IMPROVING URBAN MOBILITY IN SURABAYA

URBAN MOBILITY GUIDELINES

TECHNICAL REPORT

Australian AID
Indonesia Infrastructure Initiative
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Peter Midgley
Jakarta, January 2011

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<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>ATC</td>
<td>Area Traffic Control</td>
</tr>
<tr>
<td>ATOS</td>
<td>Access To Opportunities and Services</td>
</tr>
<tr>
<td>BAPPEKO</td>
<td>Badan Perencanaan Pembangunan Kota (City Development Planning Agency)</td>
</tr>
<tr>
<td>BRT</td>
<td>Bus Rapid Transit</td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>CMP</td>
<td>Comprehensive Mobility Plan</td>
</tr>
<tr>
<td>DisHub</td>
<td>Dinas Perhubungan (Transportation Department)</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>I_SUM</td>
<td>Index of Sustainable Urban Mobility</td>
</tr>
<tr>
<td>LTZ</td>
<td>Limited Traffic Zone</td>
</tr>
<tr>
<td>NMT</td>
<td>Non-Motorised Transport</td>
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<td>NUTP</td>
<td>National Urban Transport Policy (India)</td>
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<tr>
<td>P &amp; R</td>
<td>Park and Ride</td>
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<td>PTAL</td>
<td>Public Transport Accessibility Level</td>
</tr>
<tr>
<td>RPJMD</td>
<td>Rencana Pembangunan Jangka Menengah Daerah (Regional Medium Term Development Plan)</td>
</tr>
<tr>
<td>SKPD</td>
<td>Satuan Kerja Perangkat Daerah (Regional Government Work Unit)</td>
</tr>
<tr>
<td>V/C</td>
<td>Volume/Capacity</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

This report is designed to provide the city of Surabaya with the elements necessary to begin the process of improving mobility for its citizens. It results from a series of discussions with the city authorities and staff.

The first part of the report (Chapters 1 and 2) explains the concept of improving urban mobility and provides examples of international best practice.

The second part of the report (Chapters 3 and 4) presents a review of the roads and transportation sections of the 2011-2015 medium-term development plan (currently under discussion in Surabaya) and suggests how they may be adapted and adjusted to have a more beneficial impact on improving mobility in the city. In addition, this section of the report provides some suggestions as to how the city authorities may be able to assess the current situation with regard to mobility.

The third part of the report (Chapter 5) presents a series of measures and actions that have been shown to improve mobility elsewhere and that, if tested in Surabaya as part of a demonstration project program, may assist the city authorities in improving mobility throughout the city (similar to the “showcase corridor” program currently underway in Jakarta).

The final part of the report (Chapter 6) discusses techniques that may be useful in benchmarking and assessing the performance of the transport system and its component parts in improving mobility in absolute terms as well as how it is perceived by citizens. The report ends with conclusions and recommendations (Chapter 7).

The Annexes to the report are available as separate documents. They contain the review of the BRT Feasibility Study (Annexe 1) and the Terms of Reference (Annexe 2) for further work, both of which were key deliverables of this Activity. They also provide a review of current best practice with regard to BRT systems (Annexe 3) and a detailed overview of the Ahmedabad BRT System (Annexe 4) which is regarded by many as one of the better systems currently in operation. The results of the recently held Workshop and Focus Group Discussions on Urban Mobility are also presented in a separate Annexe (Annexe 5) and IndII Team findings on Safety are presented in Annexe 6.
For many years, urban transport planners have attempted to reduce congestion. In most cases, such studies recommend overcoming congestion by improving conditions for vehicles, particularly motorised ones such as private cars, trucks and public transport vehicles. Authors of these studies believed the solution was simple: build the roads necessary to meet demand. But something went wrong. The roads that were built stimulated even more growth in car ownership and usage. The results were ever-increasing congestion, economic inefficiencies, pollution, and other forms of environmental degradation. Clearly this approach has not worked. But what is the alternative?

Over the past decade, there has been a shift in emphasis in many countries from overcoming congestion to improving mobility. And the results are impressive. Singapore is a shining example of what can be achieved by concentrating less on building roads and concentrating more on changing the way people use roads as well as providing a first class public transport system that is affordable to the people.

Improving urban mobility means focusing on the movement of people and goods (rather than the movement of vehicles). The objective is to create a highly-efficient, flexible, responsive, safe and affordable urban mobility system with the least amount of traffic, travel and effort while ensuring environmental sustainability. This means giving priority to public transport, goods vehicles, pedestrians and non-motorised vehicles. It means providing attractive and efficient public transport services and reducing the demand for motorised travel, by car or motorcycle. It also means fully exploiting what already exists in terms of road space and services before investing in new ones.

Improving mobility is less about engineering and more about changing behaviour. It therefore has a very important social dimension and it involves many stakeholders who normally would not work together to “reduce congestion” because that is a transportation issue. Improving mobility starts with public participation, consultation,
focus group discussions, consensus building and cooperation among different stakeholders.

Improving urban mobility is more about outcomes, not outputs. For example, rather than measuring the number of additional kilometres of footpaths provided, it is more important to consider the use of these footpaths and their effect on increased accessibility, safety, improved health, etc.

Improving mobility is more about working together than writing reports. It involves people sitting down together in the fields of transport, environment, economic and social development, city and town planning, employment and housing and it involves them joining forces with social organisations and businesses to develop comprehensive approaches towards improving urban mobility. It is inclusive rather than exclusive and involves all sections of society.
2.1 EUROPE

In 2009, the European Commission established a Europe-wide policy and action plan to improve mobility in all member states of the European Community. The European Commission's first urban mobility initiatives, which relied heavily on public participation under the "Citizens' Network", date back to 1995 and 1998. Since 2002, through its CIVITAS initiative, which encouraged cities in different countries to work together, the European Union made available €180 million to cities across Europe to implement and evaluate a wide range of innovative measures to promote sustainable urban mobility. The results were impressive; most measures were successful and about 70% of them contributed to improving mobility (see Figure 3).
Integration is a trademark of the CIVITAS initiative, with packages of policies yielding greater impact than the sum of policy elements implemented in isolation. The strong commitment of politicians, synergies between policies, the promotion of local partnerships, and the involvement of users were identified as the main drivers of success.

As a result of this initiative and a six-month intensive consultation process, the European Commission adopted the Green Paper "Towards a new culture for urban mobility" on 25 September 2007. This consultation document opened an even broader debate on urban mobility and enabled the European Commission to adopt the Action Plan on Urban Mobility on 30 September 2009. The Action Plan comprises twenty measures to improve urban mobility throughout Europe by 2012 with €8 billion available for funding clean urban transport from EU structural and cohesion funds.

### 2.2 BRAZIL

The first draft National Policy on Sustainable Urban Mobility was published in 2004. It was approved in 2007 and comprises 29 directives and nine guiding principles to improve urban mobility. It requires each city with over 500,000 inhabitants to produce an Urban Mobility Plan. In addition, the Ministry of Cities has developed an Urban Mobility Program to allocate resources to metropolitan areas and cities that have established Urban Mobility Plans. Funds are channelled through the Federal Savings Bank ("Caixa Econômica Federal") to State Governments who are responsible for the management of metropolitan areas in Brazil. Counterpart funding is required from the State Governments. The Ministry of Cities is responsible for the appraisal and selection
of proposals submitted by the States. The Caixa Econômica Federal, acting on behalf of the Ministry of Cities, is responsible for disbursements of funds, supervision of project implementation and the monitoring and evaluation of the results. The Ministry of Cities has published guidelines for developing Urban Mobility Plans and for submitting proposals.

2.3 FRANCE

The French national urban mobility policy aims at coordinating the initiatives of the different agencies concerned with public transport, roads, parking and urban planning in collaboration with the commercial sector and the general public. The objective is to ensure mobility and access for all, while protecting the environment by encouraging the use of alternatives to the car that use less fuel and cause less pollution – such as public transport, walking and the bicycle.

Each city in France is required to have an Urban Mobility Plan that is compatible with national sustainable development objectives. Each plan defines the travel policy to be followed to improve urban mobility in the context of safety, health, social cohesion and urban development, parking, goods deliveries, fares, etc. and it is reviewed every five years. Cities that adopt an Urban Travel Plan are allowed to collect public transport fees from companies (Versement Transport).

To date, 50 cities, representing three-quarters of towns and cities with more than 100,000 inhabitants have approved Urban Mobility Plans. In addition, almost as many smaller towns have started a voluntary Urban Mobility Plan process.

2.4 INDIA

The objective of the National Urban Transport Policy (NUTP) for India is to ensure safe, affordable, quick, comfortable, reliable and sustainable access for the growing number of city residents to jobs, education and recreation. The national policy stresses the importance of public consultation. In addition, it emphasises the need to learn by doing through pilot projects. Under the NUTP, cities are required to have Comprehensive Mobility Plans and they receive financial assistance (up to 80% of total costs) from Central Government for preparing them. These plans are designed to focus on improving the mobility of people rather than vehicles and accordingly give priority to pedestrians, non-motorised transport, public transport (all modes), intermediate public transport (informal- and para- transit) and the development of integrated land use plans. They include short-, medium- and long-term measures to improve mobility in a sustainable manner, reduce travel demand and develop networks for public transport as well as non-motorised transport.

Funding is assured through the centrally funded Jawaharlal Nehru National Urban Renewal Mission and is already being applied in 63 cities across India. In addition, and
as a result of establishing the National Urban Transport Policy, the Ministry of Urban Development has been able to apply to the Global Environmental Facility for a grant of US$ 25 million along with up to US$ 200 million co-financing from the World Bank, to assist in the development of sustainable urban mobility solutions. Counterpart funds amounting to US$ 150 million are being provided by Central Government, State Governments and implementing agencies at the city level. The project is being implemented in ten cities and demonstration projects have already commenced in five of them.

2.5 CONCLUSIONS

The approaches developed internationally to improving mobility involve the following activities:

- Developing a sustainable urban mobility system
- Promoting integrated approaches and policies as well as improving coordination
- Focusing on citizens and the movement of people rather than vehicles
- Giving priority to public transport and non-motorised transport
- Reducing emissions/pollution
- Involving citizens through public participation
- Improving health and safety
- Promoting the use of cleaner technologies
- Sharing experience and knowledge
- Promoting pilot/demonstration projects and learning by doing
- Providing mobility for persons with disabilities, the young and the aged as well as promoting gender equality (universal access)

Most cities that have implemented sustainable urban mobility measures have experienced the following types of benefits (see Table 1, below, for an example of Access Management benefits):

- Decrease of traffic jams and congestion followed by a diminution of noise, atmospheric contamination, contribution to the greenhouse effect and accidents
- Lower energy consumption
- Reduction of travel time
- Improvement of the public transport services
- More public spaces available
- A general improvement of accessibility, including for the disabled
- Reduction of external costs
• Increased health among the inhabitants because of less contamination and increased use of bicycle and walking

• Increased quality of the urban environment and quality of life among the citizens

An important ingredient in sustainable mobility planning is the willingness of cities to try out new ideas and learn from each other. Equally important is the willingness of city authorities to consult with citizens on problems and solutions and to involve them in the design, implementation and monitoring of results.

Table 1: Results of CIVITAS Access Management Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Main outputs</th>
<th>Key results</th>
</tr>
</thead>
<tbody>
<tr>
<td>New parking management policy in Toulouse</td>
<td>Creation of resident parking rate, extension of pay parking time, preferential rate for some professionals (emergency), development of car park observatory.</td>
<td>Decrease of free park spaces and increase of pay parking, decrease of occupation and congestion rates of parking spaces, illegal parking rate decrease and high satisfaction rate of residents.</td>
</tr>
<tr>
<td>Public space redesign in Toulouse</td>
<td>Traffic layout modification, urban planning for bicycles, pedestrian zone extension and delivery area implementation right in the city centre.</td>
<td>Car traffic decrease (-15%), modification of pedestrian' and cyclists' habits and cyclists' routes, high acceptance level.</td>
</tr>
<tr>
<td>Urban mobility plan in Blagnac</td>
<td>Implementation of Blue Zone Area.</td>
<td>Better access to the centre for shops and customers and decrease in long-term parking by 59%.</td>
</tr>
<tr>
<td>High quality bus corridors in Toulouse</td>
<td>Creation of bus-segregated lanes in city centre and dedicated bus corridor linked to metro stations and Park &amp; Ride at these stations</td>
<td>Segregated bus lanes have reduced the average bus travel time, average bus speed has increased in bus corridors.</td>
</tr>
<tr>
<td>Access and parking management for city centre in Debrecen</td>
<td>Study for access restriction and parking management, modification of traffic light cycles and implementation of P&amp;R availability information signs.</td>
<td>Traffic flow increase during green cycle, citizens' satisfaction.</td>
</tr>
<tr>
<td>Parking management strategy for Mestre</td>
<td>Ten new Park &amp; Ride car parks opened with public transport services available and four information panels plus differentiated park tariffs in surrounding areas plus communication campaigns.</td>
<td>Park &amp; Ride use by visitors and commuter increased by 309%; traffic flow increase has been limited and car park turnover has improved in favour of business activity.</td>
</tr>
<tr>
<td>Electronic control of the Mestre restricted access zone</td>
<td>Implementation of video control system in the Limited Traffic Zone (LTZ).</td>
<td>Effective enforcement of the limited traffic zone; reduction by 10% in the number of cars entering to the city</td>
</tr>
</tbody>
</table>

In Surabaya, the second largest city in Indonesia, the number of private vehicles has grown dramatically. In 2005, there were approximately 1.5 million vehicles, of which 1.1 million were motorcycles and 0.26 million were private cars. By 2009, the number of motorcycles grew nearly threefold, to 2.98 million, and the number of private cars had doubled, to 0.52 million. At the same time, measures to reduce the impact of growth in the use of private vehicles, such as public transport and demand management, have not been implemented.

These and other statistics about the length and type of roads, volume/capacity ratios, road conditions, number of buses and para-transit vehicles (Angkot) are readily available. This information is useful in terms of understanding vehicle movements but more information is needed with regard to accessibility, person trips (especially on foot), travel time and the problems that people face in moving around the city. More information is needed on how people get around the city, how long it takes and what it costs.

The transport plans that are currently under discussion within the Draft Medium Term Development Plan 2010-2014 (RPJMD), concern road improvements and transportation improvements. Each plan has been prepared by the agency responsible. There appears to be very little relationship between the two plans and little indication of how the road plans would improve mobility.
3.1 RPJMD ROAD IMPROVEMENT PLANS AND PROGRAMS

Figure 5: Road Network Development Concept (2011-2015)

The conceptual approach to the development of the road network is presented in Figure 5, above. The road development policy is derived from the analysis of Volume/Capacity (V/C) ratios which provide an index of congestion in terms of the capacity of a road to handle vehicle movement. It is apparently also based on some assessment of accessibility. It draws on stakeholder forum discussions and the rational is based on the city master plan.

The objectives of the road development policy are:

1. Planning the road and bridge network system in accordance with due regard to harmony with the surrounding area and harmony with Provincial and National policies
2. Updating of the status of roads by function and class
3. Guiding the street organiser apparatus
4. Coordinating with other SKPD (Regional Government Work Unit) in giving consideration road space utilisation benefits, space-owned roads, and supervision of road space
5. Developing a road and bridge construction technology

Source: Bahan Diskusi RPJMD 2011-2015, March 2010, BAPPEKO, Surabaya
6. Improving accessibility between areas in the city of Surabaya to develop, build, and maintain the infrastructure of roads and bridges

7. Improving the performance of road management

8. Evaluating the performance of road management

The overall goal of program management and construction of roads and bridges is increased road performance. The key performance indicator is the length of the rush hour and the target is to reduce this on each road section. In the past, the key indicator was the V/C ratio. The target for 2009 was 0.8 and the results were 0.69, an improvement of 0.11 above the target (a V/C of 1.00 indicates “road saturation” or “congestion”, hence a low V/C indicates less congestion).

The road network development plan is designed to “improve city accessibility” and “increase road capacity”. To improve accessibility, the plan provides for the development of bridges, access roads, pedestrian facilities and underpasses. To increase road capacity it envisages building new roads, improving existing roads and undertaking road maintenance.

For this approach to contribute towards improving mobility it would be useful to understand more about the use of the road network by public transport and non-motorised transport (passenger flows, pedestrian movements, Becak, etc) along with an assessment of issues affecting road use such as street vendor encroachment, accidents, difficulties crossing roads for pedestrians, the aged, the disabled, etc.). Equally important is the need to assess the nature, extent and condition of pedestrian facilities and infrastructure (sidewalks, footpaths, pedestrian crossings, footbridges, etc.) and to establish some measure of the adequacy of these facilities in meeting pedestrian demand. Without this information it is almost impossible to assess the role of the road network in contributing to, or hindering, mobility. For example:

- A much broader understanding of road use (such as the use of these roads by public transport and pedestrians, freight transport, delivery, parking, accidents, etc) needs to be taken into account in prioritising the selection of roads to be included in the RPJMD.

- The road design proposals should explain how road improvements will be used by pedestrians, public transport, non-motorised vehicles, motorbikes, etc. and they should clearly demonstrate the nature and extent of the benefits that will accrue to all road users (cars, pedestrians, public transport, non-motorised vehicles, motorbikes, etc.) and assess the resulting impact on improving mobility.

- The definition of “critical bottlenecks” should include a clearer understanding of the problems (the nature of delays, how long and to whom) and the impact on mobility for all users (including the disabled, the young, the aged and the poorer sections of society).
3.2 RPJMD TRANSPORTATION IMPROVEMENT PLANS AND PROGRAMS

The Transportation Improvement Plans and Programs under consideration for the city are summarised in the RPJMD document and illustrated in the presentation entitled: “Bahan Diskusi: Program Pengembangan Transportasi” (Transportation Development Program) dated March 17, 2010.

The presentation provides a comprehensive overview of the current situation with regard to public transport operations (essentially routes but also a list of issues), freight operations, traffic control (traffic signal locations), on-street parking (locations), at-grade rail crossings (locations), pedestrian crossing and footbridges (locations).

The traffic and transportation infrastructure issues are summarised as follows:

- Many streets lack traffic control equipment and infrastructure (traffic signs, markings, separators, traffic lights, area traffic control, warning lights, etc.).
- Most equipment and infrastructure is concentrated in the north-south corridor of the city.
- The traffic lights system is not fully developed, not fully integrated and connected to the control centre.
- Many traffic signs have been lost and damaged and many are old.
- There is a deficit in public off-street parking facilities.
- There are insufficient bus stops and shelters.
- Roads are congested especially in and around activity centres (such as markets).

The strategic objectives of the Transportation System Development Program are to:

1. Improve the performance of the urban transport system
2. Encourage the provision of mass transit facilities and infrastructure
3. Improve public transport services

The process to achieve these objectives is summarised as follows:

1. Undertake an update of the transportation system plan in a sustainable and integrated manner
2. Develop an understanding of sustainable approaches for the operators of the transport system
3. Improve control activities in the operation of transportation systems
4. Improve the performance of the implementation of traffic control activities within the transportation system

The objectives of the Transportation System Development program are:

- To apply the results of studies and planning of urban transport systems in Surabaya
• To increase the staff capacity of transportation system operators
• To optimise the use of the road network and its supporting infrastructure
• To encourage the development and use of mass transit
• To improve the performance of public transport services with the principle of a door-to-door service
• To improve the quality and performance of the public transport service network and ensure its integration into an inter-modal public transport system
• To increase rail transport capacity in the City (commuting)
• To encourage the use of technology in the operation of transportation systems
• To integrate parking and public transit (park and ride)
• To evaluate the performance of the transportation system

The overall goals of the Transportation Improvement Plans and Programs are increased road performance and improved public transport service. The key performance indicators are average vehicle speeds (km/h) on primary and secondary arterial roads and the headways (in minutes) of microbuses and city buses.

The proposals identified to meet these objectives are under discussion. They are illustrated in the presentation entitled: “Bahan Diskusi: Program Pengembangan Transportasi” (Transportation Development Program) dated March 17, 2010. They comprise a series of measures that would certainly improve traffic conditions in the city and may well improve mobility. They include measures to improve Area Traffic Control (ATC), introduce Bus Rapid Transit (see Annex 1), develop a cycle path network demonstration project within the Central Business District along with the possibility of introducing a bicycle sharing scheme. The only proposal that is presented in detail in the draft RPJMD is the introduction of BRT.

While these measures will certainly contribute to improving mobility, they do not cover issues such as parking and demand management; the growth in motorcycle ownership and use; accident prevention and reduction; Angkot and non-motorised transport (especially walking).

As in the case of the Road Improvement Plans (outlined in Section 3.1.1. of this report), the analysis of the current situation would benefit from a clearer understanding of how people use the transportation system and the problems they face in moving around the city on foot, by public transport (especially Angkot), by car or motor cycle. The transportation proposals should clearly demonstrate the nature and extent of the benefits that will accrue to all road users and assess the resulting impact on improving city-wide mobility for all users (including the disabled, the young, the aged, women and the poorer sections of society).
3.3 CONCLUSIONS AND OBSERVATIONS

It is clear from the improvements that have been made in recent years to sections of the road network and footpath network, that the city has the capacity to implement civil works to a high standard and maintain them. Equally important is the observation that the city has the capacity to introduce innovative traffic calming measures such as raised pedestrian crossings. The plans and proposals that are under discussion have been well prepared and meet high standards in terms of engineering design and practice. They reveal that the city of Surabaya has at its disposal a team of highly motivated and competent staff in both the road and transportation agencies. What is missing is the integration of their proposals into measures that are explicitly designed to improve mobility for all citizens. This will require a comprehensive analysis of issues, derived from extensive consultation and a deeper understanding of the situation on the ground, both physically and in terms of how people use road infrastructure and services to get around.

The following sections of this report present some suggestions as to how this may be achieved along with examples of best practice from other cities and other countries.
Before attempting to develop solutions to improving mobility in Surabaya, basic information is needed on how people get around the city, how long it takes or what it costs. There are several approaches to obtaining this information. The most useful is consultation with the people themselves to understand the issues and preferences for solutions. In parallel with the consultation process, it is important to assess accessibility. This is a key measure of mobility and can be obtained from a combination of surveys, observations and measurements. The critical point is to translate this data into usable indices. Finally, work should begin on developing a mobility index for Surabaya. An approach has been developed and tested on the city of Curitiba in Brazil. The Index is quite complex and could be simplified considerably and adapted to Surabaya. It would provide a very useful benchmark for assessing progress.

The key missing ingredients in the current knowledge base on Surabaya are public transport users and pedestrians. A major effort is needed to survey public transport usage and walking. Public transport user and pedestrian information and opinions can be captured through focus group discussions. The condition of pedestrian facilities (sidewalk conditions, barriers to walking and so on) will nevertheless require extensive surveys and pedestrian counts (at intersections, pedestrian crossings, market and other activity areas, etc.).

In addition it will be important to know about origins and destinations, Becak trips and cycling, ridesharing (there appear to be many vehicles with more than one passenger), stated and revealed preferences of travellers, etc.

The Urban Mobility Toolkit published by the Asian Development Bank provides a very comprehensive guide on how to undertake surveys and analysis of current conditions with special sections on Public Transport and Non-Motorised Transport.

The following sections provide some examples of approaches for consultation, measuring accessibility and developing mobility indices. It includes a summary of the
Urban Mobility Toolkit along with links to access the full toolkit documentation which is available on-line.

4.1 CONSULTATION

Improving mobility involves everyone and it starts with the people who live and work in the city. It is essentially a social exercise and involves many actors. The city has initiated a series of workshops and focus discussion groups (see Annexe 4). These should continue and should be expanded to include as wide a cross-section of the population as is possible and reasonable within time and budget constraints.

The survey approach adopted in London with regard to the introduction of the congestion charge is an interesting example of how to identify problems and solutions that may help in the organisation of focus group discussions in Surabaya.

The first questions that were posed to the focus groups were:

- Are there transport problems in London?
- If so, what are the problems and how they could be solved?

In response to questions about traffic problems over 90 percent of Greater London residents said that “Yes, there is too much traffic in London”.

By far the most mentioned traffic problem by Greater London residents was “slow journey times”. A quarter of residents mentioned “air pollution”.

When given a list of potential traffic problems in terms of “some people say that traffic levels in London cause the following problems” and asked to agree or disagree, Greater London residents responded to each of the suggestions as shown in Figure 7, with air pollution, longer journey times and unreliable bus times with the highest scores.
When asked which would be the single most effective solution to reduce traffic levels, people cited traffic restraint measures as well as traffic improvements; see Figure 8 (restraint measures are shown in a darker shade).

Of the restraint measures, the general public considered the most effective measures to be a ban on cars and road user charges in Central London. They considered better quality public transport to be the most effective improvement measure. The result of this consultation process (undertaken in 2000) was the famous and highly successful
London Congestion Charge introduced in 2003, the revenues from which finance bus improvements, in accordance with the public’s expressed preferences.

4.2 ACCESSIBILITY

A key element of urban mobility is accessibility – to employment, services, education, recreation facilities, etc. It is therefore useful to measure the way in which transport facilitates accessibility to opportunities and services. The main accessibility measure for London is the Public Transport Accessibility Level (PTAL). This measures access to the public transport network for any location in London by combining walk time required to access the transport network with service waiting time at bus stops and stations (see Figure 9).

**Figure 9: Example of the London “Public Transport Accessibility Level” (PTAL) index**

Develop and keep up to date a system for mapping public transport access using Public Transport Accessibility Levels (PTAL)

- proximity of bus stops and rail stations
- number of services available
- the frequency of the services.

The higher the value, the more access the public transport network provides.


A new measure, which quantifies Access To Opportunities and Services (ATOS), has been developed in London to reflect access by public transport and walking to jobs, educational establishments, health services, food shopping/town centres and open spaces. In a dense urban environment, accessibility in terms of travel time is not always the main issue - for example a school may be readily accessible, yet may not have sufficient capacity to accommodate local children or be appropriate to their specific needs. To account for these difficulties, ATOS typically looks at access to more than one establishment, thereby reflecting a degree of ‘user choice’ in the methodology. The average time required for accessing employment and key services in London by public transport or on foot in 2008/09 was 17.4 minutes. (see Figure 10).
4.3 INDEX OF SUSTAINABLE URBAN MOBILITY (I_SUM)

The Index of Sustainable Urban Mobility (I_SUM) was developed to provide planners and public administrators with a tool to evaluate the performance of a city in terms of mobility. I_SUM is a method used to assess the mobility conditions in any city by taking into consideration the inherent complexity of the urban space. In addition, the index covers several aspects associated with the new paradigm of sustainable mobility while simultaneously considering traditional issues of transportation planning. In order to be as comprehensive as possible, the method relies on eighty-seven indicators that cover thirty-seven themes. These themes can be further grouped into nine main areas, or domains. Once having calculated the index for any given city, the values can be used for comparison between cities, or benchmarking.

This approach has been applied to the city of Curitiba in Brazil and has found to be quite accurate in terms of measuring the relatively high standards of mobility found in this city. The results which led to a global value of 0.747 (out of a maximum of 1.0) confirmed both the ability of the index to measure the strengths of the city planning strategies and the positive results of the municipal mobility policies (see Tables 1 and 2).

In the case of Curitiba, the Index has been applied ex-post. In the case of Surabaya, a simplified version of the Index could be developed to measure progress in achieving agreed outcomes. Two approaches are possible. A baseline index could be established...
at 1.00 and the target score would be above 1.00 (say 1.5 within 5 years) or a target score could be 1.00 (as an absolute) and progress measured in achieving the target score.

Table 2: The Index of Sustainable Urban Mobility in Curitiba

<table>
<thead>
<tr>
<th>DOMAINS</th>
<th>THEMES</th>
<th>INDICATORS</th>
<th>SCORES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Accessibility to transport systems</td>
<td>Accessibility to transit</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public transportation for users with special needs</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transport expenses</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td>Universal accessibility</td>
<td>Streets and sidewalks adapted for users with special needs</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessibility to open spaces</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parking spaces to users with special needs</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessibility to public buildings</td>
<td>not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessibility to essential services</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>Physical barriers</td>
<td>Urban fragmentation</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Legislation for users with special needs</td>
<td>Actions towards universal accessibility</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Environmental impacts</td>
<td>CO Emissions</td>
<td>not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CO2 Emissions</td>
<td>not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Population exposed to traffic noise</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Studies of environmental impacts</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Natural resources</td>
<td>Fuel consumption</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use of clean energy and alternative fuels</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>Social aspects</td>
<td>Information available to the population</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social inclusion</td>
<td>not available</td>
</tr>
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<td></td>
<td></td>
<td>Vertical equity (income)</td>
<td>not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Education and active citizenship</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Education for sustainable development</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public participation</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Participation in decision-making</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Integration of political actions</td>
<td>Integration of different government levels</td>
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<td></td>
<td></td>
<td>Public-private partnerships</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Acquisition and management of resources</td>
<td>Acquisition of resources</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Investments in transport systems</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Distribution of resources (public x private)</td>
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<tr>
<td></td>
<td></td>
<td>Distribution of resources (motorized x non-motorized)</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>Urban mobility policy</td>
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<tr>
<td></td>
<td>Provision and maintenance of transport infrastructure</td>
<td>Density of the street network</td>
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<tr>
<td></td>
<td></td>
<td>Paved streets</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintenance expenditures in transport infrastructure</td>
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</tr>
<tr>
<td></td>
<td>Transport infrastructure</td>
<td>Streets signaling</td>
<td>not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distribution of transport infrastructure</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>Non-motorized modes</td>
<td>Bicycle transportation</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length and connectivity of cycleways</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bicycle fleet</td>
<td>1.00</td>
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<tr>
<td></td>
<td></td>
<td>Facilities for bicycle parking</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>Pedestrians</td>
<td>Pathways for pedestrians</td>
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<td></td>
<td></td>
<td>Streets with sidewalks</td>
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<tr>
<td></td>
<td>Trips reduction</td>
<td>Travel distance</td>
<td>not available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Travel time</td>
<td>not available</td>
</tr>
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<td></td>
<td></td>
<td>Number of trips</td>
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<tr>
<td></td>
<td></td>
<td>Measures to reduce motorized traffic</td>
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Table 3: The Index of Sustainable Urban Mobility in Curitiba (Cont.)

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<tr>
<th>DOMAINS</th>
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<th>INDICATORS</th>
<th>SCORES</th>
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<tbody>
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<td>Urban transport system</td>
<td>Transp. safety and quality</td>
<td>Total travel of the travel network: 0.13</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Transit service frequency: 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>On-time performance: 0.99</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transit average speed: 0.45</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transit fare: 0.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Passengers per kilometer: 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Annual number of passengers: 0.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>User satisfaction with the transit service: 0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diversity of transportation modes</td>
<td>Diversity of transportation modes: 0.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public versus private transport: not available</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Motorized versus non-motorized modes: not available</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transp. regulations and enforcement</td>
<td>Contacts and rotations: 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public transport: 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transit regulations: 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transit transfers: 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fare policy: 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discounts and fare rules: 1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fare transfers: 0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public subsidies: 0.75</td>
<td></td>
</tr>
</tbody>
</table>


4.4 URBAN MOBILITY TOOLKIT

As a result of establishing the National Urban Transport Policy in India in 2006, the Asian Development Bank assisted the Indian Government in the development of Guidelines and Toolkits for Urban Transport Development in Medium Sized Cities in India. These Guidelines and Toolkit were completed in 2008 and are available online from the ADB at [http://sti-india-uttoolkit.adb.org/](http://sti-india-uttoolkit.adb.org/). The Guidelines are grouped within the following modules:
• Module 1: Comprehensive Mobility Plans (CMPs): Preparation Toolkit
• Module 2: Bus Rapid Transit (BRT): Toolkit for Feasibility Studies
• Module 3: Guidelines for Bus Service Improvement: Policy and Options
• Module 4: Guidelines for Parking Measures: Policy and Options
• Module 5: Guidelines for NMT Measures: Policy and Options

Although these guidelines are designed to be used within the context of the Indian National Urban Transport Policy, they represent good examples of best practice and should be considered in developing approaches to improving urban mobility in Surabaya. The Comprehensive Mobility Plan Toolkit (Module 1) is especially relevant for Surabaya. It is 116 pages in length and comprises the following sections:

SECTION I INTRODUCTION
• Background
• What is a CMP?
• Relationships between a CMP and Other Existing Plans
• FAQs on CMPs

SECTION II CMP PREPARATION PROCESS
• Understanding Key CMP Tasks
• Stakeholder Consultation
• Update and Maintenance of CMP
• Preparing for a CMP: Where to Start?

SECTION III TASK DESCRIPTION
• Task 1 Defining Scope of the CMP
• Task 2 Data Collection and Analysis of the Existing Urban Transport Environment
• Task 3 Development of Integrated Urban Land Use and Transport Strategy
• Task 4 Development of Urban Mobility Plan

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• Task 5 Preparation of the Implementation Program

SECTION IV ANNEXES
• Annexe 1 Sample Survey Forms
• Annexe 2 Sample Project Sheets
• Annexe 3 Tentative Checklist for Evaluating CMPs
• Annexe 4 Modelling Approach in CMP Process
• Annexe 5 Approaches to Selecting Priority Measures
• Annexe 6 Sample TOR for CMP Preparation

Copies can be obtained in hard copy from IndII or on-line in PDF format from this site: http://www.adb.org/Documents/Produced-Under-TA/40006/40006-01-ind-dpta-01.pdf
Improving mobility involves developing tailor-made approaches that fit city-specific needs. The extensive work undertaken in the CIVITAS program (see section 2.1.1, above) confirms that innovative approaches to improving urban mobility need to be adjusted to the requirements of each city through a process of testing with small and manageable demonstration projects. The showcase corridors that are being improved in Jakarta follow a similar approach. Improving urban mobility involves learning by doing and learning from and with others. It is essentially a cooperative knowledge-sharing process where cities work together to understand problems and find solutions. In this respect, improving urban mobility differs from urban transport planning which relies on standard “text book” approaches to every city and every problem (e.g. using volume/capacity ratio standards that ignore “friction” - caused by street traders, delivery vehicles, illegal parking, jay-walking, and so on - as a diagnostic tool for congestion).

The following sections of the report present some of the measures that have been introduced and tested in demonstration projects in other cities. They will serve as a guide to approaches that may be adaptable to Surabaya as well as a stimulus to developing totally new and innovative measures to improve mobility that are “made in Surabaya” (such as testing the possibility of introducing electric powered Becak within neighbourhoods and the Central Business District).
5.1 BUS RAPID TRANSIT

Figure 12: Bus Rapid System in Nantes, France (low-floor buses and non-median stations)

Before embarking upon a major effort to design and build a Bus Rapid Transit (BRT) system in Surabaya, the city may wish to develop a pilot program to test many of the options and alternative configurations that are possible with BRT (see Figure 12, above). Just as there is no “text book” for improving urban mobility, there is no “text book” BRT system. Each system has evolved to meet the special requirements of each city. There certainly are many BRT modules in terms of busway design, station design, bus type, access provisions, etc.

Annexe 2 presents a generic set of Terms of Reference for Bus Rapid Transit Studies that can be adapted to develop a pilot demonstration project; Annexe 3 presents a very comprehensive overview of the range of Bus Rapid Transit systems and modules currently available; and Annexe 4 presents an overview of the Ahmedabad Bus Rapid Transit System that has an approach and design modules that may be readily adaptable to Surabaya.

5.2 INTEGRATED TICKETING

Integrated ticketing using smart card technology improves mobility by enabling the user to switch seamlessly between different modes of travel. Although at first glance this may appear to be too sophisticated an approach for Surabaya, nearly everyone in the city uses a mobile phone and is therefore familiar with smart card technology and use. It should therefore be possible to consider testing integrated ticketing as part of a BRT pilot with selected Angkot feeder services, improved Becak systems, the Madura ferries.
With the “pass partout” card, La Rochelle (France) is offering a multimodal urban transport card with a wide range of options: urban bus, regional trains, boats, taxis, park and ride, public bicycles, and car sharing. The idea is to offer one ticketing solution for all sustainable transport modes in the La Rochelle area (see Figure 13). Similar systems have been introduced in Freiburg (Germany) and Toulouse (France).

**Figure 13: Integrated Ticketing Strategy (La Rochelle, France)**

Source: The transport and mobility strategy in La Rochelle, 2008, Sébastien Davy, Urban Community of La Rochelle

### 5.3 ENCOURAGING CYCLING

The City Transportation Agency (DisHub) has developed a cycle path project concept for the Central Business District (see Figure 14). This would make an excellent low cost demonstration project to assess the potential for increased bicycle use as well as testing the potential for a modern Becak system (with new vehicle designs) to serve the area.
Evidence from field visits suggests there are relatively few cyclists in the city undoubtedly due to the complete lack of facilities for cyclists and the danger of attempting to cycle on or across the primary road network. Nevertheless, it would be important to assess the potential for cycling and for providing a comprehensive cycle network.

Becak are still an important source of transport within residential neighbourhoods but there is little evidence of any Becak facilities in the city nor are there apparently any proposals to improve conditions for them. What is clear is that they provide an income for a substantial number of people. It would be possible to convert Becak into a relatively “clean” 21st century mode of transport with the adoption of battery powered electric motors using “pedelec” technology (a form of hybrid bicycle) and there is no reason why Becak drivers should not make use of cell phones and smart cards to provide an “on-demand service”.

Following the success of the smart bike-sharing system in Paris, these systems are rapidly being introduced in many cities for daily mobility. The basic premise of the smart bike-sharing concept is sustainable transportation. Such systems often operate as part of the city’s public transport system. They provide fast and easy access, have diverse business models and make use of applied technology (smart cards and/or mobile phones). There are an estimated 375 bicycle-sharing schemes operating in 33
countries in almost every region of the world using around 236,000 bicycles. Although these systems may at first glance appear not to be appropriate for cities such as Surabaya (because of climate), the recent growth in systems in countries such as Brazil, Chile, China, India, Iran and Mexico would suggest that these approaches are certainly capable of being adapted and should be considered for demonstration.

5.4 PEDESTRIANS AND WALKING

Since 2006, sidewalk improvements have been made to many primary roads in and around the CBD. In 2010 raised pedestrian crossings were being implemented in 20 locations where secondary roads intersect with primary roads. These measures are very effective in improving mobility by “traffic calming” (slowing down vehicles approaching the pedestrian crossing) and giving pedestrians priority. This should be confirmed from Focus Group Discussions with the public. Assuming they are indeed perceived as improving mobility, they need to be replicated at ALL pedestrian crossings, especially those along the primary roads and those controlled by traffic signals. Given the width of the primary roads (four-to-six lanes), it will be essential to provide for pedestrian refuges every two-to-three lanes.

These measures should result from extensive focus group discussions and pedestrian movement surveys that will need to be undertaken throughout the city but especially within the CBD and market areas. In addition, surveys need to be undertaken of current footpaths and pavements throughout the city. Conditions in many streets are such that pedestrians are forced to walk for some distance in the road due to broken drains, exposed tree roots, broken surfaces, street vendors, pedestrian crossings that lead nowhere or simply the lack of any form of sidewalk.

Approaches that have proven viable in many cities include undertaking Walkability Assessments. These have been successfully field tested in 13 cities in Asia by the Clean Air Initiative for Asian Cities Center (CAI-Asia) and the results are presented in Table 3.

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6 Bicycle-sharing Schemes: Analysis of experience and perspectives for enhancing sustainable mobility in urban areas. Technical background information paper, 2010, Peter Midgley, United Nations Department of Economic and Social Affairs, NY, USA

7 See Pedestrian Design Guidelines, 2009, UTTIPEC, Delhi Development Authority, New Delhi, India
Walkability Assessments involve undertaking surveys of pre-identified pedestrian routes within residential areas, educational complexes, public transport terminals, market areas, commercial districts and employment areas. The Field Walkability Survey is based on the Global Walkability Index and includes nine Parameters:

- Walking Path Modal Conflict
- Availability of Walking Paths
- Availability of Crossings
- Grade Crossing Safety
- Motorist Behaviour
- Amenities
- Disability Infrastructure
- Obstructions
- Security from Crime

In addition, pedestrian preference interview surveys are undertaken to assess travel behaviour and preferences regarding improvements in walkability and pedestrian facilities. This data is compared with the profile of the respondents to correlate preferences with such factors as age, sex, income levels, and so on.

### Table 4: Field Walkability Assessment Results of 13 Cities in Asia

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Highest</th>
<th>Lowest</th>
<th>Average</th>
<th>City-Highest</th>
<th>City-Lowest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking Path Modal Conflict</td>
<td>80</td>
<td>53</td>
<td>65</td>
<td>Hong Kong</td>
<td>Karachi</td>
</tr>
<tr>
<td>Availability Of Walking Paths</td>
<td>74</td>
<td>48</td>
<td>58</td>
<td>Hong Kong</td>
<td>Kathmandu</td>
</tr>
<tr>
<td>Availability Of Crossings</td>
<td>87</td>
<td>53</td>
<td>69</td>
<td>Kota</td>
<td>Kathmandu</td>
</tr>
<tr>
<td>Grade Crossing Safety</td>
<td>76</td>
<td>45</td>
<td>60</td>
<td>Manila</td>
<td>Hanoi</td>
</tr>
<tr>
<td>Motorist Behavior</td>
<td>72</td>
<td>41</td>
<td>58</td>
<td>Hong Kong</td>
<td>Jakarta</td>
</tr>
<tr>
<td>Amenities</td>
<td>85</td>
<td>32</td>
<td>49</td>
<td>Hanoi</td>
<td>Kathmandu</td>
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<td>Disability Infrastructure</td>
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<td>Kathmandu</td>
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<tr>
<td>Obstructions</td>
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<td>33</td>
<td>56</td>
<td>Hong Kong</td>
<td>Jakarta</td>
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<tr>
<td>Security from Crime</td>
<td>77</td>
<td>44</td>
<td>63</td>
<td>Kota</td>
<td>Jakarta</td>
</tr>
<tr>
<td>Walkability Score</td>
<td>70</td>
<td>45</td>
<td>58</td>
<td>Hong Kong</td>
<td>Jakarta</td>
</tr>
</tbody>
</table>

More than 4,500 people were interviewed in 13 cities:

- 51 percent of respondents said that their households had no vehicles
- About 67 percent of trips are within 30 minutes
- About 30 percent trips are less than 3 km and 20 percent within 3-6 kms
- About 36 percent consider walkability in the “bad” or “worse” category while only 17 percent consider walkability as either “good” or “best”
- Respondents in Davao, Hong Kong and Manila considered their walkways are “good” or “best”
- Respondents in Kathmandu, Jakarta and Kota considered their walkways as “bad” or “worse”
- About 40 percent of respondents consider that they are very exposed to air pollution while walking

In improving facilities for pedestrians it is important to ensure that sidewalks and footpaths are designed to accommodate expected demand in terms of pedestrian flows. Table 4 presents standards adopted in India. In the same way that road capacity standards apply to a clear roadway, these standards apply to an uncluttered footpath that is clear of parked vehicles, traders, trees or debris.

<table>
<thead>
<tr>
<th>Capacity in (Persons) (in one hour)</th>
<th>Required width of footpath in meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>All in one direction</td>
<td>In both directions</td>
</tr>
<tr>
<td>1220</td>
<td>800</td>
</tr>
<tr>
<td>2400</td>
<td>1600</td>
</tr>
<tr>
<td>3600</td>
<td>2400</td>
</tr>
<tr>
<td>4800</td>
<td>3200</td>
</tr>
<tr>
<td>6000</td>
<td>4000</td>
</tr>
</tbody>
</table>

Source: Footfalls: Obstacle Course to Liveable Cities, Centre for Science and Environment, Delhi, India

### 5.5 MOTORCYCLES

Although motorcycles are an attractive alternative to public transport for many people in Surabaya (due to the poor service levels of the bus system and the operating characteristics of the Angkot), they are intrusive and hard to regulate. The city of Guangzhou has progressively reduced motorcycle use and finally banned them completely from the city area. Guangzhou improved its public transport system

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8 Walkability in Asian cities: state and issues, 2010, Bert Fabian, Sudhir Gota and Alvin Mejia, Clean Air Initiative for Asian Cities Center, presented at the ADB Transport Forum, Manila, Philippines, 25-27 May 2010
dramatically and over 50 percent of motorcycle users transferred to using public transport by the time the ban was complete. Before completely banning motorcycles, Guangzhou tried many techniques to restrict motorcycle access to residential and other sensitive areas. Surabaya may well benefit from testing some these techniques and developing new ones to help control motorcycle access, but care has to be taken to allow wheelchair access for disabled people.

Bollards are the preferred method of restricting motorised vehicle access in many countries. Staggered bollards make life more difficult for motorcycles but still allow for convenient access for cyclists, wheelchairs and pushchairs (see Figure 15).

Figure 15: Motorcycle access control in the United Kingdom

Source: Cycling Design Guide, 2006, Nottinghamshire County Council, UK

5.6 TRAFFIC CALMING

Traffic calming strategies aim to reduce the speed and volume of traffic to improve safety for pedestrians and cyclists, as well as improve the environment. This involves more than just physical changes; it represents a process of social change requiring extensive community participation. Traffic calming measures comprise volume control measures (that reduce through traffic by blocking certain movements and diverting traffic to other streets) and speed control measures (that slow down traffic by changing vertical or horizontal alignment or narrowing the roadway).
Volume control measures (see Figure 16) comprise:

- Closing streets completely or partially to motorised traffic by creating pedestrian zones
- Preventing turns or through movements into residential areas by creating a cul-de-sac or dead end
- Preventing cross-movements at junctions by using median barriers, forced-turn islands or "diagonal diverters". Diagonal diverters are often staggered to create circuitous routes that discourage through traffic while maintaining local access

Speed control measures (see Figure 17) comprise:

- Narrowing roadways by widening footpaths and pavements, by using kerb extensions (also called "bulbouts") at pedestrian crossings, by installing chokers (to narrow the roadway to a single lane at selected points) and by establishing pedestrian refuges or small islands in the middle of the roadway
- Introducing speed control devices (such as speed bumps, speed humps, speed tables, speed cushions, raised pedestrian crossings and raised intersections), speed reduction layouts (such as chicanes) and surface materials (such as bricks or cobblestones)
- Reducing speed limits near institutions such as schools and hospitals and installing vehicle-activated signs that react with warning messages if speed limits are exceeded

While many of these measures are well known, it would be useful to undertake a series of pilot demonstration projects in selected areas in Surabaya in association with community organisations to assess their usefulness in improving mobility for residents while reducing unnecessary motorised through traffic.
5.7 DEMAND MANAGEMENT

Transport Demand Management (also referred to as "Travel Demand Management") comprises a set of policies, strategies and action plans designed to change and reduce demand for car use through changes in travel behaviour.

Transport Demand Management (TDM) is a profound new way of thinking about travel, one that attempts to influence travellers by promoting alternative modes and destinations of travel as well as improved options (faster routes and more reliable travel times). TDM encourages sustainable travel, improves mobility and increases transport system efficiency. Trips are prioritised according to their value and cost to society as a whole (higher value trips and lower cost modes have priority over lower value, higher cost trips). TDM objectives include reduced traffic congestion, road and parking cost savings, increased safety, improved mobility, energy conservation and pollution emission reductions. Transport Demand Management does not eliminate automobile travel but it tends to significantly reduce the amount of personal vehicle travel that would otherwise occur. Real-time information systems can now let travellers make better decisions about how they travel (mode), when they travel (time), which route they travel (route), or whether they travel at all.

Transport Demand Management measures are by their nature innovative and often seen as being quite radical. They are criticised for placing unfair restrictions on automobile travel or as being harmful to consumers, regressive or wasteful. In reality, TDM measures improve travel options for everybody, including people who continue to drive. To be effective, they need to be thoughtfully planned and implemented. They therefore require strong political commitment, stakeholder involvement and advanced consultation.

TDM comprises an ever-expanding range of physical, operational, pricing and institutional measures:

- Congestion charging and electronic road pricing
- Traditional mobility management programs to encourage changes in travel behaviour
- Public transport improvements
- Measures to promote walking and non-motorised vehicle use
- Telecommuting and the use of intelligent transport systems (its)
- Parking management
- Physical traffic restraint measures
- Traffic Management

Many of these measures have been discussed in this report. The following sections discuss two of the most critical measures that need to be considered in managing transport demand: Congestion charging and electronic road pricing; Parking Management; and Traffic Management.
5.8 CONGESTION CHARGING AND ELECTRONIC ROAD PRICING

Road pricing means charging for the use of roads in a way that reflects the costs of using them - paying more when roads are congested and less when traffic is light. Congestion charging is a form of road pricing that aims to reduce motor vehicle travel into congested urban areas.

Road pricing is a form of demand management that has become accepted as a policy measure to combat pollution and congestion. Motorists are encouraged to change their habits, travelling at different times or by different routes, possibly to alternative destinations, or making their journey by public transport and/or non-motorised transport (on foot or by cycle). Road pricing works best when applied in parallel with other measures, such as public transport improvements and provisions for cyclists and pedestrians. Road pricing is a tool to reduce congestion and thereby improve air quality and standards of health. It can also reduce the need for new or widened roads. Key stakeholders are vital to the success of a pricing scheme, and must be consulted effectively to raise the level of awareness and support. Road pricing schemes have been successfully introduced in London, Singapore, Milan and Stockholm.

5.8.1 London

The Central London Congestion Charging Scheme has been in operation since February 2003 and was extended westwards in February 2007. During its hours of operation, drivers of vehicles are required to pay a standard daily charge of £8 (increased from £5 in July 2005) to travel within the Congestion Charging zone, subject to a number of discounts and exemptions. The principal aim of the scheme is to reduce congestion by encouraging drivers to switch from private car use to other modes of transport. It also produces net revenues to support London's Transport Strategy (in the 2007/08 financial year these amounted to £137 million, allocated mainly to improvements to bus operations). Following its introduction in 2003, congestion was substantially reduced within the zone and traffic entering the zone was reduced by around 20 per cent.

5.8.2 Singapore

The Singapore Area Licensing Scheme (ALS), introduced in 1975, was the first urban congestion pricing scheme to be successfully implemented in the world. Motorists had to purchase daily or monthly licences to enter the 6-square-kilometer central area during restricted hours (called the "Restricted Zone") - later increased to 7.25-square-kilometers. Car pools with four persons including the driver were exempt from paying the congestion charge. The initial drop in traffic entering the Restricted Zone was 44% (31 % by 1988) due to diverting away from the city centre those motorists whose destinations were not the city itself but had merely been using the city roads as short cuts, as well as by those who changed their journey start time to avoid paying the ALS.
fees. There was little evidence to suggest that motorists had transferred to public transport in significant quantities.

Figure 18: Singapore Electronic Road Pricing (ERP) gantry at North Bridge Road.

Source: Global Transport Knowledge Partnership, 2010, Topic Information Sheet: Road Pricing

The Singapore Electronic Road Pricing (ERP) Scheme replaced the Area Licensing Scheme (ALS) in September 1998 (see Figure 18). The ERP is an innovative tool for implementing congestion pricing. The basic idea of ERP is similar to the ALS, but charges can be varied over time and location, reflecting the true cost of vehicle use. All 33 ALS "gantries" (entry points) were replaced with ERP gantries for the 720 hectare core area. Each vehicle to enter the restricted zone is fitted with an "In-vehicle Unit" (IU) that reads from a stored-value cash card, from which charges are deducted automatically as soon as the vehicle enters the restricted zone. ERP charges vary each half-hour of the day, from S$2.50 during peak hours to 50 cents during off-peak, depending on the road section. Charges are different for motorcycles, cars, cargo vehicles, taxis and buses. ERP charges are subject to review every three months to suit changing traffic conditions. Charges are tied to prevailing speeds with the aim of maintaining traffic speeds of 45-65 km per hour on expressways and 20-30 km per hour on arterial roads.

5.8.3 Milan

The ECO-PASS Scheme in Milan has been in operation since January 2008. It is designed to restrict access to an 8-sq-km inner area of the central area of Milan by charging the vehicles that pollute most heavily. Ecopass aims to make the air cleaner by reducing PM emissions by 30% and relieve congestion by reducing the number of incoming cars by 10% (and thereby speeding up public transport in the area). Money raised goes towards buses, cycle paths and green vehicles. The Ecopass Area has 43 entrance points, each equipped with CCTV cameras designed to record vehicle licence plate
numbers and pollution class. An Ecopass costs between two and 10 Euros for the most polluting models. Electric, hybrid, and some low-polluting cars are exempt. The city is seeking to raise 24 million Euros a year and will invest about two-thirds in improving public transportation. About 90,000 cars cross the charge area daily of which 39,000 cars enter the zone between 7:30 a.m. and 5:00 p.m.

5.8.4 Stockholm

The Stockholm Congestion Charge is a congestion pricing system implemented as a tax that is levied on most vehicles entering and exiting central Stockholm, Sweden. The congestion tax was implemented on a permanent basis on August 1, 2007, after a seven-month trial period between January 3, 2006 and July 31, 2006. The primary purpose of the congestion tax is to reduce traffic congestion and improve the environmental situation in central Stockholm. The funds collected are used for new road constructions in and around Stockholm. Since beginning operation, the charge has resulted in a 15% reduction in traffic and a 10-14% drop in CO\textsubscript{2} emissions.

While it appears that the current laws and regulations in Indonesia may not allow cities to introduce road pricing, this may soon change. In the meantime, Surabaya may wish to consider taking a closer look at these systems to understand the true benefits as well as the issues involved in implementation with a view to designing a system that will work in Surabaya, especially with regard to motorcycles, and contribute to improving mobility.

5.9 PARKING MANAGEMENT

Parking is an essential component of the transportation system. Vehicles must park at every destination. The location, supply, and pricing of parking influence development opportunities, property values, and urban form. It plays a key role in land use accessibility and the economy of major centres. Parking availability is of significant importance to travellers making travel decisions. It affects such diverse travel decisions as mode choice, trip destination choice, and trip frequency.

Parking management is designed to make more efficient use of parking resources by sharing, regulating and pricing; using off-site parking facilities; implementing overflow-parking plans; improving user information; and improving walking and cycling conditions. It also involves reducing parking demand by encouraging use of alternative modes of transportation and improving enforcement and control of parking regulations.

Parking management focuses equally on quality, such as the ease of obtaining parking information, the convenience and safety of walking from a parking space to destinations, and the attractiveness and security of parking facilities. A cost-effective, integrated parking management program can often reduce parking requirements by
20-40 percent, while improving user convenience and helping to achieve other planning objectives, such as supporting more compact development, encouraging use of alternative modes of transportation, and increasing development affordability.

Many cities control on-street parking by using multi-space pay station technology. This technology has the potential to increase occupancy and turnover of parking spaces, provide more complete and timely information and statistics, increase revenue, and provide greater flexibility and control of parking rates. The technology also provides a broader range of payment options including credit cards and is one of many important components necessary to better manage city parking resources.

Parking management is important for Surabaya to consider applying in its efforts to improve mobility. The issue in Surabaya is about managing motorcycle and car parking and there are opportunities to test different options, especially for motorcycles, as part of a series of demonstration projects.

5.10 TRAFFIC MANAGEMENT

Traffic Management is the process of adjusting or adapting the use of an existing road system to meet specified objectives without resorting to substantial new road construction.

The goal of urban traffic management is to make the most productive use of the existing road based transport system by adjusting, adapting, managing and improving the system. Specifically, traffic management is designed to improve the movement of people and goods; to improve the quality and safety of the traffic and transport system; and to contribute to the improvement of the urban environment.

Traditionally, traffic management has been involved with the development and application of measures directed at optimising the efficiency of urban road infrastructure. Recently, the emphasis has been more towards promoting a modal shift in favour of public transport and other environmentally friendly modes.

Traffic management improves the flow of traffic and enhances mobility, thereby reducing emissions and fuel consumption. Area Traffic Control (computerised control of traffic signals) systems are the most common traffic management instruments to secure traffic flow objectives. Segregation of traffic, including bus priority systems (such as dedicated bus lanes), can decrease the variability of traffic speed; enhance safety, and, equally important, increase the efficiency and attractiveness of public transport.

Although traffic management measures are relatively cheap and quick-acting, traffic management is not a guaranteed, one-time cure for traffic congestion. It needs constant adjustment and enforcement to be effective. Traffic management requires effective planning, implementation and enforcement skills. Although traffic
management measures may improve traffic flow, this can generate increased traffic and additional travel.

Surabaya has made good use of traffic management techniques and is in the process of upgrading and expanding its Area Traffic Control System. These approaches should continue and should allow for the testing of innovative measures as well as the development of “made in Surabaya” measures that are appropriate for conditions in the city. This would be the subject of a series of demonstration projects within the CBD and along critical “showcase” corridors as a contribution toward improving mobility.

5.11 FREIGHT

Freight transport plays a central role in the business and life of cities, especially port cities such as Surabaya. Within any city, freight systems distribute food, water, energy, information (mail, newspapers, etc.) and other essentials to individual households and businesses. They also handle the collection and removal of trash and waste. These are complex and costly processes, as freight must be delivered (or picked up) in small units and everybody must be served. For cities to exist at all, these services must be provided. For cities to prosper, they must be provided effectively.

Inefficiencies in urban freight transport can occur as a result of existing road layouts or traffic levels. They can also come about due to non-freight urban transport policies that have unintended consequences on freight transport operations (e.g. the introduction of bus lanes). Such inefficiencies can have both financial and environmental impacts and are therefore best avoided from the perspective of both companies and the wider society.

Goods vehicle operators and drivers face a range of difficulties when carrying out freight operations in urban areas. These include:

- Traffic flow/congestion issues caused by traffic levels, traffic incidents, inadequate road infrastructure, and poor driver behaviour
- Transport policy-related problems including vehicle access restrictions based on time and/or size/weight of vehicle, bus and cycle lanes, etc.
- Parking and loading/unloading problems including regulations, fines and lack of space
- Customer/receiver-related problems including queuing to make deliveries and collections, difficulty in finding the receiver, collection and delivery times

Urban freight transport management uses the following types of strategies to increase the efficiency of freight and commercial transport:

- Using restricted and/or variable delivery times to reduce congestion (especially in city centres)
• Using small and medium size vehicles with modern emission controls and/or human powered transport for local distribution
• Improved scheduling and routing to reduce freight vehicle mileage and increase load factors through increased computerisation and coordination
• Organising delivery systems such that fewer vehicle trips are needed to distribute goods
• Implementing fleet management programs that reduce vehicle mileage, use optimal sized vehicles for each trip, and ensure that fleet vehicles are properly maintained
• Improving vehicle operator training to encourage more efficient driving

Urban freight transport initiatives can be categorised under five themes. These are listed below together with the type of improvements each initiative can aim to achieve.

• Operations: efforts to improve aspects of operational efficiency including speed and reliability of deliveries, reduction of costs, convenience and customer service, and operational safety.

• Land use and Infrastructure: efforts to reduce the demand for freight transport by reorganising the land use patterns in an urban area (retail, commercial, industrial, freight transport operations, residential).

• Environment: efforts to reduce or minimise the environmental impacts of urban freight transport.

• Regulations: efforts to influence urban transport behaviour and patterns through the implementation of traffic and transport policies.

• Technology: efforts to improve operational performance of equipment and facilities, or reduce environmental impact through the application of technological initiatives.

Table 5, below, provides examples of urban freight initiatives that may be worth considering initially as demonstration projects related to each of the above themes.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Examples of urban freight initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations</td>
<td>• Out-of-hours deliveries and evening/night deliveries</td>
</tr>
<tr>
<td></td>
<td>• IT tools (real-time traffic information, routing and scheduling, telematics)</td>
</tr>
<tr>
<td></td>
<td>• Consolidation of deliveries</td>
</tr>
<tr>
<td></td>
<td>• Home deliveries and collection points</td>
</tr>
</tbody>
</table>
### Theme: Examples of urban freight initiatives

<table>
<thead>
<tr>
<th>Theme</th>
<th>Examples of urban freight initiatives</th>
</tr>
</thead>
</table>
| Environment            | • Use of environmentally friendly vehicles and modes  
                          • Environmental zones  
                          • Dissemination of best practice  
                          • Urban distribution centres |
| Land use and infrastructure | • Urban distribution zones  
                               • Improvement of highway, railway and inland waterway connections  
                               • Relocating logistics and industrial activities |
| Regulations            | • Access and loading/unloading restrictions based on vehicle size or time  
                          • Promoting the use of environmentally friendly vehicles and modes  
                          • Dedicated lanes and facilities for freight traffic  
                          • Lorry routing  
                          • Road pricing systems |
| Technology             | • Access control systems  
                          • IT  
                          • Technology for reduced noise in operations  
                          • Vehicle design and technology to reduce pollutant emissions |

Source: BESTUFS Policy and Research Recommendations III, 2007, Julian Allen (UoW), Claudia Eichhorn (PTV)

### 5.12 SAFETY

There are three major options to improve pedestrian safety in Surabaya (see Annexe 6). These are:

- As a component of a broad, overall urban mobility program
- As a specific, large-scale pedestrian safety and amenity improvement program
- As a demonstration project consisting of a number of selected pedestrian safety treatments

The general scope for each of these options would be as follows:

1. **An Urban Mobility Program: Potential activities as part of a comprehensive urban mobility program would include:**
• Obtain available fatal and serious injury crash data from Dinas/ Police for 2008, 2009, 2010 for the greater Surabaya area - and distinguish data for the downtown area. Analyse the crash situation for pedestrians, cyclists and motorcyclists.

• Devise a series of 1 to 2 day workshops and other training for City staff to improve their understanding of safety risks for pedestrians (and motorcyclists and other road users), including consideration of the Indonesian institutional, legal and regulatory framework. Discuss and further develop measures based on international good practice – adjusted to match local conditions - which could be adopted to reduce those risks.

• Learn from inspection and review of existing pedestrian measures about major issues to be resolved in any major upgrading program.

• Consider safety issues around cycling conditions in the downtown area.

• Consider safety issues around motorcycling conditions in the downtown area.

• Consider measures to improve safe access to upgraded public transport facilities and services and to build safety for pedestrians into the operation of the system.

• Develop a program to improve pedestrian amenity in downtown Surabaya through encouraging retail premises to front streets, encouraging the development of verandas on premises and providing more extensive street tree plantings. Encourage street cafes. Promote these potential and actual improvements to traders and landlords and to the Surabaya public.

• Develop an action plan for cycling and motorcycling activities to support the urban mobility program.

• Develop an investment program for pedestrian, cycling and motorcycling activities.

2. A comprehensive pedestrian safety improvement program could be built around:

• Identifying those locations from analysis of crash data where pedestrian safety is most challenged as described above. Analyse the crash situation for pedestrians.

• Devising a series of 1 to 2 day workshops and other training for City staff to improve their understanding of safety risks for pedestrians, including consideration of the Indonesian institutional, legal and regulatory framework. Discuss and further develop measures based on international good practice – adjusted to match local conditions - which could be adopted to reduce those risks.

• Setting the priority for treatment: signalisation (for high risk intersection locations and at mid-block locations, subject to crash history) and then platform construction and increased signage at locations where signalisation was not possible within available funding.

• Upgrading of intersection signals at 50 intersections with pedestrian-activated mechanisms at those locations (in association with a computerised traffic signal control system).

• Installing pedestrian traffic signals at 50 mid-block crossing locations, including pedestrian activated mechanisms at those locations.
• Constructing platforms at 100 mid-block pedestrian crossings and providing associated signage and marking upgrades.

• Arranging a comprehensive police enforcement blitz on driver and rider behaviour to improve compliance at all pedestrian crossings, but especially those crossings upgraded under the program.

3. A demonstration project involving a number of selected treatments which could proceed quite soon as a pilot or demonstration project (i.e., in 2012) would include the following actions:

- Determine a pilot project and location/area for early development/implementation of pedestrian safety improvement measures for locations where pedestrian safety is most challenged through:
  - Discussion with city including DP staff, Bappeko, INTP and other stakeholders; and
  - Analysis of crash data

- Addressing management and institutional issues: Consider who would lead the project in the city having regard to the preferred (for a successful project) lead agency, partnership and performance framework/accountability arrangements within the city for development and implementation, i.e.:
  - Set Plan
  - Allocate funds and responsibilities
  - Implement the plan
  - Measure before and after/evaluation
  - Publish results and extend successful outcomes to broader scale

- Extend the project to include support for police enforcement activity at traffic signals generally and at non-signalised and signalised pedestrian crossings, improved alignment and coverage in schools in CoS through cooperative planning of Dinas and Police traffic safety education activity and training of Dinas in application of good practice traffic markings and signage.

Details of the demonstration project at ten signalised intersections and twenty mid-block locations (ten signalised and ten non-signalised) are set out in the recommended approach below.

4. Recommended Approach

A. Demonstration Project

A demonstration project is recommended as the preferred and most likely option to succeed in the immediate future.
The objectives would be to commence road safety knowledge transfer activities to city staff through pilot projects and to provide an initial level of Technical Assistance to the city of Surabaya including:

- Provision of road safety training courses – using Indonesian academic staff and international practitioners if necessary - at executive and middle management levels for DP and PU staff within the City to support identified pilot projects.
- Support for Police enforcement of compliance by motorcyclists (and other motorists) with traffic lights at intersections and with signals at mid-block pedestrian crossings.
- Support for Police enforcement of compliance by motorcyclists (and other motorists) with non-signalised pedestrian crossing regulations.
- Conduct of a “stock take” of a small number of existing pedestrian facilities.
- Carrying out pedestrian crossing safety improvement at, for example, ten mid-block locations (including problem analysis, signage and line marking, works [e.g. for median refuges] and equipment (traffic signals).
- Carrying out pedestrian crossing safety improvement at, for example, ten intersection locations (including problem analysis, signage and line marking, works - e.g. for median refuges) and equipment (manual intervention within signals to create a pedestrian phase on demand).
- Carrying out pedestrian crossing safety improvement at, say, ten additional mid-block locations (including problem analysis, signage and line marking, and works (e.g. for median refuges and for platforms).
- Review of school take up of traffic safety education across the city and considering incentives to encourage greater take-up and some funding for training of DP staff as leaders who in turn could train nominated teachers in schools.
- Advice on effective provision of road signage and markings to the Dinas Perhubungan (road safety and traffic management group).

5. Expected outputs/ deliverables

Outputs will be:

- Treatments at thirty pedestrian crossings, (ten at signalised intersections, ten at mid-block locations to be signalised and ten at mid-block locations to be treated with signage, line marking and with marked platforms)
- Data available in summary about pedestrian crossing details/ risks
- Change to red light compliance by motorcyclists through a shift in enforcement by Police
- Change to compliance by motorcyclists with pedestrian crossing regulations through a shift in enforcement by Police
- Extension of traffic safety education into schools
• More consistent and better standard signage, line marking and traffic signal operation across the City
• Much improved literacy for Dinas staff about road safety risks and suitable treatments to reduce that risk for vulnerable road users
• Improved capacity by police to confidently enforce the road rules

Expected benefits:
• Establishment of a model for improving pedestrian safety at crossings through improved enforcement of regulations and traffic signal compliance for drivers and riders and through enhanced signalisation or physical works.
• Reduced non compliance with red lights by riders at intersections generally as part of the process of building compliance/ deterrence by motorists generally – respect for Police and recognition by riders and police that non compliance with traffic laws will have consequences.
• Increased knowledge about pedestrian crossing safety and facilities/approaches that respond effectively to these risks.
• Extension of traffic safety education into schools by Dinas P. and INTP working together.
• Improved awareness by DP of what is a suitable standard of traffic signage and line marking.

5.13 SOCIAL INCLUSION AND GENDER EQUITY

Transport and mobility have a strong bearing on social inclusion and gender equality, but in practice this is often insufficiently recognised. Social inclusion is about considering the needs of the whole community including all vulnerable groups such as children, disabled people, elderly, low income households, minority groups etc. It involves guaranteeing equal access to public services, affordability and availability of related mobility options. Gender equity involves giving women and men the same opportunities, rights and responsibilities in the fields of transport and mobility.

There are substantial differences between transport use groups and ways of travelling, which differ with age, gender and lifestyle. The table below gives an overview of the different user groups as well as the main arguments for considering these groups within a sustainable urban mobility plan.

<table>
<thead>
<tr>
<th>Target Groups</th>
<th>Social inclusion topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td><strong>Road safety</strong>: Children are particularly vulnerable traffic participants that need to be protected from dangerous traffic conditions.</td>
</tr>
</tbody>
</table>
Target Groups | Social inclusion topics
---|---
Young people and students | **Social opportunities and autonomy**: A strategy taking into consideration their high mobility needs and expectations will facilitate their integration in the society.

Elderly | **Road safety and accessibility**: A good accessibility to public transport and a safe transport system will ensure a more active participation of this target group to social activities.

People with disabilities | **Accessibility**: Accessibility of all public facilities is a pre-condition for their unlimited participation in social life.

People with low incomes | **Employment and affordability**: Poor transport provision can act as a barrier to accessing high quality education or adequate health care facilities, and even prevent employment.


Attitudes as regards the transport system also differ according to gender. Women and men have different concerns and expectations, related to their particular responsibilities and economic and social roles. For the moment, transport planning methods do not always adequately capture the needs of women. This reduces women’s economic and social productivity, their access to public services and community participation. Personal safety issues concern particularly women who restrict their travel much more than men. Because of their fear of violence and aggression, women are less willing to travel after dark. As they are subject to sexual discrimination and sex-specific violence, they avoid certain areas of town and certain transportation options at certain times of the day.

A gender sensitive transport system would be one that is of advantage to all users. First, because it enables not just women, but all people whose mobility patterns are complex, to be mobile and participate in economic, social, cultural, institutional, etc. life. Second, it therefore enhances the options and the quality of life for people whose mobility had been restricted. And third, by increasing chances in life for large parts of the urban inhabitants, the urban economy, urban life and urban society as a whole will largely benefit. If mobility is regarded a prerequisite for participation in urban life, than an improvement of the mobility chances of people will in turn enhance urban society.
CHAPTER 6: URBAN MOBILITY INDICATORS AND BENCHMARKING

Figure 19: Urban Mobility Goals for Dublin


6.1 PROGRESS MONITORING INDICATORS

Monitoring progress in achieving strategic objectives is important in any activity. It is a critical component in improving urban mobility as it enables the public at large and key stakeholders to be kept informed of progress. It enables the rapid identification of any problems and corrective actions to be taken. Indicators clearly need to reflect the goals and objectives but they should also be relatively easy to measure and, most importantly, they should be understood by the population at large. Examples of such indicators that are being used to monitor progress in achieving strategic objectives in London are illustrated in Figure 20.
6.2 MEASURING MOBILITY AND TRAVEL

Understanding how travel is measured is important as there are several different definitions in general use. Each of these, when subjected to appropriate analysis, is capable of providing different insights into the nature and extent of travel. At its most basic, travel consists of the movement of people. Travel may be considered from many points of view, ranging from consideration of the behaviour of individual people, or identifiable groups of people, to measuring travel activity in the aggregate.

A number of different methods are used to measure travel. Some are simply based on counts, for example the number of vehicles using the road or passengers on public transport, while others are derived from sources related to the provision of transport services, such as ticket sales used, for example, to determine the number of trips made by bus.

Data on complete trips and the quality of travel are best collected by interview surveys that involve asking people about their travel experiences.
6.3 PUBLIC PERCEPTIONS

Mobility has a fundamental impact on overall ‘quality of life’ as perceived by those who travel around the city. Although ‘quality of life’ may mean different things to different people, most city administrations make it a priority to improve the quality of overall daily travel experiences, for example in more reliable journey times on the roads and on public transport. However, more reliable journey times may not be considered by the public as a priority. It is therefore important to understand people’s expectations (and they change over time) and measure the extent to which people actually perceive a contribution from improved mobility to their overall quality of life.

Performance indicators to assess the impact of improving mobility on quality life include the following:\(^9\)

- Accessibility: distance to education, health care, services, or the bus stop per household unit, whereby the shorter the distance, the better the accessibility.
- Travel Time: Daily travel time to work or education per household or daily trip fare to work or education per household unit, whereby the lower the value the higher the mobility
- Availability: Types of public transport available, number of changeovers or different types of public transport needed to reach certain destinations
- Affordability: Cost of fares for travelling to different destinations compared to household income
- Health: Noise levels expected around public transport systems compared to standards and expected air pollution levels at bus stops compared to ambient air quality standards
- Time saving: Amount of time to reach a destination by public transport compared to private vehicles, including comparison of trip durations one year ago

In London, customer satisfaction information is derived from a series of surveys exploring satisfaction with public transport, the road network and overall journey experience. In all cases, survey respondents rate their satisfaction on a scale from 1 to 10, with 10 representing ‘extremely satisfied’. An example is presented in Figure 21. The results of these surveys can be used to adjust programs to better meet public expectations and ensure that the strategic goals of improving mobility for all are indeed being met.

\(^9\) A Framework for achieving sustainable urban mobility, 2010, Sophie Punte, Executive Director, CAI-Asia Center, presented at Sustainable City Finance, New York City, 7 January 2010
There are many factors that contribute to the understanding of how to improve mobility. Cities such as London undertake a very comprehensive series of surveys to keep track of progress and identify problems in time to take corrective action. While Surabaya may not have the resources to undertake such a wide review of progress as London, it should nevertheless begin to take steps to understand the impact of its actions (or lack of them) on improving mobility for its citizens. Certainly one important survey that should be attempted is to assess Surabaya residents’ perceptions of their overall journey experience while travelling in the city and overall journey times.

Transport and mobility are vital for society. Socio-economic interaction requires the physical movement of people and goods, which condition people’s quality of life. Urban transport planning therefore implies making choices that strongly affect society as a whole. It actually shapes the environmental, economic, social and cultural future of cities – not only transport infrastructures and services.

Transport planning still tends to be regarded as a technical task, merely oriented at “eliminating bottlenecks” or providing “capacity” rather than achieving broader social objectives. Consequently, it often lacks the necessary level of stakeholder participation.

### 7.1 PILOT DEMONSTRATION PROJECTS

In order to develop approaches that will contribute to improving mobility in Surabaya, the city will need to test and adapt international best practice to local conditions. In addition, the city would benefit from bringing together the agencies and stakeholders that are involved in the development of the city and the movement of people and goods. The workshops and focus group discussions that took place in December, 2010 represent an excellent first step in this direction and should continue. Ideally, future workshops and focus group discussions should be linked to the design and execution of pilot demonstration projects to test and adapt the following types of urban mobility concepts and measures:
• Bus Rapid Transit (BRT): Many cities\textsuperscript{10} have undertaken BRT demonstration projects along pilot corridors to test options such as station design, buses, operating procedures, etc. These projects run for a limited time (e.g. 3 months) and allow people to travel free so as to assess user perceptions of the service. Sections of the proposed East-West corridor in Surabaya may well be appropriate for this type of demonstration project, especially the section serving the ITS complex.

• Non-Motorised Transport (NMT): From the surveys undertaken of current footpaths and pavements throughout the city and the walkability assessments, recommended in Section 5.1.4. (above), it should be possible to identify those areas where pedestrians would benefit from improved facilities and where different approaches can be tested in terms of footpath design, pedestrian crossings and pedestrian refuges, restricting access to motorised vehicles (such as within kampongs), and providing pedestrian space in and around markets, etc. In addition, the cycle path project concept for the Central Business District described in Section 5.1.3. (above) would make an excellent low cost demonstration project to assess the potential for increased bicycle use as well as testing the potential for a modern Becak system (with new vehicle designs) to serve the area.

• Traffic Calming: It would be useful to undertake a series of pilot demonstration projects in selected areas in Surabaya in association with community organisations to assess the usefulness of the volume control and speed control measures described in Section 5.1.6. (above) in improving mobility for residents while reducing unnecessary motorised through traffic.

• Traffic Management: Surabaya has made good use of traffic management techniques and is in the process of upgrading and expanding its Area Traffic Control System. These approaches should continue and should allow for the testing of innovative measures as well as the development of “made in Surabaya” measures that are appropriate for conditions in the city. This would be the subject of a series of demonstration projects within the CBD and along critical “showcase” corridors as a contribution toward improving mobility (see Section 5.1.10, above).

• Parking Management: Many cities control on-street parking by using multi-space pay station technology. This technology has the potential to increase occupancy and turnover of parking spaces, provide more complete and timely information and statistics, increase revenue, and provide greater flexibility and control of parking rates. The technology also provides a broader range of payment options including credit cards and is one of many important components necessary to better manage City parking resources. A limited trial in Surabaya would enable the city to test the appropriateness of this technology.

• Safety: A demonstration project involving a number of selected treatments at ten signalised intersections and twenty mid-block locations (ten signalised and ten non-signalised) has been identified in Section 5.1.12. (above). This would enable

\textsuperscript{10} Accra, Ahmedabad, Beijing, Chicago, Chongqing, Dhaka, Delhi, Eugene and Kampala have undertaken (or are in the process of undertaking) pilot BRT projects.
the city to test different approaches to improving pedestrian safety at crossings as well as measure the impact of improved enforcement of regulations and traffic signal compliance for drivers and riders and through enhanced signalisation and civil works.

7.2 THE NEED FOR AN INTEGRATED APPROACH

Improving urban mobility involves learning by doing and learning from and with others. It is essentially a cooperative knowledge-sharing process where city agencies and stakeholders work together to understand problems and find solutions. In practice, however, existing organisational divisions make it difficult to do this. The most common types of organisational boundaries that hinder integrated approaches can be summarised as follows:

- Transport modes and carriers: separated responsibilities for public transport and road traffic in particular, but also for walking and cycling, parking, rail, road, water and air transport
- Authority areas: administrative divisions such as municipal boundaries that cut across existing transport patterns (e.g. travel-to-work areas)
- Public and private sector: agencies in charge of planning and/or operation of infrastructures and services (e.g. public transport)
- Government tiers: competencies and responsibilities distributed among various authority levels i.e. municipalities, provinces, regional and national government agencies

The city of Surabaya has at its disposal a team of highly motivated and competent staff in both the road and transportation agencies. What is missing is the integration of their proposals into measures that are explicitly designed to improve mobility for all citizens. This will require a comprehensive analysis of issues, derived from extensive consultation and a deeper understanding of the situation on the ground, both physically and in terms of how people use road infrastructure and services to get around. In parallel with the consultation process, it is important to assess accessibility. This is a key measure of mobility and can be obtained from a combination of surveys, observations and measurements.

7.3 THE RECOMMENDED PROCESS

A process that has proven to work well in Europe in overcoming organisational boundaries and encouraging cooperation among stakeholders is provided in the “Sustainable Urban Transport Planning Manual: Guidance for stakeholders” published in 2007 by European Commission, DG Environment. A number of basic elements have been defined in this manual that may be helpful for improving mobility in Surabaya. These are:
• “Tasks” - these are activities required for developing and implementing concrete urban mobility policies, consolidated in a formally adopted and approved “action and budget plan”.

• “Missions” - underlying the Tasks, these are preparatory and accompanying activities that are crucial for the success of the process. They systemise the range of actions necessary to initiate new ways of thinking, to establish planning routines and to provide a stable institutional framework within which innovative urban mobility policies can be developed.

There are 5 Tasks to be considered for elaborating an action plan and budget ready for adoption and implementation:

1. **Status analysis and scenario development**
   a. Identify and analyse the key planning documents, procedures and policies and create a reference point of pertinent information sources.
   b. Provide a comprehensive quantified baseline of the current status of mobility and transport development in the urban agglomeration. Prioritise key mobility problems and identify data gaps.
   c. Develop scenarios that allow for discussing different strategies for improving mobility. Inform and stimulate the discussion among stakeholders.

2. **Vision, objectives and targets**
   a. Develop a common long-term vision for improving mobility between all local stakeholders and citizens. Create a qualitative description of the desired future status.
   b. Define clear and measurable objectives that can orientate and prioritise action. Specify what should be achieved and when, building on the common vision.
   c. Define a set of measurable, relevant and realistic targets that allow monitoring progress towards achievement of the objectives and assessing the efficiency and effectiveness of the measures taken.

3. **Action and budget plan**
   a. Define a broad set of policies and measures that helps to achieve the vision and objectives.
   b. Ensure realistic delivery and efficient and effective allocation of resources (human, knowledge, funds).

4. **Assigning responsibilities and resources**
   a. Formalise the responsibility of implementing agencies and provide the necessary means for implementing all policies and measures.
   b. Ensure the actual implementation of the action and budget plan.
5. **Monitoring and evaluation**

   a. Assess the planning and implementation process and facilitate anticipation of problems and verification of accomplishments.

   b. Provide information about the development of future improvements.

There are ten Missions to be considered for establishing the strategic and operative framework for preparing urban mobility improvements:

1. **Timing of the planning process**: Harmonise the timing of different technical and political decision-making processes and identify “windows” for coordination. Define a realistic schedule for the process.

2. **Strategic coordination**: Assess all stakeholder positions and create a sound basis for co-operation.

3. **Responsibility and geographical coverage**: Define an adequate territorial delimitation for SUTP, ensuring coverage of actual mobility patterns. Assign suitable agency responsibilities and obtain political approval.

4. **Citizen participation**: Encourage citizens to partake in collective decision-making. Ensure maximum transparency, strengthen local political culture and create broad public ownership.

5. **Stakeholder involvement**: Ensure a well-structured involvement of public and private stakeholders in all stages of the process.

6. **Integration of policies**: Establish mobility planning as a shared policy domain, truly serving the different needs of society. Define integration between mobility and sector-specific policies.

7. **Social inclusion and gender equity**: Understand and address the role of gender and social status in urban mobility. Create awareness, balance participation and develop targeted measures for gender equity and social inclusion.

8. **Information and public relations**: Manage relationships with the local media and encourage regular reporting. Manage the information release and dissemination channels to create public awareness and a lively urban mobility discourse.

9. **Skill management**: Ensure that the necessary (wide) range of skills for managing and driving the improving urban mobility process are available in local authorities and among stakeholders to efficiently drive forward Tasks and Missions.

10. **Management and organisation**: Clarify and formalise agency relations. Ensure accountability and transparency of the planning process. Facilitate an efficient planning process, making optimum use of resources and addressing risks.
It has to be underlined that the process outlined above does not mean developing a transport “master plan”. It is also not finished once an action plan containing innovative transport measures has been adopted. Rather, improving urban mobility is a continuous process that needs to grow from, and within, the community and from learning by doing.

Several of the components identified above may already be part of common practice in Surabaya, while others may represent true innovations. Here, the aim is to provide a comprehensive overview of the variety of activities, so that the city may adapt and adopt examples of international best practice to improving urban mobility for all of its citizens.
CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS