

**CITY OF JOHANNESBURG  
TRANSPORT ASSESSMENT GUIDELINES**

AS APPROVED BY MAYORAL COMMITTEE

DATE: XX XXXXX XXXX

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a world class African city



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## ACRONYMS

CoJ: City of Johannesburg

HTS: Household Travel Survey

ITN: Integrated Transport Network

NLTA: National Land Transport Act (Act 5 of 2009)

NMT: Non-motorised Transport

JDA: Johannesburg Development Agency

JPC: Johannesburg Property Company

JRA: Johannesburg Roads Agency

LOS: Level of Service

RSDF: Regional Spatial Development Framework

SDF: Spatial Development Framework

SDP: Site Development Plan

SITPF: Strategic Integrated Transport Plan Framework

STA: Site Traffic Assessment

TA: Transport Assessment

The City: City of Johannesburg's municipality and its agencies including the Johannesburg Roads Agency (JRA) and the Johannesburg Development Agency (JDA)

TIA: Traffic Impact Assessment

TIS: Traffic Impact Statement

TIS: Transport Information Register

TOD: Transit Oriented Development

## CHAPTER 1 INTRODUCTION

### 1.1 The Aim of the Guideline

The central theme of the Guideline is to promote sustainable urban form, mixed-use high density developments, public transport and non-motorised transport; as key components in addressing transport needs in all developments in the city.

The main aim is therefore to provide a guideline that will as far as possible promote the *significant shift* in perspective required from the industry whilst also considering:

- The limitations in terms of the practical alignment of transport policies and guidelines;
- practical institutional capacity restrictions; and
- retaining current procedures and practices where possible.

The procedures to determine the effect of change in land use often only cater for traffic related impacts and do not allow for sufficient assessment of other modes like pedestrians, cyclists and public transport. This Guideline document therefore aims to provide specific refinements that are considered appropriate to the City relating to:

- The capacity assessment of public transport and non-motorised transport.
- The importance of master planning for all modes of transport.
- Thresholds and the extent of transport assessments required.
- Mitigation measures other than vehicle road capacity and parking provision.

It furthermore often occurs that agents acting on behalf of applicants do not consider some of the requirements of the City. This creates delays in the approval of applications and affects the relationship between the City and developers. This could mainly be attributed to a lack of guidance and communication by the City towards agents acting on behalf of applicants in respect of the requirements. The aim of this document is therefore also to provide guidelines to ensure uniform and consistent requirements and

standards for Transport Assessments submitted to the City.

The Guideline is intended to assist private and public developers to improve transport planning. The additional requirements to assess and plan for public transport and non-motorised transport will add an extra layer of complexity to the original / traditional “Traffic Impact Assessment” approach and will have an impact on the intensity of the feasibility stage of infrastructure projects. However improved planning will lead to the optimum use of existing and future transport infrastructure and will ultimately lead to financial savings in the form of capital and operational costs at implementation stage.

## 1.2 Policy Framework

The CoJ has an active policy agenda to improve mobility and promote walking, cycling and public transport so as to make Johannesburg a more liveable city and to boost urban functionality and competitiveness as identified in the Joburg 2040 Growth and Development Strategy. The current reality is that traffic congestion in the city is severe and mobility is heavily compromised on the vehicle road network. This could partly be attributed to the approach to transport planning (including traditional Traffic Impact Assessments) which has historically been neglecting public transport and non-motorised transport modes despite the policy objectives emphasizing the need for improvement in these options.

The City is progressively through policy development and public infrastructure investment making strides to improving transport conditions by promoting walking, cycling and public transport to be modes of choice in line with the City’s vision. To this end the City has inter alia published the Complete Streets Design Guidelines Manual to ensure more equitable distribution of road space to all road users. However more work is required to ensure adequate provision of public infrastructure (sidewalks, including accessibility for disabled users, cycling facilities, multi-modal facilities, etc.) by private developers through developer contributions. The City’s approach to reducing and controlling the growth in traffic demand is to focus on mobility for people and goods, not vehicles per se. The solution to the city’s growing congestion problems is therefore not to simply build more roads which will attract more traffic but to



use a multi-disciplinary approach where professionals work together to achieve the City's goals.

In this regard, the following strategies will need to be considered in the new approach towards Transport Assessments:

- Transit-oriented development (TOD) and mixed-use developments 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 change in travel behaviour, culture and walking and a willingness by employers and employees to support travel demand management strategies.
- Reduce the relative convenience of private car use through prioritizing the movement of public transport vehicles on the roads.
- 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).
- Develop safer roads for all road users (including pedestrians and cyclists).

## 1.3 Institutional and Legal Framework

### 1.3.1 City of Johannesburg

The City of Johannesburg's municipality and its agencies' (the City) responsibilities are outlined in the National Land Transport Act (NLTA) (No. 5 of 2009), Chapter 2, Section 11 c. In the context of these guidelines the City is responsible for example:

- Developing land transport policy that includes spatial development policies on densification and development corridors;
- Bringing together and coordinating relevant officials and agencies responsible for transport and land use planning;
- Preparing and implementing transport plans;

- Promoting the optimum use of available travel modes to reduce travel time and cost;
- Providing information to users or potential users of public transport;
- Ensuring provision for special categories of passengers on public transport;
- Applying traffic management techniques;
- Undertaking measures to limit damage to the road system;
- Planning, implementing and managing modally integrated public transport networks;
- Applying travel demand management measures for the municipal area;
- Setting operational and technical standards and monitor compliance in relation to service delivery.

The Johannesburg Roads Agency's (JRA) mandate does not cover responsibility for off-road public transport infrastructure (such as rail) or off-road non-motorised transport infrastructure (such as cycle paths through parks) (Refer to **Section 1.3.2**). It also does not cover public transport services (road based or off-road). The CoJ is therefore responsible for these aspects in accordance with the NLTA.

### 1.3.2 Johannesburg Roads Agency

The JRA is a state owned entity which is formed in terms of the Municipal Systems Act 32 of 2000 as amended and has as its sole shareholder the Metropolitan Council of Johannesburg (CoJ). The JRA is tasked with the design, construction and maintenance of roads and roads related infrastructure. The agreement between the JRA and the CoJ is set out in a Service Delivery Agreement. The key service areas of the JRA are:

Traffic regulatory infrastructure:

- Traffic signals management
- Road signs and markings management
- Road safety (infrastructure)
- Network monitoring
- Intelligent transport system
- Traffic engineering (geometric improvements)

- GIS and accident management systems
- Traffic signal operations
- Overload control

Road Infrastructure:

- Road assets management systems (RAMS)
- Planning
- Design
- Maintenance
- Construction
- Strategic assets
- Development control

Stormwater infrastructure:

- Flood line and master planning
- Stormwater maintenance
- Stormwater network development planning
- Development control
- Dam safety management
- In house designs (capacity building)

The JRA's mandate covers responsibility in terms of the vehicle road network infrastructure and associated road based public transport infrastructure as well as road based non-motorised transport infrastructure.

The JRA's mandate does not cover responsibility for off-road public transport infrastructure (such as rail) or off-road non-motorised transport infrastructure (such as cycle paths through parks). It also does not cover public transport services (road based or off-road). The CoJ is therefore responsible for these aspects in accordance with the NLTA.

### **1.3.3 The requirement for Transport Assessments**

In terms of the National Land Transport Act (NLTA) (No. 5 of 2009), Chapter 4, Section 38 it is provided that:

- (a) no substantial change or intensification of land use on any property may be undertaken without the written consent of the relevant planning authority;
- (b) developments on property within the area of the planning authority are subject to **traffic impact assessments and public transport assessments** as prescribed by the Minister;
- (c) where new or upgraded transport infrastructure or services are suggested in such assessments, the costs thereof must be paid by the planning authority, unless it has agreed with a developer or other person to pay those costs; and
- (d) no action may be taken that would have the result of substantially decreasing the quantity or availability of land transport infrastructure or services, unless the owner of the land on which the infrastructure is situated, or the holder of the relevant operating licence, as the case may be, has notified the relevant planning authority in writing not less than 30 days before the action is taken.

It is further stipulated in Section 39 that any authority with responsibility for approving substantial changes in land use or development proposals which receives an application for such change or intensification, must ensure that such application is accompanied by the required **traffic impact assessment and public transport assessment**, and has sufficient information for the authority to assess and determine the impact of the application on transport plans and services.

## 1.4 The Development of the Guideline

The development of the Guideline was based on and informed by a review of:

- The City's Transport and Environmental Objectives
- Existing Transport / Traffic Assessment Guideline Documentation
- International and Local Best Practice
- Stakeholder Consultation Meetings
- The City's Available Data Sources and Masterplans

The CoJ and the JRA acknowledge the following national guidelines and have reviewed these guidelines (amongst others) when developing this document:

- Manual for Traffic Impact Studies, Department of Transport, RR93/635, 1995.

- TMH 16, Volume 1 South African Traffic Impact and Site Traffic Assessment Manual, COTO, 2012.
- TMH 16 Volume 2 South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual.
- TMH 17 Volume 1 South African Trip Data Manual.

## 1.5 Status of the Guideline

Unless stated otherwise, this Guideline supersedes the above (**Section 1.4**) and any other guidelines within the jurisdiction of the CoJ. This guideline therefore replaces previous requirements in other manuals or guidelines, including those listed in **Section Error! Reference source not found.**, for a Traffic Impact Assessment, a Traffic Impact Study, a Traffic Impact Statement or a Site Traffic Assessment. It should also be noted that the City is under no obligation to follow any guidelines that have not been proclaimed through an ordinance, bylaw or council resolution.

Distinction is made between a manual and a guideline. This document should be viewed as a guideline rather than a manual. It is therefore not exhaustive and conclusive and the applicant remains responsible to undertake the Transport Assessment and consider all aspects related to the potential impacts of the development in a professional manner.

If any aspect is silent in this Guideline, the City will make a determination on the issue and convey the same to the applicant submitting the Transport Assessment. The CoJ and the JRA reserve the right to reasonably require additional information at their discretion to be supplied in the assessment that is not stipulated in this Guideline.

## 1.6 Who should use the Guideline?

The Guideline is relevant to all land use and transport developers and intended for:

### Private Entities:

- Resident Associations and their agents submitting Transport

Assessments to the City.

- Developers and their agents submitting Transport Assessments to the City.

#### Public Entities:

- CoJ and JRA officials evaluating Transport Assessments.
- Other departments or agencies of CoJ submitting Transport Assessments internally, for example the Johannesburg Property Company (JPC) and the Johannesburg Development Agency (JDA).
- National, provincial or neighbouring local authorities submitting Transport Assessments to the City.

## 1.7 Terminology

A **Transport Assessment** is defined with reference to the NLTA's requirement for traffic impact assessments and public transport assessments. It is defined as a written assessment which provides detailed information on a range of transport conditions both before and after the development has been built and subsequently proposes mitigation measures to account for any negative impacts on the transport environment from a capacity and safety perspective.

An **Internal Transport Assessment** is a capacity and safety assessment of the internal site layout and accesses to the external non-motorised transport facilities, public transport services and vehicle road network. The Internal Transport Assessment study area must correspond to the latest available Site Development Plan (SDP).

An **External Transport Assessment** considers the capacity and safety assessment of the external non-motorised transport facilities, public transport services and vehicle road network. Three study areas need to be defined: a non-motorised transport facilities study area, a public transport services study area and a vehicle road network study area. Study areas will not necessarily cover the same geographical area and may overlap.

**Pre-application consultation** is an optional meeting, email or phone conversation that takes place prior to the commencement of a Transport

Assessment with the JRA to confirm the extent of a Transport Assessment. The purpose of the consultation is to confirm the extent of the Transport Assessment. Aspects such as the type of application, approving department, location, study areas, proposed development, threshold calculation, type of transport assessment, assessment years, master planning, data requirements, surveys to be carried out, external authorities to be consulted and latent rights may be discussed. The outcome of the pre-application consultation should accompany the application in written form, such as an email, meeting notes or a formal letter.

**The City** refers to the CoJ, the JRA and any other CoJ departments or agencies.

**Public transport** is defined in terms of the NLTA as a scheduled or unscheduled service for the carriage of passengers by road or rail, whether subject to a contract or not, and where the service is provided for a fare or any other consideration or reward including cabotage in respect of passenger transport as defined in the Cross-Border Act. It is therefore a collective term used to refer to informal and formal public transport including road based public transport services, such as Bus Rapid Transit, buses, minibus taxis and other modes such as, trams, metered taxis, tuk-tuks, last-mile services and off-road public transport services, such as light rail services and passenger rail services as well as infrastructure such as stations, terminals and depots.

**Infrastructure** in relation to land transport is defined as fixed capital equipment and facilities in the land transport system in accordance with the NLTA.

**Last-mile services** are defined as the movement of people and goods from a transportation hub to a final destination.

A **Transport Master Plan** is defined as a Transport Assessment that was formally adopted as policy by the City and carried out for an area for which spatial master planning exists, such as the Regional Spatial Development Frameworks or Spatial Precinct Plans.

**Development Applications** are defined as an application to amend the Town

Planning Scheme and/or an application for the approval of a Site Development Plan (SDP). Development applications and their supporting Transport Assessments are submitted to and evaluated for approval by the CoJ Development Planning Department

***Applications for changes to transport infrastructure or services*** are defined as applications to change any transport infrastructure or services not related to development applications, for example proposed traffic calming measures or the introduction of additional buses on an established public transport service route, or the redesign of a street to incorporate “Complete Street Principles”. Applications for changes to transport infrastructure or services (not related to development applications) are submitted to and evaluated for approval by the JRA.

## 1.8 Future Development of the Guideline

### 1.8.1 Scoping Document

International best practice indicates that authorities require the submission of either a Scoping Report or the completion of a Scoping Form prior to the commencement of a Transport Assessment. The idea is that such a compulsory scoping document would then be approved by the authority in question before a Transport Assessment is commenced.

A scoping document contains details such as:

- A brief description of proposed amendment to the town planning scheme, site development plan or changes to transport infrastructure or services, including location map.
- Type of Application, for example Amendment to the Town Planning Scheme, Site Development Plan, Changes to Transport Infrastructure or Services.
- Approving Department.
- Threshold Calculation.
- Internal and external study areas for non-motorised transport facilities, public transport services and the vehicle road network.
- Type of Transport Assessment in terms of the extent of modelling to be



carried out, data requirements and data surveys to be carried out.

- Assessment Years.
- Master planning availability.
- Latent land use development rights.
- External authorities to be consulted.

The benefits of a process involving a compulsory scoping document to the industry as a whole are numerous, for example:

- Additional or different requirements by the authorities can officially be stipulated through the scoping document, where these requirements differ from the requirements as outlined by the accepted guideline document.
- A consistent approach across the industry towards all transport assessments is ensured as discretionary aspects are clarified at the onset of the assessment.
- The planning process is streamlined as discretionary requirements are clarified at the onset. The assessment is therefore more likely to meet all the agreed requirements thereby limiting the resubmission and reassessment of applications by officials.
- The scoping document can be used by the applicant to appoint appropriate representatives or consultants to carry out the exact works as indicated by the scoping document.

The City does not currently have the institutional capacity or the legal framework to manage and enforce the submission of a compulsory scoping document and will continue to investigate this in future. In the interim an optional pre-application consultation process is outlined in the Guideline (refer to **Section 4.1**).

### 1.8.2 Travel Plan

The submission of a Travel Plan is a requirement as indicated by international best practice and all indications are that this is the primary means by which authorities can obtain developer contributions in terms of public transport and non-motorised transport. It is related to a specific development application and represents a package of practical measures to be implemented by the

applicant to minimise the negative impacts of travel and transport and aims to co-ordinate transport with wider policy issues (such as environment, accessibility and social inclusion) into a co-ordinated strategy. The Travel Plan essentially translates the theoretical work of the Transport Assessment into operational reality. As such, it will need to be monitored and developed over time to take account of changing circumstances and ensure that it continues to remain focussed on providing up to date strategies.

In the case of an application where the developer does not have an end user identified, it may be appropriate that the applicant still produces a Travel Plan (which would be amended by the occupier) and would agree the basic provisions. The measures should be designed with a view to meet the mode share targets which would be derived from the Transport Assessment.

Typical measures that may be considered by the applicant would be, for example:

- Travel plan management and promotion
  - Appointment and training of a travel plan coordinator.
  - Access to personalised travel planning advice.
  - Establishment of a steering group to share knowledge and coordinate the improvement of sustainable travel options.
  - Provision of travel information (e.g. website link to a Journey Planner or bus real-time information, notice board, newsletter, travel advice to visitors).
  - Provision of induction pack for new employees/residents, with package of incentives for sustainable travel.
  - Marketing pack and training of sales staff for new residential developments.
  - Holding or sponsoring travel plan promotional events (e.g. Bike Week / Eco-mobility festival).
  - Publicise travel plan successes. People may be more likely to continue mode shift if commended as well as encouraging others.
  - Private developers could sponsor the monitoring and enforcement of cycle lanes.

- Reducing the need to travel
  - Introduce policy on flexible working (e.g. teleworking, home working and flexitime).
  - Adoption of 'smart' working practices (e.g. teleconferencing, audioconferencing, hot desking).
  - Local recruitment strategy and incentives for staff to relocate closer to work.
  - On-site services for employees (e.g. cafe, crèche, shop).
  - Web access and provision of office space in homes.
  - Home delivery drop-off points.
  
- Increasing walking
  - Promotion of public health campaigns encouraging walking and cycling.
  - Distribution of maps showing safe and convenient local walking routes to services.
  - Provision of signage/wayfinding.
  - Improvements to pedestrian access/quality (e.g. safe crossings, tactile paving, dropped kerbs, disabled access, CCTV, lighting).
  - Walking events such as led walks at lunchtime or after work, pedometer challenges.
  
- Facilitating cycling
  - Provision of appropriate numbers, type and location of cycle parking facilities (e.g. covered and secure).
  - Availability of supporting facilities for staff (e.g. showers, lockers).
  - Provision of cycle tracks or dedicated segregated infrastructure, where appropriate.
  - Discounts or loans for purchase of equipment (e.g. cycle loan, tax free scheme to employees, vouchers).
  - Advice or training on riding skills, use of bike buddies.
  - On-site bicycle repair service.
  - Cycle maintenance classes.
  - Pool bikes and cycle clubs.
  - Regular cycling promotion days.

- Provision of information on local cycle routes.
- Promotion of cycle hire schemes and cycle superhighways.
- Encouraging use of public transport
  - Provision of a public transport guide as part of sustainable travel information for residents, staff or visitors.
  - Integration of conveniently located bus waiting and drop off points, giving easy access to main entrances.
  - Contribution towards improving public transport operations: rerouting, capacity enhancements, bus priority.
  - Links to an online Journey Planner or organization's intranet.
  - Access to real-time service information.
  - Hosting an update screen within the building for staff and visitors.
  - Provision of shuttle service (e.g. private bus or minibus facilities, taxi share) to local transport hubs.
  - Collection from station service for visitors.
  - Public transport travel subsidy.
  - Bus stop or bus priority improvements (e.g. shelters, accessibility, live departure information).
  - Policies supporting use of public transport for travel in the course of work.
- Reducing vehicle trips
  - Commitment to a parking management plan detailing how parking will be allocated and operated (e.g. whether paid permits are required, dedicated spaces for car sharers, prioritisation of new residential parking for larger units).
  - Commitment to parking surveys, including off-site surveys if appropriate.
  - Car-free proposals or reallocation of parking over time.
  - Parking enforcement (needs-based allocation, permits, drop off areas, pay and display.)
  - Parking charges, with revenue ring-fenced to pay for sustainable travel measures.
  - Provision of dedicated spaces for, and funding of, a car club.
  - Provision of free membership of a car club for occupiers.

- Corporate car club membership.
- Contribution towards introduction of a controlled parking zone.
- Capping of parking permits (e.g. residents excluded from applying for parking permits for local controlled parking zone).
- Promoting car sharing schemes to raise car occupancy levels, including ride-matching databases, a guaranteed ride home, dedicated parking spaces and incentives for car sharers such as preferential parking.
- Providing eco-driving training to staff and residents.
- Provision of secure powered two wheeler vehicle parking and changing facilities.
- Designated pick up/drop off point for minibus and/or metered taxis and private hire vehicles.
- Providing electric vehicle charging points (both active and passive) and incentives to encourage use of electric and low emission vehicles.
- Providing dedicated parking for low emission vehicles in a priority location and supporting this through the vehicles in the company car fleet.
- Site design to reduce vehicle speed, restricted car movement through the site.
- Location of parking to minimise intrusion and avoid dominance of the site.
- Cost of parking not subsumed in cost of admission to sites, but charged separately.
- Discounts for visitors arriving by sustainable transport.
- For visitors, information about sustainable access prominently featured (ahead of directions by car) in all promotional literature, posters and websites publicising the site.
- Marketing of sites based on their sustainable transport access and facilities, not simply availability of car parking.
- Indicate how existing parking spaces can be converted to additional bulk.

Travel Plans can be tailored for specific land uses. For example School Travel Plans may include mechanisms such as safe walking and cycle routes, cycle stands, parent waiting shelters, cycle training, school buses. Workplace Travel

Plans may include mechanisms such as flexible working hours, home working, car sharing.

Typical targets to be set by the Travel Plan may include for example:

- To increase the mode share of staff cycling to work from 5% to 10% within two years of completion of the development.
- Introduce flexible and home working into company policy within six months of occupation of the site.
- To increase the number of employees walking to work by 10% (from the baseline of 18%) within one year of the baseline survey being undertaken.
- Increase amount of secure cycle parking by 50% from 34 to 51 spaces within three months after first occupation.
- The number of car vehicle trips per visitor/shopper trip will not exceed X at any time.
- To decrease the number of single occupancy vehicles entering the site by 20% within three years of the baseline survey.
- To reduce CO<sub>2</sub> emissions of company fleet by 20% within three years, from the current baseline of X kg in 2013.
- 80% of users within phase 1 of the development to be aware of travel plan within three months of full occupation.
- The number of weekday vehicle trips generated by the site when site is completed will not exceed X.

Typically the Travel Plan should detail the proposed monitoring mechanisms as part of the Transport Assessment. The monitoring requirements will be the responsibility of the applicant (or subsequent occupier(s)) and shall be reported to the responsible authorities. Monitoring could involve the building occupier(s) submitting an annual report to the responsible authorities presenting the outcome of monitoring exercises.

Monitoring exercises may involve measuring the modal share to assess if targets are being achieved and assessing parking demand and usage. Trips by foot, cycle or bus may be measured. It could be, for example, a condition that at intervals of 12 months and 24 months after the development commencing operation that certain data sets were provided.

The purpose of monitoring within the Travel Plan is to ensure that the transport related impacts at delivery are consistent with that for which approval has been sought and obtained. When the development application is approved the Travel Plan's proposals can become conditions of the approval.

The City does not currently have the institutional capacity or the legal framework to manage and enforce the implementation and monitoring of a Travel Plan and is working towards establishing the institutional capacity and legal framework in the near future. In the interim the City will require non-motorised transport facility, public transport services and vehicle road network mitigation measures in terms of infrastructure or services to be implemented where deemed required and in accordance with the recommendations following the Transport Assessment.

## 1.9 Guideline Map / Document Outline

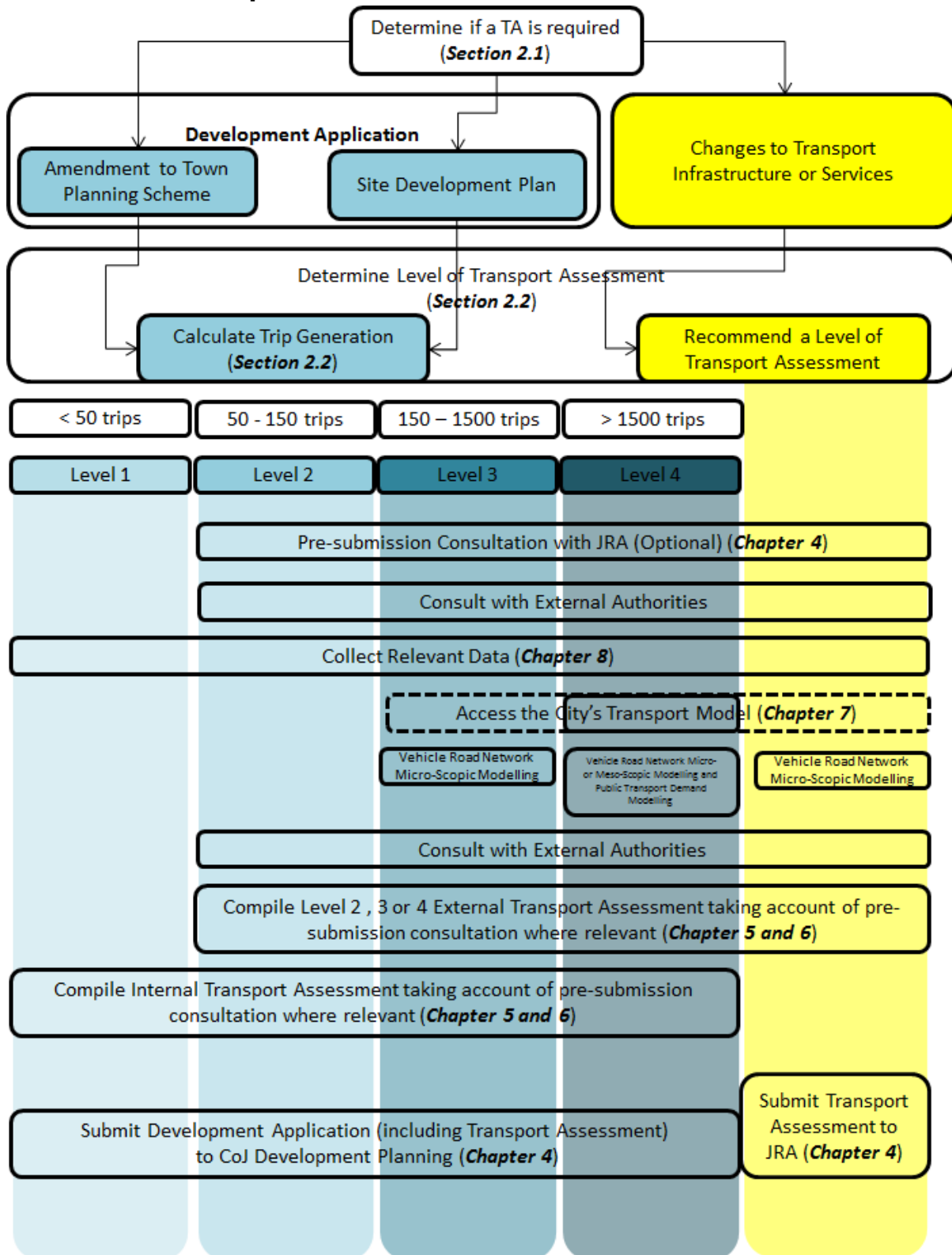


Figure 1: Guideline Map / Document Outline



## CHAPTER 2 THE REQUIREMENT FOR A TRANSPORT ASSESSMENT

### 2.1 When is a Transport Assessment Required?

The requirement for a Transport Assessment (TA) will replace any need for a Traffic Impact Assessment (TIA), a Traffic Impact Statement (TIS) or a Site Traffic Assessment (STA).

A Transport Assessment is required in the following three instances:

1. When an application for an amendment to the Town Planning Scheme is submitted, for example, the following:
  - Rezoning.
  - Change in development conditions.
  - Consent-use.
  - Subdivision.
  - Consolidation.
  - Township establishment.
2. When an application for the approval of a Site Development Plan is submitted.
3. When an application for changes to transport infrastructure or services is submitted by private entities or public authorities that are not required as a result of the two development application procedures outlined above. These may include, for example, the following applications:
  - Pedestrianisation.
  - Pedestrian crossings or pedestrian bridges.
  - Cycle routes.
  - The introduction of a new public transport services.
  - Permanent or temporary road closures.
  - Access closure or access provision for non-motorised transport or vehicles.
  - Traffic calming.
  - Changes to intersection control.

- Changes to geometric layout of intersections and roads.

The requirement for a Transport Assessment is subject to the thresholds as discussed in **Section 2.2** and the extent of assessment as discussed in **Chapter 3**.

## 2.2 Thresholds

Land use developments generate varying levels of person or vehicle trip movements and have varying effects on the operation of the transport network. The numbers of expected person or vehicle trips depends on the type and size of land use development.

The thresholds for the levels of transport assessments required for the various applications are outlined in **Table 1**. In case of a significant construction phase it is required that the threshold for the construction phase be determined and supported by the appropriate level of External Transport Assessment.

Table 1: Extent of Transport Assessment Thresholds

Type of Application	Ultimate peak hour vehicle trips generated	Internal Transport Assessment	External Transport Assessment			
			Level 1	Level 2	Level 3	Level 4
Amendment to the Town Planning Scheme	Less than 50	✓	✓			
	50 – 150	✓		✓		
	150 - 1500	✓			✓	
	More than 1500	✓				✓
Site Development Plan	Less than 50	✓	✓			
	50 – 150	✓		✓		
	150 - 1500	✓			✓	
	More than 1500	✓				✓
Changes to Transport Infrastructure or Services (independent from the above development applications)	N/A		✓	✓	✓	✓

The ultimate peak hour vehicle trips generated as shown in **Table 1** above were converted to land use developments of corresponding types and sizes for ease of reference and is provided in **ANNEXURE A: Thresholds for different land use types and sizes**.

The City may in some instances require a different extent of Transport Assessment at their discretion. Internal and External Transport Assessments are defined in **Section 1.7** and further detailed in **Chapter 3**.

### 2.3 Vehicle Trips Generated vs. Person Trips Generated

Whilst the focus of the Guideline is on directing the focus of transport assessments to public transport service mitigation measures and non-motorised transport facility mitigation measures it should be noted that the thresholds are based on *vehicle* trips generated, not *person* trips generated.

The reason for this approach when determining the threshold is that a consistent way is required to determine the level of External Transport Assessment required for all applicants / type of development applications. There are currently no standardised accepted methods available to calculate person trip generation. There are currently only standardised methods available to calculate vehicle trip generation. The City is investigating the development of standardised person trip generation rates. As soon as these are available this guideline may be amended to incorporated person trip generation rates into the calculation of thresholds. In the interim the threshold calculation will however be based on the calculation of vehicle trips as detailed here:

In the case of the development applications (i.e. an Amendment to the Town Planning Scheme or a Site Development Plan) the threshold for an External Transport Assessment should be calculated based on the expected ultimate additional peak hour vehicle trips generated. In the interest of consistency, it is required that the ultimate additional peak hour vehicle trips generated should be calculated as follows:

- The principles as detailed in Appendix B.4 of “South African Traffic Impact and Site Traffic Assessment Manual, TMH 16, August 2012, COTO, 2012” shall apply.
- The principles as detailed in Chapter 4 of “South African Trip Data Manual, TMH 17, COTO, 2012” shall apply.
- The above principles shall be applied with one exception: No allowance

may be made for the application of reduction factors or trip generation adjustment factors as detailed in Section 4.9 and Table 3.2 of Appendix A of TMH 17 or Section B4.2 of TMH 16 when determining the threshold.

- Trip generation should therefore represent the ultimate additional peak hour vehicle trips generated for the **ultimate phase** of the proposed development and include pass-by, diverted, transferred and primary trips both internal and external as defined by these manuals.
- The trip generation should relate to the ultimate final phase of the proposed development and correspond in full to the description submitted as part of the town planning application where relevant.

In the case of applications to make changes to Transport Infrastructure or Services an External Transport Assessment will be required in all cases, irrespective of any expected trip generation, unless otherwise indicated through pre-application consultation.

## 2.4 Duration of validity of a Transport Assessment

The duration of validity of a Transport Assessment depends to a large extent on the availability of master planning for the duration of the proposed phasing of the development. If master planning is available for the duration of the phasing of the development and adequately taken into account in the Transport Assessment the Transport Assessment and application can be considered valid for the duration of the master plan once approved.

However in some instances, specifically where master planning is not available for the duration of the phasing of the development, the City may restrict the validity period of the approved Transport Assessment at their discretion and may request the resubmission of the Transport Assessment at a later stage. Should the City restrict the validity period this will be stated as part of the conditions of the approval of the Transport Assessment. As examples the City will request the resubmission or review of the Transport Assessment under the following circumstances:

- Should all the rights not be exercised within three years, a resubmission or review of the Transport Assessment will be requested.
- Should the cumulative impact of various development applications

within the study area be deemed to be in excess to what was anticipated at the time of the submission, a resubmission or review of the Transport Assessment will be requested.

- Should the transport environment and infrastructure change significantly as to render the originally approved Transport Assessment and mitigation measures insufficient, a resubmission or review of the Transport Assessment will be requested.
- Should a particular aspect, for example the access, a particular intersection or a particular public transport or non-motorised transport initiative require to be updated or adjusted due to changed circumstances, a resubmission or review of the Transport Assessment will be requested.
- Should a Site Development Plan be submitted after the approval of a Transport Assessment that is deemed to be substantially different from the assumptions made for the initial Internal Transport Assessment, a resubmission or review of the Transport Assessment will be requested.

Following the resubmission or review of the Transport Assessment, new conditions of development (including new required mitigation measures of transport infrastructure or services) may be set, by the City.

## CHAPTER 3 EXTENT OF TRANSPORT ASSESSMENTS

### 3.1 Introduction

In this chapter, the extent of an Internal Transport Assessment and the extent of each level of External Transport Assessment in terms of the following aspects are discussed:

- Study area.
- Type of Transport Assessment.
- Assessment years.
- Master planning.

An **Internal Transport Assessment** is a capacity and safety assessment of the internal site layout and accesses to the external non-motorised transport facilities, public transport services and vehicle road network. The Internal Transport Assessment study area must correspond to the latest available Site Development Plan (SDP).

An **External Transport Assessment** considers the capacity and safety assessment of the external non-motorised transport facilities, public transport services and vehicle road network. Three study areas need to be defined: a non-motorised transport facilities study area, a public transport services study area and a vehicle road network study area. Study areas will not necessarily cover the same geographical area and may overlap.

An Internal Transport Assessment is required to accompany all four levels of External Transport Assessments (Level 1, 2, 3 and 4).

In some instances the extent of the required Transport Assessment can be adjusted at the discretion of the City.

## 3.2 Internal Transport Assessment

An Internal Transport Assessment is required to accompany for **all levels of External Transport Assessment (Level 1, 2, 3 and 4)**, with one exception: an Internal Transport Assessment is not required in cases where an application for amendment to the Town Planning Scheme or an application for approval of a Site Development Plan is submitted that will result in the development of a single residential house with access onto Class 3, 4 or 5 roads.

A pre-application consultation may take place prior to the commencement of the Internal Transport Assessment (refer to **Section 4.1**).

The capacity and safety assessment of the internal provision of transport infrastructure forms part of the Site Development Plan approval process. Problematic internal transport infrastructure provision will spill over onto the external road network leading to capacity and safety issues on the external road network to then be addressed by the City.

In cases where a final SDP is not available, preliminary indications of the internal site layout and the access of pedestrians and cyclists to/from the *external* vehicle road network and external non-motorised transport network (if different) must be indicated. In addition the access of light- and heavy-motorised vehicles to/from the *external* vehicle road network (if different) must preliminary be indicated.

Once the final Site Development Plan is made available the resubmission of the Internal Transport Assessment may be requested at the discretion of the City should there be a substantial deviation from the preliminary internal site layout.

### 3.2.1 Study Area

This assessment considers the capacity and safety assessment of the internal site layout and accesses to the external non-motorised transport facilities, public transport services and vehicle road network. The Internal Transport

Assessment study area must correspond to the latest available Site Development Plan (SDP).

### 3.2.2 Type of Transport Assessment

The following transport modes need to be considered in terms of internal transport infrastructure provision:

- Non-motorised transport: pedestrians and cyclists.
- Light-motorised transport vehicles: motorcycles, private light vehicles, minibus taxis, tuk-tuks, light delivery vehicles, etc.
- Heavy-motorised transport vehicles: buses, freight vehicles, heavy delivery vehicles, refuse collection vehicles, fire trucks, emergency vehicles, etc.

The capacity assessment of the internal site layout and access onto the public road network can be based on a spreadsheet model and supported by the application of stand-alone intersection software such as SIDRA, unless otherwise stated as per the pre-application consultation (refer to **Section 4.1**).

Internal non-motorised transport routes should connect to neighbouring internal routes and routes along the public road network. All proposed on-site intersections and accesses onto the public road network should be assessed to determine the appropriate intersection control and geometric layout (refer to **Section 6.4.2**).

The internal capacity assessment should focus on the sufficient provision of:

- Parking for cyclists.
- Shower facilities for non-motorised transport.
- Drop-off and pick-up facilities for light-motorised transport vehicles.
- Parking for light-motorised transport vehicles.
- Drop-off and pick-up facilities for heavy-motorised transport vehicles.
- Parking for heavy-motorised transport vehicles.
- Ramp capacity at entry and exit accesses.
- Queuing capacity at controlled high security points at entry and exit accesses.



The safety assessment of the internal site layout and access onto the public road network should take cognisance of universal access design principles.

The internal safety assessment should evaluate the geometric design of the following, where relevant:

- Safe accommodation of non-motorised transport including tactile ramps at intersections.
- Traffic management and traffic calming.
- Parking area layout and circulation taking account of conflicting non-motorised transport and vehicles.
- Drop-off and pick-up facilities access for vehicles.
- Deliveries and refuse collection points access.
- Vehicle circulation and turning movements.
- Entry and exit access design and spacing, considering sight distance.
- Design speed.

### 3.2.3 Assessment Years

The assessment years for the Internal Transport Assessment should correspond to the required assessment years for the equivalent External Transport Assessment. Should no External Transport Assessment be required, the base year and year of opening should be assessed. In such a case it should be assumed that the full development proposal will be operational at the year of opening.

### 3.2.4 Master Planning

When metropolitan, provincial and national master planning is available it should be considered by the applicant. Metropolitan master planning is the responsibility of the City. The master planning that may impact the Internal Transport Assessment should correspond to the master planning for the equivalent External Transport Assessment. Master planning may affect the internal transport provision, for example, when a non-motorised transport route is planned adjacent to the site, the site layout and pedestrian access must be planned to link up with the future route. The provision of on-site

public transport drop-off facilities or ranks must be planned in accordance with future planned public transport services as per the master planning.

### 3.3 External Transport Assessment

The following transport modes need to be considered in terms of the capacity and safety of external transport infrastructure provision:

- Non-motorised transport: pedestrians and cyclists.
- Light-motorised transport vehicles: motorcycles, private light vehicles, minibus taxis, tuk-tuks, light delivery vehicles, etc.
- Heavy-motorised transport vehicles: buses, freight vehicles, heavy delivery vehicles, refuse collection vehicles, fire trucks, emergency vehicles, etc.
- Off-road transport vehicles: passenger rail and light rail

#### 3.3.1 Level 1 External Transport Assessment (0-50 ultimate additional peak hour vehicle trips)

In most cases it is required that the Level 1 External Transport Assessments be supported by an Internal Transport Assessment only (refer to **Section 3.2**). However in highly congested or complex urban environments an External Transport Assessment may be required at the discretion of the City where less than 50 additional peak hour vehicle trips are expected. In such cases an applicant may wish to carry out a pre-application consultation to clarify the requirements (refer to **Section 4.1**).

#### 3.3.2 Level 2 External Transport Assessment (50-150 ultimate additional peak hour vehicle trips)

The applicant has the option to carry out a pre-application consultation with the JRA (refer to **Section 4.1**). The purpose of the consultation should be to confirm the extent of the Transport Assessment requirements. The requirements outlined in this section should guide the consultation.

### Study Areas:

This assessment considers the capacity and safety assessment of the external non-motorised transport facilities, public transport services and vehicle road network. Three study areas need to be defined: a non-motorised facilities transport study area, a public transport services study area and a vehicle road network study area. Study areas will not necessarily cover the same geographical area and may overlap. The study area requirements are as follows:

- Non-motorised transport facilities: Up to the **first** existing or planned **intersection** of pedestrian and cycle ways on either side of the pedestrian accesses to the development within 2km.
- Road based and off-road public transport services: Up to the **first** existing or planned public transport **stop or station** on either side of the pedestrian accesses to the development within 500m.
- Light and heavy vehicle road networks: Up to the first existing or planned intersection on either side of the vehicle accesses to the development within 2km. Note that the heavy vehicle road network study area should incorporate road based public transport vehicles.

### Type of Transport Assessment:

The following assessments will be required:

- A statement on the availability of non-motorised transport facilities within the non-motorised study area.
- A statement on the availability of road based and off-road public transport services within the public transport study area.
- A capacity and safety assessment of all intersections within the vehicle study area.

The statement on the capacity and safety of non-motorised transport facilities and public transport services can be based on information made available by

the City (refer to **Chapter 8**). Where significant gaps exist in the available information the applicant may be expected to carry out non-motorised transport surveys, such as traffic counts, origin-destination surveys or journey time surveys.

The vehicle road network capacity assessment can be based on a spreadsheet model and supported by the application of stand-alone intersection software such as SIDRA. The applicant will be responsible for collecting the relevant information to inform the assessment of the vehicle road network, for example traffic counts, origin-destination surveys or journey time surveys.

#### Assessment Years:

The assessment years required are: base year, year of opening, year of opening + 5 years. It should be assumed that the full development proposal will be operational at the year of opening.

In case of a significant construction phase it is required that the construction phase transport is assessed as an additional scenario, where appropriate.

#### Master Planning:

Metropolitan, provincial and national master planning, where available, should be considered by the applicant. Metropolitan master planning is the responsibility of the City and where it is not available, a Level 2 assessment may still be considered by the City. The applicant should be aware that the absence of master planning for the duration of the proposed phasing of the development may result in the City restricting the validity period of the Transport Assessment (refer to **Section 2.4**).

### **3.3.3 Level 3 External Transport Assessment (150-1500 ultimate additional peak hour vehicle trips)**

The applicant has the option to carry out a pre-application consultation with the JRA (refer to **Section 4.1**). The purpose of the consultation should be to confirm the extent of the Transport Assessment requirements. The requirements outlined in this section should guide the consultation.

## Study Areas:

This assessment considers the capacity and safety assessment of the external non-motorised transport facilities, public transport services and vehicle road network. Three study areas need to be defined: a non-motorised transport facilities study area, a public transport services study area and a vehicle road network study area. Study areas will not necessarily cover the same geographical area and may overlap. The study area requirements are as follows:

- Non-motorised transport facilities: Up to **the first** existing or planned **major destination** or public transport service that can be reached by existing or planned (where available) cycling and/or pedestrian routes within 2km of the pedestrian accesses to the development.
- Road based and off-road public transport services: Up to **the first** existing or planned **major destination** that can or will be reached by each existing or planned (where available) public transport service within 500m walking distance of the pedestrian accesses to the development.
- Light and heavy vehicle road networks: All road infrastructure where the ultimate additional peak hour **vehicle trips** generated for the **ultimate phase** of the proposed development (including pass-by, diverted, transferred and primary trips) will be 75 or more trips added to any lane volume. No allowance may be made for the application of reduction factors or trip generation adjustment factors when determining the extent of the study area. Note that the heavy vehicle road network study area should incorporate road based public transport vehicles.

Whilst the focus of the Guideline is on directing the focus of transport assessments to public transport service mitigation measures and non-motorised transport facility mitigation measures it should be noted that the vehicle study area is based on **vehicle** trips generated, not **person** trips generated.

The reason for this approach when determining the vehicle study area is that it is important to ensure that the extent of the vehicle study area is adequately represented. As such this method will represent a “worst-case” scenario and the approach is therefore conservative, as person trips are not being manipulated here to reduce the vehicle study area to be analysed.

Once the threshold and the vehicle road network study areas have been determined allowance may be made for the application of reduction factors or trip generation adjustment factors when determining the trip generation and mode split of the proposed development.

Existing intersections within the vehicle study area should be surveyed, where required, and analysed to illustrate current capacity limitations. The City then needs to be convinced that these intersections will not be impacted due to the planned implementation of mitigation measures in terms of public transport and non-motorised transport.

The expected impact and proposed mitigation measures should be determined through the normal capacity assessment methodology and the application of *person trip generation*, not *vehicle trip generation*, as well as well as appropriate mode split assumptions as outlined in **Section 5.1**.

The **major destination** should be determined by referencing the latest Spatial Development Framework (SDF) available here:

[http://joburg.org.za/index.php?option=com\\_content&view=article&id=5941:spatial-development-framework-2010-2011&catid=61&Itemid=114](http://joburg.org.za/index.php?option=com_content&view=article&id=5941:spatial-development-framework-2010-2011&catid=61&Itemid=114)

In Table 5.14 of this document a hierarchy of nodes is defined as follows:

- CBD Nodes.
- Metropolitan Nodes.
- Regional Nodes.
- District Nodes.
- Specialist Nodes.

Maps of these nodes are also provided under the description “Mixed Use

Nodes 2010”, also called Appendix A. In Annexure B node profiles are provided which include a description of existing transportation facilities within the node.

More details are provided in the latest Regional Spatial Development Frameworks for each region (Region A to G) available here:

[http://joburg.org.za/index.php?option=com\\_content&task=view&id=5543&Itemid=114](http://joburg.org.za/index.php?option=com_content&task=view&id=5543&Itemid=114)

In Section 3.1.3 of each Regional Spatial Development Framework (RSDF) the nodal hierarchy for each region is defined. The Regional Spatial Development Framework also includes a map showing the boundaries of each node. The following nodes are defined:

- CBD Nodes.
- Metropolitan Nodes.
- Regional Nodes.
- District Nodes.
- Specialist Nodes.
- Neighbourhood Nodes.
- Industrial Nodes.

It is recommended to consider “Regional Nodes” and “Metropolitan Nodes” as defined by the SDF or RSDF as **major destinations** when determining the extent of the public transport and the non-motorised transport study areas. However in some cases some other nodes may be considered major destinations depending on the location of the development application.

#### Type of Transport Assessment:

It is a requirement that in the case of a proposed amendment to the Town Planning Scheme or the submission of a Site Development Plan that a Level 3 Transport Assessment be supported by a socio-economic / demographic market assessment. Such an assessment should indicate the envisaged customer segmentation, market trends and the expected take-up or occupation of the newly planned developments. This assessment may form part of the town planning application in which case the Transport Assessment

must make reference to this assessment.

The following assessments will be required:

- A capacity and safety assessment of all the non-motorised transport facilities within the non-motorised study area.
- A capacity assessment of all the public transport services within the public transport study area. There is no requirement for the applicant to assess the safety of public transport vehicles. The safety of public transport services should be addressed under the safety assessment of the vehicle road network.
- A capacity and safety assessment of all intersections within the vehicle study area.

The capacity and safety assessment of non-motorised transport facilities and public transport services can be based on information made available by the City (refer to **Chapter 8**). Where significant gaps exist in the available information the applicant may be expected to carry out non-motorised transport surveys, such as traffic counts, origin-destination surveys or journey time surveys.

The vehicle road network capacity assessment can be based on a spreadsheet model and supported by the application of stand-alone intersection software such as SIDRA. Alternatively in a complex urban environment, micro-scopic modelling based on network software that models intersection and turning movement delays such as AIMSUN, VISSIM or Transyt, may be required. The applicant will be responsible for collecting the relevant information to inform the assessment of the vehicle road network, for example traffic counts, origin-destination surveys or journey time surveys.

#### Assessment Years:

The assessment years required are: base year, year of opening, year of opening + 5 years and one additional forecast year.

The additional forecast year to be analysed should be based on the forecast



years of the master planning for the study area or the infrastructure or operational implementation program for the study area. It should be assumed that the full development proposal will be operational at the year of opening. Alternatively, additional assessment years may be required as per the proposed phasing of the development.

In case of a significant construction phase it is required that the construction phase transport is assessed as an additional scenario, where appropriate.

#### Master planning:

Metropolitan, provincial and national master planning, where available, should be considered by the applicant. Metropolitan master planning is the responsibility of the City and where it is not available; the master planning for the area needs to be completed by the City or the City's nominated agent before a Level 3 External Transport Assessment may be considered by the City. The applicant should be aware that the absence of master planning for the duration of the proposed phasing of the development may result in the City restricting the validity period of the Transport Assessment (refer to **Section 2.4**).

#### **3.3.4 Level 4 External Transport Assessment (more than 1500 ultimate additional peak hour vehicle trips)**

The applicant has the option to carry out a pre-application consultation with the JRA (refer to **Section 4.1**). The purpose of the consultation should be to confirm the extent of the Transport Assessment requirements. The requirements outlined in this section should guide the consultation.

#### Study Areas:

This assessment considers the capacity and safety assessment of the external non-motorised transport facilities, public transport services and vehicle road network. Three study areas need to be defined: a non-motorised transport facilities study area, a public transport services study area and a vehicle road network study area. Study areas will not necessarily cover the same geographical area and may overlap.

A study area needs to be defined for non-motorised transport facilities as follows:

- **All** existing or planned **major destinations** or public transport services that can be reached by existing or planned (where available) cycling and/or pedestrian routes within 2km from the border of the development precinct.

Study areas need to be defined for vehicle road networks and public transport services. These should be determined by accessing the City's transport model and investigating the current and future desire lines from / to the proposed development for each mode (refer to **Chapter 7**).

- Road based and off-road public transport services: The study area for public transport should be confirmed through an investigation into the existing and planned **major destinations** that can or will be reached through existing or planned public transport services. As a minimum it should include **all** existing or planned **major destinations** that can or will be reached by each existing or planned (where available) public transport service within 500m walking distance from the border of the development precinct.
- Light and heavy vehicle road networks: The study area for vehicles should be confirmed through an investigation into the existing and planned **major destinations** that can or will be reached by light or heavy vehicles along existing or planned roads. Note that the heavy vehicle road network study area should incorporate road based public transport vehicles.

The **major destination** should be determined by referencing the latest Spatial Development Framework (SDF) available here:

[http://joburg.org.za/index.php?option=com\\_content&view=article&id=5941:spatial-development-framework-2010-2011&catid=61&Itemid=114](http://joburg.org.za/index.php?option=com_content&view=article&id=5941:spatial-development-framework-2010-2011&catid=61&Itemid=114)

In Table 5.14 of this document a hierarchy of nodes is defined as follows:

- CBD Nodes.
- Metropolitan Nodes.
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- District Nodes.
- Specialist Nodes.

Maps of these nodes are also provided under the description “Mixed Use Nodes 2010”, also called Appendix A. In Annexure B node profiles are provided which include a description of existing transportation facilities within the node.

More details are provided in the latest Regional Spatial Development Frameworks for each region (Region A to G) available here:

[http://joburg.org.za/index.php?option=com\\_content&task=view&id=5543&Itemid=114](http://joburg.org.za/index.php?option=com_content&task=view&id=5543&Itemid=114)

In Section 3.1.3 of each Regional Spatial Development Framework (RSDF) the nodal hierarchy for each region is defined. The Regional Spatial Development Framework also includes a map showing the boundaries of each node. The following nodes are defined:

- CBD Nodes.
- Metropolitan Nodes.
- Regional Nodes.
- District Nodes.
- Specialist Nodes.
- Neighborhood Nodes.
- Industrial Nodes.

It is recommended to consider “Regional Nodes” and “Metropolitan Nodes” as defined by the SDF or RSDF as **major destinations** when determining the extent of the public transport and the non-motorised transport study areas. However in some cases some other nodes may be considered major destinations depending on the location of the development application.

### Type of Transport Assessment:

It is a requirement that in the case of a proposed amendment to the Town Planning Scheme or the submission of a Site Development Plan that a Level 4 External Transport Assessment be supported by a socio-economic / demographic market assessment. Such an assessment should indicate the envisaged customer segmentation, market trends and the expected take-up or occupation of the newly planned developments. This assessment may form part of the town planning application in which case the Transport Assessment must make reference to this assessment.

The following assessments will be required:

- A capacity and safety assessment of all the non-motorised transport facilities within the non-motorised study area.
- A capacity assessment of all the public transport services within the public transport study area. There is no requirement for the applicant to assess the safety of public transport vehicles. The safety of public transport services should be addressed under the safety assessment of the vehicle road network.
- A capacity and safety assessment of all intersections within the vehicle study area.

The capacity and safety assessment of non-motorised transport facilities can be based on a spreadsheet model based on information made available by the City (refer to **Chapter 8**). Where significant gaps exist in the available information the applicant may be expected to carry out non-motorised transport surveys, such as traffic counts, origin-destination surveys or journey time surveys.

The capacity assessment of the vehicle road network and public transport services must be informed by a macro-scopic mode-choice demand model (refer to **Chapter 7**).

The capacity and safety assessment of public transport services should be informed by the City's transport model specifically in terms of the expected

mode split and trip distribution component of the capacity assessment. The public transport capacity assessment can be based on a spreadsheet model based on information extracted from the City's transport model. Alternatively, it may be agreed that the applicant should model the proposed development interactively by utilizing the City's transport model.

The vehicle road network, capacity assessment should focus on capacity restraints relevant to light vehicles, heavy vehicles and road based public transport vehicles and should be supported by a meso-scopic or micro-scopic network model that models intersection and turning movement delays. Software such as AIMSUN, VISSIM, VISUM, Transyt or Saturn may be required. The applicant will be responsible for collecting the relevant information to inform the assessment of the vehicle road network, for example traffic counts, origin-destination surveys or journey time surveys.

#### Assessment Years:

The assessment years required are: base year, year of opening, year of opening + 5 years, year of opening + 10 years and one additional forecast.

The additional forecast year to be analysed should be based on the forecast years of the master planning for the study area or the infrastructure or operational implementation program for the study area. It should be assumed that the full development proposal will be operational at the year of opening. Alternatively, additional assessment years may be required as per the proposed phasing of the development.

In case of a significant construction phase it is required that the construction phase transport is assessed as an additional scenario, where appropriate.

#### Master planning:

Metropolitan, provincial and national master planning, where available, should be considered by the applicant. Metropolitan master planning is the responsibility of the City and where it is not available; the master planning for the area needs to be completed by the City or the City's nominated agent

before a Level 4 External Transport Assessment may be considered by the City. The applicant should be aware that the absence of master planning for the duration of the proposed phasing of the development may result in the City restricting the validity period of the Transport Assessment (refer to **Section 2.4**).

### **3.3.5 Compare Extent of Different Levels of External Transport Assessments**

In **Table 2** a summary of the extent for each level of External Transport Assessment is provided in terms of the study areas, the type of Transport Assessment, the assessment years and master planning.

Table 2: Extent of External Transport Assessments Comparison

External Transport Assessment	Ultimate peak hour vehicle trip generation*	Internal Transport Assessment Required	EXTENT OF TRANSPORT ASSESSMENTS						
			Assessment Years	Study Area			Type of Transport Assessment	Typical Methods and Software	Master planning
				Non-motorised Transport Network	Public Transport Network	Road Network			
Level 1	0-50	Yes	1.) Base year 2.) Year of opening	<i>Internal</i> Site and Accesses	<i>Internal</i> Site and Drop-Off/Pick-Up facilities	<i>Internal</i> Site and Accesses	Internal capacity and safety assessment	Excel spreadsheet model and stand-alone intersection modelling (e.g. <i>SIDRA</i> )	Masterplanning that affects the internal transport provision should be taken into account and included
Level 2	50-150	Yes	1.) Base year 2.) Year of opening 3.) Year of opening +5 years	Up to the <i>first</i> existing or planned <i>intersection</i> of pedestrian and cycle ways on either side of the pedestrian accesses within 2km	Up to the <i>first</i> existing or planned public transport <i>station or stop</i> on either side of the pedestrian accesses within 500m	Up to the <i>first</i> existing or planned <i>intersection</i> on either side of the vehicle accesses within 2km	1.) A statement on the availability of non-motorised transport facilities 2.) A statement on the availability of public transport services 3.) Capacity and safety assessment of intersections	Excel spreadsheet model and stand-alone intersection modelling (e.g. <i>SIDRA</i> ); Statements based on information made available by City	Metropolitan, provincial and national masterplanning should be considered. Where metropolitan masterplanning is available a Level 2 assessment may still be considered by the City.
Level 3	150-1500	Yes	1.) Base year 2.) Year of opening 3.) Year of opening + 5 years 4.) One additional forecast year as agreed	Up to the <i>first</i> existing or planned major <i>destination</i> or public transport mode that can be reached by existing or planned (where available) cycling and/or pedestrian routes within 2km of the pedestrian accesses to the development.	Up to the <i>first</i> existing or planned major <i>destination</i> that can or will be reached by each existing or planned (where available) public transport service within 500m of the pedestrian accesses to the development.	All road infrastructure where the ultimate peak hour vehicle trips generated for the ultimate phase of the proposed development will be <b>75 or more vehicle trips</b> added to any lane volume*.	1.) Capacity and safety assessment of non-motorised transport facilities 2.) Capacity assessment of public transport services 3.) Capacity and safety assessment of intersections <i>Transport Assessments should be supported by a socio-economic/demographic market analysis</i>	Excel spreadsheet model and stand-alone intersection modelling (e.g. <i>SIDRA</i> ) OR, in a complex urban environment, micro-scopic modelling (e.g. <i>Transyt, Aimsun or Vissim</i> ); The public transport services capacity assessment and the non-motorised transport facility capacity assessment can be based on information made available by the City	Metropolitan, provincial and national masterplanning should be considered. Where metropolitan masterplanning is not available needs to be completed before a Level 3 assessment may be considered by the City.
Level 4	>1500	Yes	1.) Base year 2.) Year of opening 3.) Year of opening + 5 years 4.) Year of opening + 10 years 5.) One additional forecast year as agreed	<i>All</i> existing or planned major <i>destinations</i> or public transport services that can be reached by existing or planned (where available) cycling and/or pedestrian routes within 500m of the border of the development precinct.	<i>All</i> existing or planned major <i>destinations</i> that can or will be reached by each existing or planned (where available) public transport service within 500m of the border of the development precinct.	From development to existing and planned major <i>destinations</i> that can or will be reached by vehicles along existing or planned roads.	1.) Capacity and safety assessment of non-motorised transport facilities 2.) Capacity assessment of public transport services 3.) Capacity and safety assessment of intersections <i>Transport Assessments should be supported by a socio-economic/demographic market analysis</i>	Public Transport and vehicle road network should be informed by <i>Macro-scopic</i> mode-choice demand model. The road network should be supported by a <i>meso-scopic or micro-scopic</i> network model. Public transport service may be analysed by a spreadsheet model informed by the <i>City's transport model</i> or by modelling the proposed development by utilizing the City's transport model. The non-motorised transport capacity assessment can be based on a spreadsheet model based on information made available by the City.	Metropolitan, provincial and national masterplanning should be considered. Where metropolitan masterplanning is available it needs to be completed before a Level 4 assessment may be considered by the City.

\* No allowance may be made for the application of reduction factors or trip generation adjustment factors when determining the threshold

## CHAPTER 4 APPLICATION PROCESS

### 4.1 Pre-Application Consultation

#### 4.1.1 What is Pre-Application Consultation?

Pre-application consultation is an optional meeting, email or phone conversation that takes place prior to the commencement of a Transport Assessment with the JRA to confirm the extent of a Transport Assessment.

#### 4.1.2 What is the purpose of Pre-Application Consultation?

The purpose of the consultation is to confirm the extent of the Transport Assessment. For example aspects such as the type of application, approving department, location, study areas, proposed development, threshold calculation, type of transport assessment, assessment years, master planning, data requirements, surveys to be carried out, external authorities to be consulted and latent rights may be discussed. The required extent of Transport Assessments outlined in **Chapter 3** should guide the consultation.

#### 4.1.3 When is a Pre-application Consultation required?

Pre-application consultation with the JRA is optional for applicants submitting any extent of Transport Assessment and especially recommended for Level 3 and Level 4 External Transport Assessments.

#### 4.1.4 The Pre-application Consultation Process

The onus will be on the applicant to determine and present the intended extent of the transport assessment as guided by the requirements in **Chapter 3**.

JRA officials are available on weekdays between 9h00 and 16h00 at the following address:

9<sup>th</sup> Floor, North Wing

JRA Building



66 Sauer Street  
JOHANNESBURG  
2000

JRA officials can be contacted at (011) 298 5000 or [info@jra.org.za](mailto:info@jra.org.za)

On Mondays between 9h00 and 11h00 JRA officials are available at an open meeting during which an applicant's Site Development Plan (and associated Internal Transport Assessment) can be discussed at the following address:

<sup>5th</sup> Floor

Metro Centre  
158 Civic Boulevard  
Braamfontein

Any agreements reached during the pre-application consultation, specifically where deviations from these guidelines are proposed and recommended at the discretion of the City, must be documented in writing and must accompany the application. This document may be in the form of an email, meeting notes or a formal letter.

A pre-application consultation with the JRA does in no way guarantee the approval of a development application by CoJ Development Planning Department or the approval of an application for changes to transport infrastructure or services by the JRA.

#### 4.1.5 Discussion points at the Pre-Application Consultation

The following aspects in terms of the extent of the Transport Assessment may be discussed at a pre-application consultation with the JRA:

- A brief description of proposed amendment to the town planning scheme, site development plan or changes to transport infrastructure or services, including location map.
- Type of Application, for example Amendment to the Town Planning Scheme, Site Development Plan, Changes to Transport Infrastructure or Services (refer to **Section 2.1**).

- Approving Department (refer to **Section 4.2** and **Section 4.3**).
- Threshold Calculation (refer to **Section 2.2**).
- Internal and external study areas for non-motorised transport facilities, public transport services and the vehicle road network (refer to **Chapter 3**).
- Type of Transport Assessment in terms of the, extent of modelling to be carried out, data requirements and data surveys to be carried out (refer to **Chapter 3**).
- Assessment Years (refer to **Chapter 3**).
- Master planning availability (refer to **Chapter 3**).
- Latent land use development rights.
- External authorities to be consulted.

#### **4.2 Proposed amendment to the Town Planning Scheme and submission of a Site Development Plan**

When a development application is submitted (i.e. an Amendment to the Town Planning Scheme or a Site Development Plan) the applicant should adhere to the following procedure:

- Submit the application, including the Transport Assessment, to the CoJ's Development Planning Department.
- The CoJ's Development Planning Department will then indicate to the applicant should additional comments be required from other CoJ departments or agencies, including the JRA.
- The CoJ's Development Planning Department will also indicate should additional comments be required from external authorities, including neighbouring local transport authorities, Gauteng Province Department of Roads and Transport, South African National Roads Agency Limited, Gautrain Management Agency, Metrobus, etc.
- Should comments be required from other internal or external authorities it is up to the applicant to submit the application in full (including the town planning application) to these authorities, to obtain comments from these authorities and to submit these comments to the CoJ's Development Planning Department.
- In cases where comments are required from the JRA the requirement to

submit the application in full (including the town planning application) must be noted. The Transport Assessment on its own as a standalone document will not be accepted by the JRA. Specific attention should be given to the following:

- The description of the proposed development in the Transport Assessment should correspond in full to the town planning description of the proposed amendment of the Town Planning Scheme.
- The socio-economic / demographic market assessment that is submitted in support of the proposed amendment of the Town Planning Scheme should be submitted as supporting documentation to the JRA.

### 4.3 Proposed changes to transport infrastructure or services

When an application or a proposal is submitted for changes to transport infrastructure or services that are not required as a result of the development application as explained in **Section 2.1**, the applicant should adhere to the following procedure:

- Submit the application, including the Transport Assessment, to the JRA.
- The JRA will then indicate to the applicant should comments be required from other CoJ departments or agencies.
- The JRA will also indicate should comments be required from external authorities, including neighbouring local transport authorities, Gauteng Province Department of Roads and Transport, South African National Roads Agency Limited, Gautrain Management Agency, Metrobus, etc.
- Should comments be required from other internal or external authorities it is up to the applicant to submit the application in full to these authorities, to obtain comments from these authorities and to submit these comments to the JRA.

## CHAPTER 5 CAPACITY ASSESSMENT ASSUMPTIONS

### 5.1 Trip Generation Assumptions

In terms of latent rights the following process should be followed:

- The three study areas (non-motorised transport facilities study area, public transport services study area and vehicle road network study area) should be compared to determine the study area encompassing the largest geographic area.
- The latent rights of developments located within the largest study area boundary should be determined.
- Person trips should be estimated for the largest study area taking into account latent rights.

Trip generation shall be expressed in person trips generated, as opposed to vehicle trips generated. In the absence of up to date person trip generation rates for different land use types, the approaches outlined in **Section 5.1.1, 5.1.2 and 5.1.3** must be considered by the applicant.

It must be noted that in the interest of consistency surveys at similar sites to inform the envisaged trip generation for a proposed development may only be considered in exceptional cases as agreed and approved during a pre-application consultation.

#### 5.1.1 The City's Transport Model (calibrated to 2014)

The model provides trip generation algorithms for:

- Trip purposes: Home to work, home to education, home to shopping, home to other and non-home based to other.
- Income groups: Low, medium and high income person trips.
- In total 12 calibrated trip generation functions are available.

Table 3: Production and Attraction Trip Generation Rates for the AM Peak Period

Trip Origin	Trip Purpose	Income	Trip Generation Rate
Home	Work	Low	Number of low income employed persons x 0.41
Home	Work	Medium	Number of medium income employed persons x 0.38
Home	Work	High	Number of high income employed persons x 0.52
Home	Education	Low	Number of people in low income household x 0.22
Home	Education	Medium	Number of people in medium income household x 0.22
Home	Education	High	Number of people in high income household x 0.20
Work	Home	Low	Number of low income employment opportunities x 0.21
Work	Home	Medium	Number of medium income employment opportunities x 0.13
Work	Home	High	Number of high income employment opportunities x 0.16
Education	Home	Low	Number of low income learners x 1
Education	Home	Medium	Number of medium income learners x 0.66
Education	Home	High	Number of high income learners x 0.48

### 5.1.2 South African Trip Data Manual published by COTO (2012)

The following approach is only recommended for Level 1, 2 and 3 Transport Assessments in cases where access to the City's transport model's trip generation component is not advisable in accordance to the City's document outlining the protocol to access and use the model (available here [www.joburg.org.za](http://www.joburg.org.za)):

- The principles as detailed in Appendix B.4 of "South African Traffic Impact and Site Traffic Assessment Manual, TMH 16, August 2012, COTO, 2012" shall apply.
- The principles as detailed in Chapter 4 of "South African Trip Data Manual, TMH 17, COTO, 2012" shall apply.
- Allowance may be made for the application of reduction factors or trip generation adjustment factors as detailed in Section 4.9 and Table 3.2 of Appendix A of TMH 17 or Section B4.2 of TMH 16 for the purposes of a capacity assessment.

- Trip generation should represent the ultimate additional peak hour **person** trips generated for **each phase** of the proposed development and include pass-by, diverted, transferred and primary trips both internal and external as defined by these manuals.
- This approach is different from the required approach when calculating the threshold (**Section 2.2**) and the study area for a Level 3 External Transport Assessment's vehicle road network (**Section 3.3.3**). Refer to **Section 2.3**.

The manual proposes reduction factors for trip generation rates for various land use types based on the following four factors:

- Mixed-use development.
- Low vehicle ownership.
- Very low vehicle ownership.
- Transit nodes or corridors.

If reduction factors are applied a phased approach should be followed. Each phase of the development should be evaluated in terms of its mixed-use character, vehicle ownership and public transport accessibility. The reduction factors should be adjusted for each phase of the development and each assessment year.

Reduction factors must be applied with caution and must be substantiated based on the information made available by the CoJ (refer to **Chapter 8**):

Mixed-use developments: Trip reduction as a result of "Mixed-Use" Developments is based on various factors and combination of factors for example the scale of the development, the mix of the development, the proximity of the various uses to one another, the hours of operation, the location of the development. Information on the potential users, where they work, where they live, where they go to school and where they shop needs to be assessed to support a reduction factor for mixed-use developments. This information should be made available by the socio-economic / demographic market assessment supporting the town planning application. Mixed-use developments will only be considered in the following cases:

- A combination of residential, office and retail land uses.

- A combination of residential, manufacturing and retail land uses.
- A combination of residential, education and retail land uses.

#### Vehicle ownership:

- Vehicle occupancy statistics are more often than not sensitive to the location of the proposed development.
- Information on unemployed population per ward and low income residential areas is available from the Transport Information Register's GIS database. This information can be used to make assumptions regarding car ownership.
- Information on household income and vehicle ownership is available per analyses area from the Household Travel Surveys.
- Vehicle ownership may change over time and any assumption should be adjusted for each phase of the development supported by empirical research.

#### Transit nodes or corridors:

Only development proposals of which the border of the development precinct is located within 500m walking distance from an existing or planned road based or off-road public transport service may be considered for this reduction factor.

#### Vehicle Occupancy:

In order to convert the ultimate additional peak hour vehicle trips generated to person trips, assumptions on vehicle occupancy need to be made. These assumptions should be based on surveyed information as reported by the Transport Information Register's GIS database and the Strategic Integrated Transport Framework (refer to **Chapter 8**).

#### **5.1.3 South African Trip Generation Rates published by the Department of Transport (1995)**

The document provides average person trip rates for the peak hour of the land use as well as daily person trip rates for the land use.

## 5.2 Trip Distribution Assumptions

It is important to understand that trip making patterns, including time of day and trip distribution of public transport and non-motorised transport users are often very different from those of light vehicle users. The trip distribution should therefore be calculated and demonstrated per mode.

In terms of the assumed future public transport services and non-motorised routes, it should also be noted that these initiatives can add substantial capacity to the transport network and can momentarily change the assumption regarding the origin and destination of users, especially long distance trip makers. The trip distribution should therefore be sensitive to the phasing of the development and the phasing of the public transport services and non-motorised routes.

Trip distribution assumptions should be based on information made available by the City. These sources mainly include:

- The City's Transport Model.
- Transport Information Register.
- Transport Information Register GIS Database.
- Household Travel Survey.

Master planning should also be consulted to inform the assumptions regarding trip distribution.

## 5.3 Mode Split Assumptions

The mode split assumptions should be sensitive to the phasing of the development and the phasing of the public transport services and non-motorised routes.

Mode split assumptions should be based on information made available by the City. These sources mainly include:

- The City's Transport Model.
- Transport Information Register.



- Transport Information Register GIS Database.
- Household Travel Survey.

Master planning should also be consulted to inform the assumptions regarding mode split.

Once the threshold and the vehicle road network study areas have been determined allowance may be made for the application of reduction factors or trip generation adjustment factors when determining the trip generation and mode split of the proposed development.

Existing intersections within the vehicle study area should be surveyed, where required, and analysed to illustrate current capacity limitations. The City then needs to be convinced that these intersections will not be impacted due to the planned implementation of mitigation measures in terms of public transport and non-motorised transport.

The expected impact and proposed mitigation measures should be determined through the normal capacity assessment methodology and the application of *person trip generation*, not *vehicle trip generation*, as well as well as appropriate mode split assumptions.

## CHAPTER 6 MITIGATION MEASURES

### 6.1 When are mitigation measures required?

Mitigation measures are required when the operations of an existing or planned non-motorised transport facility, public transport service or vehicle road network reaches Level of Service (LOS) E.

The applicant should take cognisance of the warrants for the provision of certain mitigation measures, such as signalised intersections, as outlined in the South African Road Traffic Signs Manual of the Department of Transport (2011), or pedestrian facilities as outlined in the Pedestrian Facility Guidelines of the Department of Transport (1993).

### 6.2 Level of Service Calculation

#### 6.2.1 Non-motorised transport facilities

##### Acceptable Walking and Cycling Distance

The acceptable cycling distance for commuting purposes is 5km. The acceptable walking distance for commuting purposes (where walking is considered the main mode of transport) is 2km. The non-motorised transport facility study areas are generally not required to extend beyond 2km from the border of the development precinct or the pedestrian access to the development (refer to **Section 3.3**).

Where walking is considered a secondary mode of transport to access other transport facilities, the guidelines in **Table 4** shall apply. The public transport services study area are generally not required to extend beyond public transport services within 500m of the border of the development precinct or the pedestrian access to the development (refer to **Section 3.3**).

Table 4: Acceptable Walking Distance

Destination	Acceptable walking distance
Road and/or Street Crossing	50 – 100m
Building Entrance from Parking	100m
Road based public transport stops	300m
Community facilities and parks	400m
Off-road public transport stops	500m

The calculation of walkway, waiting area and bicycle lane LOS are based on the guidelines provided by the Department of Transport.

### Walkway Level of Service

Pedestrian and cycle traffic data is required to assess system level of service. The capacity of non-motorised transport facilities can be based on information made available by the City (refer to **Chapter 8**). Where significant gaps exist in the available information the applicant may be expected to carry out non-motorised transport surveys, such as traffic counts, origin-destination surveys or journey time surveys.

The LOS thresholds for walkways are provided in **Table 5**.

Table 5: LOS Criteria for Walkways

LOS	Random Flow				Platoon Situation	
	Pedestrian Space	Pedestrian Flow Rate	Average Travel Speed	V/C Ratio	Pedestrian Space	Pedestrian Flow Rate
	$A_p$ (sqm/ped)	$V_p$ (peds/min/m)	$S_{TP}$ (m/s)		$A_p$ (sqm/ped)	$V_p$ (peds/min/m)
A	>6	<16	1.3	<0.2	>49	</=1.6
B	>4 – 6	16 – 23	1.3	0.2 – 0.3	>9 – 49	>1.6 – 10
C	>2 – 4	23 – 32	1.2 – 1.3	0.3 – 0.45	>4 – 8	>10 – 20
D	>1 – 2	32 – 49	1.1 – 1.2	0.45 – 0.65	>2 – 4	>20 – 36
E	>0.7 – 1	49 – 75	0.8 – 1.1	0.65 – 1.0	>1 – 2	>32 – 60
F	</=0.7	Variable	<0.8	Variable	</=1	>60

A platoon situation is for example be considered at a traffic light, at a public transport drop-off point or at certain access controlled development. All other situations could be considered normal situations or random flow.

The LOS of a walkway can be determined by estimating one of the following, depending on the available data:

- Pedestrian Space
- Pedestrian Flow Rate
- Average Travel Speed
- V/C Ratio

The estimation of these parameters are further detailed below.

**Pedestrian Space (sqm/ped)**

$$A_p = (60 \times S_p) / V_p$$

**Average Pedestrian Walking Speed (m/s)**

$$S_p = (1 - 0.000073 \times V_p^2) \times S_{FS} \text{ (m/s)}$$

**Pedestrian Free Flow Speed (m/s)**

$S_{FS} = 1.3\text{m/s}$  for normal situations – reduces to  $1.0\text{m/s}$  for > 20% elderly

**Pedestrian Flow Rate (peds/min/m)**

$$V_p = \text{peds/min/m}$$

Where  $m = W_E$

**Effective Sidewalk Width (m)**

$$W_E = \text{Total Width} - W_o - W_s$$

$W_o$  = Fixed object adjustment (inside and outside) – example could be up to 1m for a row of trees or light poles

$W_s$  = Shy distance adjustment (inside and outside) – 1m for display window, 0.6m for building and 0.4m for fence – weighted by percentage of  $L_E$

**Average Travel Speed (m/s)**

$$S_{TP} = L_E / (L_E / S_p + D_{PP})$$

Where:

$D_{PP}$  = delay at intersection in the direction of travel (sec)

**Effective Segment Length (m)**

$$L_E = \text{Total Length over } W_E$$

### **Volume over Capacity Ratio (V/C)**

$$V/C = V_p / \text{Capacity}$$

Capacity = 50 peds/min/m for stairs

Capacity = 60 peds/min/m for platoon situation

Capacity = 75 peds/min/m for random flow

### **Waiting Area Level of Service**

The LOS thresholds for waiting areas are provided in **Table 6**

Table 6: LOS Criteria for Waiting Areas

LOS	Pedestrian Space (sqm / ped)
A	>1.2
B	>0.9 – 1.2
C	>0.6 – 0.9
D	>0.3 – 0.6
E	>0.2 – 0.3
F	</=0.2

### **Pedestrian Space (sqm/ped)**

$$A_p = W_E \times L_E / \text{waiting pedestrians}$$

### **Effective Sidewalk Width (m)**

$$W_E = \text{Total Width} - W_o - W_s$$

$W_o$  = Fixed object adjustment (inside and outside) – example could be up to 1m for a row of trees or light poles

$W_s$  = Shy distance adjustment (inside and outside) – 1m for display window, 0.6m for building and 0.4m for fence – weighted by percentage of  $L_E$

### **Effective Segment Length (m)**

$$L_E = \text{Total Length over } W_E$$

### **Waiting pedestrians (peds)**

At a traffic signal:

$$V_p \times \text{minutes red signal time}$$

## 6.2.2 Public Transport Services

Public transport service data is required to assess system level of service. The capacity of public transport services can be based on information made available by the City (refer to **Chapter 8**). Where significant gaps exist in the available information the applicant will not be expected to carry out public transport service surveys.

However should the applicant be required to illustrate the effective implementation of public transport mitigation measures the analyses must be supported with appropriate public transport service data, such as passenger counts, origin-destination surveys or journey time surveys. Alternatively public transport service capacity can be assessed by the applicant through the City’s transport model (refer to **Chapter 7**) and the City’s master planning as per the Integrated Transport Network.

If a public transport service is currently at capacity and there are no future plans in accordance with the proposed phasing of the development or master planning to increase the public transport service capacity, no benefit or mitigation may be claimed from the existing public transport service.

The LOS thresholds for public transport services are provided in **Table 7**

Table 7: LOS Criteria for Public Transport Services

LOS	Numerical Score	
	Min	Max
A	0	2
B	2	2.75
C	2.75	3.5
D	3.5	4.25
E	4.25	5
F	5	

### Numerical Score

$$= 6 - 1.5 \times \text{TransitWaitRideScore} + 0.15 \times \text{PedLOS}$$

Table 8: Ped LOS

Walkway to PT Service LOS / Waiting Area at PT Service LOS (select the worse)	Numerical Value
A	1
B	2
C	3
D	4
E	5
F	6

### *TransitWaitRideScore*

= headway factor x perceived travel time factor

Table 9: Headway factor

Headway (min)	Frequency (veh/h)	Headway Factor
60	1	1
45	1.33	1.33
40	1.5	1.5
30	2	2
20	3	2.44
15	4	2.8
12	5	2.99
10	6	3.16
7.5	8	3.37
6	10	3.58
5	12	3.79

Table 10: Perceived travel time factor

Perceived travel time rate (min/km)	CBD	Other Areas
1.2	1.5	1.31
1.5	1.41	1.22
1.9	1.31	1.12
2.5	1.17	1
3.7	1	0.85
7.5	0.76	0.67
18.6	0.58	0.53

***Perceived Travel Time Rate (min/km)***

= actual in vehicle time rate x excess wait time rate – amenity time rate

***Actual In Vehicle Time Rate (min/km)***

= passenger load weighting factor x average speed (min/km)

Table 11: Passenger Load Weighting Factor

Load factor (passengers / seat)	Passenger Load Weighting Factor
less than 0.8	1
1	1.19
1.1	1.41
1.2	1.62
1.3	1.81
1.4	1.99
1.5	2.16
1.6	2.32

***Excess Wait Time Rate (min/km)***

= excess wait time / average trip length

***Excess Wait Time (min)***

= sum of the differences between schedules and actual arrival times for a service / number of observations

***Average Trip Length (km)***

A default value of mode specific passenger trip lengths city wide can be assumed

***Amenity Time Rate (min/km)***

=(0.8 x Shelter + 0.12 x Bench) / average trip length

Shelter = proportion of stops with shelters

Bench = proportion of stops with benches

**6.2.3 Vehicle Road Network**

The effectiveness of a proposed mitigation measure should be measured by evaluating the vehicle road network through investigating the following:



- Level of Service (which may be based on V/C or average delay)
- Delay (which may be based on average, maximum or total)
- Volume / Capacity (which should be calculated in equivalent passenger car units (pcus))
- Queues (maximum or total)

The LOS thresholds for the vehicle road network are provided in **Table 7**

Table 12: LOS Criteria for Vehicle Road Network

LOS	Average Delay (secs/veh)		Volume / Capacity Ratio (V/C)
	Priority	Signal	
A	<10	<10	<0.5
B	<15	<20	<0.8
C	<25	<35	<0.9
D	<35	<55	<0.95
E	<50	<80	<0.99
F	50+	80+	0.99+

The following assumptions should be made when determining LOS, delay, V/C or queues:

***Intergreen time to stop on yellow***

Normal reaction time = 0.75 secs

Slower reaction time = 1 sec

Acceleration = 0.67 m/s<sup>2</sup>

***Minimum green times for signal phases***

Through green: 7 – 11 secs

Leading green: 4 – 7 secs

Lagging green = 3 secs minimum

Pedestrian green man = 4 secs

Yellow = 3 secs

All red = 2 secs

***Deceleration rates to stop on yellow***

Deceleration rate = -3.7 m/s<sup>2</sup>

Truck deceleration rate = -3.05 m/s<sup>2</sup>

Comfortable deceleration rate = -2 m/s<sup>2</sup>

Light vehicle length = 6m

### 6.3 Who is responsible for mitigation measures?

Mitigation measures may take the form of:

- Additional or improved non-motorised transport facility infrastructure
- Additional or improved public transport services
- Additional or improved vehicle road network infrastructure

Developer contributions are currently guided by the following document, available here: [www.joburg.org.za](http://www.joburg.org.za).

#### 6.3.1 Private Applicants

Private applicants are considered to be developers and residents associations (refer to **Section 1.6**). The provision of public transport services as a mitigation measure may be problematic for private entities. In terms of public transport mitigation measures a Travel Plan is internationally considered to be the primary means by which authorities can obtain developer contributions in terms of public transport. The City does not currently have the institutional capacity or the legal framework to manage and enforce the implementation and monitoring of a Travel Plan and is working towards establishing the institutional capacity and legal framework in the near future (refer to **Section 1.8.2**).

In the absence of a Travel Plan in support of public transport services it is therefore concluded that only non-motorised transport infrastructure provision and vehicle road network infrastructure provision are within the control of private entities. It is therefore recommended that the private applicant present two options, as follows:

- Option 1: illustrating how the impact on transport can be mitigated mainly through the provision of additional non-motorised transport facility infrastructure and public transport services.
- Option 2: illustrating how the impact on transport can be mitigated

mainly through the provision of additional non-motorised transport facility infrastructure and vehicle road network.

The private applicant may wish to only consider Option 1 in cases where an existing or planned public transport service (as per the available master planning) exists. In the case of Option 1 the private applicant may then wish to engage with the City in terms of their provision of public transport services to ensure the successful mitigation of the transport impact.

### 6.3.2 Public Applicants

Public applicants are considered to be CoJ itself or departments or agencies of CoJ or other national, provincial or local authorities (refer to **Section 1.6**). The provision of public transport services as a mitigation measure falls within the mandate of the government sphere. Public applicants should therefore focus on illustrating how the impact on transport can be mitigated mainly through the provision of additional non-motorised transport facility infrastructure and public transport services where an existing or planned public transport service (as per the available master planning) exist.

## 6.4 How should mitigation measures be demonstrated?

### 6.4.1 General Requirements

The Transport Assessment should correspond to the latest available Site Development Plan submitted where relevant. The description of the proposed development in the Transport Assessment should correspond in full to the town planning description of the proposed amendment of the Town Planning Scheme. The socio-economic / demographic market assessment that is submitted in support of the proposed amendment of the Town Planning Scheme should be submitted as supporting documentation to the JRA.

The Transport Assessment should clearly outline the mitigation measures to be implemented by the applicant and the mitigation measures considered to be the responsibility of the City of Johannesburg or other agency.

Where this Guideline is silent on any issue related to the planning for non-

motorised transport facilities or the vehicle road network, the applicant should consider the following guidelines:

- Pedestrian and Bicycle. Department of Transport. August 2003.
- Complete Streets Design Guidelines Manual. City of Johannesburg, 2013.
- JRA Roads and Stormwater Manual. JRA. 2015.
- Pedestrian Facility Guidelines: Manual to Plan, Design and Maintain Safe Pedestrian Facilities. National Department of Transport, 1993. RR 92 / 126.

#### 6.4.2 Internal Transport Assessment Requirements

The internal vehicle road network should be assessed and mitigation measures illustrated for the following modes (where relevant):

- Non-motorised transport: pedestrians and cyclists.
- Light-motorised transport vehicles: motorcycles, private light vehicles, minibus taxis, tuk-tuks, light delivery vehicles, etc.
- Heavy-motorised transport vehicles: buses, freight vehicles, heavy delivery vehicles, refuse collection vehicles, fire trucks, emergency vehicles, etc.

The following aspects should be indicated conceptually, taking account of the available space and gradient:

- The accommodation of pedestrians and cyclists on the *internal* vehicle road network (including internal intersections) and *internal* non-motorised transport network (if different) must be indicated. Pedestrian and cyclist crossings should be indicated.
- The access of pedestrians and cyclists to/from the *external* vehicle road network and external non-motorised transport network (if different) must be indicated.
- The accommodation of light- and heavy-motorised vehicles on the *internal* vehicle road network (including internal intersections) must be indicated.
- The access of light- and heavy-motorised vehicles to/from the *external* vehicle road network must be indicated.
- The provision of *internal* public transport facilities such as stops, shelters, interchanges, holding facilities, ranking facilities must be

indicated.

In addition the following are specific details required (refer to **Section 3.2.2**):

- Access onto the *external* vehicle road network should be indicated and detailed in terms of its proposed width, bell mouth radius and stacking distance.
- All vehicle road network accesses to/from the proposed development should be accompanied with a throat length analyses.
- Parking must be provided as per the latest Town Planning Scheme available here [www.joburg.org.za](http://www.joburg.org.za).
- Safe parking for cyclists must be indicated.
- All internal pedestrian intersection crossings shall be provided taking account of universal access design principles including signal controls where traffic signals are warranted.
- In the case of schools or education facilities it is particularly important to indicate pedestrian and scholar transport circulation and parking internally.
- In case of a township establishment, a township layout must be submitted as part of the Transport Assessment indicating the required road reserves.
- In the case of proposed signalisation a signal warrant should accompany the Transport Assessment in accordance with the SARTSM, Volume 3.

It should be noted that it is required that all internal non-motorised transport facilities and public transport service infrastructure be provided at the time of the final site inspection.

#### 6.4.3 External Transport Assessment Requirements

The external vehicle road network should be assessed and mitigation measures illustrated for the following modes (where relevant):

- Non-motorised transport: pedestrians and cyclists.
- Light-motorised transport vehicles: motorcycles, private light vehicles, minibus taxis, tuk-tuks, light delivery vehicles, etc.
- Heavy-motorised transport vehicles: buses, freight vehicles, heavy delivery vehicles, refuse collection vehicles, fire trucks, emergency

vehicles, etc.

- Off-road transport vehicles: passenger rail and light rail

The following aspects should be indicated conceptually, taking account of the available space and gradient:

- The accommodation of pedestrians and cyclists on the *external* vehicle road network (including external intersections) and *external* non-motorised transport network (if different) must be indicated. Pedestrian and cyclist crossings should be indicated. This is required for the entire external road network within the non-motorised transport study area.
- The accommodation of light- and heavy-motorised vehicles on the *external* vehicle road network (including external intersections) must be indicated. This is required for the affected intersections and road sections within the vehicle road network study area.
- The above includes the accommodation of construction traffic and diverted traffic during construction on the *external* vehicle road network (including external intersections).
- The provision of *external* public transport facilities such as stops, shelters, interchanges, holding facilities, ranking facilities must be indicated.

In addition the following are specific details required:

- All external pedestrian intersection crossings shall be provided taking account of universal access design principles including signal controls where traffic signals are warranted.
- In case of a township establishment, a township layout must be submitted as part of the Transport Assessment indicating the required road reserves.
- In the case of proposed signalisation a signal warrant should accompany the Transport Assessment in accordance with the SARTSM, Volume 3.
- Conceptual design drawings must be overlaid on an aerial photograph or a Google Earth image and must show accurate cadastral information.
- The drawing should indicate the existing road reserve as well as the required road reserve / servitude to accommodate the proposed vehicle road network upgrades and/or non-motorised transport facility upgrades.

- Where additional public transport services are required, the following information must be provided:
  - Description of the public transport service required in terms of mode, vehicle capacity and frequency within the public transport study area.
  - Reference to public transport master planning that describes the City's program to implement the required additional public transport services and its correspondence to the phasing of the proposed development.
  - Should no such master planning exist, the applicant should illustrate how the additional public transport services will be provided.
- Proof of a study area inspection must be submitted.
- All input assumptions into the software and capacity assessment should be detailed.

It should be noted that it is required that all internal non-motorised transport facilities and public transport service infrastructure be provided at the time of the final site inspection.

## CHAPTER 7 MODELLING

### 7.1 Scale of Transport Modelling

The types of assessment required for each level of External Transport Assessment in terms of the modelling requirements are different for each level. The following scales of transport modelling are briefly defined:

#### 7.1.1 Macro-scopic

These models are strategic regional models. They are often used to assess policies such as tolling, large scale public transport investment strategies and demand management incentives like congestion charging or peak spreading. They are also described as static (as opposed to dynamic) models. These are network models in the sense that they do not model intersections and do not take into account intersection or turning movement delays. Level of service is calculated based on the capacity of a network link and the anticipated volumes (i.e. Volume / Capacity Ratio). Typical software used for these scale of models is EMME, VISUM and TransCAD. In some instances software like Saturn Buffer Network may also be used (although that does not have a customized mode split functionality included). The City's transport model can be considered a macro-scopic model. The assignment of public transport person trips and on-or off-road public transport vehicles along higher order road networks (where applicable) can inform the envisaged demand and capacity restraint of public transport services. These models typically do not incorporate lower order road networks and therefore are not able to estimate pedestrian and cyclist demand for a specific development.

#### 7.1.2 Meso-scopic

These models are smaller in scale. They are often used to assess the vehicle road network wide capacity implications of a specific development proposal. They are also described as static (as opposed to dynamic) models. They are simulation models in the sense that they simulate intersections and take account of intersection and turning movement delays caused by queueing. Level of service is calculated based on the delay experienced by a particular



movement. Typical software used for these scale of models is Saturn Simulation Network, Aimsun Planner, VISUM.

### 7.1.3 Micro-scopic

These models simulate local transport networks. They are often used to assess localized vehicle road network capacity implications for a specific development proposal. They are also described as dynamic (as opposed to static) models. They are micro-simulation models in the sense that they simulate local transport networks and dynamically adjust trip making choices based on the envisaged queueing. Typical software used for these scale of models is Aimsun Microsimulation, VISSIM, Paramics, etc. These models can be designed to model the movement of road based public transport vehicles along the vehicle road network and as such the impact of these vehicles on the vehicle road network capacity can be assessed. However the demand for and capacity restraint of public transport services can normally not be determined through the application of these type of models. These models typically do not include a mode split component and therefore are not able to assign pedestrian and cyclist demand for a specific development.

Specialized micro-scopic models can be developed to simulate pedestrian movements in urban environments such as public transport stations, stadiums, public spaces, etc.

Static versions of micro-scopic models are also available. They are often used to assess localized intersection capacity implications. They simulate local intersections individually. Typical software used for these scale of models is SIDRA and Transyt.

## 7.2 The City's Transport Model

The following section provides background information to the City's transport model. More information is available from the City's document outlining the protocol to access and use the model, available here [www.joburg.org.za](http://www.joburg.org.za).

The City's Transport model can be considered a strategic macro-scopic mode split demand model. It can also be described as a static network model which takes into account the capacity along network links to determine Level of Service.

The model was recently converted from EMME software and is now based in VISUM software. It is calibrated to 2014 observed traffic data.

It covers the entire Johannesburg Metropolitan Boundary as well as some portions of the neighboring municipalities. The extent of the model is shown in **Figure 2**.

Demand matrices based on the Strategic Development Framework (SDF) are available for 2014, 2015 and 2037. The model includes networks and route information for the following modes:

- Light vehicle road network.
- Freight routes.
- Bus routes (Metrobus, Putco, etc.).
- Minibus-taxi routes.
- Bus Rapid Transit routes (Rea Vaya).
- Passenger rail routes (Prasa).
- Light rail routes (Gautrain).

Only class 1, 2 and 3 roads are modelled. The non-motorised transport facility study area is therefore not represented in full.

The model incorporates information provided by the Gauteng Household Travel Survey of 2013 and the Transport Information Register of 2014.

The model includes a mode split component that was developed and based on stated preference surveys. A logit choice model determines the likelihood of a person choosing a mode based on each mode's travel cost. Due to limited public transport route and passenger information, passenger demand was only validated on an overall market share rather than link or line level. The model does not include walking or cycling as a primary mode split.

Trip generation is calculated for different trip purposes and different income levels.

Weekday AM and PM peak hours are available.

For the purposes of transport assessments, the applicant should consider extracting a cordon model from the macro-scopic model and refining it to a meso-scopic or micro-scopic model. The macro-scopic model should take into account all existing and planned initiatives related to strategic vehicle road networks and public transport services.

The protocol for accessing the City's Transport Model is available here [www.joburg.org.za](http://www.joburg.org.za).

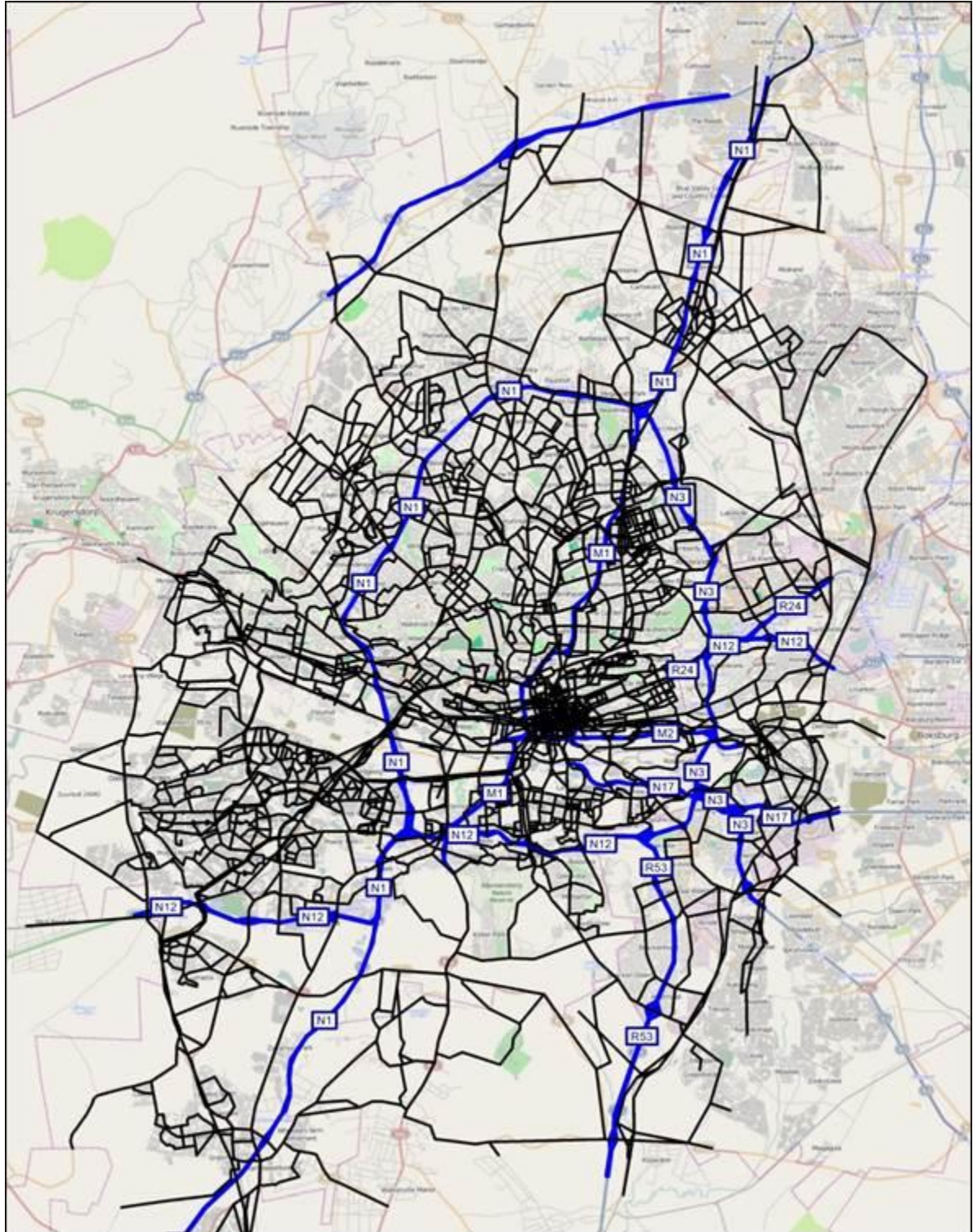


Figure 2: Extent of the City's Transport Model

## CHAPTER 8 SOURCES OF INFORMATION

In the following section, the existing sources of information available from the City are listed. This list is maintained and may be updated from time to time. The onus is on the applicant to obtain the latest list from the City.

### 8.1 Transport Information Register

The document: “Transport Information Register. Summary of Data. 13 February 2014. CoJ” is available [here: www.joburg.org.za](http://www.joburg.org.za).

Information on public transport modes are provided in the following chapters:

- Chapter 7: Minibus Taxi.
- Chapter 10: Rail – Gautrain and PRASA.
- Chapter 11: Bus – Rea Vaya, Gautrain Feeder Services, Metrobus, Putco and 8 other subsidized bus companies.

#### 8.1.1 Passenger Origin-Destination Information

Origin-Destination Information is available for:

- Minibus Taxi for Region A - G provided in Section 7.4 and shown on Maps 7.4a – 7.4g.
- Minibus Taxi for smaller precincts namely Alexandra, Fourways, Midrand, Sandton, Rosebank and Randburg provided in Section 7.5.

Route information is available for:

- Gautrain (Map 10.1).
- PRASA (Map 10.2).
- Rea Vaya (Map 11.1).
- Gautrain Feeder (Map 10.1).
- Metrobus (Map 11.3).
- Putco (Map 11.5).

No route information is provided for minibus taxis.

Passenger survey information (boarding and alighting) is provided for a few selected routes (Appendix C) namely:

**Minibus Taxi:**

- Alexandra to Plein Street Minibus Taxi Route.
- Bree Street Rank - Fourways Diepsloot.
- Bree Street Rank- Randburg.
- Diepsloot – Fourways.
- Jeppe/Delvers to Eastgate.
- Noord Street - Midrand Minibus Taxi.
- MTN Noord Street – Midrand.
- Noord Street Rank - Sunninghill/Sandton.
- Roodepoort (Ontdekkers) - Bree Street Minibus Taxi.
- Orange Farm - Bree Street Minibus Taxi.

**Metrobus:**

- Ghandi Square to Sunninghill (Via Rivonia).
- Soweto (Protea Glen) to Sunninghill.
- Braamfontein - Tulisa Park.
- Crosby to Judith's Paarl.
- Johannesburg Hospital - Rosettenville.
- Westgate to Bedford Plaza.

**Putco:**

- Putco route Dobsonville Ext 3 - Midrand.
- Sandton to Dobsonville Depot.
- Main Reef / Commando - Strijdom Park.
- Dobsonville Ext 3 - Fourways / Kya Sand Dobsonville.

### **8.1.2 Available Public Transport Service Capacity**

Vehicle capacity information is available for:

- *Rea Vaya (Section 11.1.2).*
- *Gautrain Feeder (Section 11.2.2).*

Frequency information is available for:

- Gautrain (Section 10.1.1).
- PRASA (Section 10.2.2 and Appendix D1).
- *Rea Vaya* (Section 11.1.2).
- *Gautrain Feeder* (Section 11.2.2).
- Metrobus (Section 11.3.7).

Information on peak hour passenger boarding and alighting is available for a few selected routes served by the following service providers (Appendix C) and listed in **Section 8.1.1** above:

- Minibus Taxi.
- Metrobus.
- Putco.

### 8.1.3 Other Information

“Mixed-Use Nodes” are indicated in Figure 7, Section 3.10.

## 8.2 Transport Information Register GIS Database

The Transport Information Register’s supporting GIS Database is available here [www.joburg.org.za](http://www.joburg.org.za). The layers which were identified to be of particular use for the purposes of Transport Assessments are highlighted in yellow as discussed below.

**Table 13: Transport Information Register GIS Database**

Layer	Points	Polygons	Polylines	Description
<b>GENERAL</b>				
Areas	49			
Places	79			
Towns	24			
COJ_Boundary		1		Boundary of area under City of Johannesburg's jurisdiction
COJ_Employment_RemainderPop_Wards2011		130		Number of voters per ward, employed population per ward, remaining population per ward
COJ_Employment_RemainderPop_Wards2011_Regions		7		Number of voters per ward, employed population per ward, remaining population per region
COJ_Wards2011		130		
COJ_Wards2011_Census2011		130		
COJ_Wards2011_Census2011_Regions		7		
GITMPTZ		833		Gauteng Integrated Transport Master Plan Traffic Zones
Low_Income_Residential_Area_Indicatf		13		Low Income Residential Areas
Regions		7		
<b>TRAFFIC DATA</b>				
CordonCountsPoints_2005_Northbound_Eastbound	55			2005 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
CordonCountsPoints_2005_Southbound_Westbound	58			2005 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
CordonCountsPoints_2006_Northbound_Eastbound	31			2006 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
CordonCountsPoints_2006_Southbound_Westbound	33			2006 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
CordonCountsPoints_2007_Northbound_Eastbound	60			2007 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
CordonCountsPoints_2007_Southbound_Westbound	60			2007 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
Cordon_Counts_Points_2008_AM_TotalPersonTrips	14			2008 Total AM Person Trips. Presumably AM peak hour, not period. Not per Direction.
Cordon_Counts_Points_2008_Northbound_Eastbound	50			2008 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
Cordon_Counts_Points_2008_Southbound_Westbound	50			2008 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
Cordon_Counts_Points_2013	51			2013 Survey Locations
Cordon_Counts_Points_2013_Modul_Split	51			2013 Traffic count data and vehicle occupancy data. Unclear descriptions. Presumably AM peak hour, not period.
CordonCountsPoints_2009_Northbound_Eastbound	7			2009 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
CordonCountsPoints_2009_Southbound_Westbound	8			2009 Vehicle count data and mode split data. Unclear description of veh 1, veh2, veh3, veh4. Presumably AM peak hour, not period.
CountStations_Intersections	118			
CountStations_V02	522			
OccupancyCountsPoints_2005_Northbound_Eastbound	29			2005 Person Trips, Vehicle Occupancy, Person Mode Choice. Unclear Descriptions Presumably AM peak hour, not period.
OccupancyCountsPoints_2005_Southbound_Westbound	38			2005 Person Trips, Vehicle Occupancy, Person Mode Choice. Unclear Descriptions Presumably AM peak hour, not period.
OccupancyCountsPoints_2006_Northbound_Eastbound	24			2006 Person Trips, Vehicle Occupancy, Person Mode Choice. Unclear Descriptions Presumably AM peak hour, not period.
OccupancyCountsPoints_2006_Southbound_Westbound	25			2006 Person Trips, Vehicle Occupancy, Person Mode Choice. Unclear Descriptions Presumably AM peak hour, not period.
OccupancyCountsPoints_2007_Northbound_Eastbound	50			2007 Person Trips, Vehicle Occupancy, Person Mode Choice. Unclear Descriptions Presumably AM peak hour, not period.
OccupancyCountsPoints_2007_Southbound_Westbound	41			2007 Person Trips, Vehicle Occupancy, Person Mode Choice. Unclear Descriptions Presumably AM peak hour, not period.
OccupancyCountsPoints_2008_Northbound_Eastbound	51			2008 Person Trips, Vehicle Occupancy, Person Mode Choice. Unclear Descriptions Presumably AM peak hour, not period.
OccupancyCountsPoints_2008_Southbound_Westbound	50			2008 Person Trips, Vehicle Occupancy, Person Mode Choice. Unclear Descriptions Presumably AM peak hour, not period.
TubeCountsPoints_2005_Northbound_Eastbound	120			2005 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
TubeCountsPoints_2005_Southbound_Westbound	125			2005 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
TubeCountsPoints_2006_Northbound_Eastbound	173			2006 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
TubeCountsPoints_2006_Southbound_Westbound	167			2006 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
TubeCountsPoints_2007_Northbound_Eastbound	58			2007 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
TubeCountsPoints_2007_Southbound_Westbound	59			2007 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
TubeCountsPoints_2008_Northbound_Eastbound	125			2008 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
TubeCountsPoints_2008_Southbound_Westbound	123			2008 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
TubeCountsPoints_05_06_08_D1_D2_Trends_and_LOS_AM	64			LOS Comparison for 2005, 2006 and 2008. Presumably AM peak hour
TubeCountsPoints_05_06_08_D1_D2_Trends_and_LOS_PM	64			LOS Comparison for 2005, 2006 and 2008. Presumably PM peak hour
TubeCountsPoints_2009_Northbound_Eastbound	78			2009 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
TubeCountsPoints_2009_Southbound_Westbound	81			2009 Traffic count data. Not classified. Presumably AM peak hour, inter peak hour and PM peak hour, not period
<b>TAXI MAJOR DESTINATION PER REGION</b>				
Region_A	1			Region A's major destinations (e.g. Alexandra, Fourways, Johannesburg, Randburg). Unknown Time Period / Year. Unclear units, i.e. taxis or passengers.
Region_B	1			Region B's major destinations (e.g. Alexandra, Fourways, Johannesburg, Randburg). Unknown Time Period / Year. Unclear units, i.e. taxis or passengers.
Region_C	1			Region C's major destinations (e.g. Alexandra, Fourways, Johannesburg, Randburg). Unknown Time Period / Year. Unclear units, i.e. taxis or passengers.
Region_D	1			Region D's major destinations (e.g. Alexandra, Fourways, Johannesburg, Randburg). Unknown Time Period / Year. Unclear units, i.e. taxis or passengers.
Region_E	1			Region E's major destinations (e.g. Alexandra, Fourways, Johannesburg, Randburg). Unknown Time Period / Year. Unclear units, i.e. taxis or passengers.
Region_F	1			Region F's major destinations (e.g. Alexandra, Fourways, Johannesburg, Randburg). Unknown Time Period / Year. Unclear units, i.e. taxis or passengers.
Region_G	1			Region G's major destinations (e.g. Alexandra, Fourways, Johannesburg, Randburg). Unknown Time Period / Year. Unclear units, i.e. taxis or passengers.
<b>TAXIS</b>				
AM_Taxi_Rank_Passenger_Utilisation_DestGTMPZones	595			
AM_Taxi_Rank_Passenger_Utilisation_OriginGTMPZones	595			
PM_Taxi_Rank_Passenger_Utilisation_DestGTMPZones	545			
PM_Taxi_Rank_Passenger_Utilisation_OriginGTMPZones	819			
Taxi_CorridorVolumes_NotSurveyed_Destinations	28			Passengers per taxi route. Unknown Time Period / Year.
Taxi_CorridorVolumes_NotSurveyed_Origins	28			Passengers per taxi route. Unknown Time Period / Year.
Taxi_CorridorVolumes_NotSurveyed	28			Passengers per taxi route. Unknown Time Period / Year.
Taxi_Passenger_Satisfaction_Levels	14			
Taxi_Photos	1257			
Taxi_Rank_Condition_Categorisation	39			
Taxi_Rank_Destinations	3920			Destinations served at various taxi ranks
Taxi_Rank_Origins	3920			Origins served at various taxi ranks
Taxi_Rank_Passenger_Utilisation_Destinations	21411			Origin Rank, Destination Rank, Route Description, Number of Taxis in AM / PM Peak Hour, Utilisation Factor
Taxi_Rank_Passenger_Utilisation_Origins	21411			Origin Rank, Destination Rank, Route Description, Number of Taxis in AM / PM Peak Hour, Utilisation Factor
Taxi_Rank_Passenger_Utilisation_Total_GTSZones	96			
Taxi_Rank_Utilisation	21411			Origin Rank, Destination Rank, Route Description, Number of Taxis in AM / PM Peak Hour, Utilisation Factor
Taxi_Ranks_2003	240			List of taxi ranks
Taxi_Ranks_2013	798			List of taxi ranks
AM_Taxi_Rank_Passenger_Utilisation_Volumes_GTMPZones	297			Major taxi desire lines / distribution during the AM
PM_Taxi_Rank_Passenger_Utilisation_Volumes_GTMPZones	265			Major taxi desire lines / distribution during the PM
Taxi_Rank_OD_Route	3911			All taxi desire lines / origins destinations served
Taxi_Rank_Passenger_Utilisation_Volumes	20553			Origin Rank, Destination Rank, Route Description, Number of Taxis in AM / PM Peak Hour, Utilisation Factor
Taxi_Routes	565			Graphic of taxi routes
<b>RAIL</b>				
Gautrain_Bus_Stations	396			List of Gautrain bus stations
Gautrain_Stations	9			List of Gautrain stations
Metro_Rail_Stations	58			List of Metro Rail stations, passenger boarding and alighting. Unknown Time Period / Year. Unclear units.
Rail_Passenger	65			List of Rail stations, passenger boarding. Unknown Time Period / Year. Unclear units.
Gautrain_Bus_Routes_2013	26			Graphic of Gautrain bus route. Frequency information for some.
Gautrain_Rail	3			Graphic of Gautrain routes.
Metro_Railway_Lines	439			Graphic of Metro Rail routes
<b>FREIGHT</b>				
Heavy_Vehicle_Volumes	14			2008 Heavy vehicle count data on freeways. Unknown Time Period, Not per direction.
Major_Heavy_Vehicle_Routes	47			Major Heavy Vehicle Routes
<b>BUSES</b>				
Metrobus_Stops	1922			List of Metrobus stops
Putco_Parking_and_Depots	21			List of Putco parking and depots
Rea_Vaya_Passenger_Volumes	24			Passenger volumes at some Rea Vaya station. Unclear units and descriptions.
Rea_Vaya_Stations	208			List of Rea Vaya Stations
Terminal_Depots_MetroPutcoReaVaya	13			Depots for Metrobus, Putco and Rea Vaya
Metrobus_Routes	110			Graphic of Metrobus routes. Scheduling and frequency information for each route, but unclear.
Metrobus_Routes_from_COJ_032013	355			Graphic of Metrobus routes
Putco_Routes	116			Graphic of Putco routes
Rea_Vaya_Network	40			Graphic of Rea Vaya routes
<b>ROADS</b>				
Freeway			129	Graphic of Freeways
Provincial_Routes			4	Graphic of Provincial roads



### 8.2.1 Passenger Origin-Destination Information

Layers containing the following information for minibus-taxi mode are provided and can assist in estimating taxi passengers' distribution:

- Major minibus-taxi destinations per region.
- Major minibus-taxi destinations per taxi rank.
- Major minibus-taxi desire lines / distribution during the AM and PM.
- All minibus-taxi desire lines and origins destinations served.

2009 total vehicle traffic counts are provided for the AM, Inter and PM peak per direction. Around 80 locations were surveyed / counted. Even though this information is fairly outdated it can give an indication of the overall demand patterns per corridor and assist in making assumptions regarding trip distribution.

No passenger origin-destination information is available for other transport modes.

### 8.2.2 Available Public Transport Service Capacity

Layers containing the following information are provided and can assist in estimating the capacity of minibus-taxi routes and Gautrain bus services:

- For minibus-taxi routes the origin rank, destination rank, route description, number of taxis in AM / PM Peak Hour and utilisation factor is provided.
- Gautrain bus frequency information for some Gautrain bus routes is provided.

No public transport service capacity information is available for other transport modes.

### 8.2.3 Mode Split Information

2005, 2006, 2007 and 2008 person trip traffic counts, vehicle occupancy and

road based mode split expressed per person (not vehicle) is provided for the AM per direction. Even though this information is fairly outdated it can still give an indication of mode split per corridor but should not be applied conclusively. In 2008 approximately 50 locations were surveyed.

#### **8.2.4 Other Information**

The following information directly relevant to Transport Assessments is also available:

- A layer showing the official boundary of the CoJ.
- Unemployed population per ward and low income residential areas. This information can be used to make assumptions regarding car ownership.
- Points showing all minibus-taxi ranks, Gautrain bus stations, Gautrain stations, Metro Rail stations, Rail stations, Metrobus stops, Rea Vaya stations.
- Layers showing all taxi routes, Gautrain bus routes, Gautrain routes, major heavy vehicle routes, Metrobus routes, Putco routes, Rea Vaya routes.

### **8.3 Household Travel Surveys**

The document: "CASE. "Household Travel Survey for the CoJ. 2013. CoJ" is available here: [www.joburg.org.za](http://www.joburg.org.za).

#### **8.3.1 Passenger Origin-Destination Information**

The CoJ municipal area was subdivided into 20 geographical analyses areas. Current trip origins and destinations are provided in Section 7.8. OD information is available for all trips, all motorized trips, daily trips, AM peak period trips, and by income group for each analyses area.

#### **8.3.2 Mode Split Information**

Mode split information per analyses area is provided in Section 7.2, 7.3, 7.4, 7.5 and 7.6. Information is available for daily trips, AM peak period and per trip purpose (work or education trips).

### 8.3.3 Other Information

Information is provided per analyses area on the following aspects that may be relevant in determining vehicle ownership or the likelihood of choosing public transport and/or non-motorised transport modes:

- Household Income – Section 5.4.
- Vehicle Ownership (Bicycles, Motor Cycles, Company Cars, Household Cars) – Section 5.8.

### 8.4 Operational Plan for Metrobus

The document: “Detailed Operational Plan for Metrobus. March 2014. CoJ” is available here: [www.joburg.org.za](http://www.joburg.org.za).

The Transport Information Register and the Household Travel Survey were consulted for the operational plan.

The aim of this report was to develop a rationalized operational plan for Metrobus to be implemented in future. The focus was therefore not necessarily on reporting on current travel patterns but rather developing a future metrobus network. Therefore, the following information should in particular be noted:

- Current (2013) route information for Metrobus (Figure 6).
- 2013 Route passenger volumes (Figure 7).
- 9 Metrobus M routes including indications of existing demand along these routes (Table 4 and 9).
- 5 Metrobus SS routes including indications of existing demand along these routes (Table 5 and 10).
- 11 Metrobus Feeder Services (bus) including indications of existing demand along these routes (Table 6 and 11).
- 23 Metrobus Feeder Services (minibus-taxi) including indications of existing demand along these routes (Table 7 and 12).
- Medium and large public transport interchanges (Figure 21).
- Details in terms of the proposed frequency of M, SS and feeder services

are provided in Section 3 along with further information on demand.

## 8.5 Framework for Non-Motorised Transport

The document “Framework for Non-Motorised Transport. January 2009. CoJ” is available here: [www.joburg.org.za](http://www.joburg.org.za).

The following statements should in particular be noted:

- Amended Parking standards to incorporate standards per land use for cycle parking and associated facilities (eg. secure and undercover cycle parking, showers and lockers within workplaces).
- Site Development Plans must include and indicate provision for NMT. Provision for NMT to be reinforced through development conditions.
- Transport Assessments submitted in support of a development proposals must include NMT as part of the assessment.
- Developer contributions for NMT will be sought from development proposals falling within 2km of a planned NMT cycle route and will be adjusted on a sliding scale based on size, land use and proximity to the planned route.
- All new developments to incorporate footpaths through the development site and immediately adjacent to the site boundary where appropriate.

A list of strategies (Section 7 and 8.2) are provided and the corresponding implementing bodies (government agencies) are listed. These strategies can be investigated further by private developers when developing mechanisms for Travel Plan

The document proposes 10 priority areas to guide NMT infrastructure investment focus; however these areas are now replaced with more updated information in the CoJ’s Integrated Transport Network (ITN).

## 8.6 New Model Taxi Rank

The document: “Preliminary Design of a New Model Taxi Rank for the CoJ.

August 2011. CoJ” is available here: [www.joburg.org.za](http://www.joburg.org.za).

The document details the development of the generic preliminary design of a more compact, adaptable and accessible minibus-taxi rank. This design will be used as the base for the construction of all future minibus-taxi ranks within the CoJ. It details the standard minimum requirements and the design concept. Capital and operational costs are estimated.

## 8.7 Strategic Integrated Transport Plan Framework (SITPF)

The document: “Strategic Integrated Transport Plan Framework. October 2013. CoJ” is available here: [www.joburg.org.za](http://www.joburg.org.za).

The Household Travel Survey was consulted for the framework.

The document outlines a high level spatial network which shows the main corridors and routes for public transport freight, and cycling and walking. The Integrated Transport Network (ITP is based on the recommendations from the SITPF and supported by the City’s Transport Model.

The document provides the following information which may be of practical use in a Transport Assessment:

- Prasa Metrorail and Gautrain Networks and Stations (Fig. 3).
- The Bus Route Network in the CoJ (All Operators) (Fig 4).
- The Minibus-Taxi route Network in the CoJ (All Operators) (Fig 5).
- Average Vehicle Occupancy in CoJ (Table 2).
- Strategic Public Transport Network from the 2003 – 2008 Integrated Transport Network (Fig 7).
- High level public transport network: 2040 (Fig 18).
- Description of routes with projected 2040 peak passengers per hour per direction (Table 10).
- Non-motorised Transport Network (2009 NMT Framework) (Fig 20).
- Proposed Freight Corridors (Fig 23).

Parking management proposals are discussed (Thrust No 5). Some of these may be considered as part of a Travel Plan for example encouraging employers

to increase the cost of parking provided to employees, adhere to maximum parking provision limits in public transport priority areas, introduce a shared parking concept where the same parking spaces can be used for different uses at different times, retail and office land uses should provide for public transport vehicles, metered taxis, pedestrian access and shared parking on their Site Development Plan.

## 8.8 Master Plans

### 8.8.1 Transport Master Plans

The JRA maintains a GIS database consisting of all approved transport masterplans. The database is available here: [www.joburg.org.za](http://www.joburg.org.za).

The City currently has the following master plans available:

- Sandton Transport Masterplan.
- Rosebank CBD Transport Masterplan.
- Inner City Transport Masterplan.
- Mining-Belt West Corridor.
- Milpark Urban Development Framework.
- Randburg CBD Transport Masterplan.
- Diepsloot Transport Masterplan.
- Ivory Park Transport Masterplan.
- Linbro Park Masterplan.
- The JRA's 10 year Roads Masterplan.
- The CoJ's Integrated Transport Network (ITN). This plan shows the public transport corridors and routes that the City will be investing in, a long term cycling network and a 10 year plan of the main interventions to expand the network.
- Road Hierarchy Network Plan: "CoJ Road Network Project, Functional Road Hierarchy: Future Road Network Classification, July 2009, Volume 3 Future Year".
- Corridors of Freedom.

### 8.8.2 Spatial Master Plans



The Regional Spatial Development Frameworks are available here:

[www.joburg.org.za/index.php?option=com\\_content&task=view&id=5543&Itemid=114](http://www.joburg.org.za/index.php?option=com_content&task=view&id=5543&Itemid=114)

The Spatial Development Framework is available here:

[www.joburg.org.za/index.php?option=com\\_content&view=article&id=5941:spatial-development-framework-2010-2011&catid=61&Itemid=114](http://www.joburg.org.za/index.php?option=com_content&view=article&id=5941:spatial-development-framework-2010-2011&catid=61&Itemid=114)

The City of Johannesburg's GIS database is available here:

<http://ims.joburg.org.za/joburg/viewer.aspx>

## 8.9 Trip Generation Guidelines

The following guidelines may be used in the absence of standardised accepted methods to calculate person trip generation rates:

- South African Traffic Impact and Site Traffic Assessment Manual, TMH 16, August 2012, COTO, 2012
- South African Trip Data Manual, TMH 17, COTO, 2012
- South African Trip Generation Rates. National Department of Transport, 1995. RR 92 / 228

These documents are available here: [www.joburg.org.za](http://www.joburg.org.za).



## BIBLIOGRAPHY

1. 2014 Development Charges. Background Study. Development Finance. Canada: City of London, April 2014.
2. 2040 Growth and Development Strategy (GDS). City of Johannesburg, 2011.
3. ATTrBuTE v2.0 User Guide. Transport for London, June 2009.
4. Built Environment Performance Plan 2014/2015. City of Johannesburg, 2014.
5. City of Johannesburg. Development Planning. No title or date. "Please take note of the following points prior to the submission of an application for Rezoning".
6. Community Infrastructure Levy Charging Schedule. Mayor of London, February 2012. Greater London Authority.
7. Complete Streets Design Guidelines Manual. City of Johannesburg, 2013.
8. Detailed Operational Plan for Metrobus. City of Johannesburg, March 2014. ITS Engineers.
9. Developers Guide to Infrastructure Contributions. Essex County Council. United Kingdom , February 2010.
10. Development Charges Policy for Engineering Services for the City of Cape Town. Final Draft. City of Capetown, 3 October 2013.
11. Development Charges. An implementation Guide to the Development Charges Policy for Engineering Services for the City of Cape Town. City of Cape Town, 28 November 2014.
12. Development Contributions Practice Notes. Department of Infrastructure, Planning and Natural Resources. New South Wales Planning Reforms. Australia, July 2005.
13. Development Contributions. Guidelines for Planning Authorities. Department of Environment, Community and Local Government. Republic of Ireland, January 2013.
14. Draft Consolidated Town Planning Scheme 2010. City of Johannesburg, 2011.
15. Ekurhuleni Metropolitan Municipality: Roads and Storm-water Bulk Engineering Services Contributions Policy. Ekurhuleni Metropolitan Municipality, 2009.

16. Final Draft: Non-motorised transport facility guidelines. Department Transport. Republic of South Africa. SMEC / University of Cape Town
17. Framework for Non-Motorised Transport. City of Johannesburg, January 2009.
18. Framework for the Compilation of Traffic Impact Studies to be Evaluated by the Mangaung Metro Municipality. Mangaung Metro Municipality, 30 April 1998.
19. Guidance for Transport Assessments. Department of Transport. United Kingdom, March 2007.
20. Guidelines for Human Settlement, Planning and Design (The “Red Book”). CSIR, 2000.
21. Household Travel Survey for the City of Johannesburg. City of Johannesburg, 2013. CASE.
22. Integrated Transport Network for the City of Johannesburg – Final Draft. Annexure D. Transport Demand Model. City of Johannesburg, July 2015. Tolplan.
23. JL Botha. Trends in the Traffic Impact Assessment Process. South African Transport Conference, 2005.
24. Local Government Guidelines. Contributions Towards Community Infrastructure Funding. Western Australian Planning Commission, 2008. Syme Marmion & Co.
25. Manual for Traffic Impact Studies. National Department of Transport, 1995. RR 93 / 635.
26. Multimodal Level of Service Analysis for Urban Streets. Transportation Research Board. National Cooperative Highway Research Program. Report 616. Washington, 2008
27. Motivation report for input into the consolidated town planning scheme in respect of parking requirements. City of Johannesburg, June 2012. ITS Engineers.
28. National Land Transport Act – Act 5 of 2009. No 32110. Government Gazette, 8 April 2009.
29. Parking Standards (Second Edition). National Department of Transport, November 1985. PG3 / 85.
30. Pedestrian Facility Guidelines: Manual to Plan, Design and Maintain Safe Pedestrian Facilities. National Department of Transport, 1993. RR 92 / 126.

- 31.Planning Obligations: Practice Guidelines. London Department for Communities and Local Government, July 2006.
- 32.Policy for Engineering Service Contributions (ESC) for Roads and Stormwater and Methodology for the Calculation of Engineering Service Contributions for Roads and Stormwater Infrastructure. City of Johannesburg, 30 January 2014.
- 33.Policy on Development Contributions for Bulk Engineering Infrastructure 2013/2014. Stellenbosch Municipality, 2014.
- 34.Preliminary Design of a New Model Taxi Rank for the City of Johannesburg. City of Johannesburg, August 2011. BKS.
- 35.R. Chetty and S. Phayane. Development of Guidelines for Public Transport Facilities within the Ethekewini Municipal Area. South African Transport Conference, 2012.
- 36.Revash Dookhi. Manual for Traffic Impact Assessments and Site Traffic Assessments. Ethekewini Transport Authority, July 2015.
- 37.Road Network Project, Functional Road Hierarchy: Future Road Network Classification. Volume 3. City of Johannesburg, July 2009.
- 38.South African Engineering Service Contributions Manual for Municipal Road Infrastructure. COTO, September 2012. TMH 15.
- 39.South African Road Traffic Signs Manual. National Department of Transport. 2011.
- 40.South African Traffic Impact and Site Traffic Assessment Manual. Volume 1 and Volume 2. COTO, August 2012. TMH 16.
- 41.South African Trip Data Manual. COTO, September 2012. TMH 17.
- 42.South African Trip Generation Rates. National Department of Transport, 1995. RR 92 / 228.
- 43.Spatial Development Framework 2010/2011. City of Johannesburg, 2011.
- 44.Strategic Integrated Transport Plan Framework. City of Johannesburg, October 2013.
- 45.Supplementary Planning Document. Planning Obligations and Developer Contributions. Rutland County Council. United Kingdom, June 2010.
- 46.Traffic Impact Assessment (TIA) Guidelines. Department of Infrastructure, Energy and Resources. Roads and Traffic Division. Tasmania. September 2007.
- 47.Traffic Signal Design and Optimization – BRT Course 2 – 3 February 2016.

South African Road Federation.

48. Transport Assessment Best Practice Guidance Document. Transport for London, May 2006.
49. Transport Assessment Guidance. Transport Scotland, 2012.
50. Transport Assessment Guidelines for Developments. Volume 4. Individual Developments. Version for Trial and Evaluation. Department for Planning and Infrastructure. Western Australia Planning Commission, August 2006.
51. Transport Impact Assessment Guidelines. City of London. Canada, April 2012.
52. Transport Information Register. Summary of Data. City of Johannesburg, 13 February 2014. Arup.
53. Transportation Impact Assessment (TIA) Guidelines. City of Calgary. Transportation Planning. Canada. April 2011.



## ANNEXURE A: THRESHOLDS FOR DIFFERENT LAND USE TYPES AND SIZES

**GUIDELINE DOCUMENT FOR TRANSPORT ASSESSMENTS**

**APPROVED BY MAYORAL COMMITTEE | DATE: XX XXXXX XXXX**

Land Use	Unit	Max. Vehicle Trip Rate	Level 1		Level 2		Level 3		Level 4	
Service Industry	100 sqm GLA	0.9	0 sqm GLA	to 5556 sqm GLA	5557 sqm GLA	to 16667 sqm GLA	16668 sqm GLA	to 166667 sqm GLA	166668 sqm GLA	+
Heavy industry / manufacturing	100 sqm GLA	0.7	0 sqm GLA	to 7143 sqm GLA	7144 sqm GLA	to 21429 sqm GLA	21430 sqm GLA	to 214286 sqm GLA	214287 sqm GLA	+
Industrial Area	100 sqm GLA	0.8	0 sqm GLA	to 6250 sqm GLA	6251 sqm GLA	to 18750 sqm GLA	18751 sqm GLA	to 187500 sqm GLA	187501 sqm GLA	+
Manufacturing	100 sqm GLA	0.6	0 sqm GLA	to 8333 sqm GLA	8334 sqm GLA	to 25000 sqm GLA	25001 sqm GLA	to 250000 sqm GLA	250001 sqm GLA	+
Warehousing and Distribution	100 sqm GLA	0.5	0 sqm GLA	to 10000 sqm GLA	10001 sqm GLA	to 30000 sqm GLA	30001 sqm GLA	to 300000 sqm GLA	300001 sqm GLA	+
Mini-Warehousing	100 sqm GLA	0.4	0 sqm GLA	to 12500 sqm GLA	12501 sqm GLA	to 37500 sqm GLA	37501 sqm GLA	to 375000 sqm GLA	375001 sqm GLA	+
Single Dwelling Units	1 D/Units	1	0 D/Units	to 50 D/Units	51 D/Units	to 150 D/Units	151 D/Units	to 1500 D/Units	1501 D/Units	+
Apartments and Flats	1 D/Units	0.65	0 D/Units	to 77 D/Units	78 D/Units	to 231 D/Units	232 D/Units	to 2308 D/Units	2309 D/Units	+
Student Apartments and Flats	1 D/Units	0.3	0 D/Units	to 167 D/Units	168 D/Units	to 500 D/Units	501 D/Units	to 5000 D/Units	5001 D/Units	+
Townhouses (Simplexes and Duplexes)	1 D/Units	0.85	0 D/Units	to 59 D/Units	60 D/Units	to 176 D/Units	177 D/Units	to 1765 D/Units	1766 D/Units	+
Multi-Level Townhouses	1 D/Units	0.75	0 D/Units	to 67 D/Units	68 D/Units	to 200 D/Units	201 D/Units	to 2000 D/Units	2001 D/Units	+
Retirement Village	1 D/Units	0.4	0 D/Units	to 125 D/Units	126 D/Units	to 375 D/Units	376 D/Units	to 3750 D/Units	3751 D/Units	+
Old-Age Home	1 D/Units	0.35	0 D/Units	to 143 D/Units	144 D/Units	to 429 D/Units	430 D/Units	to 4286 D/Units	4287 D/Units	+
Recreational Homes	1 D/Units	0.35	0 D/Units	to 143 D/Units	144 D/Units	to 429 D/Units	430 D/Units	to 4286 D/Units	4287 D/Units	+
Hotel, Residential	1 Rooms	0.7	0 Rooms	to 71 Rooms	72 Rooms	to 214 Rooms	215 Rooms	to 2143 Rooms	2144 Rooms	+
Hotel, Resort	1 Rooms	0.4	0 Rooms	to 125 Rooms	126 Rooms	to 375 Rooms	376 Rooms	to 3750 Rooms	3751 Rooms	+
Guest House	1 Rooms	0.45	0 Rooms	to 111 Rooms	112 Rooms	to 333 Rooms	334 Rooms	to 3333 Rooms	3334 Rooms	+
Golf Course	1 Courses	80	0 Courses	to 1 Courses	2 Courses	to 2 Courses	3 Courses	to 19 Courses	20 Courses	+
Casino	100 sqm GLA	6.25	0 sqm GLA	to 800 sqm GLA	801 sqm GLA	to 2400 sqm GLA	2401 sqm GLA	to 24000 sqm GLA	24001 sqm GLA	+
Amusement Park	1 ha	47	0 ha	to 1.06 ha	1.07 ha	to 3.19 ha	3.2 ha	to 31.91 ha	31.92 ha	+
Sport Stadium	1000 seats	270	0 seats	to 185 seats	186 seats	to 556 seats	557 seats	to 5556 seats	5557 seats	+
Health and Fitness Centre	100 sqm GLA	9.5	0 sqm GLA	to 526 sqm GLA	527 sqm GLA	to 1579 sqm GLA	1580 sqm GLA	to 15789 sqm GLA	15790 sqm GLA	+
Public Primary School	1 students	0.85	0 students	to 59 students	60 students	to 176 students	177 students	to 1765 students	1766 students	+
Public Secondary School	1 students	0.75	0 students	to 67 students	68 students	to 200 students	201 students	to 2000 students	2001 students	+
Private School	1 students	0.8	0 students	to 63 students	64 students	to 188 students	189 students	to 1875 students	1876 students	+
University / College	1 students	0.25	0 students	to 200 students	201 students	to 600 students	601 students	to 6000 students	6001 students	+
Places of Public Worship (Weekend)	1 seats	0.65	0 seats	to 77 seats	78 seats	to 231 seats	232 seats	to 2308 seats	2309 seats	+
Places of Public Worship (Weekday)	1 seats	0.05	0 seats	to 1000 seats	1001 seats	to 3000 seats	3001 seats	to 30000 seats	30001 seats	+
Pre-school (Day Care Centre)	1 students	1	0 students	to 50 students	51 students	to 150 students	151 students	to 1500 students	1501 students	+
Cemetery	1 ha	8	0 ha	to 6.25 ha	6.26 ha	to 18.75 ha	18.76 ha	to 187.5 ha	187.51 ha	+
Public Hospital	1 beds	1.5	0 beds	to 33 beds	34 beds	to 100 beds	101 beds	to 1000 beds	1001 beds	+
Private Hospital	1 beds	1.7	0 beds	to 29 beds	30 beds	to 88 beds	89 beds	to 882 beds	883 beds	+
Nursing Home	1 beds	0.4	0 beds	to 125 beds	126 beds	to 375 beds	376 beds	to 3750 beds	3751 beds	+
Medical Clinic	100 sqm GLA	7.8	0 sqm GLA	to 641 sqm GLA	642 sqm GLA	to 1923 sqm GLA	1924 sqm GLA	to 19231 sqm GLA	19232 sqm GLA	+
Offices	100 sqm GLA	2.1	0 sqm GLA	to 2381 sqm GLA	2382 sqm GLA	to 7143 sqm GLA	7144 sqm GLA	to 71429 sqm GLA	71430 sqm GLA	+
Home Offices and Undertakings	1 houses	7	0 houses	to 7 houses	8 houses	to 21 houses	22 houses	to 214 houses	215 houses	+
Medical Consulting Rooms	100 sqm GLA	8	0 sqm GLA	to 625 sqm GLA	626 sqm GLA	to 1875 sqm GLA	1876 sqm GLA	to 18750 sqm GLA	18751 sqm GLA	+
Business Centre (Park)	100 sqm GLA	1.5	0 sqm GLA	to 3333 sqm GLA	3334 sqm GLA	to 10000 sqm GLA	10001 sqm GLA	to 100000 sqm GLA	100001 sqm GLA	+
Conference Centre	1 seats	0.5	0 seats	to 100 seats	101 seats	to 300 seats	301 seats	to 3000 seats	3001 seats	+
Building Materials	100 sqm GLA	11	0 sqm GLA	to 455 sqm GLA	456 sqm GLA	to 1364 sqm GLA	1365 sqm GLA	to 13636 sqm GLA	13637 sqm GLA	+
Hardware and Paint Store	100 sqm GLA	12	0 sqm GLA	to 417 sqm GLA	418 sqm GLA	to 1251 sqm GLA	1252 sqm GLA	to 12500 sqm GLA	12501 sqm GLA	+
Nursery (Garden Centre)	100 sqm GLA	4.1	0 sqm GLA	to 1220 sqm GLA	1221 sqm GLA	to 3659 sqm GLA	3660 sqm GLA	to 36585 sqm GLA	36586 sqm GLA	+
Shopping Centre	100 sqm GLA	4.5 - 31.50	1 sqm GLA	to 165 sqm GLA	166 sqm GLA	to 538 sqm GLA	539 sqm GLA	to 16086 sqm GLA	16087 sqm GLA	+
Bulk Trade Centre	100 sqm GLA	3.9	0 sqm GLA	to 1282 sqm GLA	1283 sqm GLA	to 3846 sqm GLA	3847 sqm GLA	to 38462 sqm GLA	38463 sqm GLA	+
Motor Dealership	100 sqm GLA	5.1	0 sqm GLA	to 980 sqm GLA	981 sqm GLA	to 2941 sqm GLA	2942 sqm GLA	to 29412 sqm GLA	29413 sqm GLA	+
Furniture Store	100 sqm GLA	2.5	0 sqm GLA	to 2000 sqm GLA	2001 sqm GLA	to 6000 sqm GLA	6001 sqm GLA	to 60000 sqm GLA	60001 sqm GLA	+
Restaurant, Quality (Sit-down)	100 sqm GLA	11.8	0 sqm GLA	to 424 sqm GLA	425 sqm GLA	to 1271 sqm GLA	1272 sqm GLA	to 12712 sqm GLA	12713 sqm GLA	+
Restaurant, Family (Sit-down)	100 sqm GLA	25	0 sqm GLA	to 200 sqm GLA	201 sqm GLA	to 600 sqm GLA	601 sqm GLA	to 6000 sqm GLA	6001 sqm GLA	+
Fast Food	100 sqm GLA	55	0 sqm GLA	to 91 sqm GLA	92 sqm GLA	to 273 sqm GLA	274 sqm GLA	to 2727 sqm GLA	2728 sqm GLA	+
Vehicle Fitment Centre	100 sqm GLA	5.2	0 sqm GLA	to 962 sqm GLA	963 sqm GLA	to 2885 sqm GLA	2886 sqm GLA	to 28846 sqm GLA	28847 sqm GLA	+