

Transport Assessments

Traffic Impact Assessment Guidelines: Traffic Impact Analysis study or Traffic Impact Assessment (Transport Assessment) is a study which assesses the effect that a particular development has on the transportation network. A traffic impact study is generally required by roads authorities to evaluate the impact of a change in land use.

Now there is a move away from merely Traffic Impact Analysis/Assessment (TIA) to Transport Assessment (TA). Planning regulations, such as PPG 13 in the UK, also makes clear that the assessment of new development proposals should include their accessibility by a range of transport methods and developers are required to demonstrate how they will reduce travel to the site by car. So a thorough, properly-prepared Transport Assessment is often essential to support a development proposal.

Developer Contribution: Contributions to development requirements are sought to ensure that full account can be taken of the impact of a development on local amenities, infrastructure and services which would not otherwise form part of a planning proposal. Transport Assessments are used as a guide to calculating Developer Contributions.

Transport Assessments

Traffic Impact Assessment/ Transport Assessments

- **Encouraging Environmental Sustainability**

- Reducing the need to travel, especially by car. Development should be located close to the services that a community needs, to seek to reduce the number and length of journeys made by car.
- Tackling the environmental impact of travel. Improve transport choices and make it safer and easier for people to access jobs, shopping, leisure facilities and services by public transport, walking, and cycling.
- The accessibility of the location. Consider how accessible a site is, or could be, without using a car. This is particularly important for large developments that create a big demand for travel.
- Other measures which may help to influence travel behaviour (ITB). Reduce car usage (particularly journeys with just one person), by measures such as travel plans, free bus passes and so on.

- **Managing the Existing Network**

- Making best possible use of existing transport infrastructure. Improve the local public transport network and use advanced signal control systems, public transport priority measures (bus lanes), or other forms of Intelligent Transport Systems (ITS) to improve how the highway network operates.

Transport Assessments

Managing access to the highway network. Take steps to make the development 'fit' within the available highway capacity. This can be done by managing travel habits through Travel Plans, supported, as necessary, by measures to manage access from developments onto the highway network.

- **Mitigating any Remaining Impacts**

- Through demand management. Use traffic control measures across a wide network to regulate flows.
- Through improvements to the local public transport network, and walking and cycling facilities. Provide new bus routes, extend existing bus routes and increasing bus frequencies, and design sites to make walking and cycling as easy as is possible.
- Through physical improvements to existing roads. It may be possible to improve the capacity of some existing roads by physical changes such as improving the geometry of junctions and so on.
- Through providing new or expanded roads. This is particularly where this would provide relief to existing roads to provide increased capacity for buses, walking and cycling.

Transport Assessments

Appraising the Impact of Proposed Developments

The following universally adopted objectives should be met:

- *Environmental* impact involves reducing the direct and indirect impacts of transport facilities on the environment of both users and non-users. There are ten sub-objectives, including reducing noise, atmospheric pollution (including that related to climate change and local air quality), impacts on countryside, wildlife, ancient monuments and historic buildings;
- *Safety* is concerned with reducing the loss of life, injuries and damage to property resulting from transport incidents and crime. The two sub-objectives are to reduce accidents and improve security;
- *Economy* is concerned with improving the economic efficiency of transport. The five sub-objectives are to improve economic efficiency for consumers, business users and providers of transport, improve reliability and the wider economic impacts, and get good value for money in relation to impacts on public accounts;
- *Accessibility* is concerned with the ability with which people can reach different locations and facilities by different modes; and
- *Integration* aims to ensure that all decisions are taken in the context of the Government's integrated transport policy.

Transport Assessments

Appraising the Impact of Proposed Developments

Environmental Issues

The following environment issues need to be assessed:

- Nuisance to people caused by transport-related noise and vibration generated by the development;
- The emission of greenhouse gases as a result of the transport implications of the development and the impact of changes in local air quality on people;
- The transport-related impacts of the development on areas of designated landscape importance;
- Whether the site is in an air quality management zone or is likely to cause a breach of current legislation;
- The transport-related impact of the development on areas of nature conservation or biodiversity and Earth heritage interests (such as geology) where they interact with roads;
- Heritage of historic resources where they interact with development-generated transport and/or proposed mitigation measures;

Transport Assessments

Appraising the Impact of Proposed Developments

Safety

The safety issues that should be assessed, including and in addition to the highway accident statistics include:

- The potential for development-related or other transport accidents in the vicinity of the site; and
- Perception of personal insecurity in and around the development site.

Economy

The Economy issues that need to be addressed in the TA are:

- Government regeneration objectives (e.g. use of brownfield sites);
- Non-motorised road users' journey time;⁵
- Motorised road users' journey time reliability;
- User costs;
- The construction, land, preparation, supervision⁶ and subsequent maintenance costs of development proposals (including mitigation works).

Transport Assessments

Appraising the Impact of Proposed Developments

Accessibility

Developers or promoters of sites should undertake accessibility modelling to establish the level of accessibility of the site, and the results should be included within the TA. Issues to be assessed from an Accessibility perspective include:

- Access to the transport system – locating access points and links for pedestrians and cyclists to the wider transport network;
- Access to the local area – providing transport nodes or interchanges for the proposed development that will benefit other developments and the local community as a whole; and
- Community severance – ensuring that the development does not create barriers to access within the local community.

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Integration

The Integration issues to be assessed include:

- The potential for the development to influence interaction among all transport modes (motorised and non-motorised), either in isolation or in combination with other developments;
- Interaction between the development proposal and wider issues of Government policy such as environmental sustainability and health;
- Integration of the development proposals with local, regional and national land use policies;
- Bringing communities together/social inclusion; and
- Separating communities as a result of cutting off existing movement paths – severance/social exclusion.

Transport Assessment

Key Issues at Pre-Application Stage

The key issues to be considered during pre-application stages are:

- Planning policy context of development proposal;
- Catchments or study area for the proposed development;
- Assessment years – year of opening and horizon year(s);
- Assessment of public transport capacity, walking/cycling capacity and the road network capacity;
- Person trip generation and trip distribution methodologies and/or assumptions;
- Measures to promote sustainable travel; and
- Mitigation measures (where applicable) – scope and implementation strategy

Transport Assessment

General Requirements of Transport Assessments

A Transport Assessment study should address the following:

- **Reducing the need to travel, especially by car** – ensure, at the outset, that thought is given to reducing the need to travel; consider the types of uses (or mix of uses) and the scale of development in order to promote multipurpose or linked trips.
- **Sustainable accessibility** – promote accessibility by all modes of travel, in particular public transport, cycling and walking; assess the likely travel behaviour or travel pattern to and from the proposed site; and develop appropriate measures to influence travel behaviour.
- **Dealing with residual trips** – provide accurate quantitative and qualitative analyses of the predicted impacts of residual trips from the proposed development and ensure that suitable measures are proposed to manage these impacts.
- **Mitigation measures** – ensure as much as possible that the proposed mitigation measures avoid unnecessary physical improvements to highways and promote innovative and sustainable transport solutions.

Transport Assessment

Issues to be addressed in Transport Assessments

A Transport Assessment study should examine the following key issues:

Existing Conditions

In preparing a TA, a full description of existing site information should be provided by the developer. These baseline conditions need to be established accurately to understand fully the context of the development proposal. This description should include as a minimum:

- ***Existing Site Information***
 - site location plan that shows the proposed development site in relation to the surrounding area and transport system;
 - the permitted and existing use of the site;
 - a detailed description of the existing land uses in the vicinity of the site, including development plan allocations or potential future uses in the case of undeveloped sites;
 - existing site access layout and access constraints, where appropriate;
 - whether the location of the site is within or near a designated Air Quality Management Area (AQMA); and
 - any abnormal load uses of the current site.

Transport Assessment

Issues to be addressed in Transport Assessments

- ***Baseline Transport Data***
 - the quantification of the person trips generated from the existing site and their modal distribution, or, where the site is vacant or partially vacant, the person trips which might realistically be generated by any extant planning permission or permitted uses;
 - existing public transport facilities (including provision/frequency of services, location of bus stops/train stations, park-and-ride facilities) in the study area; if available, the current level of patronage or usage on the public transport network in the vicinity of the site;
 - parking facilities available in the vicinity of the site;
 - existing pedestrian and cycle facilities in the vicinity of the site;
 - pedestrian and cyclists movements in the vicinity of the site;
 - a description and functional classification of the road network in the vicinity of the site;
 - current traffic flows on links and at junctions within the study area;
 - identification of the critical links and junctions on the highway network, with calibrated
 - capacity tests to reflect existing conditions;

Transport Assessment

Issues to be addressed in Transport Assessments

- for the study area, establish the current personal injury accident records for the most recent three-year period, or five years if this is considered to be more appropriate;
- a summary of planned transport improvements within the study area (including type of improvement, implementation schedule and sponsoring agency or highway authority);
- identify current peak periods on the adjacent road network and, as required, daily traffic flow data to and from the development site or in the vicinity of the site;
- levels for air quality and noise for the highway network at the site entrance and any other locations where statutory limits might be breached by additional development traffic; and
- baseline carbon emissions data for the site, broken down by mode.

Transport Assessment

Issues to be addressed in Transport Assessments

- **Public Transport Assessment**

A key issue in seeking the most sustainable solution for a particular development is the need to encourage the use of public transport. An assessment should be made of the available capacity on the existing public transport infrastructure relevant to the development. The capacity of a public transport route or service is the maximum number of people that can be accommodated on the route within the licensing laws of that particular mode.

A recommended methodology for assessing the capacity of public transport involves the following:

- Identify the analysis period, particularly the peak hours of the development and/or the entire transport system;
- Establish the total person trip generation from the proposed development for all travel modes;
- Estimate the likely modal split for the public transport network (buses, rail and tram);
- Identify the public transport services relevant to, and in the vicinity of, the proposed development;

Transport Assessment

Issues to be addressed in Transport Assessments

- Estimate the existing capacity of the bus/train/tram service by multiplying the number of services by the maximum passenger capacity for each mode (bus, train carriages);
- Estimate the current level of patronage or usage on the public transport network, using the most comprehensive data publicly available;
- Estimate the spare capacity on the public transport network; and
- Identify measures to address any shortfall in capacity, where applicable.



Transport Assessment

Issues to be addressed in Transport Assessments

- **Walking and Cycling Assessment**

Another key issue in assessing the sustainability of a development's location will be its accessibility for those walking and cycling. An assessment should be made of the available capacity of the existing cycleway and footpath network in the area of the development. This assessment will help to inform the later stages of the TA process in respect of determining modal split, and travel plan objectives. It will also indicate what enhancements, if any, are required to the local cycleway and footpath network. These assessments should be undertaken using the appropriate analytical tools and methodologies, as agreed with the relevant authorities.

- **Road Network Assessment**

In addition to assessing the public transport capacity and walking/cycling capacity, an assessment of the available vehicular capacity on the road network in the vicinity of the site should be undertaken in order to establish the potential impacts from the development, as well as the likely mitigation measures that may be required to sustain the development.

Consideration should be given to the available parking facilities in the vicinity of the site and the impact that development could have upon them. This assessment should be made in the context of the parking strategy set by the local planning authority.

Transport Assessment

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Transport Assessment

Issues to be addressed in Transport Assessments

- **Traffic data and Forecasts**

The assessment should include recent counts (normally surveyed within the last three years) for peak period turning movements at critical junctions. In certain instances, for example, where there is known to be a significant level of heavy goods vehicles (HGV) traffic, a classified count should be provided. Additional counts that may be required could include:

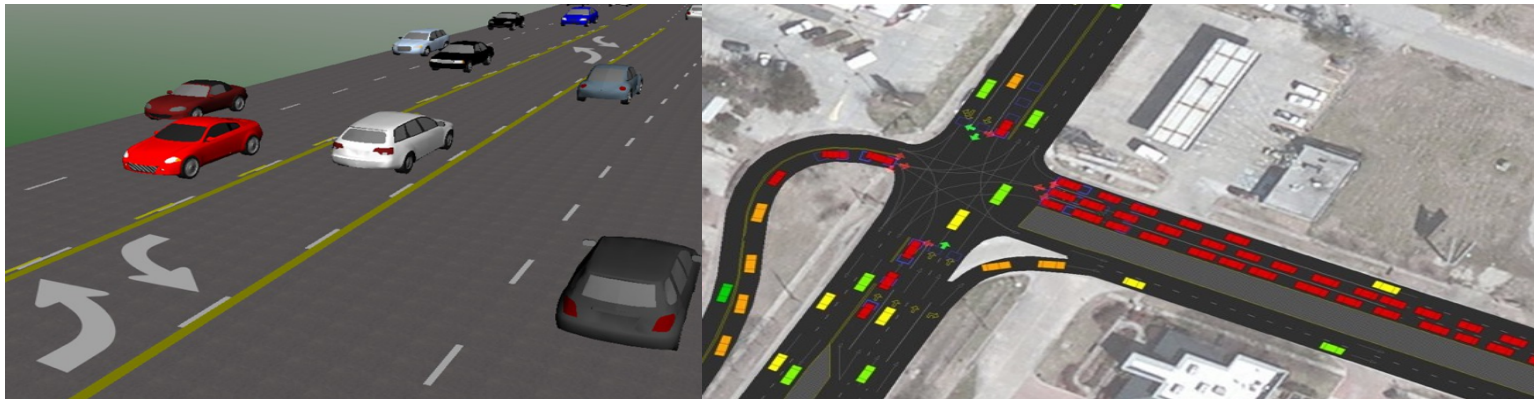
- manual turning counts (should be conducted at 15-minute intervals) to identify all relevant highway network peak periods;
 - 12-hour/24-hour automatic traffic counts (ATC);
 - queue length surveys at signal junctions to establish demand and actual traffic flows;
 - journey time surveys;
 - freight counts;
 - abnormal load counts;
 - pedestrian and cyclists counts.

Transport Assessment

Issues to be addressed in Transport Assessments

Where there is a need to project existing or historical traffic data for future year assessments, the preferred option is the use of appropriate local traffic forecasts (in the UK they use TEMPRO), provided they offer a robust assessment. In some cases, where available, National Road Traffic Forecast (NRTF) growth rates would be appropriate.

The use of any area-wide traffic models or background growth rates should be agreed with the Local Planning Authority in conjunction with the relevant highway authority at the pre-application stage.



Transport Assessment

Issues to be addressed in Transport Assessments

- **Safety Considerations and Accident Analysis**

- The assessment should also identify any significant highway safety issues and provide an analysis of the recent accident history of the study area. The extent of the safety issue considerations and accident analysis will depend on the scale of the proposed development and its location. The need to minimise conflicts between vehicles and other road-user groups should be adequately addressed.
- Critical locations on the road network with poor accident records should be identified. This is to determine if the proposed development will exacerbate existing problems or, if proposed, whether highway mitigation works or traffic management measures will help to alleviate the problems. The accident records at a particular location should be compared with local average accident rates. Where the Strategic Road Network (SRN) is involved, it is recommended that appropriate national statistics are also used as a comparison.
- Site inspections should be conducted to determine if the proposed location and design of access roads (including visibility/sight distance restrictions) would create an increased potential for accidents. Local authorities should take account of the likely effect on road safety of any modification, and should require road safety audits where appropriate.



Transport Assessment

Issues to be addressed in Transport Assessments

- **Proposed Development**

A detailed description of the proposed use or uses of the site should be provided. This should include as a minimum:

- site plan – provide plans and drawings showing site location and site layout and use;
- describe all the proposed land uses;
- scale of development – such as the number of residential units or gross floor area (GFA) of development – subdivided by land use where appropriate;
- site area in hectares;
- hours of operation – specify a weekly profile, including weekends where appropriate, over a 16 or 24 hour period. If the operation is seasonal, then this also needs to be specified;
- proposed access – describe arrangements, locations and method of linkage to existing transport infrastructure for all modes of travel (private cars, public transport, cycling, walking);
- servicing arrangements – describe routes and facilities for service vehicles;

Transport Assessment

Issues to be addressed in Transport Assessments

- the traffic impacts of site construction works, including the requirements of abnormal loads in the construction, use and decommissioning of the present development;
- proposed parking strategy (number of spaces, parking accumulation, parking layout in relation to other site elements, ratio of operational to non-operational spaces, method of car park operation, overspill parking considerations, establishment of/proximity to controlled parking zones, disabled parking, motorcycle parking, cycle parking); and
- development phasing (where applicable) – provide years of first and full occupation, as well as intermediate years if appropriate.

Transport Assessment

Issues to be addressed in Transport Assessments

- **Assessment Years**
 - The assessment year(s) in respect of capacity analysis for the transport network should be consistent with the size, scale and completion schedule of the proposed development, and that of other major developments in the vicinity of the site, as well as planned improvements to the transport system.
 - The appropriate horizon assessment year should be agreed with the relevant authorities during pre-application consultations.
 - In addition to the opening year, one or two further assessment years should be considered.
 - For the Strategic Road Network, the future assessment year should normally be ten years after the date of registration of a planning application for the development.

Transport Assessment

Issues to be addressed in Transport Assessments

- **Analysis Periods**

The TA should consider the following analysis periods:

- Weekday morning and evening peak period trips for the adjacent transport system, with particular focus on the peak period traffic flows on the road network;
- Weekday morning and evening peak period trips for the proposed development;
- An off-peak period selected to assess level of greatest change resulting from the development; and
- Weekend peak period if the development is anticipated to generate significant levels of new trips at weekends or the adjacent transport system suffers from greater levels of congestion than during weekdays.

Transport Assessment

Issues to be addressed in Transport Assessments

- **Development Trip Generation**

- The first step in quantifying the impact of a proposed development on the transport system is to provide an estimate of the person trips (for all modes) that are likely to be generated by the proposed development.

For retail developments, one should normally split trips by vehicles in to different types such as:

- **New trips** – these do not appear anywhere on the road network before the development is opened
- **Pass-by trips** – these are already on the road network directly next to the proposed development and which will turn into the site
- **Linked trips** – these are trips to several different destinations, which may be within the development site or between the development site and nearby facilities (for example a trip to a supermarket followed by a trip to another shop in a nearby town centre);
- **Diverted trips** – these are trips which are already on the road network but are not currently using the existing lengths of road next to the proposed development; and
- **Transferred trips** – these are trips which are already on the road network and accessing similar developments close by to the proposed development (for example shoppers who switch from an existing supermarket to one that has newly opened).

Transport Assessment

Issues to be addressed in Transport Assessments

- **Trip Distribution and Assignment**

Trip distribution and Assignment associated with proposed developments and these include:

- Distribution based on existing traffic surveys;
- For expansion of an existing development, distribution based on existing occupier data;
- Distribution based on census data;
- A Gravity Model; or
- A Transport Model.

Transport Assessment

Issues to be addressed in Transport Assessments

- **Capacity Assessments**

The highway capacity analysis should normally include at least:

- Assessments of the current road network and existing traffic situation validated against surveyed queues and delays; and
- Assessments of the road network for both base traffic and base traffic plus proposed development traffic at the year the development opens (that is when it is fully completed and occupied), a minimum of 5 years after you have submitted your final planning application, and at any time in between when the traffic situation may be worse.

Transport Assessment

Issues to be addressed in Transport Assessments

- **Travel Plans**

- A Travel Plan is a package of measures or agreed outcomes aimed at reducing reliance on the private motor vehicle and reducing congestion. It is a process rather than a policy document. Indeed, completing the document itself is only the start of the process.
- A successful Travel Plan involves continuous monitoring (for example, surveys), review and improvement over time. So it does require a high level of debate about transport problems, options and future action, as well as a high-level management commitment. But where a plan is likely to deliver significant reductions in the use of private cars, this could reduce the scale of highway works required to off-set the development's traffic impacts and could, in certain circumstances, result in the need for less off-street parking.
- Travel Plans (TP) form part of Smarter Choices which are techniques for influencing people's travel behaviour towards more sustainable options, such as encouraging school, workplace and individualised travel planning. T
- Travel Plans also include measures such as individualised marketing, personalised journey plans, public transport information and marketing initiatives, car sharing schemes and car clubs, plus measures that reduce the need to travel, such as video conferencing and teleworking.

Transport Assessment:

Issues to be addressed in Transport Assessments

- **Travel Plans**

A Travel Plan should ordinarily take into account:

- The plan's intended aims and objectives;
- The need for setting targets and what targets are appropriate;
- The need for imposing an alternative solution to targets or some form of penalty where any targets are not met and what those penalties might be;
- Long term management and co-ordination of the plan, particularly for developments occupied by a number of different organisations or residents;
- Monitoring, including establishing the baseline modal split position and assessing the long-term effectiveness of any measures;
- Establishing the current situation of public transport services (not just frequency of services, but bus-stop locations, route details and whether or not the services operate commercially or receive financial support) and the standard of provision for pedestrians and cyclists;
- The need for or likely nature of any on-site and off-site works and measures required to complement and support the plan. For employment or commercial development, you should consider measures at the pre-opening or staff-recruitment phase; and
- The need for or the likely content of employee and resident transport packs (for example, time-limited free bus passes, public-transport timetables and walking and cycling maps indicating local facilities).

Transport Assessments: Case Studies

Orange Farm Shopping Centre Transport Assessment, Johannesburg, South Africa

- A study investigated the impact of the additional traffic generated by a proposed shopping center on the immediate surrounding road network in Orange Farm, Johannesburg, and it determined the need for road upgrades to mitigate the anticipated traffic impact.
- The proposed development was approximately 1,250 sqm in area, with a permissible height of 2 storeys and a coverage of about 65%. The road network in the immediate vicinity of the site was predominantly class 5 roads. The class 5 roads had very little vehicular traffic. For the traffic impact study, traffic counts were conducted at the neighbouring intersections during the weekday AM and PM peak period, in addition to Saturday midday period.
- The expected trip generation from the development was estimated based on the South African Trip Data Manual (Committee of Transport Officials, 2012). Given the socioeconomic of the area and low car ownership, trip generation reduction factors were applied to the traffic impact study. The reduction factors were determined from the Technical Methods for Highways 17 (TMH 17) manual. The TMH 17 manual also allows for further reduction of trips for mixed use developments and transit nodes. However, in the case of this traffic impact study, the reduction factor for mixed use development and transit nodes were not applied.
- Assumptions with respect to the expected trip distribution were made based on the location of the site access in relation to the surrounding road network, the existing traffic volumes, travel patterns as well as the land use nature of the proposed development. Based on the assumptions made, the impact of the proposed developmental traffic on the road network was determined. The results of the operational analysis of the intersections were compared across various scenarios. The Traffic Impact (Transport Assessment) Study found that the impact of vehicular traffic on the road network would be very small and insignificant.

Transport Assessments: Case Studies

Orange Farm Shopping Centre Transport Assessment, Johannesburg, South Africa

- The number of customers using public transport, walking and bicycling was expected to be high. The City of Johannesburg Household Travel Survey (2013) showed that walking and mini-bus taxi are the main modes of transport in the Orange Farm area. The existing public transport stop is about 350m from the entrance of the proposed development. Thus the site is reasonable well located in terms of public transport accessibility. One of the recommendations of the Transport Assessment Study was that a taxi lay-by be implemented adjacent to the entrance of the shopping center. The traffic study also recommended that the sidewalk from the shopping center to the existing public transport stop be upgraded, while meeting the minimum standards.

Transport Assessments: Case Studies

Van Riebeeck Residential Development, Ekurhuleni Metropolitan Municipality, Johannesburg, South Africa.

- Van Riebeeck is a residential neighbourhood in Ekurhuleni Metropolitan Municipality that has recently experienced a lot of crime. According to the 2014 crime statistics in Van Riebeeck Park, criminal incidents have increased by 20% as compared to 2013 statistics. In order to address this issue, the residents via the home owners association applied for road closures. A Transport Assessment Study was carried out to evaluate the impact of such road closures.
- The objective of the study was therefore to evaluate the traffic impact of the proposed road closures. Based on the findings of the investigation, mitigations were proposed to minimise the impact upon the surrounding road network. The study also evaluated the impact of the proposed street closure on pedestrians and public transportation services using the streets.
- The study area only comprised of Class 5 access roads. The study area was surrounded by Class 4 roads which provided accessibility to the area. The Class 4 roads had relatively low volumes ranging between 150 and 300 vehicles per hour (vph) in both directions. The proposed road closures affected approximately 45 dwelling units. Although the study area comprised of residential land use rights, educational (a school) and business (medical doctor rooms); only the residential component were affected by the road closure.

Transport Assessments: Case Studies

Van Riebeeck Residential Development, Ekurhuleni Metropolitan Municipality, Johannesburg, South Africa.

- Turning movement counts were conducted at several intersections around the study area. The traffic counts were conducted during the AM and PM peak periods. Based on the traffic counts, the peak hour and the existing demand were determined. In order to make the traffic impact study comprehensive, pedestrian and public transportation vehicles (minibus taxis, buses) were also counted along with traffic counts. The geometry of the intersection, including number of lanes, lane configuration, lane widths were recorded, which forms a critical part of a traffic impact study. The intersection control type – signalised, unsignalised were also recorded during the survey.
- The traffic model was built using one of the analytical software. The intersections were analysed using the Highway Capacity Manual methodology. Based on the analysis, the Level of Service (LOS) of the intersections under the existing conditions were determined. The traffic from the developments were then re-routed in the traffic model to reflect the expected traffic patterns once the street closures are in place. The Transport Assessment Study compared the intersection operations before and after the street closures. Various indicators such as LOS, volume to capacity ratio, queues, delays, etc were used to compare the two scenarios. A horizon year scenario (2019) was also developed, based on growth in background traffic. Based on the Transport Assessment, it was found that the proposed road closure had little impact on the intersections and they continued to operate within the Highway Capacity Manual prescribed threshold.

Transport Assessments: Case Studies

Van Riebeeck Residential Development, Ekurhuleni Metropolitan Municipality, Johannesburg, South Africa.

- Similarly, the impact of the road closure on pedestrians and public transportation vehicles were evaluated. According to the traffic impact assessment, it was found that the street closure would have no impact on the public transportation system. The Transport Assessment Study also found that the pedestrians were largely unaffected by the proposed road closure. It was found that in certain cases, the walking distance for pedestrians had increased, however, it was well within the National Department of Transport walking distance threshold. In conclusion, the traffic impact study found that proposed road closures would not have a detrimental effect on the road network.

