fare collection costs, the station operational and management costs, marketing, city staff, all contracted services e.g. inspectors, and consulting costs.

## STRATEGIES

### IMPROVING TRANSPORT OPERATIONAL EFFICIENCIES

The first strategy in improving financial sustainability is to lower the cost of transport service provision through improving efficiencies. In this respect the Transit-Oriented Development strategy (Thrust no. 1) will over the long term contribute a great deal. To illustrate the impact of this, the effects on Rea Vaya revenue of various key parameters have been modelled. As discussed under Thrust no. 1, TOD along with higher densities and mixed land use, will improve both ridership turnover and reverse direction ridership. The impact of these on revenue is formidable. Similarly, an increase in off-peak ridership can be very helpful. The analysis is contained in the following table.

TABLE 28: IMPACTS OF RIDERSHIP TURNOVER, REVERSE RIDERSHIP VOLUMES AND OFF-PEAK UTILISATION ON REVENUE: REA VAYA PHASE 1A

	Base-line	Increase in Seat occupancy rate		Increase in no. of passengers carried in minor direction of route			Increase in off-peak ridership		Combination of increases
Seat occupancy rate per trip in peak hour , major direction (T1 and C1 routes)	1.1	<b>1.5</b>	<b>2</b>	1.1	1.1	1.1	1.1	1.1	<b>1.5</b>
Percentage of daily passengers carried in minor direction of routes	13%	13%	13%	<b>25%</b>	<b>50%</b>	<b>75%</b>	13%	13%	<b>25%</b>
Increase in off-peak ridership so ratio of off-peak boardings to peak boardings of service improves (T1 and C1)	28:72	28:72	28:72	28:72	28:72	28:72	<b>43:57</b>	<b>50:50</b>	<b>43:57</b>
Projected Phase 1A annual revenue	R80 m	R97 m	R118m	R85m	R95m	R105m	R96m	105m	R129m

What this illustrates is that:

- If each seat was occupied twice on each trunk peak period bus trip, instead of the current estimated 1.1 times, Rea Vaya's annual revenue would increase by 50%. Currently, while Rea Vaya buses cannot be faulted as they are full in the peak periods, each of the passengers is occupying the seat for most of the way.
- Currently in Rea Vaya Phase 1A, of all the daily passengers, only 13% are travelling in the minor or reverse direction of the route. If routes had more even two-way activity, revenue would also increase significantly. For example if the 13% increased to 50%, then Phase 1A revenue would increase by 20%.

- If off-peak ridership increased so that as many people travelled in the combined off-peak hours as in the peak hours – e.g. through TDM measures – then revenue would increase by 30%.
- A combination of middle-range increases in each area yields a 60% increase over current revenue.

In regard to all three of these parameters, the new Phase 1C of Rea Vaya is anticipated to have better performance than Phase 1A and is expected to achieve much better cost recovery from fares. It is estimated that it will cost the City R67,5 million a year, compared to the R124 million which is the City's estimated contribution in Phase 1A over the long term. (These amounts are net of the contribution to ongoing operational costs that the PTIS or new PTNO Grant will be contributing).

### LAND VALUE CAPTURE

Another potential source is 'land value capture', a term used to describe the public authority recouping some of the additional value that accrues to property owners as a result of the creation of a new public facility, generally in order to contribute towards payment of that facility.

If the provision of public transport leads to urban regeneration on a corridor, there will be an increase in property taxes which accrues to the City. This is a form of land value capture.

However this can be supplemented by other interventions which will be pursued by the City such as:

- Requiring property owners to contribute to the development and maintenance of facilities, as well as additional services, along the routes in ways which have a very direct advantage for the property owner.
- Establishing a special rating area along a public transport corridor. In terms of such an approach – if the majority of property owners on the corridor agree – an additional surcharge on the property tax can be collected via the property tax system and used for the direct benefit of property owners in the corridor.

### COST RECOVERY FROM THIRD PARTIES

Developers are required to pay developer contributions for new developments. This is because these new developments generate additional traffic which is to their benefit and which, if upgrading is not done, can lead to the deterioration of the road network and increased congestion for all users.

The present formula for developer contributions is out of date and also varies according to previous municipal boundaries. The developer contribution formula and way in which it is applied will be amended for more effective cost recovery.

In addition, there are a number of services that the JRA and Transport Department provide which are for the benefit of third parties. For example by implementing a security access restriction, affected residents gain a more secure environment and a decrease in traffic flow in their neighbourhood. Another example is where the JRA carries out reinstatement of the road after other utilities have carried out work on the roads.

The Transport Department and the JRA will ensure effective cost recovery on these services including security access restrictions, way leaves and reinstatement.

#### HIGHER PRIORITY IN CITY BUDGETING

Finally, the discussion above has demonstrated that 'finding alternative sources of funding' is difficult. However since the economic benefits for the city of investment in transport are significant, going forward transport expenditure in respect of quality of the road network and public transport services will increase.

Better transport systems improve the economic competitiveness of the city, attract investment and development, are part of the social wage for the poor, and make the city liveable, resilient and sustainable.

## TRANSPORT OUTPUTS AND OUTCOMES

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### OUTCOMES, OUTPUTS AND INDICATORS: DEFINITIONS

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The various thrusts and their programmes detailed in the previous sections are intended to result in significant outputs and outcomes.

The National Treasury's definitions<sup>xci</sup> of outputs and outcomes have been used in this document, namely;

- **Outputs** are “the final products, or goods and services produced for delivery. Outputs may be defined as “**what we produce or deliver**””, and
- **Outcomes** are “the medium-term results for specific beneficiaries that are the consequence of achieving specific outputs. Outcomes should relate clearly to an institution's strategic goals and objectives set out in its plans. Outcomes are “**what we wish to achieve**””.

In the context of outputs and outcomes, the short-term has been interpreted to mean in five years' time (c 2018), whereas the intermediate to long-term has been interpreted to mean between c 2018 to 2040, where 2040 is the target date for implementation of the City's Growth and Development Strategy (GDS).

An indicator has been defined as “a variable selected and defined to measure progress toward an objective”<sup>xcii</sup> and in the case of this document, both output and outcome indicators have been proposed, where output and outcome are as defined above.

Current international best practice in relation to transportation indicators is moving towards what are termed sustainable transportation indicators<sup>xciii,xciv,xcv</sup>, where a sustainable transport system can be defined<sup>xcvi</sup> as one that

- “Allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations.
- Is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy.
- Limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.”

Indicators in this document attempt to cover social, economic and environmental dimensions, or the so-called “triple bottom line”. Some individual indicators cover all three dimensions, whereas others cover two or only one of the three dimensions. In total however, the intention should be to ensure that all three dimensions are adequately covered by the indicators finally selected for use.

Although not always possible, based upon current international best practice, the following principles have been applied when selecting transportation indicators<sup>xcvii</sup>, namely;

- “Comprehensive - Indicators should reflect various economic, social and environmental impacts, and various transport activities (such as both personal and freight transport).

- Quality - Data collection practices should reflect high standards to insure that information is accurate and consistent
- Comparable - Data collection should be clearly defined and standardized to facilitate comparisons between various jurisdictions, times and groups. For example, “Number of people with good access to food shopping” should specify good access and food shopping
- Understandable - Indicators must be understandable to decision-makers and the general public. The more information condensed into an index the less meaning it has for specific decisions
- Accessible and transparent - Indicators (and the raw data they are based on) and analysis details should be available to all stakeholders
- Cost effective - Indicators should be cost effective to collect
- Net effects - Indicators should differentiate between net (total) impacts and shifts of impacts to different locations and times
- Functional - select indicators suitable for establishing usable performance targets”

The results of all of the above are summarised in Table 31, which is a list of outputs and outcomes together with output and outcome indicators for each of the nine thrusts.

## INDICATORS

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The following table sets out outputs, outcomes and indicators for each of the nine thrusts in the *Framework*.

In each case a baseline will need to be established, against which future change is measured. In some cases the desired change is an increase, in other cases a decrease.

TABLE 29: OUTPUTS, OUTCOMES AND INDICATORS PER THRUST

<b>Thrust 1 - Restructure and integrate the City</b>	
<b>OUTPUTS (by 2018)</b>	<b>OUTPUT INDICATORS</b>
1. Plan and implement BRT trunk or complementary routes or public transport priority routes for conventional buses and minibus-taxis in the main TOD corridors	<ul style="list-style-type: none"> <li>Number of kms of BRT trunk or complementary routes or public transport priority routes implemented</li> </ul>
<b>OUTCOMES</b>	<b>OUTCOME INDICATORS</b>
1. An efficient, city-wide public transport system located predominantly along high-density mixed land use corridors	<ul style="list-style-type: none"> <li>Amount of additional retail, office and residential land value within a 500m strip on both sides of Rea Vaya trunk routes and within 500m radius of Gautrain and PRASA stations</li> </ul>
2. Lower unit cost of public transport service provision through improved transport efficiencies	<ul style="list-style-type: none"> <li>Average daily passenger boardings per bus</li> <li>Average daily passenger boardings per bus kilometre</li> </ul>
<b>THRUST 2 - Improve and expand provision of quality public transport and use of non-motorised transport</b>	
<b>OUTPUTS (by 2018)</b>	<b>OUTPUT INDICATORS</b>
1. Integrated passenger information at all public transport facilities and cycling and walking route information	<ul style="list-style-type: none"> <li>Percentage of public transport ranks, stations and shelters displaying integrated passenger information</li> </ul>
2. Increase availability of bicycles	<ul style="list-style-type: none"> <li>Number of sponsored and donated bicycles provided to learners and low-income users</li> </ul>
3. Integrate fare medium of Gautrain, Metrobus and Rea Vaya on the basis of EMV-based smartcards	<ul style="list-style-type: none"> <li>Number of EMV smartcards in active use</li> </ul>
4. Increase amount of road-based transport provided in terms of scheduled and performance contracts	<ul style="list-style-type: none"> <li>Number of public transport vehicles under contracts managed by the Scheduled Services Management Agency (SSMA)</li> </ul>
5. Rea Vaya Phase 1B and Phase 1C to be in operation	<ul style="list-style-type: none"> <li>Rea Vaya Phase 1B and 1C in operation</li> </ul>
6. All scheduled conventional bus services are converted to gross cost contracts managed by the Scheduled Services Management Agency (SSMA)	<ul style="list-style-type: none"> <li>Percentage and number of all scheduled conventional buses under contractual management of SSMA</li> </ul>
7. Re-fleet Metrobus with buses using greener fuel sources	<ul style="list-style-type: none"> <li>Average age of Metrobus fleet</li> <li>Number of Metrobus vehicles using alternative green fuels</li> </ul>
8. Assist the minibus-taxi industry to refleet, to greener vehicles	<ul style="list-style-type: none"> <li>Average age of minibus-taxi fleet in Johannesburg</li> <li>Number of recapitalised minibus taxis that have switched to greener propulsion systems</li> </ul>
9. Establish or enable park and ride sites	<ul style="list-style-type: none"> <li>Number of park and ride sites in daily operation</li> <li>Number of parking bays at operational park and ride sites</li> </ul>

10. New public transport vehicles and infrastructure universally designed	<ul style="list-style-type: none"> <li>• Accessibility audits for new public transport vehicle and infrastructure</li> </ul>
OUTCOMES	OUTCOME INDICATORS
1. High-quality, safe, accessible, affordable and environmentally friendly public transport services	<ul style="list-style-type: none"> <li>• Average public transport travel time for journey to work</li> <li>• Rates of public transport crashes, injuries and fatalities</li> <li>• Average frequency of contracted services (peak and off-peak)</li> <li>• Percentage of HH spending &gt;10% of income on transport</li> <li>• Per capita emissions of greenhouse gases from transport</li> <li>• Per capita emissions of air pollutants from transport</li> </ul>
2. The majority of trips are made using public transport, walking and cycling.	<ul style="list-style-type: none"> <li>• Percentage share of journeys by modes of walking, cycling, public transport and private car</li> </ul>
3. Public transport passengers are satisfied with public transport services and other aspects of the transport system in general	<ul style="list-style-type: none"> <li>• Public transport system and transport system satisfaction ratings</li> </ul>

<b>Thrust 3 – Maintain, improve, extend and integrate transport infrastructure</b>	
OUTPUTS (by 2018)	OUTPUT INDICATORS
1. Build new roads and retrofit existing roads to Complete Streets standards	<ul style="list-style-type: none"> <li>• Kms of complete streets implemented</li> </ul>
2. Introduce managed lanes (HOV, kerbside exclusive lanes for public transport, and contraflow lanes for public transport)	<ul style="list-style-type: none"> <li>• Km of managed lanes, by category, in operation</li> </ul>
3. Create a designated network of quality pedestrian routes and cycle routes	<ul style="list-style-type: none"> <li>• Kms of the continuous designated pedestrian and cycle network implemented</li> </ul>
4. Maintain the road network with reference to the PMS and BMS and restore to acceptable condition	<ul style="list-style-type: none"> <li>• Percentage of roads categorised as “good” in terms of the Visual Condition Index and/or International Roughness Index</li> </ul>
5. Equip all public transport routes with kerbside commuter shelters at regular intervals	<ul style="list-style-type: none"> <li>• Percentage of required total commuter shelters erected</li> </ul>
6. Public transport facilities managed so that they are safe, clean and accessible to all commuters	<ul style="list-style-type: none"> <li>• Number of public transport facilities formally managed</li> </ul>



7. Replace all old traffic signals and cabling with new equipment and cable and install remote monitoring systems and UPS, giving priority to the City's 200 main intersections initially	<ul style="list-style-type: none"> <li>• Average number of traffic signal outages per day</li> <li>• Number of traffic signal outages per day lasting longer than 24 hours</li> </ul>
OUTCOMES	OUTCOME INDICATORS
1. Public transport and non-motorised transport infrastructure that is built, maintained and managed in such a way that it supports walking, cycling and the use of public transport	<ul style="list-style-type: none"> <li>• Increased percentage of residents satisfied with public transport and non-motorised transport facilities in the City</li> </ul>
2. Road network infrastructure that is built, maintained and managed in such a way that it supports good mobility for goods and people	<ul style="list-style-type: none"> <li>• Increased percentage of residents satisfied with roads in the City</li> </ul>
3. Storm water infrastructure is constructed, maintained and managed in such a way that it responds to climate change and water scarcity and that residents' safety is ensured	<ul style="list-style-type: none"> <li>• Increased percentage of residents satisfied with storm water in the City</li> </ul>

#### Thrust 4 – Support economic growth through improving freight mobility

OUTPUTS (by 2018)	OUTPUT INDICATORS
1. Improve the mobility of freight	<ul style="list-style-type: none"> <li>• Freight routes designated in CITP and signposted accordingly</li> <li>• Satisfaction rating by Johannesburg Freight Operators Forum</li> </ul>
2. Establish a database on urban freight transport in CoJ	<ul style="list-style-type: none"> <li>• Urban freight database established and operational</li> </ul>
3. Investigate introduction of access time regulations for urban goods transport especially in Inner City and introduce where necessary	<ul style="list-style-type: none"> <li>• Ratio of off-peak to total freight travel</li> </ul>
4. Reduction in overloading by freight vehicles	<ul style="list-style-type: none"> <li>• Percentage Increase in prosecution of overloaded vehicles</li> </ul>
OUTCOMES	OUTCOME INDICATORS
1. Freight movement in the CoJ will be safe, reliable, and efficient to support the city's economy and be in balance with the needs of other transport users, the environment and quality of life	<ul style="list-style-type: none"> <li>• Freight transport speed and reliability</li> <li>• Freight crash and fatality rates</li> </ul>

#### Thrust 5 – Manage congestion, travel demand and parking

OUTPUTS (by 2018)	OUTPUT INDICATORS
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1. Promote ridesharing (lift clubs)	<ul style="list-style-type: none"> <li>Increased modal share of liftclubs in trips to work</li> </ul>
2. Work with major employers to assist them to introduce Employee Trip Reduction Programmes (variety of measures)	<ul style="list-style-type: none"> <li>Number of major employers to have introduced trip reduction programmes</li> </ul>
3. Introduce Precinct Trip Reduction Programmes	<ul style="list-style-type: none"> <li>Number of precinct programmes introduced</li> </ul>
4. Introduce paid on-street parking in major commercial nodes and nodes which will benefit from managed parking	<ul style="list-style-type: none"> <li>Number of on-street parking spaces under management</li> </ul>
OUTCOMES	OUTCOME INDICATORS
1. Congestion has been reduced through greater use of public transport, cycling and walking, introducing travel demand management and through improving the operation of the road network	<ul style="list-style-type: none"> <li>Personal mobility (annual person-kilometres) by mode (non-motorised, private and public transport)</li> <li>Reduction in CBD &amp; Sandton Cordon peak period traffic volumes</li> <li>Reduction in per capita congestion costs</li> <li>Reduction in per capita transport energy consumption</li> </ul>

### Thrust 6 – Actively engage citizenry in improving the transport system

OUTPUTS (by 2018)	OUTPUT INDICATORS
1. Update and maintain the Traffic Safety Management Information System and, inter alia, identify the top hazardous locations	<ul style="list-style-type: none"> <li>Traffic Safety MIS updated and maintained</li> </ul>
2. Implement Streets Alive - Carry out ongoing educational and behavioural change programmes ; Develop ward-based action plans on road safety; Arrange Open Streets events	<ul style="list-style-type: none"> <li>Number of public events</li> <li>Number of ward-based road safety plans developed</li> <li>Number of Open Street events</li> </ul>
OUTCOMES (c 2018-2040)	OUTCOME INDICATORS
1. Reduction in road crashes and fatalities	<ul style="list-style-type: none"> <li>Total transport crash and fatality rates</li> </ul>

### Thrust 7 – Transform the transport sector and encourage new, efficient and profitable transport enterprises and employment creation

OUTPUTS (by 2018)	OUTPUT INDICATORS
1. Transport Department to enable new enterprise formation in the transport sector and pursue maximum job creation through projects under its control	<ul style="list-style-type: none"> <li>Number of new enterprises formed through projects under City of Joburg Transport Sector control</li> <li>Number of new jobs created (permanent and 55-day definition, direct and indirect) through projects and contracts under City of Joburg Transport Sector control and breakdown by category (youth, women, people with disabilities)</li> </ul>

OUTCOMES (c 2018-2040)	OUTCOME INDICATORS
<p>1. A transformed, expanded and prosperous private sector in transport generating new jobs and income generating opportunities</p>	<ul style="list-style-type: none"> <li>• Number of new enterprises formed through projects under City of Joburg Transport Sector control</li> <li>• Number of new jobs created (permanent and 55-day definition, direct and indirect) through projects and contracts under City of Joburg Transport Sector control and breakdown by category (youth, women, people with disabilities)</li> <li>• Contribution of transport sector to city economy</li> <li>• Estimated number of indirect jobs generated by City Transport Sector through green fleet initiatives</li> </ul>

<b>Thrust 8 – Plan and regulate the transport system</b>	
OUTPUTS (by 2018)	OUTPUT INDICATORS
<p>1. Systematically programme regular data collection, analysis and storage of information</p>	<ul style="list-style-type: none"> <li>• Transport data that has been collected systematically on a regular basis</li> </ul>
<p>2. Maintain and update all information systems and create information systems to properly store all data collected, including GIS, TSMIS, TIR, Capital Investment Mangement System in respect of road network, JRA databases (PMS, BMS etc), cordon and screenline counts, automatic vehicle counts, and household travel survey</p>	<ul style="list-style-type: none"> <li>• Maintained and up-to-date databases</li> </ul>
<p>3. Monitoring plan for Rea Vaya Verified Carbon Standard and prepare validation reports every two years</p>	<ul style="list-style-type: none"> <li>• Successful validation of carbon savings by independent VCS auditors and sale of carbon credits</li> </ul>
<p>4. Update, improve and maintain the Emme model</p>	<ul style="list-style-type: none"> <li>• A licensed, updated and maintained Emme model</li> </ul>
<p>5. Develop procedures and a database and management system to support the decision making process in respect of operating licence applications referred by the PRE</p>	<ul style="list-style-type: none"> <li>• A new procedure and database in place</li> <li>• Percentage of legally-compliant public transport vehicles</li> </ul>

<b>Thrust 9 – Resource and finance the transport plan</b>	
OUTPUTS (by 2018)	OUTPUT INDICATORS
<p>1. Capacitation, training and knowledge management in order to build a centre of excellence in transport</p>	<ul style="list-style-type: none"> <li>• Number of bursaries awarded to Transport Department staff or awarded by Transport Department to members of the public</li> <li>• Percentage of staff who received training each year</li> <li>• Number of young professionals employed in transport sector in City of Joburg</li> </ul>

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