

THE FEDERAL TERRITORY DEVELOPMENT AND
KLANG VALLEY PLANNING DIVISION
PRIME MINISTER'S DEPARTMENT
GOVERNMENT OF MALAYSIA

JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)

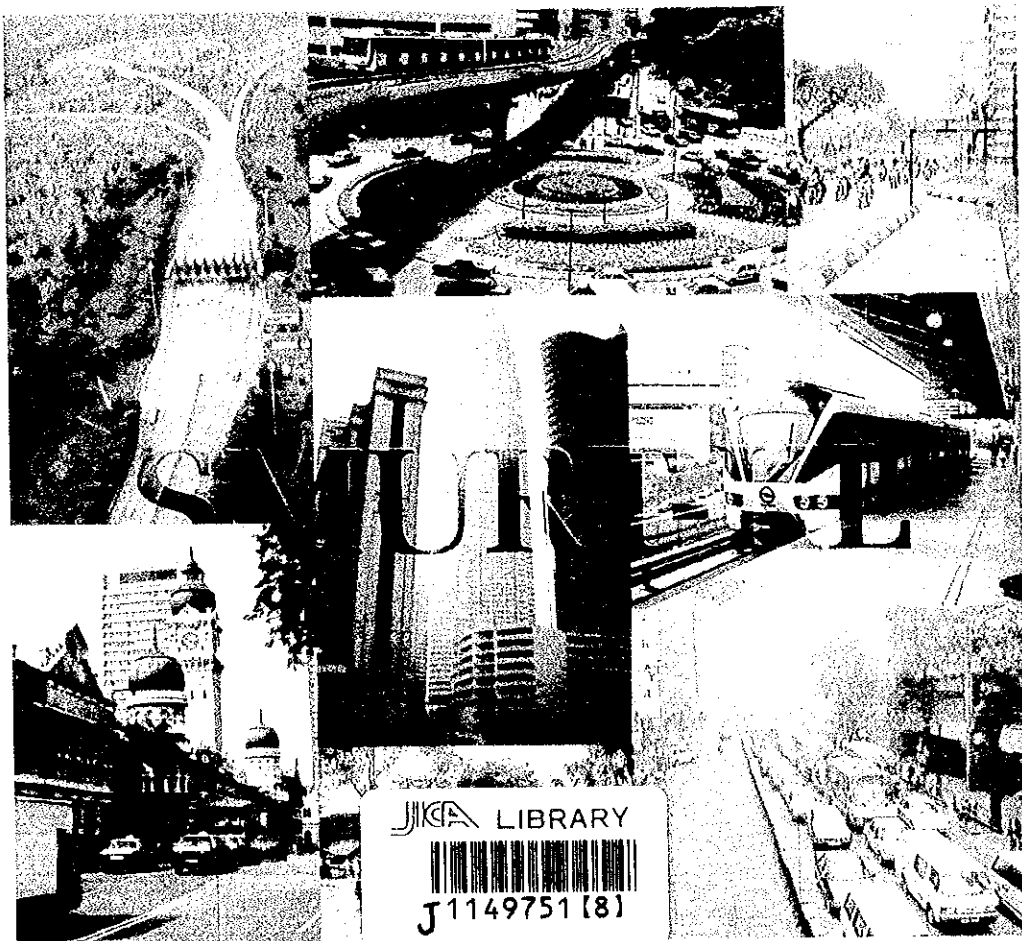


A STUDY
ON



INTEGRATED URBAN TRANSPORTATION STRATEGIES
FOR ENVIRONMENTAL IMPROVEMENT
IN KUALA LUMPUR

FINAL REPORT
VOLUME II



FEBRUARY 1999

PACIFIC CONSULTANTS INTERNATIONAL
SUURI-KEIKAKU CO.,LTD

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(as of the end of September 1998)

List of Abbreviations

		Chapter
CBD	Central Business District	11
LEV	Low Emission Vehicle	11
NGV	Natural Gas Vehicles	11
API	Air Pollution Index	11
EDMC	Energy Data and Modelling Center (Japan)	11
KL	Kuala Lumpur	11
GDP	Gross Domestic Product	11
SRFA	Sub-Regional Fire-fighting Arrangement	11
AWASI	Area Watch and Sanction Inspection	11
SIRIM	Standards and Industrial Research Institute of Malaysia	11
CPA	Central Planning Area	11
CNG	Compression Natural Gas	11
HPU	Highway Planning Unit	14
LRT	Light Rapid Transit	14
BOT	Build-Operate-Transfer	14
IRR	Inner Ring Road	9
MRR	Middle Ring Road	9
ETC	Electronic Toll Collection	9
PCU	Passenger Car Unit	9
MSC	Multi-media Super Corridor	11
SCATS	Sydney Coordinated Adaptive Traffic System	9
FIRR	Financial Internal Rate of Return	13
EIRR	Economic Internal Rate of Return	13
KTMB	Keretapi Tanah Melaya Berhad	13
PLUS	Project Lebuhraya Utara Selatan	13
IDC	Infrastructure Development Corporation	13
STAR	Sistem Transit Aliran Ringan	13
PUTRA	Projek Usahasama TRansit Automatic Sdn. Bhd.	13
PRT	People-mover Rapid Transit	13

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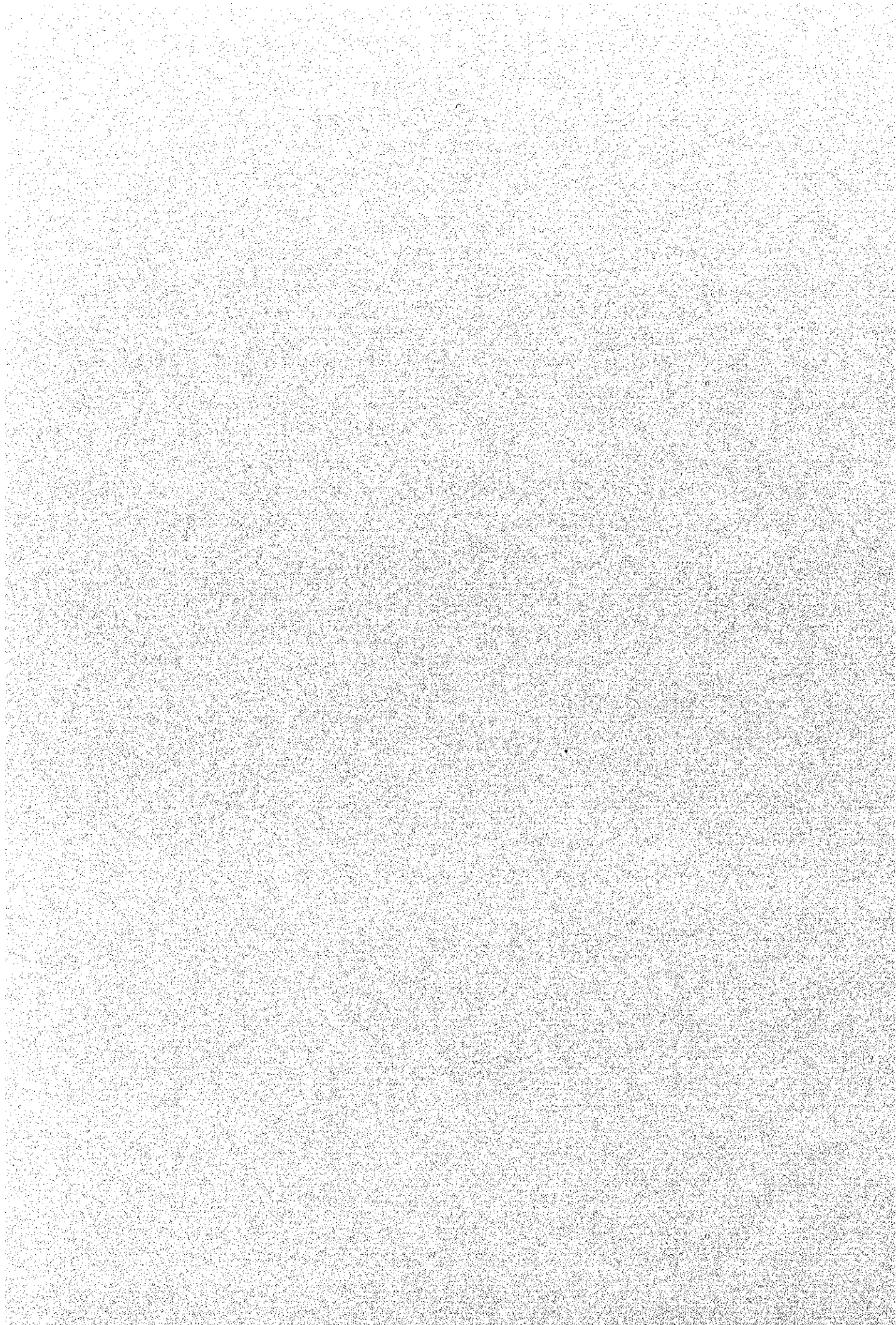
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Chapter 8

Long Term Development Plan



Chapter 8 Long Term Development Plan

8.1 Master Plan

8.1.1 Component of Master Plan

(1) Planning Components

As mentioned in Chapter 6 “Urban Transportation Policies and Strategies”, the main projects and strategies were summarised into several items. From the view point of formulating the SMURT-KL Master Plan, major project components were categorised into four (4) groups by taking into consideration the results of the policies and strategies as shown in Figure 8.1.1.

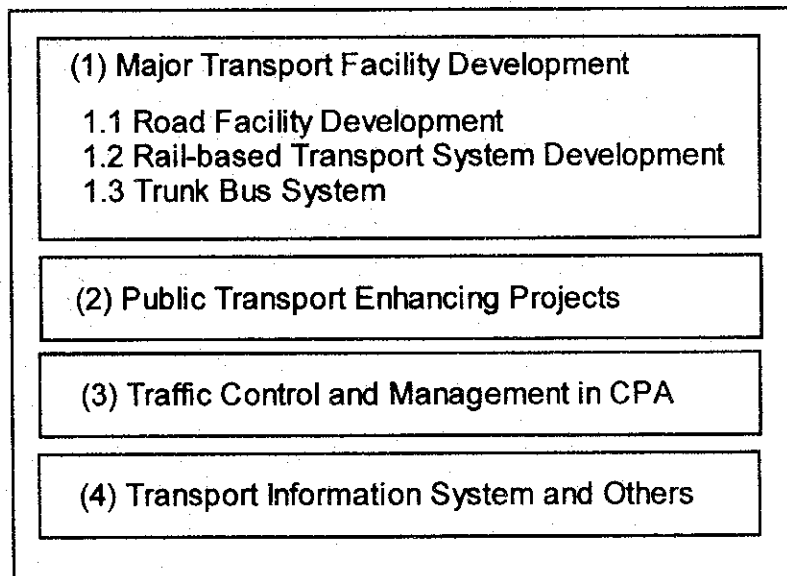


Figure 8.1.1 Planning Component

(1) Major Transport Facility Development

This project component consists of new rail-based projects, trunk bus system projects and highway projects. These projects are considered to be one of the major measures to change the current car-driven society into public-oriented society catering for future traffic demand.

1) Road Facility Development

Many road projects have been committed in the Klang Valley region so far and some of them are presently under construction. After having reviewed the road projects, some new road projects were proposed to cope with the future road traffic demand.

2) Rail-based System Development

There are four rail-based systems, i.e. STAR System (I), PUTRA System (II), PRT monorail and KTMB. KTMB, the Ampang line and the Commonwealth line of the STAR System (I), and the southern line of the PUTRA System (II) are in service at present. In addition, the northern line of STAR System (I) connecting to Sentul is to open in December 1998. However, the south section of PRT monorail was cancelled in the middle of 1998 due to the economic woes in Malaysia. The south section of PRT monorail is planned in accordance with huge urban developments alongside the line and it appears that it will not be revived under the current economic circumstances.

The Damansara-Cheras line is a newly proposed rail-based system, which is required in order to change the mode from the trunk bus system in the future in accordance with the increment of ridership.

3) Trunk Bus System

Six lines of trunk bus system have initially been planned in the Study to restore the share of the whole bus system. As mentioned above, the plan is to change the Damansara-Cheras line from a trunk bus system to a rail-based system later.

(2) Public Transport Enhancing Projects

One of the focal issues in the Study was how to enhance the public transport to cater for future traffic demand. Although the main objective will be attained by the major transport facility development as mentioned above, it is important to support the increase of their usage by providing related facilities such as station plaza, transferring facilities and so forth.

(3) Traffic Control and Management in CPA

Traffic control and management in the CPA is one of the most urgent initial measures to improve the current traffic congestion. Package plans composed of various countermeasures should be brought into effect immediately. Area Pricing is recommended with the provision of reversible lanes and the introduction of a trunk bus system in the Master Plan, once the currently planned rail-based system is completed.

(4) Transport Information System and Others

After the completion of the major transport facility development, traffic management becomes more important in terms of how to effectively and efficiently use the transport facilities in order to improve the quality of life as well.

The truck terminal is another facility development from the viewpoint of freight movement and lorry traffic.

(5) SMURT-KL Master Plan

Taking these components into consideration, the major transport facility development master plan is outlined in Figure 8.1.2. The other plans are explained in Chapters 9 and 10, respectively.

8.1.2 Road Facility Development Plan

(1) Current Road Plan

1) View Point of Future Road Network

As described in Chapter 5, "Planning Framework", there are many privatised road projects in the Study area. These projects seem to have been proposed to relieve the current traffic congestion through private investments, though part of the projects originated from the previous major road network master plan drawn by the Highway Planning Unit (HPU) and other concerned authorities.

Regarding these road projects, all the figures seem to fit the preferable future road network as a whole. The question is how to adjust these projects to one another and in what priority to implement these projects in view of the recent economic problems.

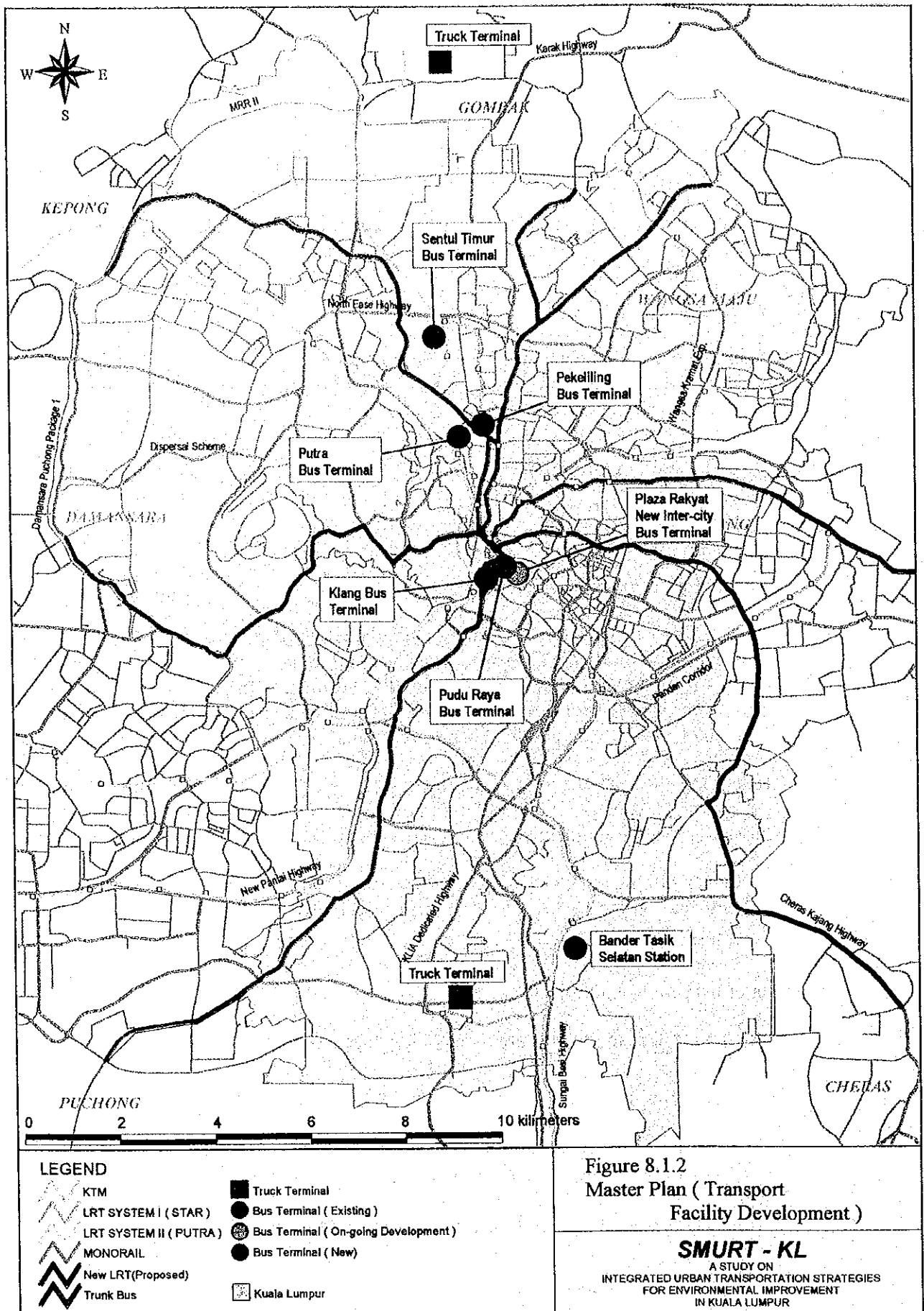
Moreover, the necessity of other new road projects shall be discussed based on the current road projects when the long term road network perspective is considered for the Study area.

2) Major Current Road Projects

Major current road projects are listed below (see Figure 8.1.3)

a. Middle Ring Road II

The eastern part of the Middle Ring Road II (MRRII) is under construction at present as public works using the government funds and is expected to be in service in the near future. The western part of the project is being planned as a privatised road, named Damansara Puchong Expressway, part of which has already been undertaken.



b. Western KL Traffic Dispersal Scheme and Others

In the west side of the Study area, there are some road projects including the dispersal scheme, Damansara Transit and others. These projects were proposed by the same private investors.

c. New Pantai Highway

This project was proposed to mitigate the burden on the Federal Highway, which has been subjected to chronic traffic congestion.

d. KLIA Dedicated Highway

The Multimedia Super Corridor and Kuala Lumpur International Airport (KLIA) brought forth this project. In the initial plan, the project was scheduled to open to the public in conjunction with the completion of the KLIA but it has been deferred due to its large construction cost.

e. KL Elevated Inner Ring Road

This project's function is to disperse the traffic plunging directly into the CPA.

f. North East Highway

This project's function is to also disperse the traffic coming from the north, and to bypass the CPA. This project is to be executed soon although construction has not yet begun yet at present.

g. Pandan Corridor Extension

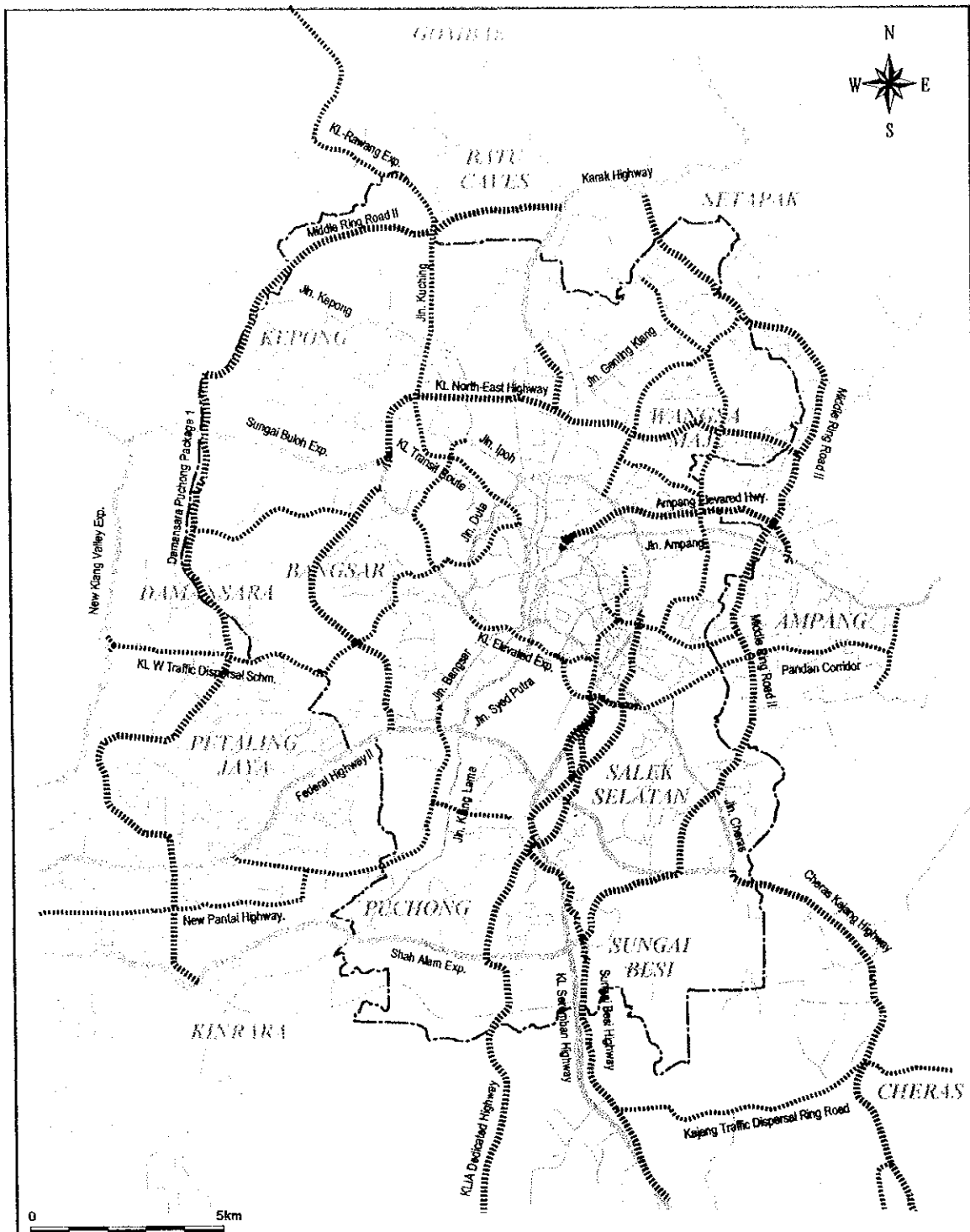
This project aims to promote the access between the CPA and the eastside of the CPA.

h. Wangsa Keramat Expressway

This road is planned between the Middle Ring Road II and Jln. Tun Razak, connecting the Wangsa area and the Selangor Golf Club.

3) Necessary Adjustment of the Projects

Many new road projects concentrate on or alongside Jln. Tun Razak since there is not much space available inside the CPA for these projects. Two of those are the KL Elevated Inner Ring Road and the Pandan Corridor Extension. Both projects are planned in the southern area of Jln. Tun Razak. However, these projects duplicate each other between Jln. Tun Razak and the Middle Ring Road II. Some minor adjustments will be necessary.



LEGEND	
	Existing Road
	Planned Arterial Road
	Planned Major arterial Road

Figure 8.1.3
Current Road Projects

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8.1.3 Newly Proposed Projects

(1) Problems of Current Plan

a. Traffic Demand into and across CPA

One of the features of traffic demand is that a lot of traffic plunges into the CPA even in the future. Another is that considerable traffic is crossing from west to east due to the emergence of new central business districts instead of the old CBD in China Town.

This trend is due to recent urban development widely spread in the Study area, although main projects are concentrated in CPA and the surrounding areas. This is schematically illustrated in Figure 8.1.4.

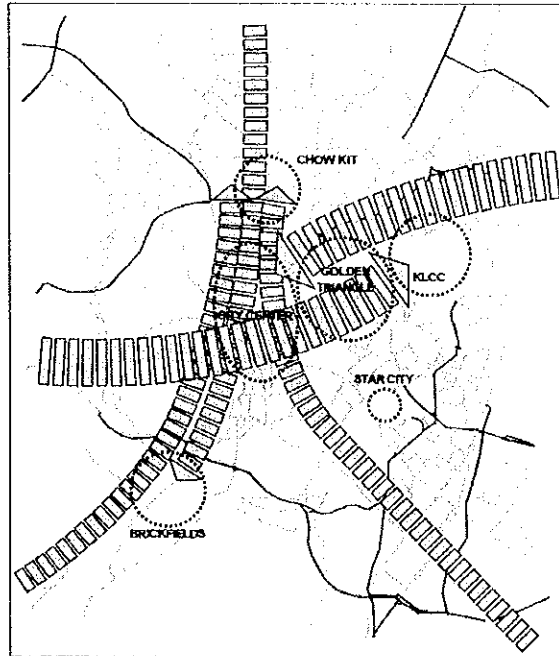


Figure 8.1.4
Traffic Demand Crossing CPA

b. Heavy Traffic From Southeast

The biggest current development corridor between KL and Shah Alam in the Klang Valley region produces a large number of traffic going to the centre of KL. The level of household income is high and this is one of the reasons why heavy vehicle traffic is being generated in these areas.

c. Traffic From Southern Region to Petaling Jaya

The considerable amount of traffic bound for KL is one of the features of the Study area. However, another attention has to be paid to traffic generating from the southern region of Shah Alam Expressway such as Subang Jaya and so on. This region, consisting of comparatively high-class residential areas, has been developing in the recent years. A lot of commuting activities to Petaling Jaya can be observed.

d. Insufficient Street Network

As there are many highway projects, planned under either as BOT or BOO scheme, these are expected to operate as toll roads. Almost all of these highways are realised as major arterial functions and as part of a well-established arterial road network.

On the other hand, drivers cannot find the street-routes to their destinations due to the poor street network in some areas. The establishment of local road network is important for daily activities and the formulation of the neighbourhood.

2) Additional Road Network

The Future road network appears to be well planned. However, considering the road network configuration based on the results of future traffic assignment and characteristics, the following new complementary new road projects will be necessary by the year 2020 (see Figure 8.1.5).

a. Underground Expressway

One of the measures to mitigate the traffic congestion in the CPA is to increase the area of roads in the CPA. However, there is no room for improvement and construction of roads in this area because it has been densely built up. The underground expressway is proposed to solve the problem, and is planned under Jln. Raja Chulan with several access ramps connecting to exiting streets. This road is to connect to the Middle Ring Road II eventually.

b. Arterial Road 1 (KL Elevated Highway – Wangsa Keramat)

This road provides a direct connection between the KL Elevated Highway and Wangsa Keramat by an elevated road passing through the CPA from the north to the south alongside Jln. Tun Razak.

c. Arterial Road 2 (KL Elevated – New Pantai Highway)

This road is planned in order to mitigate the heavy traffic burden of Syed Putra connecting to the CPA directly from the Federal Highway. There is a cemetery at the west side of Jln. Sungai Besi. The road project is to pass through the land area of the cemetery. However, if a redevelopment plan of the cemetery is allowed in future, the route will be subject to change and have to be planned elaborately to include, peripheral minor arterial roads at that stage.

d. Local Roads

The new road projects mentioned above are designed to cater mainly to the traffic demand characteristics. However, it is also essential to create a well arranged neighbourhood environment for the future development of the Study area. Nine road projects are proposed for this purpose.

Some of the major local roads are explained below:

i) L1(Section between Jln. Genting Kelang and Jln. Damansara)

The necessity for this new road will not be so urgent from the traffic demand point of view. However, the areas alongside the road are not so densely populated at present but are expected to develop in the future. There is no local road provided in the areas except radial roads. Once the area is developed, it will be too late to realise a new local road here due to land acquisition problems. This new road is planned to guarantee a better neighbourhood environment in advance.

ii) L2 (Section between Jln. Yap Kwan and Jln. Datuk Abu Malik)

The area where this new road is planned consists of poorly arranged narrow roads and the neighbourhood environment has also been aggravated. The new road will help to improve the environment in the area by providing a basic road arrangement.

iii) L3 (Section between Jln. Ampang and Jln. Raja Chulan)

The roads in this area consist of radial roads only. There is no north-south road. In addition, a local road, which is one of peripheral roads around KLCC, has already been constructed. The new road will be connected by taking advantage of this already constructed road.

e. C1 (Access to Petaling Jaya)

The area located in the southern part of the Shah Alam Expressway has a big development potential. The main impacts are from the Multimedia Super Corridor, and the big transport infrastructure facilities such as the Shah Alam Expressway, the North-south Central Link and other relevant road development. This new road between Jln. Pintasan Puchong Sungai Besi and Jln. Templar aims to provide a smooth access from this area to Petaling Jaya where there is no definitive road at present due to the presence of the Klang River.

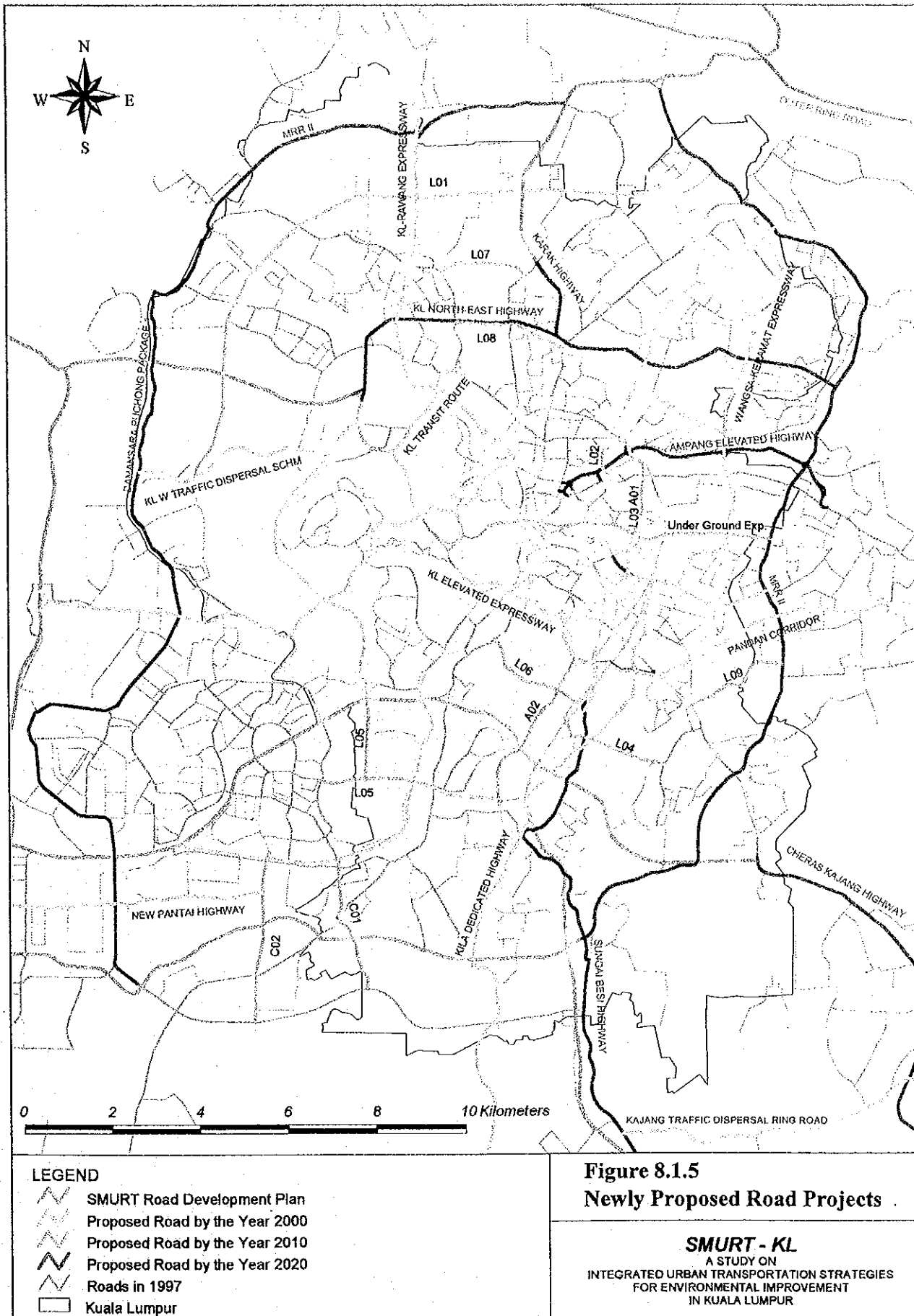
f. C2 (Connecting Federal Highway and Jln. Pintasan Puchong Sungai Besi)

As mentioned above, the area located in the southern part of the Shah Alam Expressway has a big development potential. Taking this into consideration, a new road to connect both the Shah Alam Expressway and the Federal Highway is planned for smooth traffic movement at high speeds in the region.

g. L1-9 (local roads)

Local road development to create the neighbourhood itself and to prevent the environment from deterioration is another aspect of road development in the Study area. A target of privatised road development by investors is construction of arterial roads due to project viability. None of the investors are concerned about local road development. This has brought about an inadequate street road network arrangement, forcing users to make detours to arrive at their destinations when they

use ordinary streets in some areas. In order to establish a comprehensive road network, not only highway and expressway but ordinary street network have to also be constructed simultaneously. As a result, several local roads are proposed in the Study.



3) Improvement of Interchanges

According to the results of traffic assignment, many minor arterial roads and local roads show comparatively high congestion ratio in some areas. This is due to the high traffic volume exiting and entering the highways and expressways, and the difference in capacity between the roads and the highways and expressways. Much attention has to be paid to improve such interchanges and grade-intersections.

8.1.4 Road and Traffic Characteristics

(1) Hierarchy of Current Plan

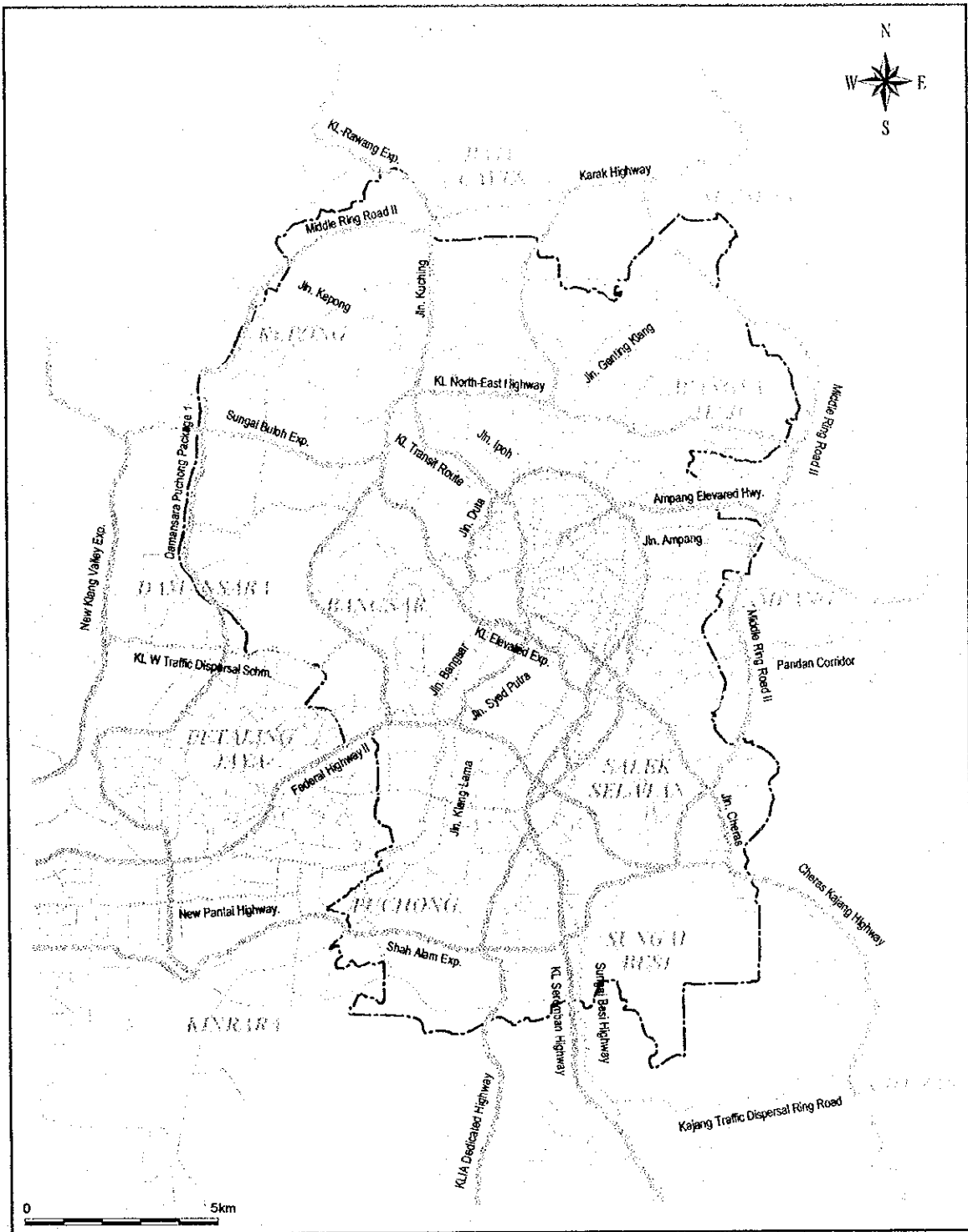
In order to discuss the network in a long term perspective, the hierarchy of the road network is analysed. The same classification used for existing road network hierarchy was used for analysis, as shown here : -

- 1 Highway/Expressway
- 2 Major arterial road
- 3 Arterial road
- 4 Minor arterial road
- 5 Local road

Road classification refers to the traffic volume and average trip length of a road section, in addition, road standard and other factors are also taken into consideration.

Figure 8.1.6 shows the result of the road network function. According to the road hierarchy, there are four major ring roads, the Outer Ring Road (not seen in the figure), the Middle Ring Road II, the combination of North East Highway and Bukit Kiara / Kerinch Link, and Jln. Tun Razak (Middle Ring Road I)

Many new major radial arterial roads are expected to provide extra service in addition to the existing road network. Considering this network configuration, it looks well arranged as a whole and car users will be able to choose alternative routes anytime when necessary.



0 5km

LEGEND




-  More than Major Arterial Road
-  Arterial Road
-  Minor Arterial Road

Figure 8.1.6

Road Network Hierarchy

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(2) Service Level of Road Network

According to the results of traffic assignment in the years 2000, 2010, and 2020, the service level of the road network and characteristics were analysed and the major results were summarised as follow:

1) Volume Capacity Ratio

Volume capacity ratios on the major road sections in each year are shown in Figure 8.1.7 (1), (2), (3). Major features are as follows:

a. Year 2000

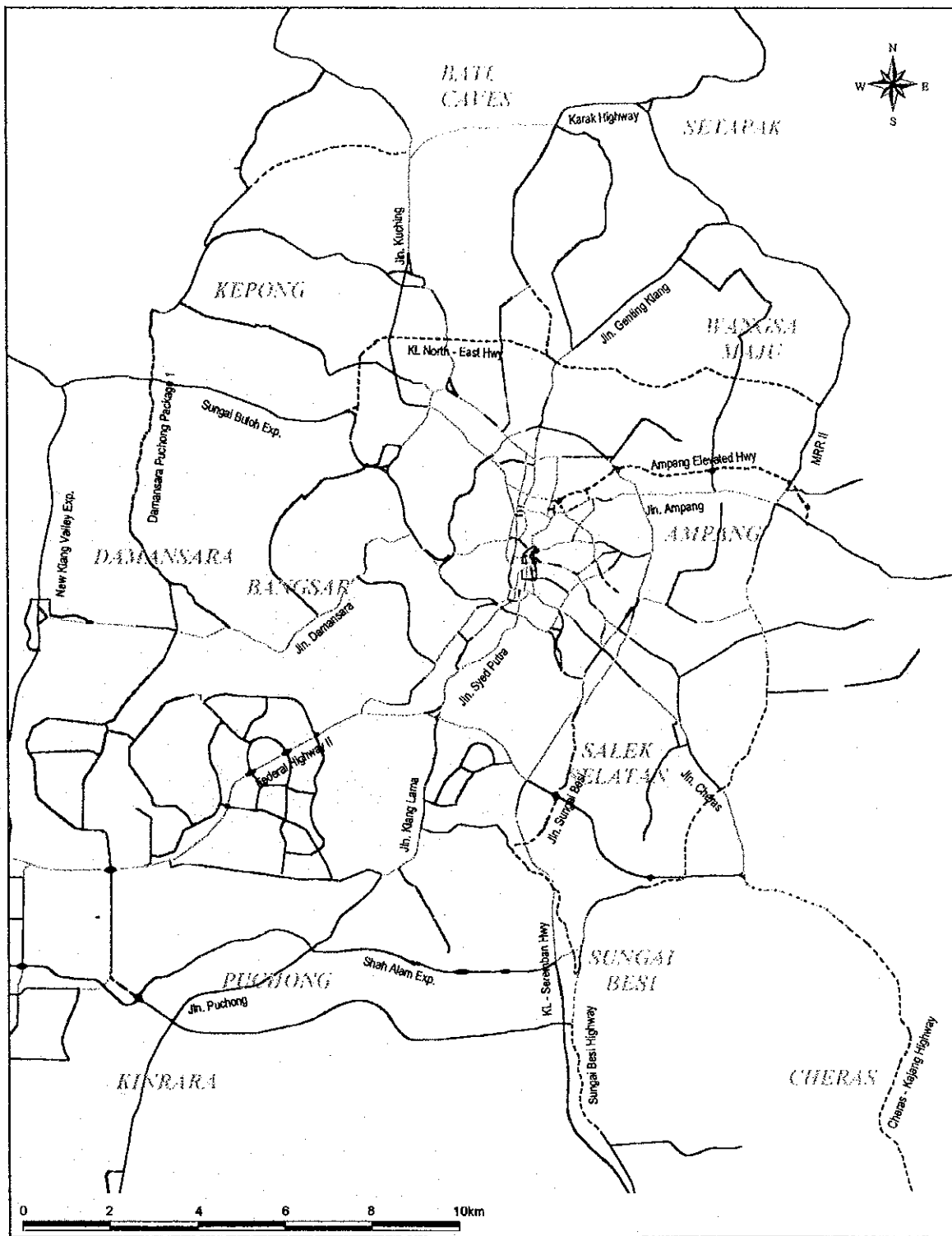
High traffic congestion ratios can be observed in a part of the CPA, Jln. Duta and Jln. Damansara. In other sections, seriously low level of service cannot be seen.

b. Year 2010

Although traffic congestion of more than 2.0 can be observed in a part of Jln. Duta as the year 2000, all sections indicate an affordable level of service, which is less than 1.5 of the congestion ratio.






c. Year 2020

The east part of Jln. Tun Razak, Jln. Istana and the section of the KL Elevated Inner Ring Road alongside the same section of Jln. Istana shows a high congestion ratio. In addition, sections with congestion ratio of more than 1.5 can be seen more frequently in the Study area in comparison with those in the years 2000 and 2010.



LEGEND

Volume Capacity Ratio

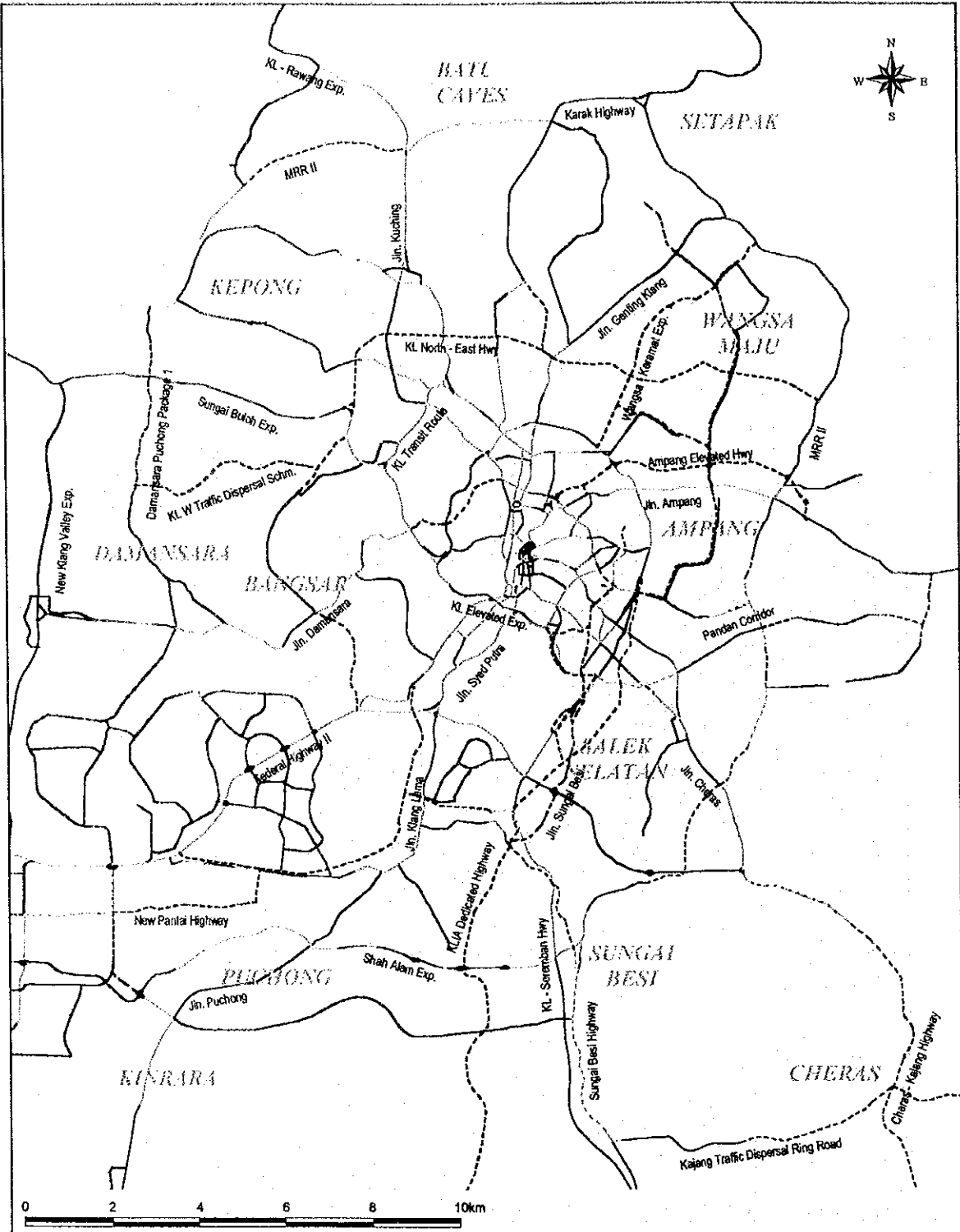
-  - 0.50
-  0.51 - 1.00
-  1.01 - 1.50
-  1.51 - 2.00
-  2.01 -

New Road

**Figure 8.1.7 (1)
Service Level of Road
Network in 2000**

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LEGEND

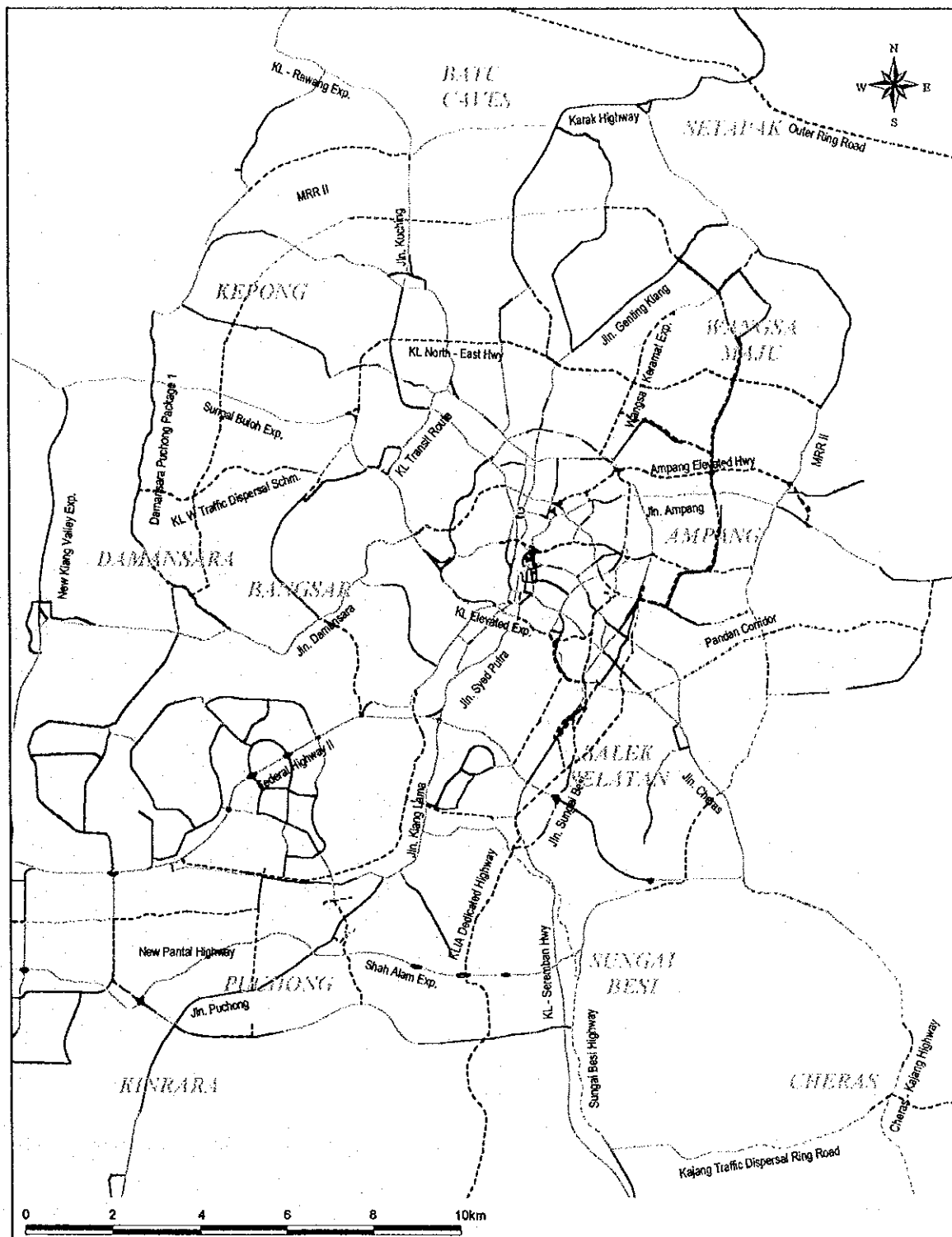
Volume Capacity Ratio

- 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 -

New Road

Figure 8.1.7 (2)
Service Level of Road
Network in 2010

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LEGEND

Volume Capacity Ratio

- 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 -

New Road

Figure 8.1.7 (3)
Service Level of Road
Network in 2020

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2) Volume Capacity Ratio on Screen Lines

Several screen lines were set up to analyse the relationship between traffic demand and road network capacity. Volume capacity ratios on the screen lines are indicated in Figures 8.1.8 and 8.1.9, and the major features are as follows:

- Volume capacity ratios outside the screen lines widely fluctuated in range from 0.2 to 1.4,
- On the other hand, those inside the screen lines showed more than 0.6 and also showed a narrow range,
- Those both outside and inside the screen lines showed low congestion ratios in 2010, with especially those outside looking more salient, and
- Those outside the screen lines No. 4 and 5 in 2010 and in 2020 are remarkably low, at 0.2. Attention has to be paid to the implementation schedule on some major road projects, which are included in the screen lines. Some adjustments may be necessary (see section 8.1.5 Implementation Priority).

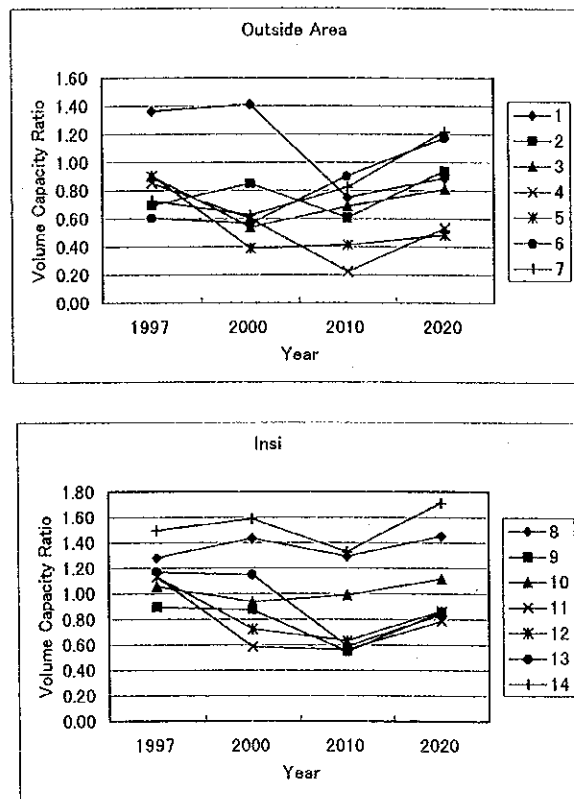
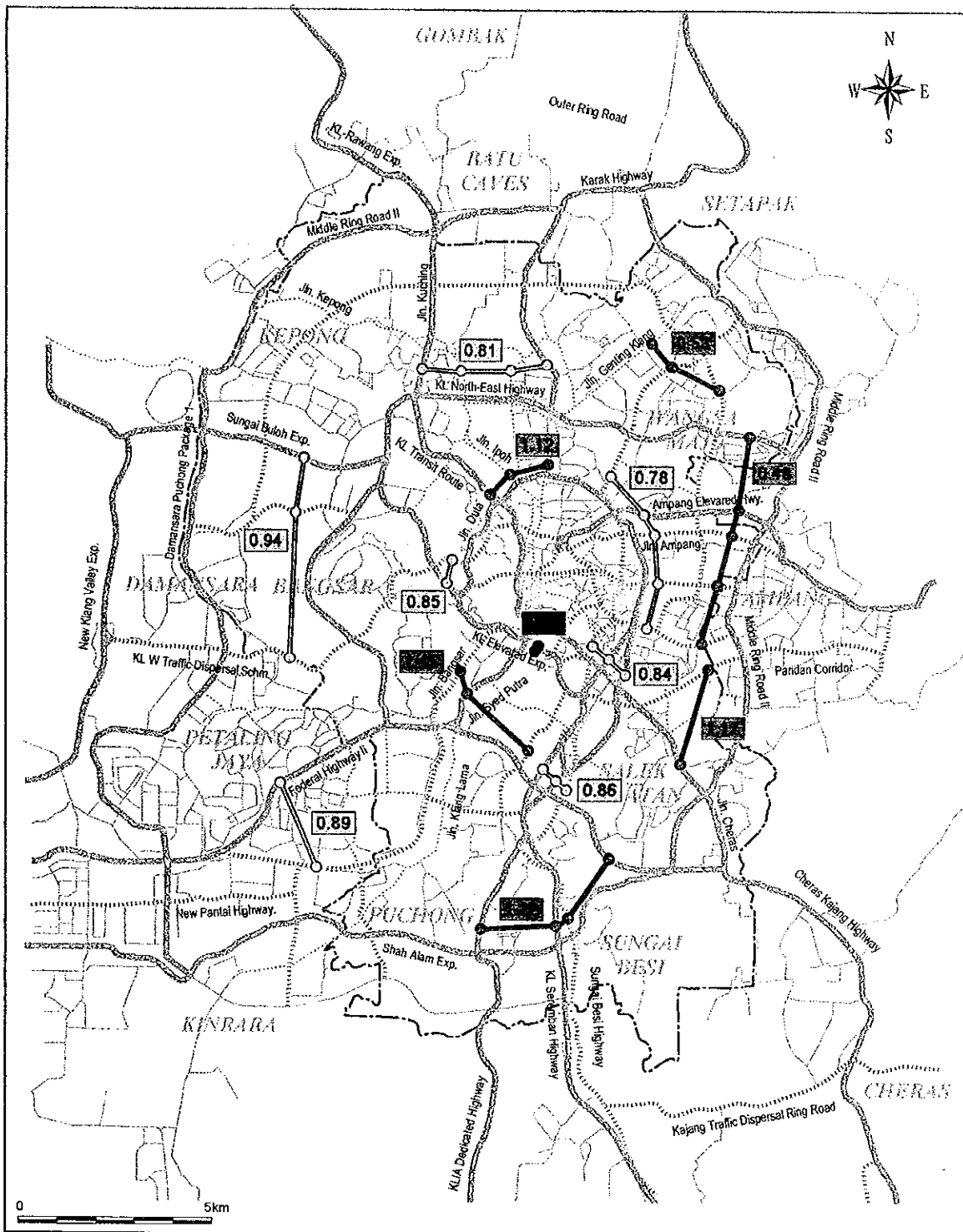


Figure 8.1.9
Volume Capacity Ratios on the Screen Lines



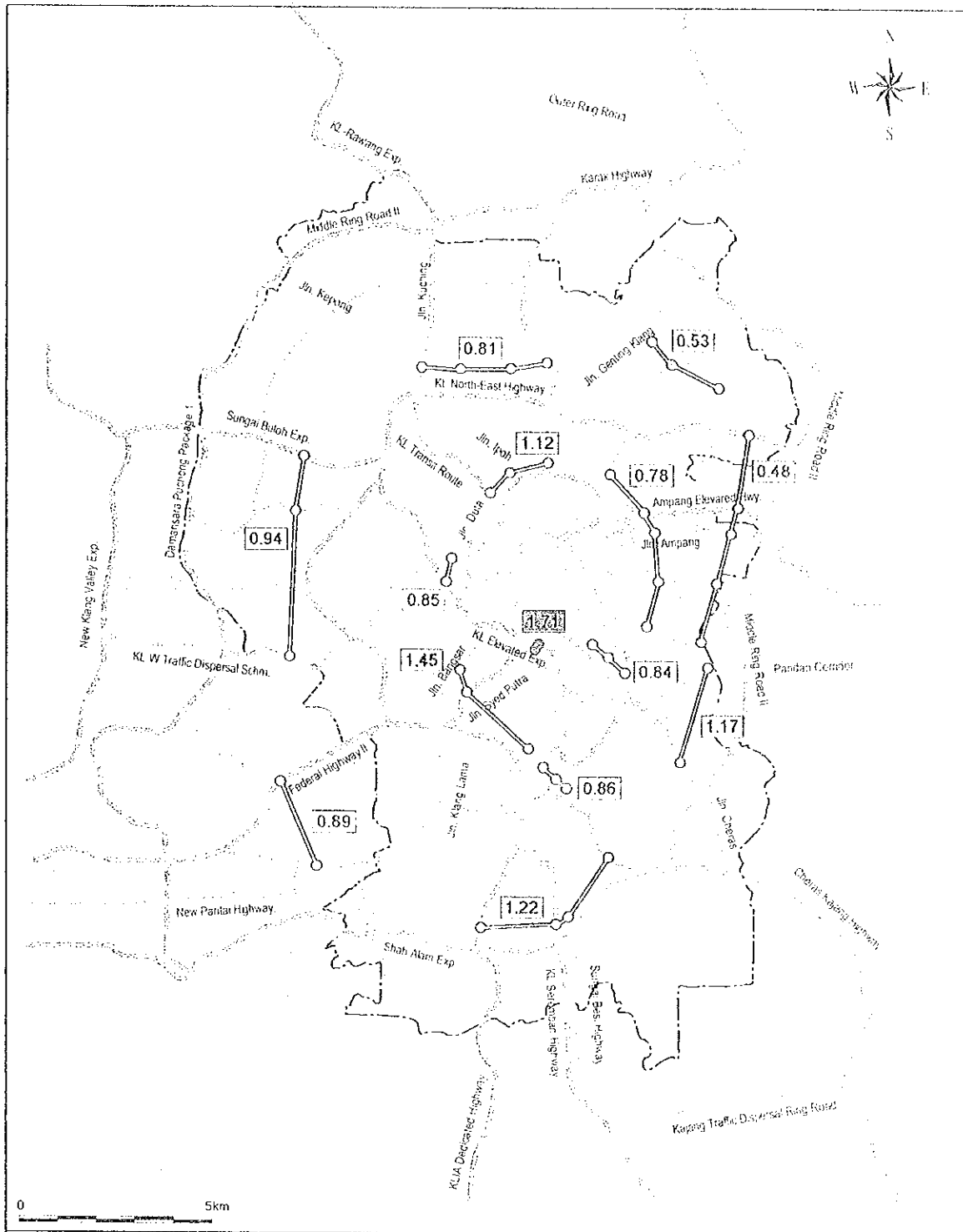
LEGEND

- More than Major Arterial Road
- Arterial Road
- Minor Arterial Road
- Screen Line

Congestion Ratio	
	0.50
	0.51 - 0.75
	0.76 - 1.00
	1.01 - 1.50
	1.51 -

Figure 8.1.8
Location and Congestion Ratio
on Screen Lines

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LEGEND	
	More than Major Arterial Road
	Arterial Road
	Minor Arterial Road
	Screen Line
	Congestion Ratio - 0.50
	0.51 - 0.75
	0.76 - 1.00
	1.01 - 1.50
	1.51 -

Figure 8.1.8
Location and Congestion Ratio on Screen Lines

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(3) Network Characteristics

In order to realise the road network characteristics, origin and destination analysis at major sections of the network was conducted and the location of these sections is shown in Figure 8.1.10.

The detailed results of the origin destination distribution of the major road sections are tabulated in the Appendix, and only major ones on specific road sections were analysed. According to the analysis, the major points were as follows:

1) Ring Road (Figure 8.1.11(1))

Two types of ring road were analysed in this section, i.e. Middle Ring Road (2), and North East Highway and Bukit Kiara, which is realised as a kind of an intermediate ring road. The origin and destination distribution shows different characteristics between the Middle Ring Road (2) and the intermediate ring road. It is obvious that the middle ring road (2) in the western region has wider O-D trip distributions in comparison with those of the intermediate ring road. On the other hand, the northern region has longer trips compared to those of the intermediate ring road,

2) KL Seremban Highway and Jln. Sungai Besi (Figure 8.1.11(2))

Although these two roads are running side by side, the pattern of trip distributions is quite different. KL Seremban Highway has more varied kinds of trips and a wider trip distribution such as those coming from the western region.

3) Federal Highway and New Pantai Highway

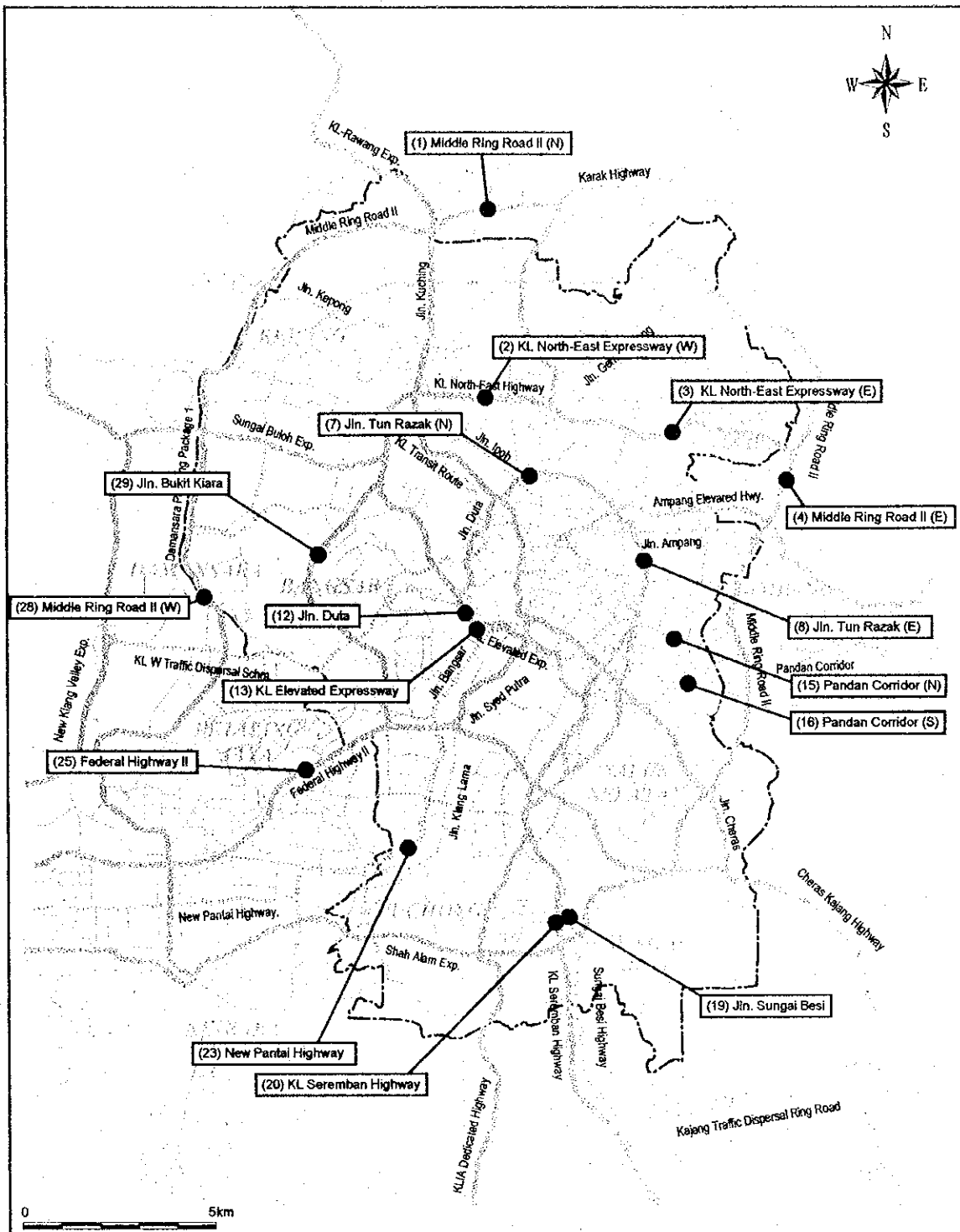
These two roads seem to be showing similar characteristics, connecting the western region and the centre of KL. The OD distribution pattern however, showed that the Federal Highway has a stronger road function with a wider and more varied vehicle trip distribution.

4) KL Elevated Inner Ring Road and Jln. Duta

These two roads are located in the same place running side by side. KL Elevated is, however, catching trips generated from the western region, and reversely trips coming from the eastern region are assigned to Jln. Duta

5) Pandan Corridor North and South

Both of these two roads are realised as new roads to connect the eastern region and the centre of KL. Trips on Pandan Corridor North are mainly from the CPA (inside of Jln. Tun Razak). On the other hand, Pandan Corridor South has trips spread widely into the CPA and the surrounding areas in the south.

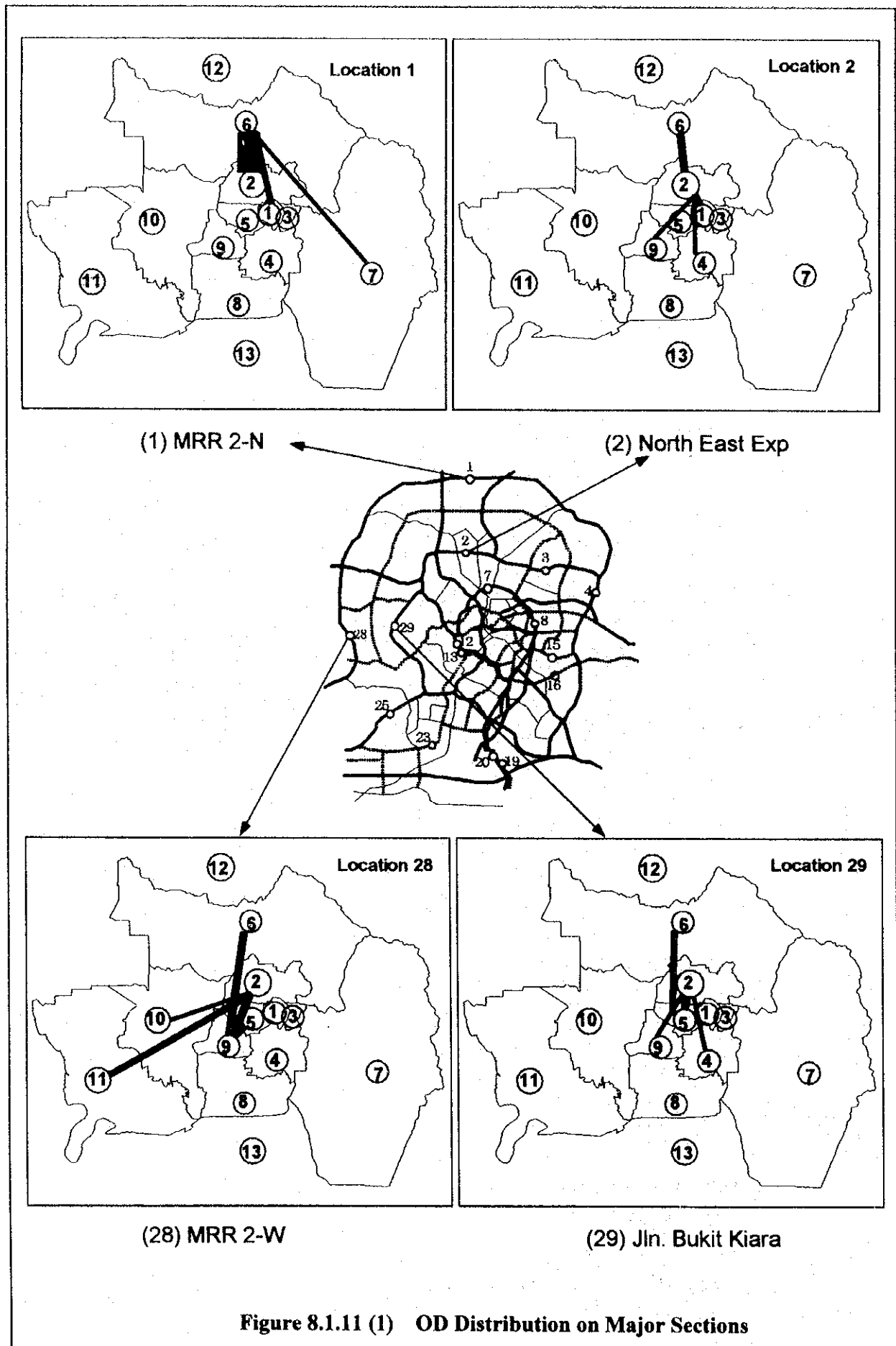


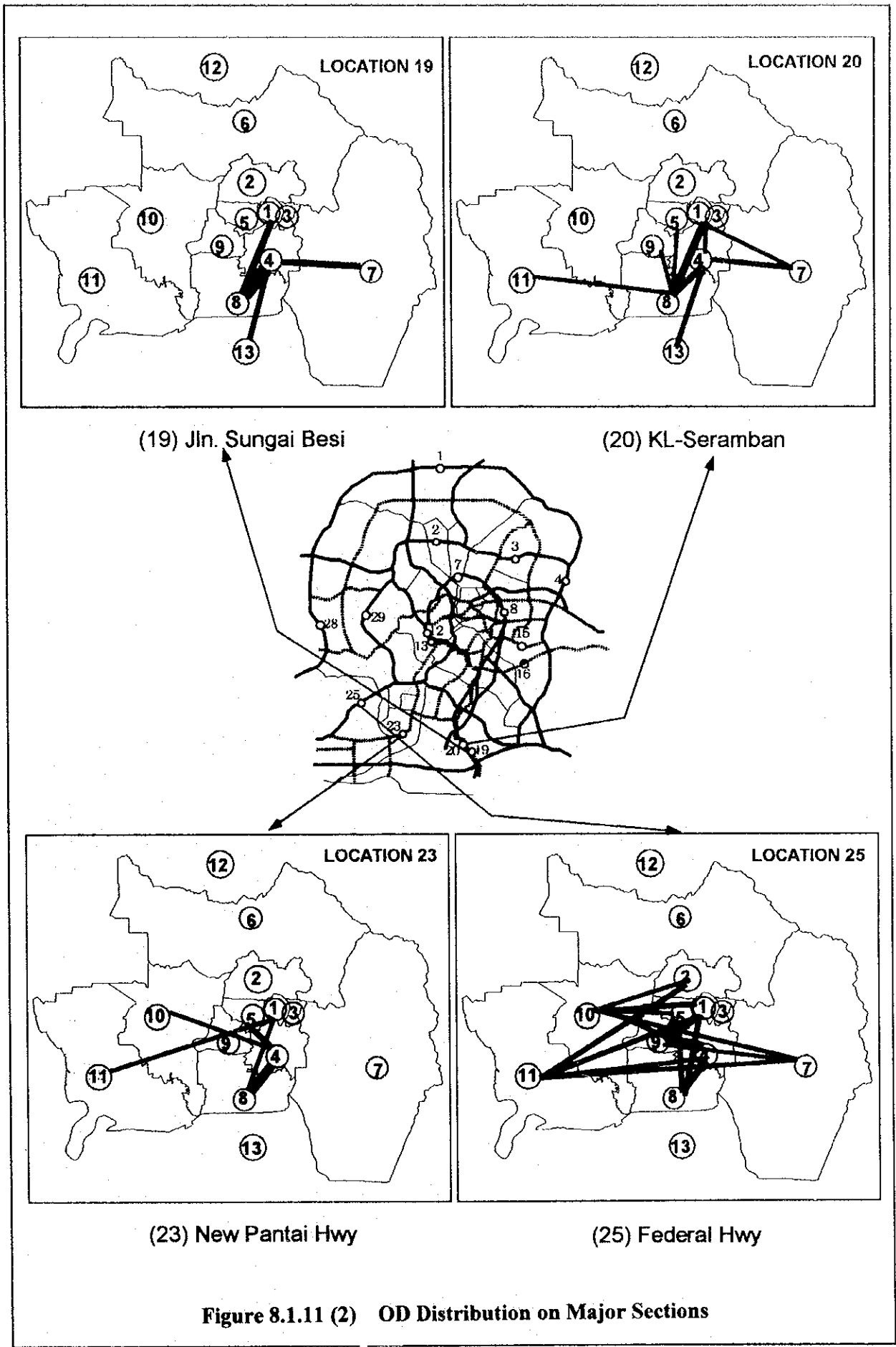
LEGEND

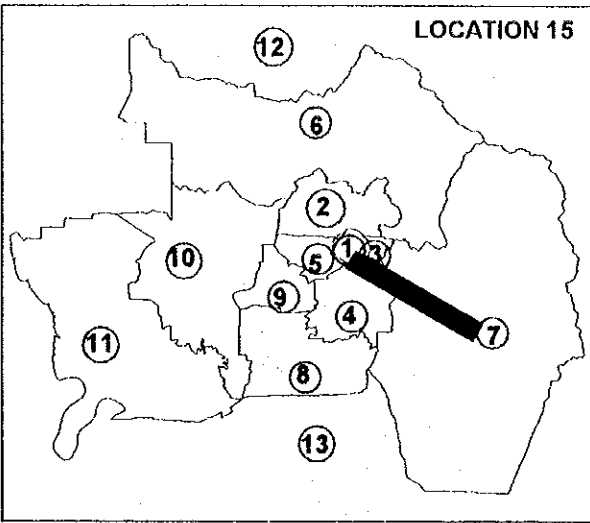
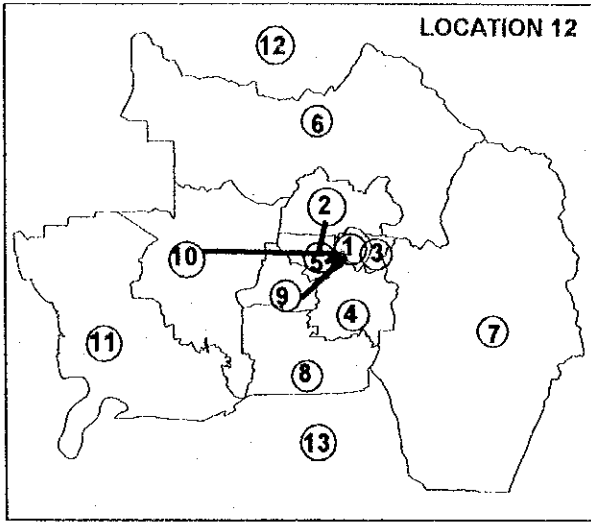
- More than Major Arterial Road
- Arterial Road
- Minor Arterial Road
- Location for OD Distribution Analysis

Figure 8.1.10
Location for
OD Distribution Analysis

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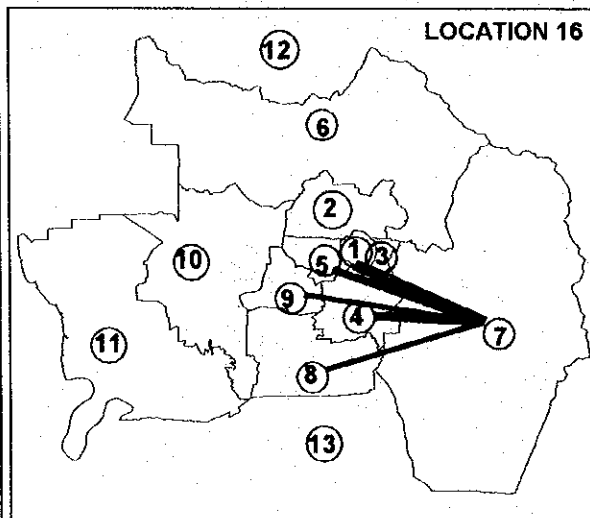
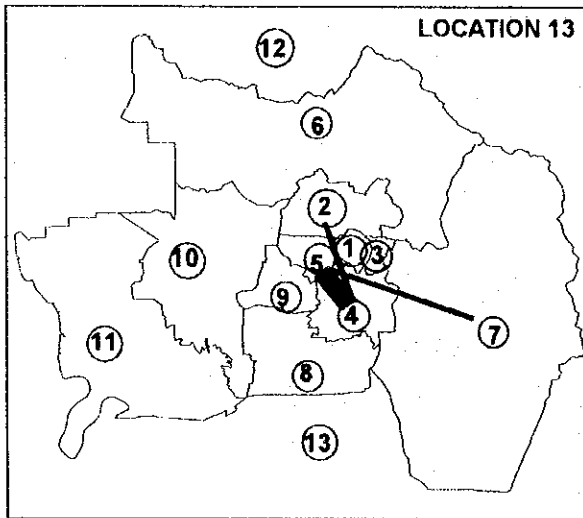






(12) Jln. Duta

(15) Pandan Corridor-North



(13) KL Elevated

(16) Pandan Corridor-South

Figure 8.1.11 (3) OD Distribution on Major Sections

6) Network Characteristics and Road Function

Considering these road network characteristics from the viewpoint of traffic demand on major road sections, the major arterial road network seems well established by sharing various trips in accordance with the location and function of the roads.

8.1.5 Implementation Priority

After examination in the above section, some road projects, which are scheduled to be implemented in the future, will be postponed to tune the traffic demand. They are :

1) North East Highway

This project is expected to be executed, in the year 2000, though the construction work has not begun yet at present. Considering the volume capacity ratio in 2010, Middle Ring Road II can be expected to cope with the traffic demand for a short period in the northern area.

2) Wangsa Keramat Expressway

Wangsa Keramat Expressway consists of two road projects. One connects to Jln. Ampang and heads for the southern area, and the other is connects to the northern part of Jln. Tun Razak. The section connecting Wnagsa Maju and Jln. Ampang passes through alongside the existing road, Jln. Setiawangsa, where LRT System II is under construction. Considering these situations, it does not seem necessary to implement this section in the near future, and deferment of the implementation seems pertinent.

3) Underground Expressway

This new road is expected to increase road capacity on the CPA boundary as one of the key issues. In this view, the projects are to be implemented in 2020. On the other hand, considering many road projects in screen line No. F5, where the volume capacity ratio is low in 2010 and 2020, attention has to be paid to the implementation schedule of the eastern part of this project in relation to the progress of the other related projects in the area.

8.1.6 Measures for Development Control

(1) Floor Area Control

Two measures for floor area control are recommended: i.e., measures for urban development projects and those for the whole area in KL. These shall be discussed in the course of the study on Review Work of Structure Plan in KL, which is now in progress.

1) Measures for Urban Development Project

A regulation of floor area control for urban development projects shall be discussed in co-operation with other comprehensive city planning rules and regulations. There is a need to apply more precise and vigorous criteria to urban development projects. This would enable less allowances in negotiations with applicants for the development projects.

2) Measures for the Whole Area in KL

Trimming traffic, total floor area and economic activities are very important even in the process of establishing the urban transportation plan. In the long-term, it is obvious that provision and construction of urban transportation facilities have some limitation in the Study area. Thus, formulation of land use plan suitable especially for public transport would greatly contribute to solving of the urban transportation problems eventually. The floor area control regulation is a measure not only to restrain the total floor area in a certain district but also to stimulate urban development itself.

On top of that, floor area control also provides additional floor area to be used for leading projects, which contribute to the improvement of the city environment or urban transport development policies such as the development of complexes near rail stations.

(2) Guarantee of Road Plans

Several road projects were newly proposed in the Study. It might be too early to discuss about the construction of these projects, whether as privatised or public works at this point in time. The key issue is how to keep the land for the new roads. One of the major difficulties in constructing new roads is land acquisition. This is particularly true in urban areas of other major cities.

In this view, it is necessary to establish a certain set of measures to guarantee road construction by the authorities, for instance the right of pre-emption of necessary land for new road construction. There is no local plan in KL at present and this makes future road construction more difficult.

Two measures are proposed. One is the authorisation of a road plan in the local plan after the completion of the Review Work of Structure Plan. The other is the authorisation of the whole road network plan as a city plan and to restrict additional private land development in the right of way of planned roads. If this measure is taken, City Hall can judge the propriety of new private development projects in the application stage and order the applicants to change the initial development plan to fit the authorised road plan.